

15th Annual

 Undergraduate

 Research

 Conference

Southwest Minnesota State University

**WEDNESDAY,
DEC. 2, 2020**

**Virtual Conference
Begins at 8:30 a.m.**

ABSTRACTS



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Purpose

The purpose of the Annual SMSU Undergraduate Research Conference is to highlight the original and creative work done by SMSU undergraduate students at a one-day conference to be held annually at the SMSU campus. The public, including the university and Marshall community, friends, parents, alumni, prospective students and employers are all encouraged to attend and enjoy the excitement of intellectual accomplishments of our students. Considering the COVID-19 pandemic, this year's conference is organized as a virtual event, with all presentations held live via Zoom. Links to discipline-specific sessions are found in the conference schedule.

How the Conference Started

The conference was initiated fall of 2006 by Dr. Emily Deaver, Professor Emeritus of Environmental Science. After she and Dr. Thomas Dilley conducted an Environmental Science program review in 2005-2006, it was clear that their science students needed more experience conducting research and communicating the results of that research to the broader community. The 1st Annual SMSU Undergraduate Research Conference was designed as a mechanism for SMSU science students to engage in a professional exchange of scientific ideas, as well as a means to showcase and celebrate their hard work and accomplishments. The first year program included 21 oral and 27 poster presentations from science students in Environmental Science, Biology, Physics and Chemistry. Because of the positive feedback from the academic community, the conference was expanded to include all disciplines across campus. Fall 2007 the 2nd Annual SMSU Undergraduate Research Conference doubled the number of presenters with 13 different programs across campus participating. This year, the 15th year of the SMSU Undergraduate Research Conference, there are 14 different programs participating, with 20 different faculty advisors. In total, there are 123 different undergraduate students presenting 47 orals and 47 poster presentations.

The hope is that the conference will continue to grow each year as we celebrate the intellectual achievements of SMSU undergraduates.

Thank you to the David B. Jones Foundation for their generous support.



**15th Annual Undergraduate Research Conference
at Southwest Minnesota State University**

WELCOME AND KEYNOTE

Zoom Link: <https://minnstate.zoom.us/j/92711341351>

Password: URC2020

Room Moderator: Dr. Thomas Dilley

- 8:30 Kumara Jayasuriya, SMSU President, Opening Remarks
- 8:40 Dr. Kristen Mueller, Emergency Medicine Assistant Professor & Physician, Washington University School of Medicine, St. Louis
Keynote Address: "Firearm Violence and Injury: A Public Health Epidemic with Local Solutions"

MID-MORNING SESSIONS 9:45-11:00AM

ROOM 1: Zoom Link: <https://minnstate.zoom.us/j/94104164852>

Password: URC2020

Room Moderator: Dr. Sandy Craner

Biology Senior Seminar

- 9:45 Manoj Sapkota, Biology, Anti-cancer Effect of Fucoxanthin
- 10:15 Sarina Smith, Biology, The role of *Salmonella enterica* serovar Typhimurium Immunotherapy Treatment for Relapsed B-cell Lymphoma

ROOM 2: Zoom Link: <https://minnstate.zoom.us/j/92711341351>

Password: URC2020

Room Moderator: Dr. Thomas Dilley

Ecology

- 9:45 Amy Heibult, Caedyn Reinhardt, & Louis Lozinski, Biology, Effects of Permethrin on Dragonfly Nymph (Odonata: Libellulidae) Feeding Behavior
- 10:00 John Palmer, Biology, Insect Survey of the Richard and Irene Maertens Conservation and Research Area
- 10:15 Joey Heinen, Biology, The Effect of Ambient Temperature on the Fecundity of *Drosophila melanogaster*
- 10:30 Jayla Burt, Biology, The Effect of Major Weather Events on the Biogeochemistry of Wetlands
- 10:45 Brandon Medina, Biology, The Effects of Insect Specific Pesticides on Non-Insect Arthropods

ROOM 3: Zoom Link: <https://minnstate.zoom.us/j/96830052205>

Password: URC2020

Room Moderator: Dr. Sang Jung

Computer Science

- 9:45 Neil Podoll & Victor Adewale, Computer Science, Subscription Tracker
- 10:00 Thomas Adegbite & Victor Ayemobuwa, Computer Science, Responsive Restaurant Website
- 10:15 Eric Ahmann, Computer Science, My Recipe Box, A Web Application Built with Modern Technologies
- 10:30 Hailemichael Hagos & Sulaimon Yussuf, Computer Science, Online Athletic Market

ROOM 4: Zoom Link: <https://minnstate.zoom.us/j/95553405106>

Password: URC2020

Room Moderator: Dr. Kenneth Chuckwuba

History & English

- 9:45 Isabella Erickson, History, The Purpose and Politics of the King James Version
 10:00 Alisha Cooper, English, How Octavia E. Butler's Lilit's Brood Reflects Contemporary Society
 10:15 Bryton Dressen, History, A Comparative History of the Geneva Convention of 1929 and the German POW Camp in New Ulm, Minnesota
 10:30 Levi Magnuson, History, When Goofy Met Gorbi: The Story of the 1990 Summit between Rudy Perpich and Mikhail Gorbachev

ROOM 5: Zoom Link: <https://minnstate.zoom.us/j/99211295450>

Password: URC2020

Room Moderator: Prof. Sheila Tabaka

Theatre

- 9:45 Domonique McPhail, Theatre, Everyman
 10:00 Avianna McFarquhar, Theatre, The World of Love Labour's Lost
 10:15 Shelby Lengyel, Theatre, Coriolanus Dramaturgy Project
 10:30 Kavon Wilborn, Theatre, The World of Antony & Cleopatra

ROOM 6: Zoom Link: <https://minnstate.zoom.us/j/98085756421>

Password: URC2020

Room Moderator: Dr. Jeffrey Bell

Exercise Science

- 9:45 Issac Fischer, Exercise Science, Comparing Landing Mechanics in Non-game Situations in Collegiate Division II Female Basketball Players
 10:00 Anthony Gamez, Exercise Science, Nasal Breathing vs. Mouth Breathing and Strength Output in D2 Wrestlers
 10:15 Erik Thorvilson, Exercise Science, Hockey Specific Performance Testing in High School Hockey Players
 10:30 Sara Teske, Exercise Science, Comparing Landing Mechanics in Non-Game Situations in Female Division II Basketball Players

LATE-MORNING SESSIONS 11:00AM-12:30PM

ROOM 1: Zoom Link: <https://minnstate.zoom.us/j/92592933007>

Password: URC2020

Room Moderator: Dr. Tony Greenfield

Biology Senior Seminar

- 11:00 Askandar Adam, Biology, The Role of Monoclonal Antibodies in the Treatment of Alzheimer's Disease
 11:30 Christopher Berg, Biology, Glioblastoma Multiforme Characteristics That Lead to Onset Symptoms of Epileptic Seizures

ROOM 2: Zoom Link: <https://minnstate.zoom.us/j/98085756421>

Password: URC2020

Room Moderator: Dr. Jeffrey Bell

Exercise Science

- 11:00 Kyle Richter, Exercise Science, Evaluation of FMS, Y-Balance, and Other Body Measurements in Division II Football Players
- 11:15 Morgan Frank, Exercise Science, Comparing Landing Mechanics in Non-Game Situations in Female Division II Basketball Players
- 11:30 Braeden Hanson, Exercise Science, Nasal Breathing vs. Mouth Breathing and Strength Output in D2 Wrestlers
- 11:45 Jacob Fike, Exercise Science, Do Compression Sleeves Help Increase Endurance Running Performance?

ROOM 3: Zoom Link: <https://minnstate.zoom.us/j/92711341351>

Password: URC2020

Room Moderator: Dr. Thomas Dilley

Biology & Environmental Science

- 11:00 Alexa Smith & Erin Smith, Biology, Comparison of *Asclepias syriaca* and *Asclepias tuberosa* on Monarch Growth and Preference
- 11:15 Amber Wells, Biology, Antibiotic Effects on Thistle Caterpillar (*Vanessa cardui*) Gut Biomes
- 11:30 Brandon Parish, Biology, Comparing Insect Diversity of Flowering Prairie CRP and Woodland Habitat
- 11:45 Jacob Groen, Biology, Negative Effects of Reed Canary Grass (*Phalaris arundinacea*) on Plant Diversity in a Local Riparian Wetland
- 12:00 John Palmer, Environmental Science, Biota Survey of the Richard and Irene Maertens Conservation and Research Area
- 12:15 Manoj Sapkota & Askandar Adam, Environmental Science, Impact of Climate Change on Soil Hydrology and Wetland Ecology

ROOM 4: Zoom Link: <https://minnstate.zoom.us/j/94597375625>

Password: URC2020

Room Moderator: Dr. Sang Jung

Agribusiness Management

- 11:00 Sadie Stelter & Kaylea VanRegenmorter, Agribusiness Management, Agriculture Development in Argentina
- 11:15 Meghan Beckendorf & Mary Sundquist, Agribusiness Management, Analysis of Bangladesh and Myanmar
- 11:30 Jennifer Schulze, Management, Effective Strategies for Consulting Firms in the Upper Midwest
- 11:45 Hameedah Owolabi & John Duncan, Agribusiness Management, Agricultural Sector in Brazil
- 12:00 Hailey Nierling & Anna Kern, Agribusiness Management, Analysis of the Agriculture Sector, Economic Policies, and Issues of Madagascar

ROOM 5: Zoom Link: <https://minnstate.zoom.us/j/92283426547>

Password: URC2020

Room Moderator: Dr. Cindy Aamlid

Sociology

- 11:00 Jaivon Cheek, Sociology, The Effects of College Homelessness
- 11:15 Autumn Hess, Sociology, Influence of Gender on Body Tattooing
- 11:30 Kaitlyn Dordal, Sociology, Child Sex Trafficking
- 11:45 Hanna Vos, Sociology, The Sociology of the Secondhand Shopper

ROOM 6: Zoom Link: <https://minnstate.zoom.us/j/99211295450>

Password: URC2020

Room Moderator: Prof. Sheila Tabaka

Theatre

- 11:00 William Stevens, Theatre, A Midsummer Night's Dream Dramaturgy
- 11:15 Kevin Bowles, Theatre, The Historical Aspects of Shepherding in Relation to the Play 'The Second Shepherds Play'
- 11:30 Braden Hanafee-Major, Theatre, The Aftermaths of War as Shown in Shakespeare's Titus Andronicus
- 11:45 Elizabeth Zoya, Theatre, The Man of Mode

EARLY AFTERNOON SESSIONS 1:00-2:30PM

ROOM 1: Zoom Link: <https://minnstate.zoom.us/j/94104164852>

Password: URC2020

Room Moderator: Dr. Sandy Craner

Biology Senior Seminar

- 1:00 Jacob Groen, Biology, Efficacy and Mechanisms of Resveratrol as a Potential Treatment for Malignant Melanoma
- 1:30 Amber Wells, Biology, The Efficacy of Inhaled Nitric Oxide for Treating Pulmonary Hypertension in Pre-Term Neonates
- 2:00 Joey Heinen, Biology, Aggressive Behavior in Pet Dogs: Nature or Nurture?

ROOM 2: Zoom Link: <https://minnstate.zoom.us/j/92559493353>

Password: URC2020

Room Moderator: Dr. Shelby Flint

Botany

- 1:00 Nicholas Putnam, Biology, Effects of Garlic on Legumes
- 1:15 Patrick Rhoads & Hunter McFall, Biology, The Allelopathic Effects of Citrus Peels on Sweet Corn Plants
- 1:30 Addison Schroeder, Biology, The Effects of Carbonated Water on the Growth of Barley and Radish Seedlings
- 1:45 Kaytlen Heacock & Hope DeNeui, Biology, Allelopathy Effects of Marigold Extracts on Zinnia Germination
- 2:00 Askandar Adam & Edward Nkumeh, Biology, Allelopathic Effects of Coffee Arabica Extracts Due to its Resistance to Pests and Herbicides

ROOM 3: Zoom Link: <https://minnstate.zoom.us/j/92711341351>

Password: URC2020

Room Moderator: Dr. Thomas Dilley

Environmental Science

- 1:00..... Rachel Miller, Environmental Science, Development of Growth Curves for Two Lichen Species, *Xanthoria elegans* and *Dimelaena oreina*, on Tombstones in Southwestern Minnesota Using Lichenometry Methods
- 1:15..... Jason Turner, Environmental Science, Geomorphology, Channel Characteristics, and Land use Patterns Along Bluebird Creek in Southwest Minnesota
- 1:30..... Katherine Knights, Environmental Science, The Geomorphology of Three River Canyons formed in the Sioux Quartzite of Southeast South Dakota
- 1:45..... Oluwaseun Famakinwa, Environmental Science, Evaluating Water Chemistry in Lake Sarah, Murray County, Minnesota
- 2:00..... Michael Luke, Environmental Science, Habitat Evaluation of Ditch Ecosystems in Yellow Medicine River Watershed District

ROOM 4: Zoom Link: <https://minnstate.zoom.us/j/94583354439>

Password: URC2020

Room Moderator: Dr. Heather Moreland

Math & Computer Science

- 1:00..... Krischal Lageju & Abinash Thapa, Computer Science, International Student Community (ISC)
- 1:15..... Priyanka Shrestha, Computer Science, COFFEE PLUG
- 1:30..... Cora Engels, Math, A Mathematical Model of Chemical Kinetics
- 1:45..... Logan Pankonin, Math, Modeling Basketball Free Throws
- 2:00..... Sean Knight, Computer Science, ASUAndroid

ROOM 5: Zoom Link: <https://minnstate.zoom.us/j/92283426547> Password: URC2020

Room Moderator: Dr. Cindy Aamlid

Sociology & Psychology

- 1:00..... Zoe Hess, Psychology, Effects of Dynamic Visual Noise on Mental Comparison of Objects
- 1:15..... Taylor Himley, Sociology, Representation of Race, Sexuality, Disability, and Class in Animated Films
- 1:30..... Norah King, Sociology, Experiences of LGBTQ Youth in Foster Care
- 1:45..... Faviola Cid, Sociology, Analysis of Social Change During the COVID-19 Pandemic
- 2:00..... Chanelle Walker, Sociology, Family Estrangement as a Social Issue
- 2:15..... Olivia Smith, Sociology, The Foster Care to Prison Pipeline and the Benefits of Restorative Justice Programs

ROOM 6: Zoom Link: <https://minnstate.zoom.us/j/99211295450> Password: URC2020

Room Moderator: Prof. Sheila Tabaka

Theatre

- 1:00..... Jaimon Cheek, Theatre, Othello
- 1:15..... Emma Stringer, Theatre, Twelfth Night
- 1:30..... Leah Graham, Theatre, Dramaturgy of Shakespeare's Macbeth
- 1:45..... Claudia Wahl, Theatre, The Tempest: A Study of the English Renaissance and Roman Mythology
- 2:00..... Mary Porter, Theatre, A Dramaturgical Look at the Life and Times of Ben Jonson
- 2:15..... Zachary Hastad, Theatre, The Bacchae: A Dramaturgical Look at Greek History

LATE AFTERNOON SESSIONS 2:30-4:00PM**ROOM 1:** Zoom Link: <https://minnstate.zoom.us/j/97166792602>

Password: URC2020

Room Moderator: Dr. Vaughn Gehle

Biology Senior Seminar

- 2:30 Alexa Smith, Biology, The Role of the Ketogenic Diet in Refractory Epilepsy
- 3:00 Nicholas Putnam, Biology, Effects of Deficiency of Hath6 (Math6) Function in Reproductive System
- 3:30 Caedyn Reinhardt, Biology, The Role of Ursodeoxycholic Acid in the Treatment of Intrahepatic Cholestasis of Pregnancy

ROOM 2: Zoom Link: <https://minnstate.zoom.us/j/92559493353>

Password: URC2020

Room Moderator: Dr. Shelby Flint

Botany & Ecology

- 2:30 Lileya Kebos, Biology, Effects of Light Intensity on plant *Zinnia elegans*
- 2:45 Kyle Richter, Biology, Seeding Density Effectiveness On Weed Suppression
- 3:00 Alexander Hillesheim & Blain Dilly, Biology, The Influence of Various Light Intensities on Barley Plants
- 3:15 Emma Grote & Patia Wolfe, Biology, The Allelopathic Effect of Coffee on Sunflowers
- 3:30 Brandon Medina, Environmental Science, Isopod Substrate Preference

ROOM 3: Zoom Link: <https://minnstate.zoom.us/j/94583354439>

Password: URC2020

Room Moderator: Dr. Heather Moreland

Math & Computer Science

- 2:30 Jenna Lambrecht, Math, An SIR Model of the Spread of the Hong Kong Flu in the 1960s
- 2:45 Shane Birdsall, Computer Science, Play Pal! A Desktop Application for Performance Arts
- 3:00 Jordan Mueller, Computer Science, Designing and Building a More Useful Website for the SMSU Residence Hall Association
- 3:15 Rachel Engels, Math, The Axioms of Topology

ROOM 4: Zoom Link: <https://minnstate.zoom.us/j/95424657022>

Password: URC2020

Room Moderator: Dr. David Sturrock

Political Science

- 2:30 Colten Minkel, Political Science, Expanding Access to Affordable Insulin in Greater Minnesota
- 2:45 Esther Oluborode, Political Science, Immigration Policy in Greater Minnesota
- 3:00 Abuk Akoi, Political Science, Minnesota's Response to the Opioid Crisis
- 3:15 Isabella Erickson, Political Science, The Politics of the Line 3 Replacement Project in Minnesota
- 3:30 Shawn Merry, Political Science, Has the Paycheck Protection Program Helped Small Businesses Who Have Suffered From the COVID Pandemic?

3:45 James Hardy, Political Science, The Effects of Broadband Gaps on E-Learning in Greater Minnesota

4:00 Godwin Kakada, Political Science, The Effects of the COVID Pandemic on the Greater Marshall Economy

ROOM 5: Zoom Link: <https://minnstate.zoom.us/j/98085756421>

Password: URC2020

Room Moderator: Dr. Jeffrey Bell

History & Exercise Science

2:30 Nick Kline, History, New Ideas Come to Town: Social Movements and the Beginnings of Southwest Minnesota State College

2:45 Whitney McCamish, History, The Push Towards Prohibition in Blooming Prairie, Minnesota

3:00 Trey Johnson, Exercise Science, Nasal Breathing vs. Mouth Breathing and Strength Output in D2 Wrestlers

3:15 Derek Smith, Exercise Science, Hockey Specific Performance Testing in High School Hockey Players

3:30 Erin Schneider, Exercise Science, Comparing Landing Mechanics in Non-game Situations in Collegiate Division II Female Basketball Players Basketball Players

CLOSING SESSIONS AND LIBRARY RESEARCH AWARD ANNOUNCEMENT

Zoom Link: <https://minnstate.zoom.us/j/92711341351>

Password: URC2020

Room Moderator: Dr. Thomas Dilley

4:30 Closing Remarks and Presentation of Library Research Award

Keynote Address: *Firearm Violence and Injury: A Public Health Epidemic with Local Solutions*

Keynote Speaker: **Kristen Mueller, M.D., Washington University School of Medicine in St. Louis,** Assistant Professor, Emergency Medicine, Director of Emergency Medicine Resident Research< Faculty Scholar, Institute of Public Health

Kristen Mueller, MD is an Assistant Professor in Emergency Medicine at Washington University in St. Louis School of Medicine. She is also the director of emergency medicine resident research at Washington University School of Medicine, and a Faculty Scholar in the Institute of Public Health. She completed a one-year Emerging Infectious Disease Laboratory Training Fellowship at the Centers for Disease Control and Prevention, attended medical school at the Medical College of Wisconsin and completed her emergency medicine residency training at Washington University School of Medicine. In her current work, Dr. Mueller is an active member of the Washington University Gun Violence Initiative and is engaged in research on firearm violence and injury prevention. Dr. Mueller is the physician liaison to the newly launched St. Louis Area Hospital-Based Violence Intervention Program, Life Outside Violence. She was recently awarded a 2-year career development grant by the Emergency Medicine Foundation in partnership with AFFIRM to study firearm injuries and recidivism at St. Louis level I trauma hospitals.



Firearm injuries are a public health epidemic in the United States (US); more than 39,000 people die from firearm injuries each year, and an estimated 133,000 people are injured with firearms. Suicide is the 10th leading cause of death in the US, with the majority of these deaths resulting from firearm use. Firearm violence is the leading causes of homicide in the US, and is the third leading cause of death for young adults aged 15-34, and second leading cause of death in children. Firearm violence spreads through communities in a similar manner to contagious disease, and St. Louis, Missouri is at the epicenter of this epidemic.

During the course of this lecture on *Firearm Violence and Injury: a Public Health Epidemic with Local Solutions* we will discuss (1) an overview of the firearm injury public health crisis as well as actionable solutions to this problem, including (2) the Washington University in St. Louis Gun Violence Initiative, (3) counseling on access to lethal means at times of suicidal crisis, (4) the region-wide hospital-based violence intervention program *Life Outside Violence*, and (5) life as a clinician-researcher.

Abstracts

Mid-Morning Sessions - 9:45-11:00AM

Room 1: Biology

Moderator: Dr. Sandy Craner

Zoom link:

<https://minnstate.zoom.us/j/94104164852>

1

Title: Anti-cancer Effect of Fucoxanthin

Presenter(s): Manoj Sapkota

Advisor: Dr. Sandy Craner, Biology

Abstract: Cancer is the major cause of morbidity and mortality worldwide. Research shows that cancer therapies from marine sources are highly effective. One such source with anticarcinogenic properties is fucoxanthin, a marine carotenoid found in brown seaweeds, macroalgae, and diatoms. This review discusses studies that examine how fucoxanthin exerts anticarcinogenic effects in both animal and human cells. Wang et al, (2012) performed a study in S180 tumor bearing mice using immunohistochemistry and western blotting techniques. Results revealed fucoxanthin significantly inhibited tumor growth by down regulating the EGFR/STAT3 signal pathway. Garg et al, (2019) investigated fucoxanthin activities in human cancer cells with variable p53 status (wild-type, mutant, and null) using western blotting, immunostaining and molecular docking techniques in a dose dependent manner. Results showed that low doses of fucoxanthin inhibit key metastasis regulators and decrease cell proliferation, regardless of p53 status. Both studies suggests fucoxanthin is a safe and cheap chemotherapeutic agent.

2

Title: The role of *Salmonella enterica* serovar Typhimurium Immunotherapy Treatment for Relapsed B-cell Lymphoma

Presenter(s): Sarina Smith

Advisor: Dr. Sandy Craner, Biology

Abstract: Diffuse large B-cell lymphoma is the most common subtype of non-Hodgkin's lymphoma (NHL). Although 5-year survival rates range from 60-70%, up to 50% of patients become refractory or relapse after treatment (Crump et al., 2017). Recently, advances in treatment have been developed to treat patients in

these conditions. One such advancement is the use of an attenuated strain of *Salmonella* Typhimurium (LVR01). *S. Typhimurium* is an oncolytic virus that has been modified in a lab to infect and kill tumor cells. Here I review two studies that research the anti-tumor effect of LVR01 in an A20 lymphoma model. Grille et al. (2014) show that LVR01 induces tumor cell death. Grille et al. (2018) conclude that LVR01 combined with chemotherapy shows a prolonged survival compared to the control. Together, these studies demonstrate the possible diagnostic potential of *Salmonella* Typhimurium (LVR01).

Room 2: Ecology

Moderator: Dr. Thomas Dilley

Zoom link:

<https://minnstate.zoom.us/j/92711341351>

1

Title: Effects of Permethrin on Dragonfly Nymph (Odonata: Libellulidae) Feeding Behavior

Presenter(s): Amy Heibult, Caedyn Reinhardt, & Louis Lozinski

Advisor: Dr. Alyssa Anderson, Biology

Abstract: Dragonflies (Odonata: Anisoptera) control nuisance insects through predation. Their diversity and populations have dwindled in recent years due to the widespread use of pesticides such as permethrin, which is commonly used to control mosquitos. However, research shows permethrin has adverse non-target effects on some fish and invertebrates. Here, we examined the effect of permethrin on dragonfly nymphs by exposing four groups of six nymphs to 0.0, 0.1, 1.0, and 10.0 ppb of permethrin for 6 hours and subsequently observing their feeding behavior on amphipods. We found a significant difference in feeding response time ($p = 0.035$); however, no significant difference was detected in the number of amphipods consumed ($p = 0.137$). Overall, results suggest dragonfly nymphs are negatively impacted by weak concentrations of permethrin. The recommended concentration of permethrin for spraying mosquitoes is 4.05×10^7 ppb; therefore, any potential residue in aquatic systems could cause risk for non-target species.

2

Title: Insect Survey of the Richard and Irene Maertens Conservation and Research Area

Presenter(s): John Palmer

Advisor: Dr. Alyssa Anderson, Biology

Abstract: Insect surveys provide an understanding of the species present within a region and are most helpful when completed before any observational studies on target species believed to be present. Recently, the Richard and Irene Maertens Conservation and Research Area was donated to Southwest Minnesota State University, however, it has yet to be surveyed. The area is an acreage of reclaimed farmland, mainly flat with a channelized creek running through it. The vegetation is a mixture of invasive and native species. This project completed an insect inventory of the parcel in autumn of 2020 using four Comprehensive Insect Traps set out in pairs spaced to cover different micro-environments over week-long periods. Captured specimens were then taxonomically identified in a laboratory setting based upon morphology. The Shannon-Wiener index of diversity was used to quantify diversity, indicating an overall diverse ecosystem. Species richness and abundance were quantified as well.

3

Title: The Effect of Ambient Temperature on the Fecundity of *Drosophila melanogaster*

Presenter(s): Joey Heinen

Advisor: Dr. Alyssa Anderson, Biology

Abstract: Increased temperatures induced by climate change are impacting species around the globe. Warming will enhance the reproductive capacity of some species, while reducing that of others. The goal of this experiment was to measure the effect of variable temperatures on the reproductive rates of *D. melanogaster*. Three vials of five breeding pairs of flies each were kept at temperatures of 21°C, 28°C, and 35°C for 14 days. Offspring were counted and data were analyzed using Analysis of Variance. Results were not significant ($p = 0.0656$), however, this could be an artifact of small sample size as no offspring were produced at 35°C and there appeared to be more offspring in the 28°C treatment than the 21°C (212 vs. 148 on average). Further research is necessary to draw conclusions relating to the effect of temperature on this species' fecundity. The population of *D. melanogaster* is important to agriculture and ecological balance.

4

Title: The Effect of Major Weather Events on the Biogeochemistry of Wetlands

Presenter(s): Jayla Burt

Advisor: Dr. Shelby Flint, Biology

Abstract: Hurricanes pose an increasing threat to coastal environments as the intensity and severity of hurricanes are predicted to increase under the changing climate over the next few decades. The 2020 Atlantic hurricane season produced an unprecedented number of named storms, with 5 major hurricanes and 29 tropical storms and minor hurricanes. The objective of this literature review is to understand how major weather events, disturb rate and trajectories of the biogeochemical cycling of coastal wetlands, but to additionally detail human practices that lead to anoxic and eutrophic states inside of wetlands. Herein, studies associated with eutrophication, coastal wetland management, wetland loss, watershed and biogeochemical cycling were reviewed

5

Title: The Effects of Insect Specific Pesticides on Non-Insect Arthropods

Presenter(s): Brandon Medina

Advisor: Dr. Alyssa Anderson, Biology

Abstract: Isopods are widespread, small, terrestrial crustaceans that can potentially suffer non-target consequences from insect-specific pesticides such as malathion. Pesticides are typically used as aerosols, however, due to precipitation and associated runoff, these aerosols may find their way into the soil. In order to test isopod resilience to malathion exposure, multiple established isopod colonies were exposed to 0%, 10%, 20%, and 40% pesticide diluted with distilled water. Each colony was dosed once with its respective concentration in order to see whether any levels were tolerable. Since every isopod—excluding the controls—perished in under five days, we can conclude that malathion is lethal in low concentrations. This finding, in turn shows us that insect-specific pesticides impact non-target species.

Room 3: Computer Science

Moderator: Dr. Sang Jung

Zoom link:

<https://minnstate.zoom.us/j/96830052205>

1

Title: Subscription Tracker

Presenter(s): Neil Podoll & Victor Adewale

Advisor: Drs. Dan Kaiser, Shushuang Man, & Kourosh Morteza pour, Computer Science

Abstract: The mobile devices we carry can make our lives easier by providing communication, access to information, entertainment, financial management, etc. Numerous services are provided through these devices and many are subscription based. Subscription Tracker is an Android app built to directly manage your subscriptions. Users will be able to add, edit, and delete subscriptions directly from the app. Our tracker will provide a search tool to find the subscription services users want to manage. And it will present basic financial information for users to see how much they are spending. In addition, we plan to implement a web-scraping tool where users can enter their email, search the most popular subscription services' sites, and return the services that are associated with that email. With these functions, Subscription Tracker will be a dynamic and powerful application for those looking for a tool to help manage their subscriptions.

2

Title: Responsive Restaurant Website

Presenter(s): Thomas Adegbite & Victor Ayemobuwa

Advisor: Drs. Dan Kaiser, Shushuang Man, & Kourosh Morteza pour, Computer Science

Abstract: This is a proposed design for the D's Thai food restaurant. Some of the requirements includes catchy graphics, recipes section and owner also wanted an online menu with prices so customers can see the type of food served and price. Included in this website is the location with hours of operation and customer testimonies. According to web marketing research, this is something that easily attract people's attention especially customer looking for good restaurants. "A photo is worth a thousand words," we know" so attached to this website are aesthetic pictures and this photos go a great way in the representation of the food and the atmosphere of this restaurant. You can also access Menu listing of food and specials accompanied with prices which is great because customers can just get to the page through

a mobile device, see the list of food and choose from it right there.

3

Title: My Recipe Box, A Web Application Built with Modern Technologies

Presenter(s): Eric Ahmann

Advisor: Dr. Dan Kaiser, Computer Science

Abstract: When looking up recipes on the internet you will often be bombarded with ads and stories before you can get to the recipe, which leads to a frustrating experience. This is where My Recipe Box comes in. My Recipe Box is a recipe management tool that lets you focus on the recipe without distractions. Recipes can be imported into My Recipe Box by URL. This means that if you find a recipe on a supported site, My Recipe Box can parse the website and extract only the important information; leaving behind all the junk. Or if you have a recipe written down, you can import recipes manually as well. My Recipe Box is a web application built with modern web technologies with one goal, and that is providing an enjoyable user experience. My Recipe Box is a single page application built with technologies such as MongoDB, Express, Angular, and Node.js.

4

Title: Online Athletic Market

Presenter(s): Hailemichael Hagos & Sulaimon Yussuf

Advisor: Drs. Dan Kaiser, Shushuang Man, & Kourosh Morteza pour, Computer Science

Abstract: Our Athletic Market website will be used to purchase any athletic product. This website helps people find and buy products from different brands like Adidas, DKS, Nike, Puma, Skechers, and Under Armor. It is a valuable tool that makes it easier to purchase goods online. This website enables sellers to organize online markets, browse through the shops, and enables system administrators to accept and reject new request's and keep lists of shops. The purpose is to create a website to manage the shops' details and help customers make online purchases. Athletic Market will use a simple method for selling goods to its consumers at fair prices. The Administrative aspect of the website controls a broad range of administrative privileges across the website, primarily managing the infrastructure of the sites contents meaning everything from the updating the website inventory with the latest products from the top brands to managing the current and Incoming Users giving the users an appropriate level of access users should have ensuring the database meets user

requirements. The security of the user personal info like credit card information, address and more are all uploaded to the database and safeguarded by the Administrators.

Room 4: History & English

Moderator: Dr. Kenneth Chuckwuba

Zoom link:

<https://minnstate.zoom.us/j/95553405106>

1

Title: The Purpose and Politics of the King James Version

Presenter(s): Isabella Erickson

Advisor: Dr. Michael Hofstetter, History

Abstract: In 1604, King James hosted a conference at Hampton Court to address the concerns of his Puritan subjects. It was at this conference that a proposal for a new English translation of the Bible was made by Puritan ministers seeking Church reform. In 1611, the first copy of the King James Version was printed. Though it was an improvement upon the previous translation, the King James Version was drafted using the very ideology the Puritans opposed. King James had hoped that the new translation would bring his subjects together, but it did not. By ensuring that the new translation would follow the ideology of the Church, King James doomed the translation to fail at its unifying task. However, the King James Version has since become a ubiquitous text of Protestantism, and the most printed book in the history.

2

Title: How Octavia E. Butler's *Lilith's Brood* Reflects Contemporary Society

Presenter(s): Alisha Cooper

Advisor: Ruthe Thompson, English

Abstract: *Lilith's Brood* by Octavia E. Butler is a trilogy written in the 1980's, yet the issues that are touched on in these novels can be seen in contemporary society. Two main themes relevant to contemporary society run throughout each novel. This presentation examines the themes of power and violence in *Lilith's Brood* to draw conclusions applicable to contemporary society. We find many similarities between these novels and our present day society. These findings can be imagined as a possible prediction of how power and violence in modern society could evolve.

3

Title: A Comparative History of the Geneva Convention of 1929 and the German POW Camp in New Ulm, Minnesota

Presenter(s): Bryton Dressen

Advisor: Dr. Michael Hofstetter, History

Abstract: The Geneva Convention of 1929 discussed the humane treatment of prisoners of war for the future of participating combatants. Years later at the onset of World War II it seemed many had forgotten about how to fight a "proper war" as in the cases of both the Soviet gulag and Nazi concentration camps. This essay delves into the New Ulm POW camp in Minnesota that housed nearly 150 German soldiers during the Second World War. A relatively smaller camp, the New Ulm site was peculiar as the township had held onto a richly deep German heritage since its founding. By comparing both the Geneva Convention of 1929 and the New Ulm camp, this essay seeks to evaluate just how the German prisoners were properly treated in accordance to the convention.

4

Title: When Goofy met Gorbi: The story of the 1990 Summit between Rudy Perpich and Mikhail Gorbachev

Presenter(s): Levi Magnuson

Advisor: Dr. Michael Hofstetter, History

Abstract: The year 1990 was a watershed year in world history. The cold war tensions of the preceding decades had finally subsided and hope for global peace was high. In Minnesota, Rudy Perpich, was running for reelection as governor and was desperate. Despite winning his first two terms easily, many were growing tired of Perpich's presence and odd ideas. Desperate to remain in power he found a possible boost in inviting the popular figure of Mikhail Gorbachev to the Twin Cities. The President of the USSR was desperate for western economic investment and was facing a growing political crisis. When meeting, Perpich made sure to make an effort to emphasize economic investment between the two regions. In the short term this helped him to secure renomination but he would lose the general election. But briefly, the Twin Cities and Minnesota were on the world stage.

Room 5: Theatre

Moderator: Prof. Sheila Tabaka

Zoom link:

<https://minnstate.zoom.us/j/99211295450>

1

Title: Everyman

Presenter(s): Domonique McPhail

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: Everyman is a Medieval play about mortality and the future plans after death for Everyman. In my presentation, we will look at the everyday life of a medieval person. We will also look at artwork, clothes, music, etc. This presentation is meant to help the actors and production team better understand the world of the play. The hope is that with the given information they will be able to create an environment subtitle to the production.

2

Title: The World of Love Labour's Lost

Presenter(s): Avianna McFarquhar

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: My presentation is a dramaturge's view of the play Love's Labour's Lost, by William Shakespeare. The play is set between the 1500s to the 1600s in the middle of Spain and France called Basque Country. I will go into depth about many factors these characters within the play would be experiencing, reacting to, or dealing with during this period in history. Some of the topics I will discuss are location, clothing, religion, society, along with a few others. As this play is based on a real point in time, all the details that I discuss will be authentic facts about and from Basque Country history.

3

Title: Coriolanus Dramaturgy Project

Presenter(s): Shelby Lengyel

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: In this presentation I act as the dramaturg having analyzed the text of William Shakespeare's play "Coriolanus." I share my findings from research I've gathered about what was happening historically in England around the time it was written since this greatly influences the play, as well as Ancient Rome in the late 6th and early 5th centuries BCE when the play is set. Since the main conflict in "Coriolanus" is set between two ancient cities, I use primary research to give examples of where these places were and

what they might have looked like. The historical and primary research gathered in this presentation serves as a tool to assist the creative team in building the world and characters of "Coriolanus."

4

Title: The World of Antony & Cleopatra

Presenter(s): Kavon Wilborn

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: In this presentation, I will discuss the key aspects that bring the world of Antony & Cleopatra, a play written by William Shakespeare, to life. I will discuss how Shakespeare used the authentic lives of Mark Antony, one of the rulers of Rome during the Roman Republic, and Cleopatra, the last reigning Queen of Ptolemaic Egypt, are conjoined through love and an unfortunate set of events. Briefly touching on how life was for Shakespeare during the time of his writing of Antony & Cleopatra then, plunging into the aspects that bring each of these different hemispheres of the world together; discussing location, weaponry, clothing, architecture, and significant structures. All key elements to be used as a resource for any theatrical production team desiring to illuminate this narrative.

Room 6: Exercise Science

Moderator: Dr. Jeffrey Bell

Zoom link:

<https://minnstate.zoom.us/j/98085756421>

1

Title: Comparing Landing Mechanics in Non-game Situations in Collegiate Division II Female Basketball Players Basketball Players

Presenter(s): Issac Fischer

Advisor: Dr. Jeffrey Bell, Exercise Science

Abstract: Landing mechanics with cognitive elements can now be studied on a basketball court using insole force sensors, without requiring participants to land on a force plate. The purpose of this study was to compare lower-limb landing forces following 3-point shooting with no defender (ND), simulated defender (SD), and pass with simulated defender (PD) conditions. Fourteen female DII basketball players performed nine 3-point shots for each condition from the left, middle and right (3 shots each). Force insoles were used to measure ground reaction forces. Participants experienced greater right

peak ground reaction forces for PD compared to ND ($p<0.05$). They also experienced greater right peak load rate for PD and SD compared to ND ($p<0.05$). Altered mechanics caused by cognitive loading may lead to increased injury risk due to altered ground reaction forces and loading rates. Training directed toward reducing landing injuries should include cognitive loading components.

2

Title: Nasal Breathing vs. Mouth Breathing and Strength Output in D2 Wrestlers

Presenter(s): Anthony Gamez

Advisor: Dr. Jeffrey Bell, Exercise Science

Abstract: Little research has investigated nasal breathing during strength testing. This study examined if nasal versus oral breathing affected 1-repetition maximum (1RM) in deadlift and hang-clean. Nine male, NCAA Division 2 college wrestlers from a variety of weight classes were included in this study (weight 79.8 ± 10 kg, height 174 ± 7 cm). Subjects performed 1RM lifts in deadlift and hang-clean under nasal and oral only breathing conditions after a self-selected warm-up using an incremental increase of weight. Lifting conditions were tested one week apart using a randomized cross-over design. Nasal compared to oral breathing did not impair 1RM for hang-clean (100.0 ± 20.4 vs. 98.2 ± 21.6 kg, $p=0.94$) or deadlift (184.8 ± 34.7 vs. 186.6 ± 30.3 kg, $p=0.91$). Since nasal breathing does not impact maximal strength tests, future research should investigate greater repetitions or training with various breathing styles.

3

Title: Hockey Specific Performance Testing in High School Hockey Players

Presenter(s): Erik Thorvilson

Advisor: Dr. Jeffrey Bell, Exercise Science

Abstract: In hockey, skating is an essential skill indicative of a player's ability. Little has been done to find a quantitative test to precisely evaluate skating performance, with the most common test being the 40m on-ice sprint. This study aims to validate a specific overall skating performance test (SOSPT) at the sub-elite level. 10 male high school hockey players ages 15-18 years were tested. There was no significant correlation ($r=-0.01$, $p=0.99$) between the SOSPT and the 40m sprint. Similarly, a study done by Hajek et al. on elite-level players also showed no significant correlation ($r=0.09$, $p=0.99$). Comparing the current study to Hajek et al. using a 1-sample t-test revealed no significant difference between elite

and non-elite level players. The Cohen's-D effect-size showed non-elite skaters were comparatively 0.33 seconds slower respectively. This indicates the usefulness of the SOSPT in non-elite skaters.

4

Title: Comparing Landing Mechanics in Non-game Situations in Collegiate Division II Female Basketball Players

Presenter(s): Sara Teske

Advisor: Dr. Jeffrey Bell, Exercise Science

Abstract: Landing mechanics with cognitive elements can now be studied on a basketball court using insole force sensors, without requiring participants to land on a force plate. The purpose of this study was to compare lower-limb landing forces following 3-point shooting with no defender (ND), simulated defender (SD), and pass with simulated defender (PD) conditions. Fourteen female DII basketball players performed nine 3-point shots for each condition from the left, middle and right (3 shots each). Force insoles were used to measure ground reaction forces. Participants experienced greater right peak ground reaction forces for PD compared to ND ($p<0.05$). They also experienced greater right peak load rate for PD and SD compared to ND ($p<0.05$). Altered mechanics caused by cognitive loading may lead to increased injury risk due to altered ground reaction forces and loading rates. Training directed toward reducing landing injuries should include cognitive loading components.

Late-Morning Sessions - 11:00AM-12:30PM

Room 1: Biology

Moderator: Dr. Tony Greenfield

Zoom link:

<https://minnstate.zoom.us/j/92592933007>

1

Title: The Role of Monoclonal Antibodies in the Treatment of Alzheimer's Disease

Presenter(s): Askandar Adam

Advisor: Dr. Sandy Craner, Biology

Abstract: Alzheimer's disease (AD) is a progressive neurodegenerative disorder without a cure. An altered proteolytic process of amyloid precursor protein (APP) causes the production and aggregation of neurotoxic forms of A β . Plaques aggregate in neural synaptic junctions, reducing the amount of synapses and damaging the neurites. Several studies examine how aducanumab exerts anti-amyloid- β antibody in both human and animal models. Sevigny et al., (2016) performed a study in human and transgenic mice using ELISA techniques and florbetapir PET measurement. Results revealed aducanumab reduced A β and slowed clinical progression of dementia. Sevigny et al., (2016) investigated chaducanumab activities in Tg2576 mice using Yellow Cameleon 3.6 (YC3.6) and immunohistochemistry. The application of chaducanumab led to plaque clearance in the short term, but failed to clear plaque in the long term. In addition, the chaducanumab restored calcium hemostasis and neurite overload. Both studies suggest that aducanumab has potential as a treatment for AD.

2

Title: Glioblastoma Multiforme Characteristics That Lead to Onset Symptoms of Epileptic Seizures

Presenter(s): Christopher Berg

Advisor: Dr. Sandy Craner, Biology

Abstract: Glioblastoma multiforme (GBM) is a fatal brain tumor affecting roughly 3 per 100,000 individuals each year. Seizures caused by GBM lead to reduced survival time and decreased quality of life. It has been hypothesized that excess glutamate is responsible for the seizures. Rosati et al. (2009) studied whether excess glutamate is a result of deficient glutamine synthetase (GS) in glial cells. Their results showed patients experiencing epilepsy

had significantly lower expressions of glutamine synthetase in glia. A similar study by Duhrsen et al. (2018) examined expression levels of three glutamate channels in symptomatic and asymptomatic epileptic patients. Their results showed two glutamate channels (SLC38A3 and SLC7A11) responsible for supply and transportation to be significantly upregulated in epileptic patients. Both studies support the hypothesis that excess glutamate levels cause seizures in GBM patients.

Room 2: Exercise Science

Moderator: Dr. Jeffrey Bell

Zoom link:

<https://minnstate.zoom.us/j/98085756421>

1

Title: Evaluation of FMS, Y-Balance, and Other Body Measurements in Division II Football Players

Presenter(s): Kyle Richter

Advisor: Dr. Jeffrey Bell, Exercise Science

Abstract: Football players are at risk of suffering lower body non-contact injuries during competition. Currently, no standard assessment is used to predict future non-contact injuries in these players. Thirty-nine Division Two college football players performed Functional Movement Screens™ (FMS), Y-Balance Tests™ (YBT), and body composition analysis via bioelectric impedance. For analysis, athletes were placed into skill or non-skill groups, then further broken down by 7 position groups. Body composition was appropriate for position group player characteristics. The distribution of FMS scores were significantly different across the two groups ($p=0.004$) and the 7 positions ($p=0.025$). Y-balance scores were significantly different across the two groups ($p=0.017$) and the 7 positions ($p=0.032$). Further research should be conducted to determine if FMS, YBT, and body composition predict lower body non-contact injury, by following athletes across a singular competition season. Until then, medical evaluations may consider using these assessments in assessing potential injury risk.

2

Title: Comparing Landing Mechanics in Non-Game Situations in Female Division II Basketball Players

Presenter(s): Morgan Frank

Advisor: Dr. Jeffrey Bell, Exercise Science

Abstract: Landing mechanics with cognitive elements can now be studied on a basketball court

using insole force sensors, without requiring participants to land on a force plate. The purpose of this study was to compare lower-limb landing forces following 3-point shooting with no defender (ND), simulated defender (SD), and pass with simulated defender (PD) conditions. Fourteen female DII basketball players performed nine 3-point shots for each condition from the left, middle and right (3 shots each). Force insoles were used to measure ground reaction forces. Participants experienced greater right peak ground reaction forces for PD compared to ND ($p < 0.05$). They also experienced greater right peak load rate for PD and SD compared to ND ($p < 0.05$). Altered mechanics caused by cognitive loading may lead to increased injury risk due to altered ground reaction forces and loading rates. Training directed toward reducing landing injuries should include cognitive loading components.

3

Title: Nasal Breathing vs. Mouth Breathing and Strength Output in D2 Wrestlers

Presenter(s): Braeden Hanson

Advisor: Dr. Jeffrey Bell, Exercise Science

Abstract: Little research has investigated nasal breathing during strength testing. This study examined if nasal versus oral breathing affected 1-repetition maximum (1RM) in deadlift and hang-clean. Nine male, NCAA Division 2 college wrestlers from a variety of weight classes were included in this study (weight 79.8 ± 10 kg, height 174 ± 7 cm). Subjects performed 1RM lifts in deadlift and hang-clean under nasal and oral only breathing conditions after a self-selected warm-up using an incremental increase of weight. Lifting conditions were tested one week apart using a randomized cross-over design. Nasal compared to oral breathing did not impair 1RM for hang-clean (100.0 ± 20.4 vs. 98.2 ± 21.6 kg, $p = 0.94$) or deadlift (184.8 ± 34.7 vs. 186.6 ± 30.3 kg, $p = 0.91$). Since nasal breathing does not impact maximal strength tests, future research should investigate greater repetitions or training with various breathing styles.

4

Title: Do Compression Sleeves Help Increase Endurance Running Performance?

Presenter(s): Jacob Fike

Advisor: Dr. Jeffrey Bell, Exercise Science

Abstract: Increasing venous return could increase oxygen consumption and thus, endurance performance. This pilot study used a randomized

cross-over design to examine the effects of compression fabric (CF) worn on the lower-extremities during endurance running. Two males and one female college students ran two, 3-Kilometer timed tests one week apart. Subjects wore heart-rate monitors and were timed via stopwatch. In one test, subjects wore CF from the medial condyle to the medial malleolus of the lower-leg. In the other test, no CF was worn, including running tights or tall socks. Statistical analysis revealed no significant differences, but times were 3.5 seconds faster with CF and heart rates were 8.3 BPM lower. There was an improvement of 12.3 seconds between test one and test two, but heart-rates were 7.7 BPM faster. The small sample size prevents drawing conclusions but wearing CF may reduce heart-rate at the end of a 3-Kilometer time trial.

Room 3: Biology and Environmental Science

Moderator: Dr. Thomas Dilley

Zoom link:

<https://minnstate.zoom.us/j/92711341351>

1

Title: Comparison of *Asclepia syriaca* and *Asclepia tuberosa* on Monarch Growth and Preference

Presenter(s): Alexa Smith & Erin Smith

Advisor: Dr. Alyssa Anderson, Biology

Abstract: *Danaus plexippus* (monarch butterfly) populations have been declining since the 1950's. The decline of monarchs relates directly to lack of available milkweed. We evaluated larval growth and preference when provided two native milkweed species, common milkweed (CMW) and butterfly milkweed (BMW). We measured growth in thirty monarch caterpillars, equally divided into three groups: the first group was fed CMW, the second BMW, and the third received both. Growth was measured by assessing weight in the larval stage and preference was measured by visually assessing which leaves were fed upon. Surprisingly, no caterpillars in the BMW group survived past 15 days, while 70% of CMW and 90% and mixed caterpillars survived 21 days of the experiment. Monarchs in the mixed group showed clear preference for CMW. These results may help determine which milkweed species best promotes monarch success. Further research is needed to elucidate why caterpillars were not successful on BMW.

2

Title: Antibiotic Effects on Thistle Caterpillar (*Vanessa cardui*) Gut Biomes

Presenter(s): Amber Wells

Advisor: Dr. Alyssa Anderson, Biology

Abstract: *Vanessa cardui* (Lepidoptera: Nymphalidae), known as thistle caterpillars, are common agricultural pests. While some research has examined caterpillar gut biomes to develop effective pesticides, this work is limited. Common antibiotics used to control gut microbes are tetracyclines (e.g. tetracycline) and aminoglycosides (e.g. spectinomycin). To test the null hypothesis that there will be no difference between *V. cardui* gut microbiomes and growth rate when exposed to one or more antibiotics, 60 caterpillars were reared from eggs and divided evenly into four treatment groups: (control, tetracycline, spectinomycin, and tetracycline + spectinomycin). Larvae were weighed and observed daily, and the duration to pupate and emerge from the chrysalis was recorded. Preliminary results show no significant difference between the data of each treatment group; we anticipate similar results for forthcoming gut microbiome analysis. This work may have implications for further research on how to limit larval development for pest control.

3

Title: Comparing Insect Diversity of Flowering Prairie CRP and Woodland Habitat

Presenter(s): Brandon Parish

Advisor: Dr. Alyssa Anderson, Biology

Abstract: Ninety-nine percent of Minnesota's natural prairie has been converted to farmland. The Conservation Reserve Program (CRP) is a program that sets aside farmable land to restore natural prairie. Assessment of insect diversity can help determine the impact of converting farmed land to CRP and overall ecosystem health. This study assesses and compares the health and insect diversity within flowering prairie CRP and a naturally wooded area in southwest Minnesota. Insects were collected using pitfall traps and malaise traps. Traps were placed in mid-September 2020 and checked weekly until late-October. Insects were identified to family and diversity was assessed using Shannon-Wiener index of diversity. Results show that the prairie is more diverse than the woodland site in this tract of land. This study will provide a baseline for the insect diversity in these lands before they will be burned as part of the CRP program next spring.

4

Title: Negative Effects of Reed Canary Grass (*Phalaris arundinacea*) on Plant Diversity in a Local Riparian Wetland

Presenter(s): Jacob Groen

Advisor: Dr. Shelby Flint, Biology

Abstract: Invasive plant species can limit plant diversity within ecosystems, thus impacting ecosystem services and functions while limiting total biotic diversity. Reed canary grass (*Phalaris arundinacea*) is a common invasive species found throughout the Midwest and other temperate areas of North America. The impact of reed canary grass on plant diversity and species richness was observationally characterized in a local riparian wetland. It was hypothesized that as the abundance of reed canary grass increased the diversity of the sample plant community would decrease. Plant communities were studied in 1-meter squares and assessed for relative abundance of plant species present measured by percent cover. The Shannon Diversity Index was calculated for six 1-m² plots. It was found that as the percent cover of reed canary grass increased, species richness and diversity decreased.

5

Title: Biota Survey of the Richard and Irene Maertens Conservation and Research Area

Presenter(s): John Palmer

Advisor: Dr. Shelby Flint, Biology

Abstract: Biota surveys are important tools used to create a basic understanding of the taxa present within an area of study. In 2018 the Richard and Irene Maertens Conservation and Research Area was donated to SMSU, granting the university a parcel of land to conduct wildlife research on. Until this project, this research area had yet to be surveyed. With this research more specified projects can be undertaken in the future, building upon this now-obtained baseline or focusing on species now known to be present. Biota were observed via the incidental observation method, the presence of species was observed and recorded, then classified on a table of taxons. Utilizing the Shannon-Wiener Index of Diversity, a diversity statistic was calculated to determine how diverse the region is. Preliminary results show a moderately diverse area of study.

6

Title: Impact of Climate Change on Soil Hydrology and Wetland Ecology

Presenter(s): Manoj Sapkota & Askandar Adam

Advisor: Dr. Shelby Flint, Biology

Abstract: Researchers worldwide are looking at the ecological and hydrological impacts resulting from climate change. Wetland systems are vulnerable to changes in the quantity and quality of their water supply. Our review of the literature found that climate change is expected to profoundly affect wetlands through alterations in hydrological regimes with great global variability. Climate change can cause intense droughts or inundations. A possible reduction in rainfall can cause a decrease in the areas of mangroves and floodplains, with a consequent decline in their species numbers. Conversely, an increase in rainfall would probably cause the substitution of plant species, which would not be able to survive under new conditions for a long period that makes future efforts to restore and manage wetlands (aquatic and terrestrial) ecosystem more challenging. Policy options for minimizing the adverse impact on climate change, including different management restoration techniques are much needed.

Room 4: Agribusiness Management

Moderator: Dr. Sang Jung

Zoom link:

<https://minnstate.zoom.us/j/94597375625>

1

Title: Agriculture Development in Argentina

Presenter(s): Sadie Stelter & Kaylea VanRegenmorter

Advisor: Dr. Sang Jung, Ag. Management

Abstract: Argentina is an independent republic country, that occupies most of southern South America. In 1816, the united Provinces of Rio Plata declared their independence from Spain. After Bolivia, Paraguay, and Uruguay went their separate ways, the area that remained became Argentina. Compared to the US Argentina is three-tenths the size of the US. With an area of 2,780,400km squared. Argentina is the eighth largest country in the world and the second largest country in South America. Although the United States presents a lot of vast agriculture, Argentina may not be far behind. Argentinians have developed methods of production that have allowed them to be the leading country in exported soybeans. We will be discussing Argentina's

production rates, poverty, and production efficiency and how they are comparable to the United States. Then we will go further in depth with how Argentina is able to produce so much, while facing high poverty rates and low standard of living.

2

Title: Analysis of Bangladesh and Myanmar

Presenter(s): Meghan Beckendorf & Mary Sundquist

Advisor: Dr. Sang Jung, Ag. Management

Abstract: Myanmar and Bangladesh are represented heavily in the agriculture sectors smaller countries located in South Asia. The populations of these two countries are under 200 million heavily populated per square foot. Myanmar and Bangladesh have great potential to be becoming a large agricultural exporter in the future by implementing government support. It is important to understand the economic development between improving poverty-hunger and the globalization for the both of these countries to become well developed in the world. Hunger and poverty are largely stressful problems that are a huge underlying issue that can be resolved with proper globalization and implementations of farming efficiency techniques taught through education. Improving globalization is key for both of these countries by increasing international trade to increase the economy's prices and push forth more income per potential citizen.

3

Title: Effective Strategies for Consulting Firms in the Upper Midwest

Presenter(s): Jennifer Schulze

Advisor: Dr. Kenneth Chukwuba, Bus. Management

Abstract: Consulting firms are a viable part of the business world. Consultants work with management clientele to provide professional solutions, ranging from HR activities to cost-reduction internet technology programming. Because of high market fragmentation, no industry-wide standard exists for defining success or best practices. This paper will systematically review relevant literature published within the last 15 years. Relevant literature implies that consulting projects consist of three parts, consultant responsibility, client responsibility and, an intensive collaboration of both parties. Well-qualified consultants embrace a client-focused approach, utilizing their expertise and experience through strong communication skills. Management provides necessary resources, information, and direction. Clear objectives and open communication foster the

creation of purposeful and feasible objectives. Success is defined in terms of client satisfaction, budget adherence, and goal fulfillment.

4

Title: Hameedah Owolabi & John Duncan
Presenter(s): Agricultural Sector in Brazil
Advisor: Dr. Sang Jung, Ag. Management
Abstract: Brazil is located in the Eastern region of the South American continent bordering the Atlantic Ocean. Due to its location, it mostly experiences a tropical climate that is further accentuated by the Amazon basin ecosystem's vast area. Since the founding of Brazil's territory by the Portuguese, Agriculture has been a critical sector in economic development. Colonization was driven by the desire to exploit the fertile arable lands in Brazil. In recent times, the Brazilian agricultural sector has come under fire to destroy the Amazon forest ecosystem. Under the current president's leadership, larger parcels of the forest have been hived off to feed the growing need for agricultural space. The country leads the world in the production of beef, sugar cane, coffee, and soybeans. This alone is indicative of the success of the agricultural policies that are instituted by the Government.

5

Title: Analysis of the Agriculture Sector, Economic Policies, and Issues of Madagascar
Presenter(s): Hailey Nierling & Anna Kern
Advisor: Dr. Sang Jung, Ag. Management
Abstract: Madagascar, located off the southern coast of Africa, is the fourth largest island in the world. The island's unique and diverse climate creates a captivating agriculture industry. As the country can be described as developing, a vast majority of individuals and families in Madagascar are involved with its agriculture; this is equal to eighty-percent of the population. In terms of the country's GDP, agriculture accounts for more than a fourth of Madagascar's. One area Madagascar would like to see improvements in is their percent organic produce. Only about 129 hectares of Madagascar's agriculture land is under organic cultivation. This accounts for less than 0.005% of the total agriculture area. Other issues seen in this developing country are climate hazards such as natural disasters, land availability, species loss, and poverty.

Room 5: Sociology

Moderator: Dr. Cindy Aamlid

Zoom link:

<https://minnstate.zoom.us/j/92283426547>

1

Title: The Effects of College Homelessness
Presenter(s): Jaivon Cheek
Advisor: Dr. Cindy Aamlid, Sociology
Abstract: For my research, I spent a lot of time trying to find connections between each article and how they can be useful to be applied in a paper. Although younger populations, such as emerging adults, have been shown to be particularly susceptible to food insecurity and housing instability, the current research is predominantly devoid of literature examining these experiences on college campuses. The study I will prepare, explores the food and housing vulnerabilities that may be barriers to academic success for students who attend an urban university. My project on college homelessness would be to find solutions to us students having more comfort in a sense of "roof over our brain". My sources are a mix of different information. I have a good start and was able to find some interesting sources. Before I started to do quality research, I thought it would be best to have a plan in order to maintain success.

2

Title: Influence of Gender on Body Tattooing
Presenter(s): Autumn Hess
Advisor: Dr. Cindy Aamlid, Sociology
Abstract: Tattoos are becoming more popular and mainstream and thus it should be recognized why people get tattoos and the impact and influence they can have on people. Current research finds that people have various reasons and motivations for getting tattoos. I also found that tattoos can have a negative impact and influence on the female gender, as well as on people in the workplace. Females are viewed differently and treated differently because of tattoos and it is harder for people with tattoos to obtain and keep employment because of their tattoos. The larger implications of tattoos and their influence and impact on people are significant. With tattoos comes stigma, negative views, employment problems, and being treated and viewed differently, especially if someone is a female.

3

Title: Child Sex Trafficking

Presenter(s): Kaitlyn Dordal

Advisor: Dr. Cindy Aamlid, Sociology

Abstract: Child sex trafficking happens daily and all around us. Through research, this presentation will cover sex trafficking of child specifically in the United States. Topics covered will include possible reasons children end up in these circumstances, how technology has played a role in sex trafficking, and the psychological impacts, we will also discuss a few organizations that work to end child sex trafficking. Child sex trafficking is a large problem, through education and awareness we can work towards ending this issue.

4

Title: The Sociology of the Secondhand Shopper

Presenter(s): Hanna Vos

Advisor: Dr. Cindy Aamlid, Sociology

Abstract: Shopping at second-hand stores, also known as thrift stores or charity shops, has grown in both acceptability and popularity in recent years. In order to understand why thrift shopping has become more common, I set out to understand what motivates a person to shop second-hand. I did a review of the available literature on the motivations of the thrift store shopper and focused on articles written no earlier than 2010. The most common motivations that I found include ethical motivations, self-expression motivations, hedonic motivations, and economic motivations. These findings provide possible explanations for the increasing popularity of second-hand shopping. For those who thrift shop for reasons other than economic necessity, it is important to be self-aware and shop in a way that does not disadvantage or burden shoppers who do not have other options.

Room 6: Theatre

Moderator: Prof. Sheila Tabaka

Zoom link:

<https://minnstate.zoom.us/j/99211295450>

1

Title: A Midsummer Night's Dream Dramaturgy

Presenter(s): William Stevens

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: I'll be guiding you through the world of A Midsummer Night's Dream in a completely

dramaturgical way. You will understand Athens in The time of myths and what the royal court was like. You will see what the trade workers of Athens did during the bronze age. And of course you will get to know how scottish fairy lore was wrapped into greek mythology.

2

Title: The Historical Aspects of Shepherding in Relation to the Play 'The Second Shepherds Play'

Presenter(s): Kevin Bowles

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: The occupation of shepherds is a long and storied one that spans thousands of years and across the four corners of the globe. It is a weathered tradition and stapled icon that has been used as a story focal point for generations, most notably in Bible stories, where shepherds and sheep are mentioned over five hundred times. I will be taking a dramaturgical look into the historical and religious connections that shepherding has with the medieval play of The Second Shepherds Play. Let's start counting sheep! One, two, three.....

3

Title: The Aftermaths of War as Shown in Shakespeare's Titus Andronicus

Presenter(s): Braden Hanafee-Major

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: War is never pretty, but sometimes aftermaths of war turn once great empires into ruins and people into tattered remains of who they once were, physically or mentally. What does life after war truly mean? How do people cope? Individuals often need an outlet for grief or anger, which can lead to dangerous results for others. Women are often the vessels for these releases, as rape and abuse victims are more commonly women. In addition, PTSD (Post Traumatic Stress Disorder) is very common after battles. PTSD can cause night terrors, heightened actions, delusion episodes, anxiety, and depression. This condition can cause many to reformulate how to live out their daily lives when coming back from combat.

4

Title: The Man of Mode

Presenter(s): Elizabeth Zoya

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: Many different elements can immerse people into the world of a play: language, clothing, and mannerisms, to name a few. This research will be taking a dive into mannerisms and their effects on the development of a play. Mannerisms are constantly changing as the world changes. Because of this, theatre must look back on the time period of any given play in order to bring it to life on stage. This research PowerPoint will be covering The Man of Mode, written in 1676, and taking a look into how the mannerisms of the late 1600s would be applied to the development of that play.

Early-Afternoon Sessions - 1:00PM-2:30PM

Room 1: Biology

Moderator: Dr. Sandy Craner

Zoom link:

<https://minnstate.zoom.us/j/94104164852>

1

Title: Efficacy and Mechanisms of Resveratrol as a Potential Treatment for Malignant Melanoma

Presenter(s): Jacob Groen

Advisor: Dr. Sandy Craner, Biology

Abstract: Malignant melanoma is an aggressive cancer which readily metastasizes to the brain, lungs, and liver, causing approximately 9,000 deaths in the U.S. annually. Resveratrol, a plant polyphenol, is an antioxidant that has shown efficacy in limiting proliferation and metastases of melanoma cells, though the cellular mechanisms by which it acts remain unclear. Zhao et al. (2018) investigated the pathway by which resveratrol regulated apoptosis in melanoma cells. Results showed that resveratrol degraded Bcl-2 which triggered mitochondrial release of cytochrome c, inducing apoptosis. Salado et al. (2011) investigated the mechanism by which resveratrol inhibited hepatic metastases. Results showed that resveratrol inhibited the secretion of IL-18, which promotes tumor adhesion. These studies show the potential of resveratrol as a treatment for melanoma, along with the pathways by which it acts.

2

Title: The Efficacy of Inhaled Nitric Oxide for Treating Pulmonary Hypertension in Pre-Term Neonates

Presenter(s): Amber Wells

Advisor: Dr. Sandy Craner, Biology

Abstract: Pulmonary hypertension (PH), a progressively fatal and incurable disease, occurs in 2 out of every 1,000 infants. Inhaled nitric oxide (iNO), a vasodilator that improves circulation and gas exchange, is standard to treat full-term infants with PH. Little evidence supports its use to treat PH in pre-term infants, who are especially vulnerable. Rallis et al. (2018) conducted a study using iNO to treat 55 pre-term infants with PH. Patients received treatments of iNO that gradually increased based on their response. Positive responders were

significantly tied to the presence of oligohydramnios. Christou et al. (2017) used Sugen injections and hypoxia treatments to induce PH in rats to examine the effects of NO in PH patients. Rats with PH had lowered NO levels in the pulmonary artery and iNO helped dilate affected arteries. These studies build a strong case for further testing of iNO to treat PH in pre-term infants.

3

Title: Aggressive Behavior in Pet Dogs: Nature or Nurture?

Presenter(s): Joey Heinen

Advisor: Dr. Sandy Craner, Biology

Abstract: Annually, 4.7 million people are bitten by dogs in the United States. Determining whether these bites are a result of genetic or environmental causes is key to preventing them. This review analyses two studies that have investigated both of these aspects. Hsu and Sun (2010) examined a dog's environment as a risk factor for aggression by giving dog owners in Taiwan surveys on their dog's behavior and background. Findings suggested environmental factors and breed were significant. Zapata et al. (2016) looked for genes linked to aggressive behavior. Genetic mapping was conducted on multiple data sets with results indicating an overlap between the genes GNAT3, CD36, and IGSF1 and aggression; they conclude that these genes may be tied to aggression in dogs. Taken together, results indicate that both environment and genetics play a role in aggressive behavior, however, more research is needed to determine to what degree.

Room 2: Botany

Moderator: Dr. Shelby Flint

Zoom link:

<https://minnstate.zoom.us/j/92559493353>

1

Title: Effects of Garlic on Legumes

Presenter(s): Nicholas Putnam

Advisor: Dr. Shelby Flint, Biology

Abstract: As researchers determined years ago, garlic maintains antimicrobial properties making it an antibiotic. These when isolated are termed as allicin, naturally accumulated sulfur compounds. The compounds not only act as antimicrobials, but as a defense against invading plants species, fungus, and

microbials. Thus, garlic can be a garden pest detrimental to horticultural crops causing issues with seed germination, tissue wilting, and nutrient uptake. To test what presence of allicin would have an effect Peas and Beans were grown in sets of three and garlic extract was applied at 5 levels: 0, 2.5, 5.0, 7.5, and 10 mL per 1 cup of soil. Treatments were applied weekly for three weeks. At 7.5mL and up plants in both species were entirely dead by week three. Most were dead in week 1. Growth was stunted in all treatments compared to control with side effects of yellowing leaves, mold growing at base, and supporting stocks becoming soft.

2

Title: The Allelopathic Effects of Citrus Peels on Sweet Corn Plants

Presenter(s): Patrick Rhoads & Hunter McFall

Advisor: Dr. Shelby Flint, Biology

Abstract: There is high demand to find safe alternatives to herbicides that eliminate weed competition and maintain crop yields. Previous studies indicate that amending soil with citrus peels can accomplish that. However, these studies have been conducted overseas and with crops that are not farmed in the Midwest. This greenhouse experiment tested whether citrus, a proven allelopathic agent, would affect the growth of a Midwest crop, sweet corn (*Zea mays convar saccharata*). Ten corn plants were grown in soil amended with ground citrus peels for 5 weeks and compared to a control group. Plant height and biomass were lower than the control group. The research may have been promising overseas, but because of their harmful effects on an important crop, citrus peels are not a viable herbicide alternative in Midwest agriculture.

3

Title: The Effects of Carbonated Water on the Growth of Barley and Radish Seedlings

Presenter(s): Addison Schroeder

Advisor: Dr. Shelby Flint, Biology

Abstract: Studies have shown that plants take in a small percentage of carbon dioxide through their roots during cellular respiration. In this experiment, radish and barley seedlings were watered with tap water and carbonated water in three different proportions (1:0, 1:1, 0:1). The height of each plant was collected weekly and the average dry biomass of each plant was taken at the conclusion of the experiment. Results showed that carbon dioxide did not have a positive impact on either plant, and even inhibited the growth of the radishes.

4

Title: Allelopathy Effects of Marigold Extracts on Zinnia Germination

Presenter(s): Kaytlen Heacock & Hope DeNeui

Advisor: Dr. Shelby Flint, Biology

Abstract: Allelopathy is the chemical inhibition of a plant on another and can be used to deter germination and growth. This experiment was to test the allelopathic effects of marigold to determine if it will positively or negatively affect zinnia germination. We used two different types of concentrations (petal and leaf/stem). They were prepared by boiling 3.25 g of dried marigold petals, 1.6 of dried marigold leaves and stems in 100 mL of distilled water each then diluting it to half and fourth of the highest concentration. We used petri dishes to germinate zinnia seeds in various concentrations of petal and leaf/stem extract under 12-hour light cycles for one week then measured the percent germination and seedling lengths. Our results showed negative effects of both extracts on the zinnia seeds. This information can be useful in the scientific field of weed control in gardens and field crops.

5

Title: Allelopathic Effects of Coffee Arabica Extracts Due to its Resistance to Pests and Herbicides

Presenter(s): Askandar Adam & Edward Nkumeh

Advisor: Dr. Shelby Flint, Biology

Abstract: The experimental research aims to investigate allelopathic effects of coffee extracts on the germination, height, and dry weight of GMO and non-GMO corn. The experiment included 24 petri dishes which were used to measure germination and seedling height. We also planted 12 GMO and 12 non-GMO sweet corn (*Zea mays*) separately in the greenhouse and used them to measure the dry weight. The plants were treated with coffee extract of 0 g/L (tap water), 15g/L, 30g/L, 45g/L, for the duration of the experiment. The percentage of germinated seeds treated with 45g/L of coffee extract were significantly reduced in the non-GMO corn compared to GMO corn. The dry weight of both types of corn decreased as the concentration of coffee extract increased, but the reduction was generally greater for non-GMO corn plants. The overall performance of GMO was better than non-GMO in seed germination, height, and dry weight.

Room 3: Environmental Science

Moderator: Dr. Thomas Dilley

Zoom link:

<https://minnstate.zoom.us/j/92711341351>

1

Title: Development of Growth Curves for Two Lichen Species, *Xanthoria elegans* and *Dimelaena oreina*, on Tombstones in Southwestern Minnesota Using Lichenometry Methods

Presenter(s): Rachel Miller

Advisor: Dr. Thomas Dilley, Environmental Science
Abstract: The growth rate of lichen can be calculated using known dates on tombstones (year of death) and measuring the diameter of a lichen (using a digital caliper). This experiment was done in the Southwestern region of Minnesota's Prairie grassland. The largest diameter of two lichen species, *Xanthoria elegans* and *Dimelaena oreina*, were measured on tombstones in four locations near Ivanhoe, MN. Calculated from 312 samples, *X. elegans* had a growth rate of 0.63 mm/year, and *D. oreina* grew at 0.52 mm/year which was calculated from 61 samples. The largest lichen in 5 year clusters showed an average of 0.77 mm/yr for Sunburst and 0.65 mm/yr for Moonglow. Compared to other regional studies that took place in Southwest Minnesota, overall growth rates for both lichen are similar. The slight difference in growth rates may be due to different climates, rainfall, air pollution and other human disturbances.

2

Title: Geomorphology, Channel Characteristics, and Land use Patterns Along Bluebird Creek in Southwest Minnesota

Presenter(s): Jason Turner

Advisor: Dr. Thomas Dilley, Environmental Science

Abstract: Stream characteristics and land use patterns along Bluebird Creek in southwest Minnesota were assessed using 1:24,000 scale topographic maps to measure stream length, order, basin size, gradient, sinuosity, density, relief ratio, and other characteristics. Results show the 24 mi² basin can be divided into 2 subbasins. The upper subbasin is less affected by channelization and human impact due to a more rugged relief with only 17% of the 23 stream miles being channelized. The 18 miles of the lower basin is highly modified and had been significantly impacted by the nearby residential and agricultural areas resulting in 74%

channelization. Sinuosity of the upper subbasin was 1.1 while the gentler gradients of the lower basin resulted in more meandering and a sinuosity of 1.3, even with the extensive channelization. Bluebird Creek is surrounded mostly by agricultural land but is also influenced by pasture areas and designated Conservation Reserve Program land.

3

Title: The Geomorphology of Three River Canyons formed in the Sioux Quartzite of Southeast South Dakota

Presenter(s): Katherine Knights

Advisor: Dr. Thomas Dilley, Environmental Science

Abstract: Three canyons incised into the Proterozoic Sioux Quartzite in South Dakota were investigated to better understand canyon formation and their locations. Geomorphic parameters measured include canyon length and depth, basin size, number of tributaries, gradients, sinuosity, and joint orientations. The canyons all were approximately 14 m deep but varied in length and width. The number of tributaries differed greatly between all three, from 26 to 71, while their overall sinuosity was fairly straight. Gradients varied from 1.4ft/mi at Dell Rapids to 80ft/mi at Devil's Gulch. All three canyons showed similar joint orientations trending NW/SE, indicating joint patterns control canyon direction. Surface dating indicates the landscape was last covered by glacial ice approximately 500,000 years ago which gives an incision rate of 0.03 mm/yr., approximately 10x slower than the Grand Canyon incision rates, due to gentler gradients and the harder bedrock of the Sioux Quartzite.

4

Title: Evaluating Water Chemistry in Lake Sarah, Murray County, Minnesota

Presenter(s): Oluwaseun Famakinwa

Advisor: Dr. Thomas Dilley, Environmental Science

Abstract: Minnesota lakes are vital natural resources providing wildlife habitat and influencing the quality of life and the economy. Lake Sarah, in SW Minnesota, has provided a productive walleye fishery for many years and has recently been invaded by zebra mussels. In addition, water quality has been damaged due to lawn, fertilizer, pesticide, and pet waste runoff. This study measured changes in multiple water quality parameters at two sites during

summer 2020 including temperature, dissolved oxygen, conductivity, pH, ammonium, nitrate, phosphate, and turbidity. The results show there was no significant difference between the parameters at each site or between the two sites over time. Common values for the parameter averages include: temperature 21°C, dissolved oxygen 11.2mg/L, conductivity 0.499 uS, pH 7.7, ammonium 0.4mg/L, nitrate 0.1mg/L, phosphate 0.1mg/L, and turbidity 74 cm. All the parameters averages were below the permissive standards. Lake Sarah continues to have acceptable water quality.

5

Title: Habitat Evaluation of Ditch Ecosystems in Yellow Medicine River Watershed District

Presenter(s): Michael Luke

Advisor: Dr. Thomas Dilley, Environmental Science

Abstract: As agricultural practices intensify to feed a growing population, setbacks occur including: excess nutrients, pollutants, unprotected water, shallower root channels, soil erosion, loss of biodiversity, and less land resiliency. One solution is to create buffer zones between fields and drainage ditches to protect waterways. In addition to reducing runoff pollution, the buffer zones and ditches provide wildlife habitat. This project evaluated 6 ditches and buffer zones in Southwest Minnesota by measuring and recording the following: plant and animal abundances, soil composition, and flow of water. Barn swallows accounted for 52% of recorded bird numbers (121), followed by red-wing black birds (42), starling (25), and ducks (27). Pollinators were recorded 19 times. The two mammals; deer and mink, were recorded 9 times. Frogs and turtles also spotted 9 times. Results show that ditch systems have higher biodiversity in early summer before row crops have emerged and less biodiversity in the fall.

Room 4: Math & Computer Science

Moderator: Dr. Heather Moreland

Zoom link:

<https://minnstate.zoom.us/j/94583354439>

1

Title: International Student Community (ISC)

Presenter(s): Krischal Lageju & Abinash Thapa

Advisor: Dr. Dan Kaiser, Dr. Shushuang Man, Dr. Kourosh Morteza pour, Computer Science

Abstract: ISC (International Student Community) is a responsive website created using HTML, CSS, BOOTSTRAP 4, JS and Mongo. Being an international student is more than just going to class and doing assignments, so the more resources you have within your reach, the easier it makes life. The purpose of this website is to bring all the diverse global community into a single organization called ISC. This will help users share their experience through blogs, posts, pictures, and videos. Allowing them to bring elements from their distinct cultural backgrounds to a local community regardless of socioeconomic status, race, or geographic location. Moreover, it encourages social interaction among the students through sharing their journeys, experiences, and memories during their college life. It creates a supportive learning environment for freshmen in their educational pathways in the United states. This website is overseen by an experienced student officer to suppress false rumors among the international students regarding racism, inequality, hate-speech, violence, and helps to spread positivity.

2

Title: Coffee PLUG

Presenter(s): Priyanka Shrestha

Advisor: Dr. Dan Kaiser, Dr. Shushuang Man, & Dr. Kourosh Morteza pour, Computer Science

Abstract: Coffee PLUG is an online website where the coffee lover can find a barista quality coffee recipe that can be made at home in the of expensive coffee machine. The user can get on the website by creating an account and being a Coffee PLUG member through registration and log in features. As far as content, this website is basically a package that helps the user with a list of homemade coffees which can be prepared without using expensive coffee machine and utensils to make their own coffee at home. Technologies that I have used to create this website are HTML, CSS, JavaScript, MySQL. I am planning to include the Coffee PLUG store where the required items and ingredients will

be on sale in service of online shopping and also will post coffee blogs of great Baristas.

3

Title: A Mathematical Model of Chemical Kinetics

Presenter(s): Cora Engels

Advisor: Dr. Heather Moreland, Math

Abstract: Chemical kinetics are of high importance in the field of physical chemistry as well as throughout all hard sciences, as they help us to understand the rates at which reactions proceed. The chemical kinetics of a system of reactions in quasi-equilibrium and quasi-steady-state approximations can be modeled mathematically incorporating linear algebra, vector spaces, and differential equations. The developed model is dependent on the experimentally determined rate constants for each individual reaction in the mechanism in addition to the concentrations of each reactant. In this project, we investigate the application of such methods using the reaction mechanism proposed for the formation of synthesis gas using a Co-ZSM-5 catalyst.

4

Title: Modeling Basketball Free Throws

Presenter(s): Logan Pankonin

Advisor: Dr. Heather Moreland, Math

Abstract: Modeling free throws by calculating the best release angle and release velocity can help players become better free throw shooters. Several calculations are done to find these components, and graphs constructed to show how free throws can be modeled mathematically. We do this based on my height and then generalize to the heights of everyone else. From these calculations, we show that the best shot does not go through the middle of the hoop. Additionally, it is shown that having a consistent release velocity is much more important than the ideal release angle. Players who want to seriously improve their free throw accuracy need to focus on the right mechanics as well as their psychological mindset.

5

Title: ASUAndroid

Presenter(s): Sean Knight

Advisor: Dr. Dan Kaiser, Dr. Shushuang Man, & Dr. Kourosh Mortezaipoor, Computer Science

Abstract: The android platform currently stands as the world's most-used mobile operating system. The

combination of iOS and Android accounts for approximately 98% of the global market share. Some estimates claim that Android may reach 87% of that by 2022. ASUAndroid: ASUAndroid is a mobile utility to aid soldiers with the uniform regulatory process. By building and displaying the dimensions needed for proper uniform fabrication, the projects overall goal is to simplify the lives of the nation's military members. Currently, the codebase supports an automated process of stacking ribbons in hierarchical order. This is coupled with an inspector widget and a closet for storage. Behind the scenes, the uniforms are built from user input and the resulting vectors are stored to accommodate a later reference. This allows soldiers to have a virtual closet of all their favorite uniforms, fit with accurate dimensions, in one place.

Room 5: Sociology & Psychology

Moderator: Dr. Cindy Aamlid

Zoom link:

<https://minnstate.zoom.us/j/92283426547>

1

Title: Effects of Dynamic Visual Noise on Mental Comparison of Objects

Presenter(s): Zoe Hess

Advisor: Dr. Scott Peterson, Psychology

Abstract: Dynamic visual noise (DVN) has been shown to interfere with the production of visual images (Quinn & McConnell, 1996). The aim of this study was to investigate the effect of DVN on a size judgment task versus a length judgment task. We hypothesized that RTs for size judgments would be increased more by DVN than RTs for length judgments. Participants were randomly assigned to one of two computer-based tasks and either a DVN or no DVN conditions. After completing the assigned task, participants performed a recognition test to assess their memory for the judged items. Our results indicated that DVN had a significant effect on size judgments, resulting in slower RTs; however, DVN resulted in faster RTs for length judgments. A levels of processing effect was found, and a symbolic distance effect was noted for both tasks. The majority of our results support previous research, but further investigation is warranted.

2

Title: Representation of Race, Sexuality, Disability, and Class in Animated Films

Presenter(s): Taylor Himley

Advisor: Dr. Cindy Aamlid, Sociology

Abstract: The representation (or lack thereof) of different groups within animated films sets a precedent for how individuals within said groups are to be treated in society. Research has shown that animated films tend to largely underrepresent individuals of color, those in poverty, members of the LGBTQ+ community, and those with physical and mental disabilities. In the rare cases in which these individuals are represented, they are depicted in a way that condones discrimination and stereotypes to understand their characters. It is no secret that the mass media is an all-too-common source of information that the public turns to when they desire clarity. Through the use of these representations, animated films are doing a disservice for the ever-diversifying world that we live in by falsely portraying these groups as inferior and marginalized.

3

Title: Experiences of LGBTQ Youth in Foster Care

Presenter(s): Norah King

Advisor: Dr. Cindy Aamlid, Sociology

Abstract: LGBTQ youth in foster care have some of the most troubling experiences with family, peers, and the child welfare system. Most youth in foster care have negative experiences such as rejection, violence, harassment, homelessness, and other health issues. It was found that LGBTQ youth, in or out of foster, deal with those negative experiences at a significantly higher level. It was also found that a major need that LGBTQ youth in the foster care system lack is support and acceptance from both families and child welfare workers. Support and acceptance are vital to ensure the safety and well-being of LGBTQ youth in the foster care system. This presentation will close with a discussion of improving the foster care system for LGBTQ youth.

4

Title: Analysis of Social Change During the COVID-19 Pandemic

Presenter(s): Faviola Cid

Advisor: Dr. Cindy Aamlid, Sociology

Abstract: COVID-19 has affected every aspect of life, from individual relationships to institutional operations. As societies try to defend themselves through severe restrictions on people's movement and interactions, the disease continues to decimate families, upend governments, crush economies, and

tear through the social sector. The interconnectedness—and vulnerabilities—of the complex systems that make the modern world run have never been more apparent. What is most noticeable is the change in how social change happens. First, there is the pace. Increasingly, change is shifting from occurring incrementally, to suddenly. Second, the scope of change has also changed, from small fixes to the current systems and norms, to breaks with the past—change that breaks the frame, marking the end of one period and the beginning of another. Third and finally, sudden and dramatic social change radically alters who and how we are. We are collectively changed by the experience.

5

Title: Family Estrangement as a Social Issue

Presenter(s): Chanelle Walker

Advisor: Dr. Cindy Aamlid, Sociology

Abstract: Stand Alone, a charity in the UK, found that 54% of people knew of some form of estrangement or relationship break in their family. Estrangement is the absence of a previous relationship between family members, which can be physical or emotional, often to the extent that there is no communication between the two family members. Research done in the previous cited study points to younger generations having a different view of what family looks like and the roles that it plays in their lives. By researching the estrangement process, causes for estrangement, impact factors, and the Sociological Imagination by C. Wright Mills I was able to put together a literature review showing the impact of family estrangement in our sociological world today. With this research I was able to identify key components in the estrangement cycle that could help pave the way to end the stigma in modern day society.

6

Title: The Foster Care to Prison Pipeline and the Benefits of Restorative Justice Programs

Presenter(s): Olivia Smith

Advisor: Dr. Cindy Aamlid, Sociology

Abstract: For those who have lived through the foster system in the United States, they are at higher incarceration risks. After studying the Sociological Imagination by C. Wright Mills, the criminal justice system, & child welfare laws in America, I concluded a comprehensive literature review. This research was used to look for overlapping demographics among foster care and in the criminal justice system. It was found that children of color are more likely to find

themselves living in the foster care system & that men of color face disproportionate rates of incarceration. The literature review also allowed for a better understanding of restorative justice programs & the benefits it can have on society. An up & coming program, primarily called Circle, allows for people and families who are experiencing hardships such as adjusting to a new foster child, or struggling with substance abuse, to meet in a group & be guaranteed a place where their voice can be heard. Programs like Circle & an accelerated course of policy reform for child welfare & the foster care system would not only help break the pipeline, but also create more opportunities for those in & out of these two systems.

Room 6: Theatre

Moderator: Prof. Sheila Tabaka

Zoom link:

<https://minnstate.zoom.us/j/99211295450>

1

Title: Othello

Presenter(s): Jaimon Cheek

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: This presentation is on the Shakespearean play Othello. It includes a little background of Othello and Othello's time period of Othello. I give some interesting fun facts as well as some historic places where Othello took place and when it took place.

2

Title: Twelfth Night

Presenter(s): Emma Stringer

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: My presentation for the URC will be about Twelfth Night by William Shakespeare. I will be talking about the world of the play and the world when the play was written, especially the social customs in that time. I want to talk about the gender and sexual ambiguities in both of these worlds and how... ahead of its time this play seems to be to the casual observer.

3

Title: Dramaturgy of Shakespeare's Macbeth

Presenter(s): Leah Graham

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: Re-creating the world of 1100's Scotland for the actors and designers of Shakespeare's

MacBeth. Terminology, court etiquette, battle ground maps and more!

4

Title: The Tempest: A Study of the English Renaissance and Roman Mythology

Presenter(s): Claudia Wahl

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: The Tempest is one of Shakespeare's greatest works, and while the text is incredible, the visual elements of the time are what bring it to life. Along with the beautiful clothing of the Renaissance, this presentation will cover the Roman mythology referenced heavily in The Tempest. The goal of this presentation is to create a deeper appreciation and understanding of these elements for an audience, as well as how the work of a dramaturge would benefit a production team. Enjoy!

5

Title: A Dramaturgical Look at the Life and Times of Ben Jonson

Presenter(s): Mary Porter

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: The English Renaissance was vastly different than the twenty-first century, however, one major theme that connects the two time periods is the presence of entertainment. In this research project, I will highlight the life and times of the English playwright Ben Jonson during the late 1500's and early 1600's.

6

Title: The Bacchae: A Dramaturgical Look at Greek History

Presenter(s): Zachary Hastad

Advisor: Prof. Sheila Tabaka, Theatre

Abstract: The Bacchae is considered one of famous Grecian playwright Euripides' greatest works. It is also a show that one Zach Hastad is far too enthusiastic about. Come watch as he tells you all about one of the greatest Greek tragedies of all time. From revelry, to destruction of a palace, to gods in disguise, The Bacchae has it all. Tune in the find out if Dionysus, Greek god of wine and revelry, was really a good guy after all (he wasn't).

Late-Afternoon Sessions - 2:30-4:30PM

Room 1: Biology

Moderator: Dr. Vaughn Gehle

Zoom link:

<https://minnstate.zoom.us/j/97166792602>

1

Title: The Role of the Ketogenic Diet in Refractory Epilepsy

Presenter(s): Alexa Smith

Advisor: Dr. Sandy Craner, Biology

Abstract: Refractory epilepsy is a neurological disorder, characterized by resistance to anti-epileptic drugs. The ketogenic diet may be an effective add-on therapy to combat refractory epilepsy, given the neuroprotective effects of using ketone bodies as the brain's main energy source. I reviewed two studies that assessed how the ketogenic diet provides neuroprotective effects against seizures. Hori et al. (1997) assessed the anticonvulsant effectiveness and behavioral consequences of the ketogenic diet in kindled rats. The ketogenic diet provided transient protection against seizure generation, but not against seizure spread. Lambrechts et al. (2015) assessed the tolerability and efficacy of the ketogenic diet as an add-on therapy for children with refractory epilepsy in terms of seizure frequency, clusters and severity. A substantial proportion of patients achieved a reduction in seizure clusters and severity. Both studies suggest that the ketogenic diet provides neurological protection against seizures and may be a useful treatment for refractory epilepsy.

2

Title: Effects of Deficiency of Hath6 (Math6) Function in Reproductive System

Presenter(s): Nicholas Putnam

Advisor: Dr. Sandy Craner, Biology

Abstract: Roughly 10 to 15 pregnancies in every 100 ends in miscarriage. Further, 1% of women who experience miscarriage experience repeated miscarriages, and 50% will not know or learn the cause. A potential reason could be singular transcription factors failing to regulate proper development. A study on mice highlights this potential. Homolog of murine Hath6 was removed in mouse version Math6 via mating gene removed mice

to create homozygous recessive non transcription factor containing offspring. In female recessive offspring reproduction was impossible. Math6 was responsible for endothelial phenotypes vascular health developing between mother and offspring (Boing et al., 2018). This transcription factor in humans was identified as a responsive gene present to modulate endothelial cell differentiation and phenotype in human umbilical vein cells by applying stress in vitro and analyzing (Wasserman et al., 2002). These studies provide the impression some females could lack transcription factors necessary for reproduction leading to miscarriage.

3

Title: The role of ursodeoxycholic acid in the treatment of intrahepatic cholestasis of pregnancy

Presenter(s): Caedyn Reinhardt

Advisor: Dr. Sandy Craner, Biology

Abstract: Intrahepatic cholestasis of pregnancy (ICP) is the most common liver disease during pregnancy and has effects on both maternal and fetal health. Yang et al. (2019) hypothesized that women with ICP treated with ursodeoxycholic acid (UDCA) would not have an increased risk of adverse perinatal outcomes. Two groups of patients, based on their severity of ICP, were treated with UDCA. After treatment, there were no adverse fetal outcomes and there was a significant reduction in bile acid concentrations. Lofthouse et al. (2019) investigated how UDCA modified the placental transport of the bile acid taurocholate (TC) and its effects on vascular function. Results showed that UDCA is a competitive inhibitor of OATPA1-mediated TC uptake, and can inhibit the vascular effects of TC. These studies indicate that UDCA is effective in the treatment of ICP and its harmful effects by inhibiting the uptake of certain bile acids.

Room 2: Botany & Ecology

Moderator: Dr. Shelby Flint

Zoom link:

<https://minnstate.zoom.us/j/92559493353>

1

Title: Effects of Light Intensity on plant *Zinnia elegans*

Presenter(s): Lileya Kebos

Advisor: Dr. Shelby Flint, Biology

Abstract: Light intensity is significant in the photosynthesis process of a plant. Zinnias were grown and analyzed in a controlled environment under four levels of luminous intensity (280, 160, 40 or 30 lux) for ten days. Biomass production was then measured to find the significance of the amount of sunlight, water and minerals the Zinnia was able to capture. The Zinnia plant biomass under intensities of 160, 40, and 30 lux was lower than the biomass produced under high light intensity 280 lux. The results indicate that high light intensity positively impacts the biomass production in Zinnia plants.

2

Title: Seeding Density Effectiveness On Weed Suppression

Presenter(s): Kyle Richter

Advisor: Dr. Shelby Flint, Biology

Abstract: Noxious weeds have the ability to spread rapidly and are detrimental to wildlife habitat and crops. Water hemp is commonly found in fields and native prairies across southwest Minnesota. It is a competitor to crops and effects crop yield, as well as hinders beneficial wildlife habitat. Herbicide is a commonly used applicant to prohibit weeds. This process causes dangerous chemicals to be expelled in the air and on food humans and wildlife eat. New research has shown increasing seeding density of grasses and forbs can act as a natural weed suppressant. For analysis, 3 different seeding densities were used. The seeds were planted in a hexagonal pattern with 6 grass, forb, and grass and forb surrounding 3 water hemp seeds. Unfortunately, the water hemp did not germinate in this experiment. Further research is recommended to determine the effectiveness of weed suppression with seeding densities.

3

Title: The Influence of Various Light Intensities on Barley Plants

Presenter(s): Alexander Hillesheim & Blain Dilley

Advisor: Dr. Shelby Flint

Abstract: Barley is typically grown in natural light conditions by farmers, but is that the most efficient approach when planting this nutritious grain? This experiment was conducted to determine the best conditions for growing this plant. Eighteen barley plants were grown under each of three different light intensities (ambient, ½ ambient, and ¼ ambient) in the SMSU greenhouse. For three weeks, the heights of the plants in each treatment group were measured to determine the growth rate in the respective light intensities. The ½ ambient light barley plants had the highest growth rate, followed by the ¼ ambient light and full ambient light plants. Results indicate that to obtain optimum growth, barley plants must be planted in an area that receives enough sunlight but also has shade to retain moisture in the soil. Farmers can use this experiment to grow barley quicker and more efficiently.

4

Title: The Allelopathic Effect of Coffee on Sunflowers

Presenter(s): Emma Grote & Patia Wolfe

Advisor: Dr. Shelby Flint, Biology

Abstract: People who grow plants for aesthetic uses implement fertilizers as a way to ensure proper growth. Fertilizers contain harsh chemicals and coffee is a house-hold item that is more environmentally friendly and could affect plant growth. We conducted an experiment to determine if coffee would have a positive allelopathic effect on four sunflower varieties. Sunflowers were potted in soil (control) or a mixture of one-third ground coffee and two-thirds soil (experimental). Sunflowers were grown for five weeks while leaf and stem measurements were taken twice a week. Biomass was taken at the end. The sunflowers in the control group germinated quicker and experienced greater growth. Average stem growth and biomass were found to be greater ($p < 0.05$) in the control group. Results indicate that coffee has a negative allelopathic effect on the emergence and growth in sunflower varieties and should not be used as a fertilizer.

5

Title: Isopod Substrate Preference

Presenter(s): Brandon Medina

Advisor: Dr. Shelby Flint, Biology

Abstract: Isopods are small terrestrial crustaceans. Like all other crustaceans, isopods have gills that need to remain humid or damp in order to function efficiently. These widespread detritivores can be found near wetlands. Isopods function symbiotically with saprotrophic fungi and chemotrophic bacteria that cycle nutrients. The presence of Isopods in soil is a good indicator that microbial action is taking place. Since wetlands can vary so dramatically, the soil composition will affect the kind of organisms present. In order to determine the preference of the isopods, a terrarium with dividers gave the isopods access to various substrates (woodchips, soil, sphagnum moss, and perlite). Their preference for soil tells us that the other options didn't offer the best living conditions which can have a cascading effect on a microhabitat's productivity.

Room 3: Math & Computer Science

Moderator: Dr. Heather Moreland

Zoom link:

<https://minnstate.zoom.us/j/94583354439>

1

Title: An SIR Model of the Spread of the Hong Kong Flu in the 1960s

Presenter(s): Jenna Lambrecht

Advisor: Dr. Heather Moreland, Math

Abstract: An SIR Model of the Spread of the Hong Kong Flu in the 1960s Jenna Lambrecht Department of Mathematics and Computer Science, Southwest Minnesota State University SIR models are compartmental models that use differential equations to illustrate how infectious diseases propagate through a population over time. These models can simulate and predict how a disease could spread before it happens, giving the world a chance to prevent an epidemic from occurring. The late 1960s pandemic of the Hong Kong flu is modeled. Constant disease transmission rates as well as periodic transmission rates are considered. With a constant transmission rate, the occurrence of an outbreak depends on the basic reproduction number of the model. With a periodic transmission rate, periodic solutions are observed depending on the degree of seasonality in the transmission rate. As the degree

increases, the solution passes from a period 1 cycle to a period 2 cycle and tends towards chaotic behavior. This demonstrates the ebb and flow of the seasonal flu season and how, with a high seasonal transmission rate, epidemics can occur.

2

Title: Play Pal! A Desktop Application for Performance Arts

Presenter(s): Shane Birdsall

Advisor: Dr. Dan Kaiser, Dr. Shushuang Man, & Dr. Kourosh Morteza-pour, Computer Science

Abstract: Play Pal! is a desktop application for performance arts. It is a tool designed to aid performers in memorizing their lines and improving line recall and delivery. In the age of remote communication and social distancing, performers need additional tools to lessen the impact of social distancing on their practices and performances. Play Pal! addresses this need by providing a platform for performers to record and share lines with their fellow castmates. The app gives cast members additional opportunities to develop auditory cues and to maximize the results of individual practice. The application is designed for the windows desktop environment using the Model-View-Controller (MVC) design pattern. The code is implemented using JavaFx for the user interface and using a MySQL database instance hosted on AWS.

3

Title: Designing and Building a More Useful Website for the SMSU Residence Hall Association

Presenter(s): Jordan Mueller

Advisor: Dr. Dan Kaiser, Computer Science

Abstract: The Residence Hall Association is a student-run governing body that represents the needs of the on-campus students at SMSU. Every house on campus chooses a representative to send to our weekly General Body meetings where they then decide how to allocate the money collected from the RHA fee. I am building an RHA website to improve communication between on-campus students and the RHA as well as provide access to other useful resources. This website will allow residents to view minutes, business items, get information on upcoming events, and view pictures. It will also display the inventory of items that RHA provides for students and allow them to reserve available items.

4

Title: The Axioms of Topology

Presenter(s): Rachel Engels

Advisor: Dr. Heather Moreland, Math

Abstract: In mathematics, axioms are a set of rules that give a starting point where we can study what results from following these rules. In general, these axioms are agreed upon by mathematicians without proof; however, when mathematicians did not agree on one of the axioms of geometry, they replaced it and found that an entirely new geometry was created. Similarly, topology, which is the study of continuity, is given by three axioms. We will examine these axioms and consider how changes to them would affect topologies and some classic theorems.

Room 4: Political Science

Moderator: Dr. David Sturrock

Zoom link:

<https://minnstate.zoom.us/j/95424657022>

1

Title: Expanding Access to Affordable Insulin in Greater Minnesota

Presenter(s): Colten Minkel

Advisor: Dr. David Sturrock, Political Science

Abstract: Diabetics in Greater Minnesota face serious problems of cost and access to insulin. Prices have been doubling every two years and have become unaffordable for many Type I patients. The recently enacted Alec Smith Act and the Golden Vial Project offer some hope that access and affordability will soon improve. These acts have allowed insulin to become cheaper for Type 1 diabetics in Minnesota. However, the trade group PHRMA has brought legal action challenged the constitutionality of these measures. This study will examine the effects I will discuss the importance of the Alex Smith Act and the Golden Vial Project upon the supply and affordability of insulin, especially in Greater Minnesota, and the possible effects of the current legal action. My research will allow me to see how we can expand affordable insulin throughout Greater Minnesota.

2

Title: Immigration Policy in Greater Minnesota

Presenter(s): Esther Oluborode

Advisor: Dr. David Sturrock, Political Science

Abstract: Immigration Policy in Greater Minnesota Esther Oluborode Political Science Program, Southwest Minnesota State University Immigration as a topic has been a controversial issue in Greater Minnesota, especially with different policies and problems arising yearly. Everyone needs to pay attention to it because it affects them regardless of their status, immigrants, or not. This study explores the history of immigration policy in Greater Minnesota, the past and current issues, and offer possible solutions to this issue. The aim of this study is to understand the effects of immigration on the economy and the welfare of the state. This study was done by studying research projects, different academic articles, charts, and news articles. Results indicate that immigration in Greater Minnesota has had positive and negative issues, with the positive having a greater hand, especially in its fiscal impact. The fiscal impact of immigration includes an estimated gain of \$37 billion per year.

3

Title: Minnesota's Response to the Opioid Crisis

Presenter(s): Abuk Akoi

Advisor: Dr. David Sturrock, Political Science

Abstract: The opioid epidemic has affected all Minnesotans. In 2018, nearly 350 Minnesotans died from an opioid overdose. Along with 1,949 individuals experiencing a nonfatal opioid involved overdose. These numbers continue to rise every year, affecting families, friends, businesses and communities. To understand the depth of this situation, it is important we dive into the data, the prevention, the basics, and responses from Minnesota, along with responses from Minnesota communities. This research will provide information from a variety of sources. From the U.S. Department of Health and Human Services to Minnesota's Department of Health. Along with local treatment centers. As I continued gathering information, I was astonished by what I learned. One significant finding was the data found in the disparity among races in drug overdose deaths. Briefly discussing, African American and American Indian populations are dying from drug overdose deaths in Minnesota at a disproportionate rate compared to white Americans. This alone taught me that all programs and policy decisions about substance use disorders must include a racial equity lens in order to address any racial disparity rates within African American and

American Indian populations. Understanding these reports and data are crucial in the prevention process.

4

Title: The Politics of the Line 3 Replacement Project in Minnesota

Presenter(s): Isabella Erickson

Advisor: Dr. David Sturrock, Political Science

Abstract: Enbridge's Line 3 pipeline has carried crude oil from Alberta to Wisconsin since 1968. In 2014, Enbridge proposed replacing the old, cracked pipeline with a new route. Since its proposal, the Line 3 Replacement project has sparked controversy in northern Minnesota, through which 282 miles of the pipeline runs. Proponents of the project, including Enbridge, business owners, and labor unions, argue that the new pipeline will provide increased oil capacity, create jobs, and generate increased tax revenue. Opponents of the project, including environmentalists and certain Ojibwe bands, argue that the new pipeline is unnecessary, will cause damage to the environment, and violates tribal treaties. Despite approval in Alberta, North Dakota, and Wisconsin, the replacement project has faced legal challenges in Minnesota, and its future remains unclear.

5

Title: Has the paycheck protection program helped small businesses who have suffered from the COVID pandemic?

Presenter(s): Shawn Merry

Advisor: Dr. David Sturrock, Political Science

Abstract: The Paycheck Protection Program is an SBA (Small Business Administration) loan that helps businesses to keep their workers employed during the Coronavirus pandemic. This is an important measure due to the fact that many businesses have had to either reduce hours or close down completely. This loan program originated from the Coronavirus Aid, Relief, and Economic Security Act which became law on March 27, 2020. The Paycheck Protection Program and Health Care Enhancement Act then provided additional funding. Then on June 5th the Paycheck Protection Program Flexibility Act was passed and made some important changes. The Paycheck Protection Program is important for Greater Minnesota because many businesses in Greater Minnesota have had to either reduce hours or close down completely due to the Coronavirus pandemic. In regards to how effective the Paycheck Protection

Program has been studies and data from the Small Business Administration are important to answer this question.

6

Title: The Effects of Broadband Gaps on E-Learning in Greater Minnesota

Presenter(s): James Hardy

Advisor: Dr. David Sturrock, Political Science

Abstract: With the rise of Covid-19, many Minnesota K-12 schools have transitioned to E-Learning. According to the Minnesota Department of Education, 25,000 K-12 students in the state have either no access or unreliable access to broadband or the technology needed for E-Learning. This has affected Greater Minnesota students considerably, and disproportionately affected low-income families, students of color and indigenous students. Using public resources made available by the Minnesota Departments of Education, Employment and Economic Development and local news coverage, I was able to discover three of the most at-risk student populations in the state. The three Greater Minnesota counties I concluded to be necessary to investigate were Nobles County, Redwood County and Todd County. These three counties alone account for at least 10% students affected by this problem, posing a significant need for change in order for these children to have access to the education they need to develop and grow.

7

Title: The Effects of the COVID Pandemic on the Greater Marshall Economy

Presenter(s): Godwin Kakada

Advisor: Dr. David Sturrock, Political Science

Abstract: Minnesota has not been spared from the dangers and burdens of the Covid virus. This health crisis has affected businesses in Marshall in different ways. The small-scale businesses which are the engine of the local economy are beginning to feel the negative effects of the corona virus. Many small businesses have lost customers and therefore need to reduce employee hours or lay off workers altogether. Marshall businesses are taking many steps to survive the Covid-related shutdowns, including the widely-followed mask and social distances precautions, and report cautious optimism that enhanced medical treatments and procedures will limit future infections and hasten the return to normal social and economic conditions.

Room 5: History & Exercise Science

Moderator: Dr. Jeffrey Bell

Zoom link:

<https://minnstate.zoom.us/j/98085756421>

1

Title: New Ideas Come to Town: Social Movements and the Beginnings of Southwest Minnesota State College

Presenter(s): Nick Kline

Advisor: Dr. Michael Hofstetter, History

Abstract: This fall marked 50 years since the charter class of Southwest Minnesota State College entered its senior year. Southwest was still a new college during a time when most of the nation was embroiled in issues over Vietnam, civil rights, and women's liberation. This confluence begged the question, what was the experience at SMSC in a time when dissatisfaction was everywhere, while a college administration was also attempting to build a new institution dedicated to the betterment of a region? To answer this question, conversations were had with alumni and former faculty, and print and digital archives were reviewed at the Southwest Minnesota Regional Research Center. Through this research it is learned who were the people of those early years at SMSC that ushered in a new era for the 19-county region of southwest Minnesota, and how an overwhelming desire for change can be met with discourse, struggle, and urgency.

2

Title: The Push Towards Prohibition in Blooming Prairie, Minnesota

Presenter(s): Whitney McCamish

Advisor: Dr. Michael Hofstetter, History

Abstract: With the United States facing the entrance into World War I, many states began preparing for wartime. In Minnesota, the Commission of Public Safety was created and provided guidance and authority in a time of emergency. As a result, they released various orders that were to help the state on means of transportation, food, and alcohol. Small town Blooming Prairie, Minnesota caught the attention of the Commission due to their abundance in liquor distribution throughout dry counties in Southern Minnesota. This occurred prior to and during Prohibition, with many authoritative figures getting involved such as Governor Burnquist of Minnesota, Adjutant General Rhinow, and the Minnesota Home Guard. The saloon owners of

Blooming Prairie were not going down without a fight, and they put up a show.

3

Title: Nasal Breathing vs. Mouth Breathing and Strength Output in D2 Wrestlers

Presenter(s): Trey Johnson

Advisor: Dr. Jeffrey Bell, Exercise Science

Abstract: Little research has investigated nasal breathing during strength testing. This study examined if nasal versus oral breathing affected 1-repetition maximum (1RM) in deadlift and hang-clean. Nine male, NCAA Division 2 college wrestlers from a variety of weight classes were included in this study (weight 79.8 ± 10 kg, height 174 ± 7 cm). Subjects performed 1RM lifts in deadlift and hang-clean under nasal and oral only breathing conditions after a self-selected warm-up using an incremental increase of weight. Lifting conditions were tested one week apart using a randomized cross-over design. Nasal compared to oral breathing did not impair 1RM for hang-clean (100.0 ± 20.4 vs. 98.2 ± 21.6 kg, $p=0.94$) or deadlift (184.8 ± 34.7 vs. 186.6 ± 30.3 kg, $p=0.91$). Since nasal breathing does not impact maximal strength tests, future research should investigate greater repetitions or training with various breathing styles.

4

Title: Hockey Specific Performance Testing in High School Hockey Players

Presenter(s): Derek Smith

Advisor: Dr. Jeffrey Bell, Exercise Science

Abstract: In hockey, skating is an essential skill indicative of a player's ability. Little has been done to find a quantitative test to precisely evaluate skating performance, with the most common test being the 40m on-ice sprint. This study aims to validate a specific overall skating performance test (SOSPT) at the sub-elite level. 10 male high school hockey players ages 15-18 years were tested. There was no significant correlation ($r=-0.01$, $p=0.99$) between the SOSPT and the 40m sprint. Similarly, a study done by Hajek et al. on elite-level players also showed no significant correlation ($r=0.09$, $p=0.99$). Comparing the current study to Hajek et al. using a 1-sample t-test revealed no significant difference between elite and non-elite level players. The Cohen's-D effect-size showed non-elite skaters were comparatively 0.33 seconds slower respectively. This indicates the usefulness of the SOSPT in non-elite skaters.

5

Title: Comparing Landing Mechanics in Non-game Situations in Collegiate Division II Female Basketball Players Basketball Players

Presenter(s): Erin Schneider

Advisor: Dr. Jeffrey Bell, Exercise Science

Abstract: Landing mechanics with cognitive elements can now be studied on a basketball court using insole force sensors, without requiring participants to land on a force plate. The purpose of this study was to compare lower-limb landing forces following 3-point shooting with no defender (ND), simulated defender (SD), and pass with simulated defender (PD) conditions. Fourteen female DII basketball players performed nine 3-point shots for each condition from the left, middle and right (3 shots each). Force insoles were used to measure ground reaction forces. Participants experienced greater right peak ground reaction forces for PD compared to ND ($p < 0.05$). They also experienced greater right peak load rate for PD and SD compared to ND ($p < 0.05$). Altered mechanics caused by cognitive loading may lead to increased injury risk due to altered ground reaction forces and loading rates. Training directed toward reducing landing injuries should include cognitive loading components.

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For more information contact conference coordinators:
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