14th Annual

Undergraduate Research Conference

SOUTHWEST MINNESOTA STATE UNIVERSITY

Wednesday, December 4, 2019

Starting at 8:30 a.m.

SMSU Conference Center

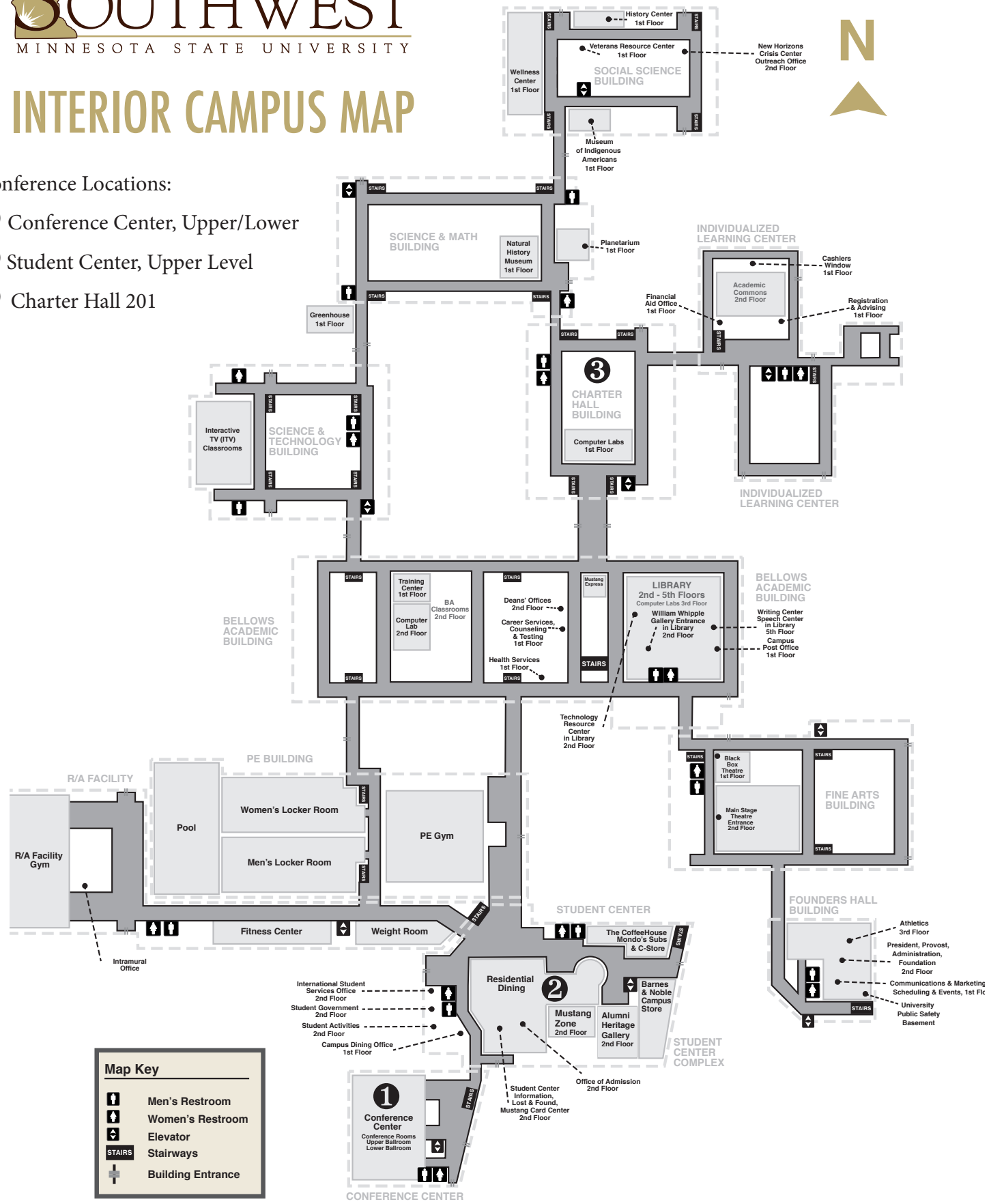
ABSTRACTS

SOUTHWEST
MINNESOTA STATE UNIVERSITY

INTERIOR CAMPUS MAP

Conference Locations:

1. Conference Center, Upper/Lower
2. Student Center, Upper Level
3. Charter Hall 201



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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.

How the Conference Started

The conference was initiated fall of 2006 by Dr. Emily Deaver, Professor of Environmental Science. After she and Dr. Thomas Dilley conducted an Environmental Science program review in 2005-2006, it was clear that our 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 14th year of the SMSU Undergraduate Research Conference, there are 18 different programs participating with 30 different faculty advisors. There are also 133 different undergraduate students presenting 29 orals and 75 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.

Welcome and Keynote

SMSU Conference Center Upper Level

8:30 ..... Kumara Jayasuriya, SMSU President, Opening Remarks

8:45 ..... Dr. Peter J. Grahn, Mayo Clinic,
Keynote Address: "From dairy farmer to translational neuroscientist: My journey across Minnesota"

ORAL SESSION A

SMSU Conference Center Upper Level

Biology, Chemisty, Environmental Science

9:45 ..... Erin Richardson, Environmental Science, Assessment of Adult Zebra Mussels in Lake Sarah, Southwest Minnesota

10:00 ..... C. Bridget DuBrey, Environmental Science, Zebra mussel (*Dreissena polymorpha*) larvae distribution in Lake Sarah

10:15 ..... Brent Huls, Environmental Science, Effects of Two Laundry Detergents on Green Algae (*Selenastrum capricornutum*)

10:30 ..... BREAK

10:45 ..... Samantha Pankratz, Environmental Science, Evaluation of tardigrades in moss on standing trees and fallen logs at Camden State Park in Lynd, Minnesota

11:00 ..... C. Bridget DuBrey, Katherine Knights, Anneke Weg & Samantha Pankratz, Biology, Color Preferences of SMSU Birds at Supplementary Feeders

11:15 ..... Ola Abimbola, Environmental Science, The survival rate of *E. coli* and *Salmonella* in 50:50 yard and kitchen waste compost at 120°F, 140°F and 160°F

11:30 ..... Baylie Bloomquist, Environmental Science, Growth Patterns of Lichen, *Xanthoria elegans* and *Dimelaena oreina*, on Tombstones in Southwest Minnesota

11:45 ..... Candace Thomas, Environmental Science, Designing an Exhibit for the SMSU Natural History Museum: The Prairie Pothole Region

12:00-1:00 .... LUNCH BREAK

1:00 ..... Sean Amegashie, Environmental Science, Concentration of Microplastics in Commercial Sea Salts

1:15 ..... Baylie Bloomquist, Louis Lozinski & Candace Thomas, Biology, Food Preference and Competition for Food Among *Acheta domesticus* (Orthoptera: Gryllidae)

1:30 ..... Cody Friedges & Austin Domeier, Biology, Dominance Assessment of Madagascar Hissing Cockroaches

1:45 ..... Christopher Berg, Idayat Agunbiade & Sarina Smith, Biology, A Longitudinal Study of PO_4^{3-} and NO_3 runoff from agricultural fields

2:00 ..... Erin Richardson, Louis Lozinski & Sara Stoneberg , Biology, Assessment of Aquatic Macroinvertebrate Biodiversity in Camden State Park, Minnesota

2:15 ..... Tanisha Neeley, Hayley Gerdes, Patrick Rhoads & Manoj Sapkota, Biology, Does bird feeder location influence the frequency of feeder visit from native species?

2:30 ..... Abbagail Schotter & Nona Meunsy, Biology, Various Behaviors of *Anolis carolinensis* Following Artificial Dew lap Ornamentation

2:45 ..... Amy Heibult & Dina Vosberg , Biology, Evaluation of Chironomid Pupal Exuviae Sampling Methodology

3:00 ..... BREAK

3:15 ..... Cora J. Engels, Chemistry, Evaluation of a modified hot-water extraction and azomethine complexation method for soil boron determination

3:30 ..... Marissa Mattson, Environmental Science, Rainfall harvest summer 2019 in Prior Lake, Minnesota Compared to Historical Events

4:30 ..... Awards Ceremony, Library Research Awards Presented

ORAL SESSION B

SMSU Charter Hall 201

English, Nursing, Sociology, Theatre

10:00 ..... Melinda Kassandra Lopez, Nursing, Hearing Loss and Dementia; Uncharted Territory

10:15 ..... Cat Schmidt, Theatre, Creating Fantastical Characters Through Makeup

10:30 ..... BREAK

10:45 ..... Claudia Wahl, Theatre, Marble Statue Makeup

11:00 ..... Danny McDonnell, Theatre, The Influence and Application of Stage Makeup on Rock'n'Roll and Professional Wrestling

11:15 ..... Alyssa Ehlen, Theatre, Ghost, Ghouls, and Goblins, Oh my! A how to on goblin makeup

11:30 ..... Hailey Bieber, English, The Historical Evolution of Feminist Novels

11:45 ..... Sariah Cheadle, English, Underestimating Children's Literature: The War That Saved My Life

12:00- 1:00... LUNCH BREAK

1:15 ..... Brooke Sorensen, Sociology, The Experiences of Female Students in the STEM Field on the Southwest Minnesota State University Campus

1:30 ..... Amber Clobes, Sociology, That's a WRAP

1:45, ... Megan Wickenhauser, Sociology, Men's Drive for Muscles and Media

2:00 ..... Megan Cull, Sociology, Sociology in Occupational Therapy

POSTER PRESENTATION SESSION A

SMSU Conference Center Lower Level
Posters displayed 8:30 a.m. to 5:00 p.m.
Times shown indicate when authors will be present at the poster

Accounting, Agriculture, Biology,
Computer Science, Exercise Science, Mathematics

1. Chelsea Wiese, Biology, Anti-immune system antibodies as a cause of kidney damage in Systemic Lupus Erythematous, Formal 2:45-3:15, Informal 11:15-11:45, 3:15-3:45
2. Patrick Rhoads, Biology, Serotonin receptor 5-HT4 activation and its ability to impede the accumulation of amyloid beta in Alzheimer's patients, Formal 1:00-1:30, Informal 10:15-10:45, 1:30-2:00
3. Hayley Gerdes, Biology, Efficacy of ketamine as an antidepressant and involvement of mTOR signaling, Formal 10:45-11:15, Informal 9:45-10:15, 3:00-3:30
4. Shawn Griffin, Biology, The Inhibitory Effects of Green Tea Derived Epigallocatechin-3-gallate against *Streptococcus mutans*, Formal 2:00-2:30, Informal 1:00-1:30, 2:30-3:00
5. Nona Meunsy, Biology, *Echinacea purpurea* for the treatment and prevention of influenza viruses, Formal 10:15-10:45, Informal 10:45-11:15, 1:30-2:00
6. Moses G. Ogundipe, Biology, The Role of Toll-Like Receptors in Pathogenesis of Guillain-Barré Syndrome, Formal 11:30-12:00, Informal 9:45-10:15, 2:30-3:00
7. Fadumo Ismail, Biology, The influence of the gut microbiome and vagus nerve on depressive behavior, Formal 1:30-2:00, Informal 2:00-2:30, 3:00-3:30
8. Prabhat Shrestha, Biology, Association between talc use and ovarian cancer, Formal 3:45-4:15, Informal 10:45-11:15, 1:00-1:30
9. Pushpa Chhantyal, Biology, Identification of the amino acid sequence responsible for Neurofibromatosis type 2 (NF2) tumor suppressor function in merlin protein, Formal 9:45-10:15, Informal 10:15-10:45, 2:00-2:30
10. Cassie Rogotzke, Agriculture, History of Risk Management in Agriculture, 11:00-12:00
11. Marco Gacke, Biology, Combinational immunotherapy with dual CTLA-4 and PD-1 blockade, Formal 3:15-3:45, Informal 11:00-11:30, 3:45-4:15
12. Erica Gervais & Cassie Rogotzke, Agriculture, Economic Development in Afghanistan, 2:30-3:30
13. Tarah Young & Ashley Anderson, Agriculture, Economic Development of Madagascar, 2:30-3:30
14. WITHDRAWN
15. Orrie Frahm, Accounting, The Positive Impacts of Family-Friendly Work Policies on Company Profits and Productivity, 10:00-11:00
16. Tanner Differding, Katie Robling & Luis E. Gaona, Biology, Allelopathic Effect of Velvetleaf on Soybean Plants, Katie 11:00-11:45, Tanner & Luis 3:00-3:45
17. Zakk Schmitz, Makayla Hoselton & Chidera Ezeh, Biology, Allelopathic Effects of Thyme on Bush Bean Growth, Chidera & Zakk 9:45-10:30, Makayla 1:00-1:45
18. Amber Wells, Rachel Miller & Kenny Famakinwa, Biology, The Impact of Herbivory on Companion Planting with Basil, Amber & Kenny 10:15-11:00, Rachel 1:45-2:30
19. Marco Gacke & Jayla Burt, Biology, Allelopathic Effect of Canada Goldenrod on Tomato Growth, Jayla & Marco 1:00-1:45

20 ..... Emmeline D. Soto, Bryan Hurley & Moshood Agboola, Biology, Allelopathic Effects of Red Pine, Blue Spruce, and White Cedar on Dandelion Growth and Development, Bryan & Moshood 9:45-10:30, Emmeline 2:30-3:15

21 ..... Montayya McManus, Exercise Science, Body Composition Changes in a Summer Swim-Team Season, 1:30-2:30

22 ..... Gabriel Galamue & Quadri Busari, Exercise Science, Does reaction-time testing improve reaction-time during sprinting? 1:30-2:30

23 ..... Matthew Stude, Mathematics, Understanding the Mandelbrot Set, 10:00-11:00

24 ..... Zach Thissen & Ben Specht, Exercise Science, Anaerobic Power in Division 2 Football Players, 1:00-2:00

25 ..... Alison Drexler, Alex Ney, Justin Clark & Zachary Morgan, Exercise Science, Effects of Fasted High Intensity Interval Training on Body Composition , Alison & Alex 10:00-11:00 ; Justin & Zachary 1:00-2:00

26 ..... Jenna Walczak & Madison Strodtman, Exercise Science, Difference in Reaction Time Between Division II Women's Volleyball and Basketball Players, 2:00-3:00

27 ..... Tyler Smith, Exercise Science, Effects of RPR Resets on Jump Height of DII Basketball Players, 10:00-11:00

28 ..... Jacob Rausch, Mathematics, Sabermetrics: The Math Behind Baseball, 10:30-11:30

29 ..... Austin Domeier, Mathematics, Lotka-Volterra Theory: The Mathematics Behind Predator-Prey Interactions, 10:00-11:00

30 ..... Nathan Kuhn, Mathematics, A Gambling System, 10:00-11:00

31 ..... Alexis Bass, Mathematics, Analysis of Option Pricing Using the Black-Scholes Model, 10:30-11:30

32 ..... Ankit Parajuli, Mathematics, Perron-Frobenius Theorem and Ranking of Soccer Teams, 10:00-11:00

33 ..... John Miller, Computer Science, Digital Synthesis, 9:30-10:30

34 ..... David Mcharo & Romit Tajale, Computer Science, DavidDoctors Android Application, 9:30-10:30

35 ..... Jace Bunne & Bailey Olson, Computer Science, BartenderMe IOS Mix Drink Application, 9:30-10:30

36 ..... Jason Kleindl, Computer Science, Fourball / Combined Golf Tournament Scoring, 1:00-2:00

37 ..... Shrijan Suwal & Prajwal Shrestha, Computer Science, Cuisine Concept, 1:00-2:00

38 ..... Jordan Mueller, Computer Science, Designing and Building a Website for the SMSU Residence Hall Association, 9:30-10:30

POSTER PRESENTATION SESSION B

Student Center Upper Level (SC 216)
Posters displayed 8:30 a.m.- 5:00 p.m.
Times shown indicate when authors will be present at the poster

Culinology, History, Music, Philosophy,
Political Science, Psychology, Sociology, Theatre

39 ..... Samantha Hotzler, Music, Bringing life to music: How performers highlight emotion as exemplified by the performance of *Vergebliches Ständchen* by Johannes Brahms, 10:00-11:00; Performance at 1:30-2:20 FA Theatre

40 ..... Kevin Totusek, Music, Music of Future Past: Composing Classical Music Through Modern Rock, 9:30-10:30; Performance at 1:30-2:20 FA Theatre

41 ..... Rachael Blake, Music, Can You Hear Me Now?: Evolution of Musical Instinct in Relation to Hearing Loss, 10:30-11:30; Performance at 1:30-2:20 FA Theatre

42 ..... Maria Callens, Music, *Sturm und Drang* in the Beethoven's Sonata Op. 10 No.1 in C minor, 9:30-10:30; Performance at 1:30-2:20 FA Theatre

43 ..... Jack Elbert, Music, Can You Feel the Rhythm?: What you Hear Versus What you See, 10:30-11:30; Performance at 1:30-2:20FA Theatre

44 ..... Ryan Ohm, Music, *Pavane Pour une Infante Défunte* (Pavane for a Dead Infant/Prince) "The story of the music by Ravel," 9:30-10:30; Performance at 1:30-2:20 FA Theatre

45 ..... Maggie Graber-Heisinger, History, The Foundation of Southwest Minnesota State University's Inter-Faculty Organization Local: Toward Conflict Resolution, 2:00-3:00

46 ..... Casey Klosterbuer, History, A Century and a Half Later: Looking Back at The Formation of Lyon County, 2:00-3:00

47 ..... Brad Bahlmann, History, From the Ashes: Tracy, Milroy, Balaton School Consolidation and Small Town Identity, 10:00-11:00

48 ..... Ty Veen, History, Crime in Lyon County during World War I and World War II, 11:00-12:00

49 ..... Brandon Vonderharr, History, The Way We Drank: Lyon County in Pre-Prohibition Minnesota, 11:00-12:00

50 ..... Cory Hollowell, History, From There to Here: The Experience of African American Student Athletes at Southwest Minnesota State University, 2:00-3:00

51 ..... Broderick Eveslage, History, Marshall, Alcohol, and Blue Laws, 11:00-12:00

52 ..... Whittney McCamish, History, Cultivating Community Through Celebration, 10:00-11:00

53 ..... Paul Ragan, History, Sharing the Stage: The History of SMSU's Theatre Program in Lyon County, 9:30-10:30

54 ..... Stanze Smith & Rajesh Hamal, Culinology, Product Development: Quick'r Curry, 11:30-12:30

55 ..... Savannah Boedigheimer, Theatre, "Cause this is Thriller," 1:30-2:30

56 ..... Allie Lamote, Theatre, The Beauty of Makeup, 1:00-2:00

57 ..... Mary Jean Porter, Theatre, History of Theatrical Clown Makeup, 1:00-2:00

58 ..... Leah Graham, Theatre, The Ageing Process: In Stage Makeup, 2:00-3:00

59 ..... Zyairr Johnson-Landoll, Theatre, African Tribal Make-up, 2:00-3:00

60 ..... Elizabeth Zoya, Theatre, Fantasy To The Stage, 2:00-3:00

61 ..... WITHDRAWN

62 ..... Jennifer Cox, Political Science, Community Responses to Plant Closures in Greater Minnesota, 1:00-2:00

63 ..... Nathaniel Van Asperen, Political Science, Student Recruitment and Retention in Greater Minnesota State Universities, 10:00-11:00

64 ..... Jake Samp, Political Science, Rural Broadband: Improving Education in the 21st Century, 10:00-11:00

65 ..... Fatou MS Kinteh, Political Science, Community Leaders Respond to Immigration Issues in Southwest Minnesota, 1:00-2:00

66 ..... Ryleigh Haynes, Sociology, How Do College Students Justify Their Deviant Behavior? 1:30-2:30

67 ..... Osman Osman, Sociology, Gender differences in professional sports, 1:30-2:30

68 ..... Richard Ayers II, Sociology, University Program Management, 1:30-2:30

69 ..... Kortney Genske, Ryleigh Haynes, Parker DeBates & Kimberlee Geuther, Psychology, Effect of Positive and Negative Emotions on Time Perception, 12:30-1:30

70 ..... Cassandra Lee, Ivan Carrillo & Katelyn Plendl, Psychology, Time Perception and Memory for Simple and Complex Words, 12:30-1:30

71 ..... Jamie Schell, Cassondra Ohnsorg & Carrie Enga, Psychology, The Effects of Personality Differences on Students' Perception of Time While Testing, 12:30-1:30

72..... A. James Gully, Philosophy, Should Corporations Serve the Public Good? 1:30-2:30

73 ..... Joey Heinen & Katherine Knights, Why the Argument of Unequal Consideration of Animals Due to Cognitive Inequality Fails, 10:00-11:00

74..... Jessica Stai, Philosophy, Which is Better: Direct Democracy vs. Representative (Indirect) Democracy? 10:00-11:00

75..... Rachal Albrecht, Political Science, Intended Effects of Rochester's Destination Medical Center, 1:00-2:00

Keynote Address: "From dairy farmer to translational neuroscientist: My journey across Minnesota"

Keynote Speaker: **Peter J. Grahn, Ph.D., Mayo Clinic**

Assistant Professor, Department of Physical Medicine and Rehabilitation
Assistant Professor, Department of Neurologic Surgery
Senior Engineer, Assistive and Restorative Technology Laboratory

For the first 18 years of my life I lived on a small dairy farm near Willmar MN. Then, in 2005, I suffered a swimming accident that resulted in a cervical spinal cord injury (SCI) and permanent quadriplegia. Following my injury, I was offered very limited treatment options, which sparked my interest in understanding the healing process of the human body. My desire to learn lead me to the biology and chemistry programs at Southwest Minnesota State University where I earned my degree in 2011.

Following my undergraduate education, I was accepted into the Office for Diversity's Post-baccalaureate Research Experience Program (PREP) at Mayo Clinic, and was provided an opportunity to work in the regenerative medicine laboratory of Anthony Windebank, M.D. While in Dr. Windebank's laboratory, I worked on multiple projects using various rodent models of peripheral and central nervous system trauma in order to evaluate the efficacy of bioengineered scaffolds seeded with regenerative cells and growth factors implanted into the site of injury to facilitate neural tissue regeneration.

Following acceptance into Mayo Graduate School, I began my dissertation project within Dr. Kendall Lee's Neural Engineering Laboratory. During my PhD studies, I worked with a team consisting of fellows, visiting scientists, neurosurgeons, and engineers to establish a new project within the lab that utilized intraspinal microstimulation (ISMS) for recovery of motor function following SCI. Our initial efforts focused on demonstrating that ISMS could be controlled wirelessly in a rodent model of complete SCI to successfully elicit hind limb motor functions. I also contributed to the establishment of a large animal model for use as a translational model to develop novel ISMS technologies that may be clinically applicable. Employing this translational model, we developed an MRI-guided, stereotactic delivery system for precise implantation of electrodes into spinal cord regions targeted via MRI.

Toward the end of my PhD training I facilitated a collaborative project between Mayo Clinic's Department of Neurologic Surgery, Department of Physical Medicine and Rehabilitation, and Dr. Reggie Edgerton's laboratory at UCLA that is ongoing. Through this collaboration we acquired Mayo IRB approval along with a FDA investigational device exemption to enroll subjects with motor complete lower limb paralysis in a clinical trial investigating the use of epidural electrical stimulation of the lumbosacral spinal cord to enable volitional control of lower limb motor functions. Currently, we have completed our first clinical trial, begun a subsequent clinical trial, and are pursuing funding to expand our spinal stimulation studies.

My career goals are to lead a translational academic research laboratory that is focused on pre-clinical animal models of spinal cord injury (SCI) to elucidate mechanisms underlying spinal neuromodulation-enabled volitional control of paralyzed functions and translates these findings from pre-clinical animal investigations to clinical application to improve quality of life for individuals suffering from SCI.

Abstracts

Oral Session A – Upper Level Conference Center
Biology, Chemistry, Environmental Science

1
Title: Assessment of Adult Zebra Mussels in Lake Sarah, Southwest Minnesota
Presenter(s): Erin Richardson
Advisor: Drs. Emily Deaver & Thomas Dilley, Environmental Science
Abstract: Zebra mussels are an invasive species of freshwater bivalve and have been confirmed in 180 lakes in Minnesota, including Lake Sarah. Zebra mussels cause ecological changes due to their filter-feeding abilities and high fecundity rates. The purpose of this study was to determine the abundance of the population in Lake Sarah. In summer 2019, 2 substrate samplers were placed under 3 boat docks around Lake Sarah. One sampler from each location was removed and replaced monthly while the second sampler remained for the entire summer. Mussels were counted and measured each month and at summer end. A significantly higher mean density was found in June at the NE location with 21.88 mussels/cm^2. Attached mussel size was similar throughout the study averaging 0.4 mm. Only a few mussels grew larger than 4 mm. Results show a difference in the number of zebra mussels throughout the lake, possibly due to wind and water currents.

2
Title: Zebra mussel (*Dreissena polymorpha*) larvae distribution in Lake Sarah
Presenter(s): C. Bridget DuBrey
Advisor: Drs. Emily Deaver & Thomas Dilley, Environmental Science
Abstract: In 2018, zebra mussels (*Dreissena polymorpha*) were found by dock haulers in Lake Sarah, a shallow, glacial lake in Southwest Minnesota. Zebra mussels are invasive aquatic organisms that cause alterations to substrates and threaten indigenous bivalves. Three 7-meter plankton tows using a 64-micron mesh net were completed monthly at four Lake Sarah locations (N, NE, S, & W) from June-September 2019 to determine veliger density. The highest mean June densities of 1.28 veligers/liter were found at N, July were 0.042 veligers/liter at NE, and August were 7.60 veligers/liter at the N site. Lake Sarah's zebra mussels spawned earlier than expected in mid-May with a second spawn in late July-early August. Spawning in Lake Sarah occurred earlier than northern Minnesota lakes due to temperature. The highest densities of veligers were found at the N and NE sites indicating that veliger density distribution is not even across the lake.

3
Title: Effects of Two Laundry Detergents on Green Algae (*Selenastrum capricornutum*)
Presenter(s): Brent Huls
Advisor: Drs. Emily Deaver & Thomas Dilley, Environmental Science
Abstract: Surfactants have been extensively studied for their toxicity and biodegradability. Biosurfactants are becoming more widespread, but there is little research on their toxicity. Many detergents, such as Method 8x, claim to be environmentally friendly by using biosurfactants. It was hypothesized that Method 8x would have no effect and Tide would reduce chlorophyll content of *Selenastrum capricornutum*. *S. capricornutum* were exposed to 10, 20, and 40 mg/L of Method 8x or Tide for four days. Chlorophyll was extracted, and absorbance was measured to determine chlorophyll concentration. Method 8x and Tide 10 mg/L samples had 5.8 and 9.8 µg/L chlorophyll respectively, both significantly lower than the 31.8 µg/L for the control. There was no significant difference between the two detergents. With proper sewage treatment, Method 8x's ingredients would biodegrade quicker and leave fewer toxic by-products. Overall, Method 8x should have a slightly lower environmental impact than Tide.

4
Title: Evaluation of tardigrades in moss on standing trees and fallen logs at Camden State Park in Lynd, Minnesota
Presenter(s): Samantha Pankratz
Advisor: Drs. Emily Deaver & Thomas Dilley, Environmental Science
Abstract: Tardigrades (Water Bears) are microscopic aquatic invertebrates thriving in habitats with adequate moisture like moss. Twenty-four moss samples were collected from three standing trees and three fallen logs near Lynd, Minnesota. The moss samples from the standing trees (*Brachium acuminatum*) and the moss on the fallen logs (*Eurhynchiastrum pulcellum*) were placed moss side down in petri dishes in the lab and leached with distilled water. Samples were examined using a compound microscope and the number of tardigrades were tabulated. A fallen log sample had 9.25/cm^2 and a standing tree 3.25/cm^2 tardigrades. The fallen log

sample was the only sample to be statistically different. The fallen log sample may have had a much larger number of tardigrades because of shade, less wind, and more moisture. No other differences were detected between samples due to high variation.

5

Title: Color Preferences of SMSU Birds at Supplementary Feeders

Presenter(s): C. Bridget DuBrey, Katherine Knights, Anneke Weg & Samantha Pankratz

Advisor: Dr. Alyssa Anderson, Biology

Abstract: Global climate change and urbanization affect bird habitats and limit their resources. Maximizing food sources in urbanized areas can help struggling bird populations. A variety of supplementary feeder options are available and since birds have excellent color vision, they may display color preferences when foraging. In September of 2019, two feeding stations were placed in an open wilderness area on SMSU's campus; each station offered feeders of four different colors (red, yellow, green, and silver) filled with shelled sunflower seeds. To assess feeder color preference, seed was measured and refilled twice weekly for 6 weeks, and a trail camera was set up to observe when feeding occurred. Analysis of Variance was used to establish whether there was a significant difference between feeder usage; to date, there is no significant preference. This experiment offers citizens and scientists insights into effective bird feeding strategies, allowing affected bird populations access to more resources.

6

Title: The survival rate of *E. coli* and *Salmonella* in 50:50 yard and kitchen waste compost at 120^{o}F, 140^{o}F and 160^{o}F

Presenter(s): Ola Abimbola

Advisor: Drs. Thomas Dilley & Emily Deaver, Environmental Science

Abstract: Compost is formed from organic material and is used as a soil additive for garden planting. Pathogenic bacteria, *E. coli* and *Salmonella* can survive at low temperature during composting which could potentially contaminate plants grown in the compost. *E. coli* and *Salmonella* survival rates in 50:50 yard and kitchen waste compost were investigated. Samples were oven heated at 120^{0}F, 140^{0}F and 160^{0}F and extracted at 10, 20, 30, 60 and 120 minutes. Bacteria samples were incubated on EMB and SS agar plates. Results indicate all bacteria died at 160^{o}F after 30 minutes while some survived at 120^{o}F and 140^{o}F. At 120^{o}F, 140^{o}F and 160^{o}F the D-values for *E. coli* were 42.01, 9.1 and 2.12, while *Salmonella* values were 54.6, 51.2, and 7.14 respectively. The Z-value for *E. coli* was 30.86, while *Salmonella* was *45.25*. The results confirm that if compost temperatures reach 160^{o}F, *E. coli* and *Salmonella* will not survive.

7

Title: Growth Patterns of Lichen, *Xanthoria elegans* and *Dimelaena oreina*, on Tombstones in Southwest Minnesota

Presenter(s): Baylie Bloomquist

Advisor: Drs. Thomas Dilley & Emily Deaver, Environmental Science

Abstract: Lichen growth rates can be used to date geomorphic surfaces with measurements of lichen found on tombstones providing known dates for the calculation. This method is widely used but may not be accurate if growth rates vary between microclimates. In this study, the largest diameter of two lichen species, *Xanthoria elegans* & *Dimelaena oreina*, were measured on tombstones in Pipestone, MN and growth rates determined. Based on 308 measurements, *X. elegans* had a growth rate of 0.50 mm/year, and *D. oreina* grew at 0.18 mm/year, calculated from 181 samples. Analysis based on five-year clusters indicated a 0.56 mm/year rate for *X. elegans* and a 0.37 mm/year rate for *D. oreina*. Compared to previous regional studies from Marshall and Canby, neither lichen showed statistically different growth indicating microclimates may not affect growth rates of these lichen or climates are not significantly different between these regions.

8

Title: Designing an Exhibit for the SMSU Natural History Museum: The Prairie Pothole Region

Presenter(s): Candace Thomas

Advisor: Drs. Thomas Dilley & Emily Deaver, Environmental Science

Abstract: The SMSU Natural History Museum's renovation focuses on the theme of change over time. SMSU is located in the Prairie Pothole Region (PPR), a grassland/wetland system supporting significant biodiversity and migratory bird flyways. In Minnesota, only 1.3% of native prairie grassland and 8% of pothole wetlands remain as a result of land use changes. To understand Minnesota's prairies within the larger ecoregion, field observations and interviews were conducted in five states and two provinces. Community members provided feedback and SMSU students in science classes were surveyed. Resulting data led to a design about the PPR's geology, geography, hydrology, ecosystem services, biodiversity, human impact, conservation, and restoration. Accessibility for multiple ages and abilities was included. Artifacts from the museum were integrated and learning opportunities created. A

prairie phenology exhibit extension would acquire data from local citizen scientists, providing seasonal snapshots of climate and other changes in this region.

9

Title: Concentration of Microplastics in Commercial Sea Salts

Presenter(s): Sean Kofi Amegashie

Advisor: Drs. Thomas Dilley & Emily Deaver, Environmental Science

Abstract: Plastic contamination of marine environments has become an ever-increasing threat. Humans have been increasingly consuming microplastics which are plastics <5mm in diameter. Through the harvesting of marine sea salt, these microplastics become part of our diets. This experiment analyzed both Marshall tap water and sea salts from various global locations. Samples were dissolved, gravity filtered, and analyzed through a microscope. Characteristics of microplastics included size (in µm), shape, and color. The total number of microplastics (2,404) from each locality varied slightly, but shapes and colors varied significantly. Dominant colors were transparent (42%) and black (32%) with minor amounts of grey (10%), blue (8%), brown (5%) and red (2%). Fibers made up 42% and fragments 37% of all MPs, with sheets, sponge and pellets contributing 21%. Some samples contained mineral sand grains. Health effects of human consumption of microplastics is still an ongoing study.

10

Title: Food Preference and Competition for Food Among *Acheta domesticus* (Orthoptera: Gryllidae)

Presenter(s): Baylie Bloomquist, Louis Lozinski & Candace Thomas

Advisor: Dr. Alyssa Anderson, Biology

Abstract: The common house cricket (*Acheta domesticus*) is increasingly produced as a human food source. We observed food preferences and foraging behaviors among later instar and adult crickets split between two control and two treatment groups (N = 25 per group). Control groups were fed Fluker's® high-calcium cricket food. Experimental groups were provided choice of cricket food, commercial chicken feed, modified Patton's diet 16, and kitchen scraps. We predicted results would show no difference in food choice, growth, survival, and foraging behaviors between control and treatment groups. Food weight was measured every other day. Data on behaviors, consumption, and preferences were collected by direct observation and video for four weeks. Observations revealed treatment crickets spent more time foraging than control. Treatment groups consumed more food per cricket than control groups ($p<0.05$), but treatment survival was lower. Given growth in cricket use for human consumption, understanding nutrition for small-scale production is essential.

11

Title: Dominance Assessment of Madagascar Hissing Cockroaches

Presenter(s): Cody Friedges & Austin Domeier

Advisor: Dr. Alyssa Anderson, Biology

Abstract: Organisms living in social groups typically develop social hierarchies. An individual's status in this hierarchy determines access to resources, mates, shelter, and other commodities. The goal of this study was to observe dominance establishment and male competition in a group of five Madagascar Hissing Cockroaches (*Gromphadorhina portentosa*) as well as scenarios that influence competition. Scenarios observed included male interactions without female stimuli, male interactions in the presence of female scent, and male interactions in the presence of a female. This was accomplished by observing one-on-one male interactions in an enclosed space separated from the group. Initial results indicate that males vigorously compete to establish dominance. However, once dominance has been established within a population, aggressive behavior is replaced with submissiveness. The reintroduction of females does appear to reinitiate male aggressive behavior. This experiment helps us determine how intraspecific male competition influences the formation of dominance hierarchies.

12

Title: A Longitudinal Study of PO_4^{3-} and NO_3 runoff from agricultural fields

Presenter(s): Christopher Berg, Idayat Agunbiade & Sarina Smith

Advisor: Dr. Alyssa Anderson, Biology

Abstract: Nitrate and phosphate inputs from agricultural runoff are one of the leading causes of impaired waterbodies in Southwest Minnesota. These nutrients can lead to harmful algal blooms and decreased oxygen levels in lakes, negatively impacting biodiversity of rivers and lakes. Here, we examined levels of phosphate and nitrate from a field outlet compared to levels downstream and upon entry into Lone Tree Lake (Lyon County, MN). Samples were collected three times from five different sites during fall 2019. Nitrate and phosphorus levels were measured using a nitrate electrode and LaMotte field test kit. Nitrate readings from the tile outlet were on average 29.8 ppm compared to 21.3 ppm at the lake entry point. Phosphorus levels varied little between field outlet and lake entry, averaging 0.2 ppm. Results

show that fertilizer runoff has a direct impact on the pollution of lakes as little was filtered out going downstream.

13
Title: Assessment of Aquatic Macroinvertebrate Biodiversity in Camden State Park, Minnesota
Presenter(s): Erin Richardson, Louis Lozinski & Sara Stoneberg
Advisor: Dr. Alyssa Anderson, Biology
Abstract: Aquatic macroinvertebrates are useful biological indicators because their presence or absence can be used to determine the quality of a body of water. In this study, we compare aquatic macroinvertebrate diversity of two streams in Camden State Park, MN; one a small stream off the Dakota Valley Trail and the other a segment of the Redwood River. Macroinvertebrates were collected from the upper and lower portion of each stream using d-frame nets and Hester-Dendy samplers during fall 2019. Samples were preserved and the organisms were later identified, where biodiversity indices (Shannon's index and Hilsenhoff biotic index) were used to assess stream health. Initial observations indicate that the stream close to the Dakota Valley Trail appears to have a higher level of diversity than the Redwood River. Results will show the overall health of the Camden State Park ecosystem.

14
Title: Does bird feeder location influence frequency of feeder visit from native species?
Presenter(s): Tanisha Neeley, Hayley Gerdes, Patrick Rhoads & Manoj Sapkota
Advisor: Dr. Alyssa Anderson, Biology
Abstract: Studies have shown that native birds in many areas are declining due to human actions, which eliminates their natural habitats. We placed two birdfeeders with sunflower seeds in each of three locations, a residential area, open area on campus, and the SMSU prairie to asses feeding pressures in each environment. Observations were conducted at each of the locations between the hours 6am-8am, when many birds feed actively. We measured the amount of food taken from the birdfeeders every other day. One-Way Analysis of Variance (ANOVA) indicated that there was a significant difference in feeding pressure in the open area compared to the prairie whereas the prairie and residential area had no significant difference in feeding pressure. By knowing where birds prefer to feed, we can better aid conservation efforts.

15
Title: Various Behaviors of *Anolis carolinensis* Following Artificial Dew lap Ornamentation
Presenter(s): Abbagail Schotter & Nona Meunsy
Advisor: Dr. Alyssa Anderson, Biology
Abstract: The effects of adding novel ornamentation to animals has been studied extensively to determine roles in reproduction and male hierarchy. The Green Anole, *Anolis carolinensis,* has adapted a dewlap, a visible projection on the throat of males. The dewlap plays a role in sexual selection and male dominance. In this study, we evaluated the behaviors exhibited by six male *A. carolinensis* after artificially coloring the dewlap either red or green in comparison to the unmanipulated control. Thirty trials were completed where two males from different treatment groups contended for a spot on a basking rock for 15 minutes after being deprived of heat/light for 5 minutes. The competing lizards showed various aggressive displays such as throat projecting and head bobbing. Common actions were also observed during their trials. There was no solid evidence suggesting that artificial coloring of the dewlap affected collective behavior of the anoles

16
Title: Evaluation of Chironomid Pupal Exuviae Sampling Methodology
Presenter(s): Amy Heibult & Dina Vosberg
Advisor: Dr. Alyssa Anderson, Biology
Abstract: Chironomids (Insecta: Diptera) are aquatic flies that act as biological indicators. Shed castings from the pupal stage (surface floating pupal exuviae, SFPE) of these flies can be used to assess chironomid populations. Methods for collecting SFPE typically include sampling a single, 50-100m stream reach. However, little work has examined how abundance of SFPE varies in different reaches of a single stream. Here, we assess whether two stream reaches in close proximity yield similar exuviae abundances, accurately reflect stream populations. Collection occurred weekly, for six weeks, to analyze abundance in upper and lower sites in two lotic systems in Camden State Park (Lincoln Co., Minnesota). Paired t-tests indicated a significant difference between upper and lower stream sites. Differences in stream morphology may account for these abundance variations. Results indicate more evaluation of stream characteristics should occur before selecting sites.

17
Title: Evaluation of a modified hot-water extraction and azomethine complexation method for soil boron determination
Presenter(s): Cora J. Engels
Advisor: Dr. Frank Schindler, Chemistry
Abstract: Boron (B) is considered a plant essential micronutrient and its concentration in soil is routinely

determined. The standard procedure for analyzing soil B is to extract B using a fiber digestion apparatus with condenser followed by B complexation with azomethine-H. Fiber digestion beakers are used to minimize B contamination, since the release of B from borosilicate glassware is well documented. The objective of this study was to evaluate the efficacy of polytetrafluoroethylene (Teflon®) beakers in B extraction. Five Standard Reference Soils (SRS) were analyzed for B as part of the Agriculture Laboratory Proficiency (ALP) Program using the Teflon® beaker modification. The laboratory precision of four samples showed greater variability, however, z-scores agreed with other laboratories for all but one sample (0.02 µg mL^{-1} above the 95% confidence interval). Results show the modified procedure accurately determines soil B. Evaluation of the modified method will continue with future ALP cycles.

18
Title: Rainfall harvest summer 2019 in Prior Lake, Minnesota Compared to Historical Events
Presenter(s): Marissa Mattson
Advisor: Drs. Thomas Dilley & Emily Deaver, Environmental Science
Abstract: Rain is an important climatic factor in determining ecosystem dynamics. Increasing concentrations of carbon dioxide in the atmosphere have a direct effect on climate and are tied to altering weather events such as rainfall. It was hypothesized that more of the rainfall events during the summer of 2019 would have a greater hourly rate than in the previous 5-year period. A rainfall collection experiment was conducted between May 19th and August 20th, 2019 using an Ambient Weather WS-2902A Smart Weather Station located in Prior Lake, Minnesota. The rainfall data was collected on an internal server through WiFi and stored online for analysis. A total rainfall of 20.69" fell during the experiment with 21 different events being greater than 0.5"/hr. Historical data show the average rainfall is 16.00" between May and August. A higher amount of rain that fell this year compared to previous years, which is in accord with recent trends.

Oral Session B- CH 201 English, Nursing, Sociology & Theatre

19
Title: Hearing Loss and Dementia; Uncharted Territory
Presenter(s): Melinda Kassandra Lopez
Advisor: Dr. Nancyruth Leibold, EdD, RN, MSN, PHN, CNE, AHN-BC
Abstract: Dementia is a disease affecting millions of people worldwide. While there are genetic dispositions for developing this condition, there are also modifiable risk factors that remain undiscovered. I investigated the rate of dementia and cognitive decline as a direct result of hearing loss while focusing on the effects of hearing-aids. My research was gathered from five studies that were done within recent years to obtain the most updated information available on the effect hearing loss has on cognitive functioning. The participants in this study ranged from ages of 50-100, and most were first-time hearing-aid users. I concluded that the link between hearing loss and dementia is real and a possible modifiable risk factor. This indicates that further long-term studies are needed to track the rate of cognitive function and allow for more accurate results. Finding modifiable risk factors would change the impact this uncharted disease has on society and healthcare.

20
Title: Creating Fantastical Characters through Makeup
Presenter(s): Cat Schmidt
Advisor: Sheila Tabaka, Theatre
Abstract: I will be demonstrating the makeup application process of Cheshire Cat and Queen of Hearts from Lewis Carrol's *Alice's Adventures in Wonderland* using BenNye theatrical makeup. I will be using two models.

21
Title: Marble Statue Makeup
Presenter(s): Claudia Wahl
Advisor: Sheila Tabaka, Theatre
Abstract: For this presentation I have used makeup to replicate the appearance of a marble statue. My goal was to take all of the shadows and textures that are present in the faces of statues and translate that into a design that is achievable with makeup.

22
Title: The Influence and Application of Stage Makeup on Rock N Roll and Professional Wrestling
Presenter(s): Danny McDonnell
Advisor: Sheila Tabaka, Theatre
Abstract:

23
Title: Ghost, Ghouls, and Goblins, Oh my! A how to on goblin makeup
Presenter(s): Alyssa Ehlen
Advisor: Sheila Tabaka, Theatre
Abstract: Have you ever wanted to make yourself look like a mythical creature? Maybe you have a D and D character you want to bring life but you don't know where to start. In this presentation I'll show you how I researched and made myself look like my very own D and D character: Jinx the Goblin! Everything from making ears out of liquid latex to reconstructing my face using a cream based makeup was used to make myself into a real life character! Come along with me as we explore the world of fantasy makeup!

24
Title: The Historical Evolution of Feminist Novels
Presenter(s): Hailey Bieber
Advisor: Dr. Ruthe Thompson, English
Abstract: Authors tend to write about events happening in their lives or in the world around them. This presentation will discuss the historical evolution of feminist novels, dating back to the 1960's and continuing until this current year. I will examine one novel from each decade and discuss both the cultural context and the authors' lives at the time they were writing novels. Looking at each decade we can see the evolution of feminist novels and how they were viewed at the time of publication compared to their popularity now. After looking at the novels; *The Bell Jar, The Female Eunuch, The Color Purple, Speak, A Thousand Splendid Suns, The Round House,* and *Girls Burn Brighter,* I will discuss why the novel is important to feminist literature today.

25
Title: Underestimating Children's Literature: The War That Saved My Life
Presenter(s): Sariah Cheadle
Advisor: Dr. Ruthe Thompson, English
Abstract: In the academic and 'adult' world, there are many who overlook children's books as a viable source of information and instruction. Doing so, however, neglects this vast body of literature whose authors put as much research and significance in writing these stories as do authors who write adult fiction and nonfiction. Framed around The War That Saved My Life by Kimberly Brubaker Bradley published in 2015, this presentation discusses Bradley's use of simple, concise and yet poignant narrative to portray a variety of topics such as family, mental health, and physical disabilities with a refreshing and clear approach. Using the example of The War That Saved My Life, I will explore the potential that can be found within literature written for children.

26
Title: The Experiences of Female Students in the STEM Field on the Southwest Minnesota State University Campus
Presenter(s): Brooke Sorensen
Advisor: Dr. Cindy Aamlid, Sociology
Abstract: The fields of science, technology, engineering, and math (STEM) have been historically male dominated. This has resulted in a chilly climate for females in these fields facilitated through stereotypes and gendered microaggressions. My research project sought to understand the experiences of female STEM students on a small Midwestern university campus. This focus group revealed that at this university, there is not the presence of a chilly climate or experiences of gendered stereotypes or microaggressions. This focus group revealed that the university provided small classroom sizes with equally represented female and male professors. The group revealed that they had not had any negative gender experiences at the university because of these factors but did feel as if it was expected to have negative experiences in their future profession. These results reveal factors that provide for a positive classroom environment without the presence of gendered stereotypes and microaggressions.

27
Title: That's a WRAP
Presenter(s): Amber Clobes
Advisor: Dr. Cindy Aamlid, Sociology
Abstract: In my presentation, we will be looking at my experience during my internship at WoMen's Rural Advocacy Programs. We will start with what WRAP is and what they do in our community. I will specifically talk about my experience and the knowledge I have gained about gender socialization through my internship at WRAP. This will include how our gender roles are seen in our culture and how it affects what we see in domestic violence. We will also be looking at the specific statistics of males vs. females in domestic violence and why this might be.

Overall, we will be discussing how gender socialization, a major topic in Sociology, can be connected to real-world issues.

28
Title: Men's Drive for Muscles and Media
Presenter(s): Megan Wickenhauser
Advisor: Dr. Cindy Aamlid, Sociology
Abstract:

29
Title: Sociology in Occupational Therapy
Presenter(s): Megan Cull
Advisor: Dr. Cindy Aamlid, Sociology
Abstract: My internship involved working through the Southwest West Central Service Cooperative (SWWC) in an Occupational Therapy setting. This setting included two school districts in Southwest Minnesota. Many sociological concepts are prevalent in an occupational therapy setting such as; family values, social class and gender. I was also able to work on several projects including a sensory pathway and interactive activity binder to use with the students. My presentation will show how the concepts of family, class and gender all connected to my work.

Abstracts

Poster Session A – Accounting, Agriculture, Biology, Computer Science, Exercise Science & Mathematics

1
Title: Anti-immune system antibodies as a cause of kidney damage in Systemic Lupus Erythematous
Presenter(s): Chelsea Wiese
Advisor: Dr. Vaughn Gehle, Biology
Abstract: Systemic lupus erythematosus (SLE) is the most common autoimmune disease worldwide. Kidney damage is common in SLE patients and is called lupus nephritis (LN). C1q is a molecule involved in immune system activation. Anti-C1q autoantibodies are suspected to cause LN. Chi *et al.* (2015) collected blood samples from SLE patients with or without LN, non-SLE autoimmune disease, and healthy controls. Their results showed that a positive correlation between anti-C1q autoantibodies and more severe SLE symptoms, and significantly higher amounts of anti-C1q autoantibodies found in SLE patients with active LN. Trouw *et al.* (2004) created an animal model of SLE. They found that anti-C1q autoantibodies caused immune cells to collect in the kidneys, leading to subsequent kidney damage. Together these studies provide evidence that anti-C1q autoantibodies are likely causes of kidney damage in SLE.

2
Title: Serotonin receptor 5-HT4 activation and its ability to impede the accumulation of amyloid beta in Alzheimer's patients
Presenter(s): Patrick Rhoads
Advisor: Dr. Sandy Craner, Biology
Abstract: Alzheimer's disease (AD) is recognized as the most socially devastating neurodegenerative disorder. AD causes the loss of neurons in the brain due to amyloid beta (Aβ) accumulation. It has been hypothesized that activation of serotonin receptors decreases Aβ. Madsen *et al*. (2011) found that the 5-HT4 (5-hydroxytryptamine) receptor is under stimulated in patients with AD. They used PET and MRI scans and positively correlated the decrease in receptor activation to the increase of Aβ. These findings warranted further testing of a 5-HT4 receptor agonist (RS 67333) to stimulate the serotonin receptor in mice with AD in an attempt to slow the accumulation of Aβ (Giannoni *et al*., 2013). The investigators found that the 5-HT4 receptor agonist was successful in slowing the accumulation of Aβ. These findings show promise to slow AD, however there is no evidence that it could lead to a cure.

3
Title: Efficacy of ketamine as an antidepressant and involvement of mTOR signaling
Presenter(s): Hayley Gerdes
Advisor: Dr. Sandy Craner, Biology
Abstract: The increasing prevalence of depression worldwide calls for a rapid-acting, generally effective treatment. Ketamine, an NMDA receptor antagonist currently used as a dissociative anesthetic, could satisfy this need; however, abuse potential restricts its clinical use. One experiment (aan het Rot *et al.,* 2010) examined the antidepressant efficacy of repeated ketamine doses in humans with major depressive disorder in an open-label study. They conclude that patients maintain an antidepressant response for as long as treatments continue and for an average of 19 days after stopping treatments. Li *et al.* (2010) investigated the mechanism behind ketamine's antidepressant effects. They exposed rats to chronic mild stressors and examined the behavioral and structural effects of ketamine. The authors conclude that mTOR signaling is involved in the mechanism of ketamine. Further research is needed to know with certainty that ketamine can be used as a safe and effective antidepressant treatment.

4
Title: The Inhibitory Effects of Green Tea Derived Epigallocatechin-3-gallate against *Streptococcus mutans*
Presenter(s): Shawn Griffin
Advisor: Dr. Sandy Craner, Biology
Abstract: Dental caries are amongst the most prevalent diseases affecting 2.44 billion people worldwide. *Streptococcus mutans* is the main etiological agent of dental caries (Xu *et al*., 2011). *Streptococcus mutans* is a dominant bacterium due to its biofilm matrix formation, which allows attachment on surfaces in the oral cavity. Green tea polyphenol Epigallocatechin-3-gallate (EGCG) possesses anti-bacterial properties. Melok *et al*. (2018) studied the quantitative effects of EGCG-S against *Streptococcus mutans* biofilm using a crystal violet assay. Complete inhibition of biofilm formation at EGCG-S concentrations of 250 μg/mL was observed. Xu *et al*. (2011) examined the effect of EGCG on multiple virulence factors. Acid production and acid tolerance were the primary virulence factors investigated. Results showed EGCG at a

concentration of 7.8 μg/mL significantly inhibited acid production of *Streptococcus mutans*. Evidence from both studies support the use of EGCG derived from green tea as a potential anticariogenic agent.

5
Title: *Echinacea purpurea* for the treatment and prevention of influenza viruses
Presenter(s): Nona Meunsy
Advisor: Dr. Sandy Craner, Biology
Abstract: Alternative treatments have been suggested for the treatment of influenza viruses (IV). *Echinacea purpurea* is an herbal supplement that has been used as a natural remedy for treatment of influenza. The efficacy of *Echinacea purpurea* in the treatment of IV has been investigated in recent studies. Raus *et al.,* evaluated the efficacy of Echinacea in relation to the standard treatment of IV, Oseltamivir (2015). Patients with influenza symptoms were randomized to an Echinacea treatment or an Oseltamivir treatment. Results were evaluated to determine noninferiority between groups. It was found that Echinacea was as effective as Oseltamivir in the treatment of IV. A study done by Pleschka, *et al.,* assessed the mechanism by which *Echinacea purpurea* works (2009). Cell culture assays were conducted and it was found that various strains of IV cultures were inhibited by the Echinacea extract. Studies have suggested that echinacea is effective in the treatment of IV.

6
Title: The Role of Toll-Like Receptors in Pathogenesis of Guillain-Barré Syndrome
Presenter(s): Moses G. Ogundipe
Advisor: Drs. Vaughn Gehle & Sandy Craner, Biology
Abstract: Guillain-Barré Syndrome (GBS) is an autoimmune disorder, characterized by an immune system attack on the peripheral nervous system. This causes progressive weakness of the limbs. It is a common cause of paralysis worldwide. The definite mechanism remains unknown. Du *et al.* (2015) studied the involvement of two cell surface receptors (TLRs) in the blood of GBS patients by quantifying mRNA levels. They found higher levels of these TLRs' mRNA, and higher levels of inflammatory compounds in GBS patients compared to controls. Brunn *et al.* (2017) analyzed the roles of TLRs in animal model for GBS using a symptom severity scale and microscopic analysis of a peripheral nerve. They found the absence of these TLRs to improve the clinical course of nerve damage in the mice. These studies suggest that TLRs are heavily involved in the pathogenesis of GBS. Future studies should investigate TLRs as potential treatment targets.

7
Title: The influence of the gut microbiome and vagus nerve on depressive behavior
Presenter(s): Fadumo Ismail
Advisor: Dr. Tony Greenfield, Biology
Abstract: Globally, depression affects 300 million people and less than half of those can receive treatment (World Health Organization, 2018). More than half of patients with mood disorders also explain having intestinal pain or gut dysbiosis (Liu and Zhu, 2018). Kelly *et al*. (2016) studied how changes in gut microbiota composition can induce depressive behavior. Patients with Major Depressive Disorder were fecal microbiota transplant (FMT) donors for the Sprague-Dawley mice. Results showed depressed FMT mice had lower gut microbiome diversity and richness, reduced depressed behavior and increased tryptophan levels using various behavioral tests. Bravo *et al*. (2011) tested the effects of *Lactobacillus rhamnosus* and a vagotomy on the behavior and GABA expression of BALB/C mice. Results concluded that *L. rhamnosus* increased GABA receptors, reduced corticosterone and depressive behavior, but the vagotomy inhibited the anxiolytic effects of the bacteria. Both studies indicate that the gut microbiome and probiotics can modulate depressive behavior.

8
Title: Association between talc use and ovarian cancer
Presenter(s): Prabhat Shrestha
Advisor: Dr. Sandy Craner, Biology
Abstract: It is hypothesized that talcum powder is a primary tool for causing ovarian cancer, possibly by causing local inflammation, an increased rate of cell division, and DNA repair. Rosenblatt *et al*. (2011) conducted a study in which women aged 35-74 years old were surveyed about their use of talcum powder, including their mode of exposure (eg. perineal application after bathing, use on sanitary napkins). Results showed a slight increase in the risk of developing a borderline tumor when talcum powder was used after bathing. Schildkraut *et al.* (2016) conducted another study to determine whether a relationship existed between the use of genital powder and non-genital powder and the development of invasive epithelial ovarian cancer, especially on African American women. Results showed a significant positive association between powder use and epithelial ovarian cancer (OR= 1.39, 95% CI:1.10,1.76). These studies provided inconsistent results indicating more research is needed on this specific topic.

9

Title: Identification of the amino acid sequence responsible for Neurofibromatosis type 2 (NF2) tumor suppressor function in merlin protein

Presenter(s): Pushpa Chhantyal

Advisor: Dr. Alyssa Anderson, Biology

Abstract: Neurofibromatosis type 2 (Nf2) is a benign tumor occurring in the cranial nerves where the protein merlin, encoded by the Nf2 gene, fails to function as a cell growth inhibitor. Previous studies suggest that phosphorylation may influences merlin function, thus this research aims to understand how phosphorylation impacts merlin functioning. Surace *et al*. (2004) studied phosphorylated merlin protein in RT4 schwannoma cells and concluded that phosphorylation at amino acid residue Serine518 impedes growth-inhibitors function. Furthermore, Rong *et al*. (2004) tested the function of merlin protein under Serine/threonine-protein kinase 2(PAK2) and found that phosphorylation of merlin at the Serine518 residue disrupts the intermolecular and intramolecular associations, inhibiting the protein's tumor suppressor activity. Both articles show that phosphorylated Serine518 amino residue is responsible for disrupting merlin protein configuration, ultimately impending the ability of merlin to act as negative growth regulator.

10

Title: History of Risk Management in Agriculture

Presenter(s): Cassie Rogotzke

Advisor: Dr. Stephen Davis, Agriculture

Abstract: Risk is found in every industry and business and refers to the likelihood of facing adverse consequences and the extent of those consequences. Farming is a business, and the microeconomic goal of any business is profit maximization, to which risks pose a serious threat. Beginning with agriculture of the Middle Ages, some sources of risk, such as adverse weather, are consistent throughout history. Others, such as the risks involved in implementing precision agriculture techniques, are unique to modern-day producers. Methods of managing risk have also seen great change since the days of primarily subsistence agriculture, from the open fields of the 14th century to the insurance and government programs available to today's farmers. The risks and risk management methods that come with agricultural decisions and operations have greatly evolved in the past eight centuries and will continue changing with agriculture to provide for shifting demands and a growing world.

11

Title: Combinational immunotherapy with dual CTLA-4 and PD-1 blockade

Presenter(s): Marco Gacke

Advisor: Dr. Tony Greenfield, Biology

Abstract: Immunotherapy is the regulation of the immune system to help the body combat diseases and infections. Immune checkpoint inhibitors CTLA-4 and PD-1 work by blocking checkpoint proteins from binding, preventing an "off" signal from being sent and allowing t-cells to kill cancer cells. (Fiegle *et al.*, 2019) studied the efficacy of these checkpoint inhibitors on carcinoma cells. 6-8 week old mice were inoculated with carcinoma cells in their liver and then treated with either CTLA-4, PD-1, or both. Results showed decrease in tumor size and metastasis with greatest reduction in combinational immunotherapy. (Larkin *et al.*, 2015) studied the survivability of patients with melanoma when treated with checkpoint blockade. In a randomized double blind study patients were treated with either impilimumab, nivolumab, or both. Results showed combinational immunotherapy showing the greatest survival rate in the combination group. These studies indicate combinational immunotherapy is the most effective in checkpoint inhibitors on cancer.

12

Title: Economic Development in Afghanistan

Presenter(s): Erica Gervais & Cassie Rogotzke

Advisor: Dr. Sang Jung, Agriculture

Abstract: Afghanistan is a multi-ethnic, landlocked country in south-central Asia. Its location is significant, as it contains many trade routes connecting Asia, Europe, and the Middle East. Therefore, it has been long sought-after by empire builders, presenting Afghanistan with a long tumultuous history of wars and leadership changes. In the past forty years alone, it has struggled with a civil war, a Soviet invasion, a Taliban takeover, the presence of al Qaeda, and the U.S. War in Afghanistan, which is nearing its twentieth year. Afghanistan's seemingly constant turmoil has been a major contributor to its difficulties in growth and development, including: poverty and low standard of living, unrest in government and politics, and inequality in gender, education, and income. Despite its attempts to regain control, grow, and develop, due to dangerous living conditions and harsh social and political policies, Afghanistan remains one of the poorest countries in the world.

13
Title: Economic Development of Madagascar
Presenter(s): Tarah Young & Ashley Anderson
Advisor: Dr. Sang Jung, Agriculture
Abstract: We studied the economic development of the country of Madagascar, the fourth largest island in the world located off the southeastern coast of Africa. Despite having bountiful natural resources, Madagascar has one of the highest poverty rates in the world, supporting 25.6 million inhabitants. In our poster, we compare the agricultural versus the modern sector, address domestic issues and problems, and dig into the international and macroeconomic policies affecting Madagascar. We conclude our presentation with conclusions and recommendations on improving the economic status of the country as a whole; there are many promising programs Madagascar can implement to improve its overall economic development.

14
Title: WITHDRAWN
Presenter(s):
Advisor:
Abstract:

15
Title: The Positive Impacts of Family Friendly Work Policies on Company Profits and Productivity
Presenter(s): Orrie Frahm
Advisor: Dr. Will Thomas, Accounting
Abstract:

16
Title: Allelopathic Effect of Velvetleaf on Soybean Plants
Presenter(s): Tanner Differding, Katie Robling & Luis E. Gaona
Advisor: Dr. Tony Greenfield, Biology
Abstract: Velvetleaf (*Abutilon theophrasti*) is a weed that has been known to have allelopathic affects. The purpose of this experiment is to observe whether velvetleaf has allelopathic potential to help farmers increase their yields. This study investigated the effects of different concentrations of velvetleaf extract on height and dry weights of soybeans (Glycine max). We predicted that the velvet leaf extract would inhibit growth and biomass of the soybeans. Eighteen-day-old soybean plants were watered with 100mL of velvetleaf extract at 12.5%, 25%, and 50% concentrations and heights of plants measured three times a week, and dry weights were collected after harvest. The height and the dry weights showed that the velvetleaf negatively affected both measurements in contrast of the control, leaving our hypothesis supported

17
Title: Allelopathic Effects of Thyme on Bush Bean Growth
Presenter(s): Zakk Schmitz, Makayla Hoselton & Chidera Ezeh
Advisor: Dr.Tony Greenfield, Biology
Abstract: Allelopathic effects of thyme leaf extract have been looked at as a natural herbicide. We investigated the allelopathic effects of thyme leaf extract on bush bean plants (*Phaseolus vulgaris*). We hypothesized that thyme leaf extract will inhibit the growth of bush beans in both hydroponics and soil. 18-day old bush beans seedlings were treated with 0%, 10%, 20% and 30% solution of 50mg/ml thyme extract. Plant height was measured for 18 days and dry weight and root length were measured at harvest. All bean plants treated with thyme leaf extract did not exhibit a decrease in the size or dry weight of the beans. There was no difference in plant growth between soil and hydroponics setup and between our control and our higher concentrations.

18
Title: The Impact of Herbivory on Companion Planting with Basil
Presenter(s): Amber Wells, Rachel Miller & Kenny Famakinwa
Advisor: Dr. Tony Greenfield, Biology
Abstract: Companion planting, an intercropping practice, of basil is beneficial to tomato plants. This study investigated herbivores impact on basil (*Ocimum basilicum*) as companion plants to tomatoes (*Solanum lycopersicum*). We hypothesized that herbivory would have a negative impact on how basil acts as a companion plant to tomatoes. 15 three-week-old tomato seedlings were transplanted into individual pots with 10 three-week-old basil seedlings transplanted into the opposite corner, five pots per treatment group. Basil leaves had three hole punches added twice a week to mimic herbivory. The heights of tested tomato plants were measured, and final dry weights were taken after a four-week testing period. Control group had the largest dry weight, but there was no significant difference between companion and treated companion group. The control group plants grew the tallest, followed by companion group with treated companion group being the shortest. Results show herbivory of companion plant reduced overall tomato growth.

19
Title: Allelopathic Effect of Canada Goldenrod on Tomato Growth
Presenter(s): Marco Gacke & Jayla Burt
Advisor: Dr. Tony Greenfield, Biology
Abstract: *Solidago canadensis* (Canada goldenrod) is native to North America but is an invasive species in Europe and Asia that has demonstrated allelopathic effects on their native species. This study looked at the allelopathic effect of *S. Canadensis* on tomato height and dry weight. We hypothesized that *S. canadensis* would have a negative allelopathic effect on the height and dry weight of the tomato plants. Aqueous extracts were prepared from the leaf, stem, and flower of *S. canadensis*. Tomato plants where treated with extract and plant heights were measured 3 times a week for 4 weeks. Plants were harvested and dry weight was measured after 4 days in the oven. All extracts exhibited positive allopathic effect on tomato plants, when compared to the control group.

20
Title: Allelopathic Effects of Red Pine, Blue Spruce, and White Cedar on Dandelion Growth and Development
Presenter(s): Emmeline D. Soto, Bryan Hurley & Moshood Agboola
Advisor: Dr. Tony Greenfield, Biology
Abstract: Allelopathic effects of pine have been found to be an effective herbicide against common weeds such as ryegrass and bluegrass. We investigated the allelopathic effects of red pine (*Pinus resinosa)*, blue spruce (*Picea pungens)*, and white cedar (*Thuja occidentalis)* extracts on the growth of dandelion (*Taraxacum officinale)* plants. We hypothesize that red pine, blue spruce, and white cedar extract will inhibit dandelion height, leaf length and shoot dry weight. 18-day old dandelion seedlings were treated with 100 g/L extracts of red pine, blue spruce, and white cedar, and water as a control. Plant height was measured over 5 weeks and leaf length and dry weight were measured at harvest. All dandelion plants treated with the extracts showed an increase in height, leaf length and dry weight over the control, which contrasts with our hypothesis. Results show that these specific conifer extracts do not inhibit dandelion growth.

21
Title: Body Composition Changes in a Summer Swim-Team Season
Presenter(s): Montayya McManus
Advisor: Dr. Jeffrey W. Bell, Exercise Science
Abstract: Competitive swimming is a popular summer sport that could improve body composition of younger athletes. Twenty-one athletes between the ages of 10 and 18 (mean 12.8 ± 2.2) years old participated in the study. Body composition data was collected at the beginning and end of a summer season using a Tanita scale (Model DC-430U). Swimmers gained weight during the season (1.1 ± 1.7 kg, $p = 0.01$) and were taller (2.4 ± 2.4 cm, $p < 0.01$). Fat mass was not reduced (0.34 ± 2.5 kg, NS) but Fat-Free Mass was significantly increased (3.1 ± 3.4 kg, $p < 0.01$). Comparing multi-sport and single-sport athletes, change in fat-free mass and fat mass before and after the season was similar. A competitive swim season lasting nine weeks during the summer may lead to improvements in muscle mass in young athletes, but some of these changes could be due to growth spurts.

22
Title: Does reaction-time testing improve reaction-time during sprinting?
Presenter(s): Gabriel Galamue & Quadri Busari
Advisor: Dr. Jeffrey W. Bell, Exercise Science
Abstract: The study's aim was to determine if playing a computer-based reaction game affects reaction time (RT) of Division-2 football skill-athletes. Subjects performed two "40 yard" (36.4 meter) sprints each day on two different days and their performance was measured by a laser-timing system (Powermax). A high-speed camera (Fastec) set at 100 frames/second captured the athlete's first movement from when a flashing light signal along with an auditory sound was given until the subject reacted. A randomized cross-over design was used in the study for game or no-game condition. We tested 10 wide receivers and 10 defensive backs. Compared to no game, there was a trend for game condition was faster for RT (0.163 ± 0.02 vs 0.148 ± 0.03 seconds, $p = 0.07$), but overall sprint time was similar (4.96 ± 0.20 vs 4.90 ± 0.22 seconds, $p = 0.31$). A larger sample size is needed for this study.

23
Title: Understanding the Mandelbrot Set
Presenter(s): Matthew Stude
Advisor: Dr. Mu-wan Huang & Dr. Heather Moreland, Mathematics
Abstract: Considered one of "the most complicated sets ever scrutinized by mathematicians," the Mandelbrot set is an intriguingly complex and beautiful set. Understanding it requires some background in complex analysis and an introduction to Julia sets. Using the book Encounters With Chaos by Denny Gulick, definitions and the basics of fractals are reviewed. An article by Robert L. Devaney assists in the deeper scrutiny of the Mandelbrot set itself. From the shape of the set's cusp to the points within

it and the spokes branching off every budding circle, there is plenty to understand and study in the Mandelbrot set. Although there are no direct applications of the Mandelbrot set, its relation to other sets, its beauty, and its structural properties are of a very curious nature and provide a foundational reference within the study of fractals and chaos theory which have applications to antenna design and cosmological models of the universe.

24
Title: Anaerobic Power in Division 2 Football Players
Presenter(s): Zach Thissen & Ben Specht
Advisor: Dr. Kris Cleveland, Exercise Science
Abstract: This study measured anaerobic power in Division 2 football players of different position groups. Nine players were divided into three different groups (skills, combos, and lineman) depending on their position on the field. Subjects completed three different tests consisting of seated medicine ball put test, Margaria-Kalamen test, and the 30-second Wingate cycling test. Lineman had the highest peak and absolute power in all three of the tests. When normalized for body mass, skill players had a higher power/kg body mass in Wingate cycling test and combos had a higher power/kg body mass in the Margaria-Kalamen test. This pilot study indicates these tests should be investigated in larger sample sizes. It is possible that all anaerobic tests may not be suited for certain position groups.

25
Title: Effects of Fasted High Intensity Interval Training on Body Composition
Presenter(s): Alison Drexler, Alex Ney, Justin Clark & Zachary Morgan
Advisor: Dr. Jeffrey W. Bell, Exercise Science
Abstract: Obesity is a prevalent issue for college students. The objective of this study was to determine the impact of high intensity interval training (HIIT) performed in a fasted state on overall body composition. Eight college students with a BMI of 25 or higher were recruited and randomized into a fasted or fed group before completing four weeks of HIIT, three times per week. Training consisted of seven repeated, alternating intervals, one minute each, of high intensity at 70-90% and rest at 60% based on target heart rate. Weight, fat mass, fat-free mass, and muscle mass were all measured using a Tanita Body Composition Analyzer (DC-430U). The results indicated no significant body composition changes in the fasted or fed group. This indicates that for future studies more participants are necessary, the duration of training should be lengthened, diet should be better monitored, and VO_{2max} should determine exercise intensity.

26
Title: Difference in Reaction Time Between Division II Women's Volleyball and Basketball Players
Presenter(s): Jenna Walczak & Madison Strodtman
Advisor: Dr. Mostafa A. Hegazy, Exercise Science
Abstract: Sport specific reaction time tests are superior to non-sport-specific tests as they distinguish between levels of athletes. However, this has not been tested in volleyball. The purpose of this study was to compare NCAA DII women volleyball players' (N=13) response times to those of basketball players (N = 13) during volleyball specific (VS) and non-volleyball-specific (NVS) tasks. During VS, players saw a video of a ball being set from different court locations and responded on a keypad if the ball was set towards them. In NVS, they responded to shapes and colors on the screen. Reaction time (RT), movement (MT) and total response time (TRT) were determined for both tasks. Volleyball players showed faster ($p<0.05$) RT, MT and TRT during VS and TRT only during NVS tasks. VS can differentiate volleyball from basketball players. Future studies should investigate if VS tasks can differentiate different levels of volleyball players.

27
Title: Effects of RPR Resets on Jump Height of DII Basketball Players
Presenter(s): Tyler Smith
Advisor: Dr. Mostafa A. Hegazy, Exercise Science
Abstract:

28
Title: Sabermetrics: The Math Behind Baseball
Presenter(s): Jacob Rausch
Advisor: Drs. Heather Moreland & Mu-wan Huang, Mathematics
Abstract: Sabermetrics takes a deep look at a certain sports team and or a certain player. First applied to baseball, sabermetrics analysis helped to show how an analytical approach to building a team can mean the difference between contending for a championship and losing year after year. Teams that rely heavily on sabermetrics tended to fair better in making playoff runs and obtaining winning seasons. It has been shown that the use of sabermetrics generally has a positive correlation with winning. The formulas and equations used by professional teams were studied and applied to the data and statistics of SMSU's baseball team.

29
Title: Lotka-Volterra Theory: The Mathematics Behind Predator-Prey Interactions
Presenter(s): Austin Domeier

Advisor: Drs. Heather Moreland & Mu-wan Huang, Mathematics

Abstract: Predator-prey interactions are a vital aspect of population dynamics. Understanding interspecific interactions can help describe past and future relationships between species. In 1925, Alfred J. Lotka and Vita Volterra independently proposed a system of differential equations to model predator-prey interactions. The predator-prey system in northern Minnesota of white-tailed deer (*Odocoileus virginianus*) and gray wolf (*Canis lupus*) populations was studied to help understand the impacts of environmental factors on these species. Data collected by the Minnesota Department of Natural Resources from 2013-2017 was used to determine initial population sizes and growth. Lotka-Volterra theory was used to model predator-prey interactions using standardized interaction rates. Although Lotka-Volterra theory has assumptions that rarely exist in the natural environment, it is essential for simulating effects on population dynamics and can lead to more accurate models of interspecies interactions in the natural environment.

30

Title: A Gambling System

Presenter(s): Nathan Kuhn

Advisor: Drs. Heather Moreland & Mu-wan Huang, Mathematics

Abstract: Gambling is a huge industry in the United States from sports betting to casino games. A few forms of theoretical betting, such as progressive betting, have been developed to beat the casino. However, these are not fool proof. Oscar's System, or Oscar's Grind, is the best approach to beat a casino. This method looks at a bettor who has high probability to win its bet back. In order for this betting system to be successful and to accumulate large profits, lots of hours (grind), is required. This betting system is modeled using Markov Chains which show each bet size and the bet number in each sequence to yield a profit of one unit. It is shown that over the long run, this system will provide increasing profits.

31

Title: Analysis of Option Pricing Using the Black-Scholes Model

Presenter(s): Alexis Bass

Advisor: Drs. Heather Moreland & Mu-wan Huang, Mathematics

Abstract: The financial market is continuously growing with increased trading and development of financial derivatives. The Black-Scholes model was developed to calculate the value of a European call option at expiration. The model allows an investor to calculate the value of an option and provides an understanding of the behavior of option prices. The resulting partial differential equation can be solved through a systematic change of variables that reduces it to the heat equation which can be solved using the Fourier Transform techniques. The resulting Black-Scholes formula involves the cumulative distribution function of the standard normal distribution and calculates the price of European call options.

32

Title: Perron-Frobenius Theorem and Ranking of Soccer Teams

Presenter(s): Ankit Parajuli

Advisor: Dr. Mu-wan Huang & Dr. Heather Moreland, Mathematics

Abstract: The problem of ranking sports teams can be tackled in many different ways. Using linear algebra and the Perron-Frobenius Theorem, we seek to rank soccer teams from the English Premier League in the hopes of determining the top four teams that will appear in the playoffs for the Champions League. Utilizing the win-loss statistics of the teams, uneven paired competitions can be converted into eigenvalue problems. These can then be analyzed and studied using the Perron Frobenius Theorem. Conclusions can be drawn about which teams are most likely to make the playoffs.

33

Title: Digital Synthesis

Presenter(s): John Miller

Advisor: Dr. Dan Kaiser, Computer Science

Abstract: Sound waves are produced by fluctuations in air pressure. The simplest form of sound waves is a sine (or cosine) function, however most sounds are the sum of a series of sinusoidal waves to produce a unique waveform. Creating these sounds is what an additive synthesizer does. Musicians use analog and digital synthesizers in their audio workstations to emulate a musical instrument. While analog synthesizers can flawlessly create waveforms, digital computers work in binary (ones and zeros), therefore in order to represent an analog waveform in a digital synthesizer, the software must create an approximation of the function by using samples, or averages of the frequency over time. My digital additive synthesizer is coded in C++ and has a GUI that allows the user to easily manipulate a waveform function to create a unique sound.

34

Title: DavidDoctors Android Application

Presenter(s): David Mcharo & Romit Tajale

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

Abstract: DavidDoctors Android Application is a medical consultation android application which consists of two components, one is for normal users, and the other is for doctors. The component for normal users is called DavidDoctors and the component for doctors is called DavidDoctorsS. DavidDoctors Android Application enables doctors or specialists to provide medical consultation to normal users or patients. We want to make it easier for anyone using our app to consult a doctor by posting a health-related question or by directly sending a message to the doctor. Also, doctors can post health-related articles that users/patients can view for their own health-related benefits. This will make it easier for people to be connected and stay connected to doctors at anytime and anywhere in the world.

35
Title: BartenderMe IOS Mix Drink Application
Presenter(s): Jace Bunne & Bailey Olson
Advisor: Drs. Daniel J Kaiser, Shushuang Man & Kourosh Mortezapour, Computer Science
Abstract: BartenderMe is an iOS application designed to be utilized by any user at or above the legal drinking age. The purpose of BartenderMe is as follows: You can find drinks based on whatever alcohol is available. Upon opening the application there will be key features such as a scan button, so the user will be able to scan the bottle's barcode to view the available mixed drink options. The app will show an image of what the drink looks like, the ingredients needed, and the steps on how to prepare the drink. If the user is not in possession of any kind of alcohol, upon opening the application, there will be a list of the 6 main alcohol types. The user can then select an alcohol type and is directed to another page with a list of brands of that specific alcohol. Once the brand is selected, there will be a list of mixed drinks that can be made from that specific alcohol. Clicking a drink will take you to the same individual drink page that is described above. Other key features will allow the user to search for a drink with the search bar and a favorites tab for saving the user's drink choice.

36
Title: Fourball / Combined Golf Tournament Scoring
Presenter(s): Jason Kleindl
Advisor: Drs. Daniel J Kaiser, Shushuang Man & Kourosh Mortezapour, Computer Science
Abstract: Golf tournaments are the lifeblood for most small, local golf courses. At our local golf course, which is a 501-C4 non-profit, proceeds from tournaments account for approximately 60% of our operating income. Larger, complex tournaments can require multiple employees to handle tournament logistics. The more people involved in the scoring of the tournament results in higher overhead, and an increased likelihood for inaccuracies in scoring. Tournament Scoring is a database/Android application that will allow a single person to run our course's most complex annual tournament; from registration to results determination. Upon registration, the database will use the registered players history to determine his/her handicap for the tournament and print the players scorecard. The Android application can be used by players out on the course during their round of play. Users will be able to record team scores with this application. These team scores will be simultaneously sent to the database in the clubhouse to provide real-time scoring for the tournament.

37
Title: Cuisine Concept
Presenter(s): Shrijan Suwal & Prajwal Shrestha
Advisor: Drs. Daniel J Kaiser, Shushuang Man, Kourosh Mortezapour, Computer Science
Abstract:

38
Title: Designing and Building a 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 students who live on-campus 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 RHA. The website will display minutes, business items, events, and pictures. It will also display the inventory of items that RHA provides for students and allow them to reserve available items.

Poster Session B – Culinology, History, Music, Philosophy, Political Science, Psychology, Sociology & Theatre

39

Title: Bringing life to music: How performers highlight emotion as exemplified by the performance of *Vergebliches Ständchen* by Johannes Brahms

Presenter(s): Samantha Hotzler

Advisor: Dr. Stephen Kingsbury & Riley Cardona, Music

Abstract: For singers, one of the most difficult aspects of learning a piece is deciding how to make a performance interesting. One effective way is to portray the emotions of the characters suggested by the text. I conducted interviews with three professional performers in order to gain insight into how they make decisions regarding their performances. Survey results indicate that they utilize a process of learning the piece with their own voice, utilizing facial expressions, as well as listening to other professionals perform the piece. Results indicate that the respondents have a similar approach to learning a new piece, but that the specifics of that approach vary from person to person. My presentation will culminate with a performance of the piece *Vergebliches Ständchen* by Johannes Brahms, through which I will demonstrate how to utilize a composite version of these procedures in order to contrast the different characters' emotions.

40

Title: Music of Future Past: Composing Classical Music Through Modern Rock

Presenter(s): Kevin Totusek

Advisor: Dr. John Ginocchio & Peter Lothringer, Music

Abstract: What would happen if a piece of classical music was inspired from modern rock? This seems be the backwards, as many songwriters nowadays write inspired from classical music. However, utilizing various methods of composition this will be an interesting experiment to go in the opposite direction.

41

Title: Can You Hear Me Now?: Evolution of Musical Instinct in Relation to Hearing Loss

Presenter(s): Rachael Blake

Advisor: Dr. Stephen Kingsbury & Riley Cardona, Music

Abstract: The main focus point of this presentation is on hearing loss in relation to musical composition. It starts off by talking about hearing loss common causes and then dives into famous composers, Ludwig van Beethoven and Gabriel Faure, who have dealt with hearing loss at various levels of the spectrum. The final conclusion is that hearing loss can have different effects to music composition-- it can influence a compositional career in many different ways.

42

Title: *Sturm und Drang* in the Beethoven's Sonata Op. 10 No.1 in C minor

Presenter(s): Maria Callens

Advisor: Dr. John Ginocchio & Dr. Daniel Rieppel, Music

Abstract: While listening to Beethoven's sonatas we hear the music, but do we fully understand what was happening during his life that affected his compositional process? By more fully understanding this, we can understand the music with greater intensity. One concept that is central to the apprehension of Beethoven's artistic ideals is that of *Sturm und Drang* (in English, "Storm and Stress"). The Sonata Op. 10 No. 1 in C minor exhibits such a connection to what otherwise would be literary; Goethe, for instance, in his novel, "Sorrows of Young Werther". This artistic expression is often identified with the stormy inner world of the author or composer and is sometimes seen as an emotional connection to the French Revolution. Anxiety over his encroaching deafness also played a role in Beethoven's use of *Sturm und Drang* and it's possible to hear this in the emotional turmoil of his composition.

43

Title: Can You Feel the Rhythm?: What you Hear Versus What you See

Presenter(s): Jack Elbert

Advisor: Dr. John Ginocchio & Dr. Scott Horey, Music

Abstract: Rhythm by nature is something that is quite fundamentally simple. Things get difficult however when the meter is thrown to more disjunct patterns. Our ears like hearing a steady metric, yet this idea of nonsymmetric meters are found all over music. This idea is used to keep listeners engaged with the music and attempting to understand this can be quite difficult at times. Looking at *Monograph IV* by Richard Gipson shows this idea of nonsymmetric meter. Going through the research of what our ears hear versus what is written in the music is that our ears put music into a simple pattern ahead of time. Audiences appreciate simple passages that stay in a simple pattern. When difficult patterns come in then engage more in listening when there is a more syncopated pattern

44

Title: *Pavane Pour une Infante Défunte* (Pavane for a Dead Infant/Prince) "The story of the music by Ravel"

Presenter(s): Ryan Ohm

Advisor: Dr. John Ginocchio & Lon Wright, Music

Abstract: *Pavane Pour une Infante Défunte* in most cases is a mysterious story about what the composition is and the inspiration for it. Scholars before have linked Maurice Ravels composition to people, events, and even artwork. What I did was follow these trails to pick up on the inspirations of this composition and what has lead them to believe these reason of why Maurice Ravel composed this work. How does the flow of the music explain scholar's hypothesis on pin pointing the main inspiration for Ravels composition. What were some of the creative choices that Ravel had deemed were important to bring his piece to life. With that the exploration of why the arrangement of the piece changed from piano to small ensemble and lastly multiple transcriptions for instruments. Maurice Ravel's piece is puzzling adventure all in itself for all listeners of classical music.

45

Title: The Foundation of Southwest Minnesota State University's Inter Faculty Organization Local: Toward Conflict Resolution

Presenter(s): Maggie Graber-Heisinger

Advisor: Dr. Jeff Kolnick, History

Abstract: The Inter Faculty Organization at Southwest Minnesota State University dates to the 1970s. This project examines the creation of the faculty union and conflicts that occurred during the union's inception leading to an eventual balancing of power between the administration and faculty. Research for this project, consisting of interviews with some of the founders and other members, will to show how the union dealt with conflict in the early stages of its formation. The goal of this project is to better understand how the early conflicts in the faculty union helped create a more cohesive faculty. A focused point in this project is to get the perspective of members that collectively began this story. In studying how the faculty union dealt with conflict, this project will help show conflict-resolution patterns that could prove useful in conflicts that arise in contemporary situations.

46

Title: A Century and a Half Later: Looking Back at The Formation of Lyon County

Presenter(s): Casey Klosterbuer

Advisor: Dr. Jeff Kolnick, History

Abstract: This year is the150th anniversary of Lyon County, Minnesota. Such commemorations beg the question, why did the first white settlers choose what is today Lyon County, and more importantly who were these settlers? To answer these questions, research for this project was conducted at the SMSU History Center and the SMSU McFarland Library. Through this research, we learn who the first white settlers in Lyon County were and how they came together to form government which later in 1869 was voted on by the Minnesota Legislature to become a county and in 1870 was officially constituted as Lyon County. Through this research the story of the first settlers in Lyon County comes to life. We also learn about the impact of the county and its government on the community that Southwest Minnesota State University calls home.

47

Title: From the Ashes: Tracy, Milroy, Balaton School Consolidation and Small Town Identity

Presenter(s): Brad Bahlmann

Advisor: Dr. Jeff Kolnick, History

A**bstract:** The purpose of this research paper is to identify and examine how the consolidation of rural school districts in Southwest Minnesota affects the communities involved. This study focuses mainly upon the TMB school district and the towns of Tracy, Milroy, and Balaton located within Lyon County in Southwestern Minnesota. The researcher focused on comparing the positive and negative aspects of school consolidation and especially on the affects that consolidation as on small town identity. The researcher uses documented literature and local media sources from around the period of consolidation as well as primary sources from educational experts and local residents who experienced life in the school district both pre and post consolidation.

48

Title: Crime in Lyon County during World War I and World War II

Presenter(s): Ty Veen

Advisor: Dr. Jeff Kolnick, History

Abstract: For my study I looked at the kinds of crimes that were committed in Lyon county during the first world war and during the second world war. I chose this because even though we have entire books and lectures about America during these periods there is almost nothing on the crime rate during these eras. To get the results that I have so far gotten, I went to the SMSU historical center and looked at both the sheriff records, which showed me when the crimes were committed, and the newspapers to see how they were reported. My most helpful findings came from the sheriff reports, which showed me everything about the case that I could need to know. I learned in doing this that despite the countries involvement in the wars, that didn't stop people from committing crime. The larger implications of my study has shown that in Lyon County at least,

even in wartime people still put their own desires above everything else.

49
Title: The Way We Drank: Lyon County in Pre-Prohibition Minnesota
Presenter(s): Brandon Vonderharr
Advisor: Dr. Jeff Kolnick, History
Abstract: This project takes a look into Lyon County's struggles with the question of liquor laws. In the years prior to what many would call the traditional prohibition era, the City of Marshall voted back and forth on many occasions whether to allow or forbid the sale and/or distribution of alcoholic substances to varying degrees. The reasons for such may not be one singular thing, but instead a variety of factors including the Women's Christian Temperance Movement to possible ethnic undertones. This project hopes to use legal documents and newspapers to dissect just what factors contributed to this turbulent time in Lyon County's history.

50
Title: From There to Here: The Experience of African American Student Athletes at Southwest Minnesota State University
Presenter(s): Cory Hollowell
Advisor: Dr. Jeff Kolnick, History
Abstract: Diversity is a key factor in any higher learning institution. In this paper I would like to dive deeper into the experiences of student athletes at Southwest State Minnesota State University. To be more specific I will discuss the experience for African American student athletes. Since the school's inception in 1968 African American athletes have been a part of the SMSU family. Research for this paper will include newspaper articles, as well as interviews and books to detail the lives of these student athletes. The end goal of this project is to find and understand what life was like on campus for these student athletes as well as their experience off campus in the Marshall community too. What was life like for those who called SMSU home.

51
Title: Marshall, Alcohol, and Blue Laws
Presenter(s): Broderick K. Eveslage
Advisor: Dr. Jeff Kolnick, History
Abstract: Where do we find sense of morality? What or how do we deem something as socially acceptable? Minnesota has struggled with these questions since its founding and so has Marshall. This project investigates the history of Minnesota's regulation of alcohol and how Marshall, Minnesota addressed issues of public morality during the years 1995 and 1996, when the city outlawed exotic dancing and lifted a prohibition on serving alcohol in restaurants and bars on Sundays

52
Title: Cultivating Community Through Celebration
Presenter(s): Whittney McCamish
Advisor: Dr. Jeff Kolnick, History
Abstract:

53
Title: Sharing the Stage: The History of SMSU's Theatre Program in Lyon County
Presenter(s): Paul Ragan
Advisor: Dr. Jeff Kolnick, History
Abstract: The art of theatre brings quite a bit to a community. It provides entertainment for the inhabitants and gives them the chance to experience new ideas and topics they may not be familiar with. It also opens opportunities for many things like collaboration between various groups, the lending of items like costumes or set pieces, and the creation of new theatre activities that community members can participate in. Because of the wide scope of the project, this presentation aims to look back at the history of the SMSU Theatre Program, starting from when it began, and showing the various ways it has interacted with the Lyon County community in relation to children's theatre.

54
Title: Product Development: Quick'r Curry
Presenter(s): Stanze Smith & Rajesh Hamal
Advisor: Dr. Peiyi Shen, Culinology
Abstract: The objective the current study was to develop a new shelf stable Curry dish using an original spice blend. Current culture allows people much less time to prepare their meals. Therefore, we developed an alternative way to make traditional, home cooked meals quickly, which is executed by preparing consumer products and providing easy instruction for completion and customization of the meal. We began developing seven spice formulations and a sauce preparation. Meanwhile, a market study demonstrated how target consumers would accept this product. Furthermore, a sensory analysis indicated which formulas were favored. (Panel comprised of 40-tatsers; untrained, self-selected, public.) Results allowed us to finalize the spice formulation. Our new product - shelf-stable "Quick'r Curry" (contains quick rice, sauce, spices and chickpeas), which provides easy and fast cooking steps as well as high quality ingredients, was highly acceptable to the consumers, as indicated by our sensory analysis and market survey.

55
Title: “Cause this is Thriller”
Presenter(s): Savannah Boedigheimer
Advisor: Sheila Tabaka, Theatre
Abstract: My project delves into Michael Jackson’s *Thriller* music video, specifically looking into his makeup transformation. The research shows how they developed the design of the makeup, what they used to create it, and how this video affected pop culture. Michael Jackson wanted to be transformed into a monster, and his fantasy came to life, winning numerous awards as it took the world by storm in the process. His infamous video still effects society today, because, after all, this is Thriller.

56
Title: The Beauty of Makeup
Presenter(s): Allie Lamote
Advisor: Sheila Tabaka, Theatre
Abstract: Makeup isn’t just here to cover up our flaws and blemishes but instead it is truly a form of art. It is just like any other art medium like acrylic paint and watercolor and it is especially helpful in the performing arts. When trying to get the characters looks across it is nearly impossible to achieve without makeup, especially for characters like Elphaba from the Broadway musical Wicked. I will be showing a visual presentation of the process of makeup done on both Elphaba and Glinda from the Broadway musical Wicked. It will show two completely different looks that give a good depiction of what makeup can accomplish. Elphaba’s color palette is completed with darker shades of green and some black. Glinda’s color palette is completed with sparkly silver and lighter shades of blue. By completing these two contrasting looks you will then be able to understand how makeup is a truly beautiful and complex form of art.

57
Title: History of Theatrical Clown Makeup
Presenter(s): Mary Jean Porter
Advisor: Sheila Tabaka, Theatre
Abstract: In modern society, we often have a negative reaction at the sight of clowns, however, this was never the destined fate for the white-faced performers. Clowns have appeared in ancient Greek and Roman societies, in the courts of kings and queens, in one-ring horse acts and the big top circus, on the theatre stage and the big screen! From Roman times to the present day, clowns have gone through a series of changes in their style of acting and their style of makeup.

58
Title: The Ageing Process: In Stage Makeup
Presenter(s): Leah Graham
Advisor: Sheila Tabaka, Theatre
Abstract: On stage and in theater there are many ways to make an actor appear to be something that they are not. Age is one of the more difficult things to change about an actor but there are methods and ways to accomplish it. One of these methods is with stage makeup, which is the topic of my research. Using three books, hours of practice and critique and many reference pictures, both of actors in makeup and of my own older family members, I studied facial structure and how time affects the way people look. Then, by using makeup, I used my own face as a canvas to age myself using that knowledge and process. I learned that, for most stage plays, makeup has to be put on with a heavy hand, otherwise the lights and distance from the actor to the audience will wash out or neutralize any small details the makeup added. With old age makeup specifically there are many parts of the body that need to be aged, not just the face but the neck, hands and any other areas visible. Learning how to do this correctly and convincingly is a great tool for anyone who wishes to be active in theatre.

59
Title: African Tribal Make-up
Presenter(s): Zyairr Johnson-Landoll
Advisor: Sheila Tabaka, Theatre
Abstract: African Tribal Makeup is used for many reasons and can mean different religious/ traditional/ military purposes. The makeup separates the boys from men, and men from older men. Even able to distinguish outsiders from the tribe. or outsiders from members of the tribe. Tribal Art ranks their members of society. The higher your rank is then the more complicated your face paint will be. Each color displays different meanings. Black: Power or Evil; Grey: Authority; Purple: Luxury or Wisdom; Yellow: Joy or Warmth; Red: Danger; Blue: Peace or Confidence; Green: Life or Growth; White: Hope or Purity. Most notable tribes across Africa include the Zulu tribe, the Maasai, the San Bushmen, and the Yoruba. The beautiful tribal art is made from clay, but I will be using my makeup kit to show the process of Tribal Art. I’ve always found Tribal makeup to be fascinating without knowing the meaning, but with the research I did, I found the meanings behind the colors they used.

60
Title: Fantasy To The Stage
Presenter(s): Elizabeth Zoya
Advisor: Sheila Tabaka, Theatre

Abstract: When live on stage we don't get to have the glory of special effects and CGI. Everything you see on stage must be skillfully designed and applied by the make-up designer. This research will demonstrate how a designer may make fantastical make-up looks for classic plays and musicals. This research will show the step by step processes of each look from finding the reference picture to translating the design onto a human to transform them into something out of this world.

61
Title: WITHDRAWN
Presenter(s):
Advisor:
Abstract:

62
Title: Community Responses to Plant Closures in Greater Minnesota
Presenter(s): Jennifer Cox
Advisor: Dr. David Sturrock, Political Science
Abstract: This project attempts to determine how Greater Minnesota communities have responded to plant closures under conditions of persistent worker shortages. Interviews with public officials, state agency studies of economic activity and labor trends, news accounts, and reports from regional nonprofits document how these developments affect rural communities. Examples studied include the closures of Del Monte in Sleepy Eye and Green Giant in Le Sueur. This project analyzes both the effects of plant closures and searches for potential remedies available for community leaders. It draws the conclusion that the emerging worker shortage in Greater Minnesota aggravates the long-term effects of plant closures. Further study will be needed to fully identify the resources available for these communities to deal with these related problems.

63
Title: Student Recruitment and Retention in Greater Minnesota State Universities
Presenter(s): Nathaniel Van Asperen
Advisor: Dr. David Sturrock, Political Science
Abstract: This project seeks to identify and analyze student recruitment and retention rates for three Minnesota state universities in Greater Minnesota, then draw conclusions about recruitment and retention issues for the entire Minnesota State system. The three universities are Southwest Minnesota State University, Minnesota State University Mankato, and St. Cloud University. The research gathered for this study came from SMSU's director of research and reporting, interviews, and publicly available data. The recruitment and retention of students are extremely important to the success and sustainability of every Minnesota State University campus. These performance measures are crucial for measuring and maintaining each university's academic quality, support services, short- and long-term planning and impact upon host communities and regions.

64
Title: Rural Broadband: Improving Education in the 21st Century
Presenter(s): Jake Samp
Advisor: Dr. David Sturrock, Political Science
Abstract: A significant portion of Lyon County, Minnesota is underserved with high speed rural broadband. Some families have resorted to driving to the local McDonalds or library so their children can do their homework. This presentation will evaluate the need for rural broadband and how better access to broadband can help rural school districts save money and fight consolidation. The information which will be gathered includes information and statistics about access to rural broadband, the function and operations of "e-learning" days and supporting documents regarding the fiscal savings generated from these "e-learning" days. There is a need for better access to broadband to allow for students to enhance their education outside of the classroom. The rural broadband infrastructure will likely need to be updated to allow for this enhancement.

65
Title: Community Leaders Respond to Immigration Issues in Southwest Minnesota
Presenter(s): Fatou MS Kinteh
Advisor: Dr. David Sturrock, Political Science
Abstract: The United States has a rich and intriguing history of immigration. The number of immigrants coming to the United States has increased as immigrants are escaping poverty and civil strife in their native countries in numbers not seen since World War II. While these immigrants help alleviate worker shortages, start small businesses and enrich the social lives of their communities, they have also created burdens on such local government services as education, housing, health care and infrastructure. My research is focused on how community leaders have responded to these problems in Southwest Minnesota, and the ways in which public opinion influences those responses. For example, it is estimated that immigrants account for at least 20 percent of the population of Worthington. Leaders in that city have created opportunities and opened doors for immigrants to flourish by serving as points of contact for economic development and social integration.

66
Title: How Do College Students Justify Their Deviant Behavior?
Presenter(s): Ryleigh Haynes
Advisor: Dr. Cindy Aamlid, Sociology
Abstract: The goal to my project is to determine how college students justify their deviant behavior. I used a convenient sample of college students for my survey. Students were asked to report on past actions that they have engaged in and explain their reasoning behind why they did it. Previous research indicates that people are more likely to engage in deviant behavior if they can neutralize the guilt from committing the action or if they make it appear normal. The student responses will be compared to nine common neutralization techniques. My presentation will share the results of this study.

67
Title: Gender differences in professional sports
Presenter(s): Osman Osman
Advisor: Dr. Cindy Aamlid, Sociology
Abstract: Gender plays a huge role when it comes to sports. Women sports are generally considered to be inferior compared to men sports. The data from my research shows that male athlete's salaries and women athlete's salaries are like night and day. Women in professional sports are also far more stereotyped than males. Research shows why women receive far less money and are stereotyped far more than men. Media, fans and the athletes themselves are reasons for the outcome. What could be done to reduce this gap includes, advertising women athletes more, raising their salaries, educating the mass etc.

68
Title: University Program Management
Presenter(s): Richard Ayers II
Advisor: Dr. Cindy Aamlid, Sociology
Abstract: My internship involved working with the faculty and office of Access, Opportunity, & Success(AOS). During my internship I worked on some projects such as safe space, mustang pathways and campus climate surveys. My main project has been coordinating the campus climate focus groups. My presentation will share how sociological concepts are connected to my work in AOS.

69
Title: Effect of Positive and Negative Emotions on Time Perception
Presenter(s): Kortney Genske, Ryleigh Haynes, Parker DeBates & Kimberlee Geuther
Advisor: Dr. Scott Peterson, Psychology
Abstract: Our group is studying the influence of positive and negative emotions on time perception. Humans do not have the best concept of time. We are always losing track of and bending our perceptions of it. Looking at how emotion effects time perception is important and can give us key insights on being able to control how we view time when it comes to emotional situations. We have performed an experiment that included 30 students that were selected by a convince sample to watch a compilation of videos that is meant to influence emotions to be positive, negative, or neutral. Each student was shown one of the three compilations. After the video was complete, we asked the participants to indicate how long they believed the video to be in full length. Our hypothesis is that the participants that were shown the positive videos will view time as faster and the duration of videos to be shorter while the participants that view the negative video set will view time as slower and the duration to be longer. The neutral video is a control condition that will allow us to make these observations. This experiment reflects previous research that has been done to show how emotion can effect time perception.

70
Title: Time Perception and Memory for Simple and Complex Words
Presenter(s): Cassandra Lee, Ivan Carrillo & Katelyn Plendl
Advisor: Dr. Scott Peterson, Psychology
Abstract: This study focuses on if an individual's time perception and memory is impacted when presented with different sets of words. The sets of words were chosen by syllables, complexity, frequency, and imagery levels. The study will take place in four different classrooms at Southwest Minnesota State University with 20-30 students in each. The students will look at one set of the words for 48 seconds. After the set of words is taken off the screen, the students will fill out a form that includes a timeline for estimating how long they looked at the words and a grid of blank lines to recall as many words as possible.

71
Title: The Effects of Personality Differences on Students' Perception of Time While Testing
Presenter(s): Jamie Schell, Cassondra Ohnsorg & Carrie Enga
Advisor: Dr. Scott Peterson, Psychology **Abstract:** The goal of this study was to investigate the effects of personality traits on students' time perception while test taking. The personality traits we focused on were introversion and extroversion as well as the student's level of boredom proneness. Participants were students from General Psychology

classes at Southwest Minnesota State University. The students were instructed to take a survey on D2L that was a combination of the Big Five Personality Test and a boredom proneness scale. Upon completion they were asked to estimate the amount of time they thought it took them to do so. Our hypothesis that we proposed was that introverts will perceive the time it took them to take the test to be shorter than it was, while extroverts will perceive the time it took them to take the test to be longer than it was, indicating that introverts have a faster internal clock than extroverts.

72
Title: Should Corporations Serve the Public Good?
Presenter(s): A. James Gully
Advisor: Dr. Brett Gaul, Philosophy
Abstract: A stakeholder is anyone or anything impacted by a corporation. This includes shareholders, consumers, employees, society, and even the environment. A shareholder is a specific group of stakeholders that happens to own shares or stocks in a corporation. Corporate social responsibility (CSR) refers to the idea that a corporation should consider the impact on all stakeholders, rather than narrowly focusing on shareholders, when making business decisions. To determine whether corporations should serve the public good, we will examine this question from an ethical standpoint and an economic standpoint. Berkshire Hathaway is an American conglomerate that emulates the commitment to CSR of its founder, Warren Buffet. The S&P 500 is an index that measures the U.S. stock market by examining the performance of 500 publicly traded corporations. To provide the economic standpoint, we will compare Berkshire Hathaway's performance to that of the S&P 500.

73
Title: Why the Argument of Unequal Consideration of Animals Due to Cognitive Inequality Fails
Presenter(s): Joey Heinen & Katherine Knights
Advisor: Dr. Brett Gaul, Philosophy
Abstract: The topic of animal welfare is often complicated and divisive, especially when it comes to matters of law and ethics. We examined the current state of animal welfare, primarily their legal considerations and compared them to those of humans. A popular argument to justify lesser consideration for animals is due to them possessing less cognitive ability in comparison to people. However, many would consider it immoral to offer less consideration for humans of reduced cognitive ability, such as infants or the mentally impaired, and there are many statements of human rights that maintain equality amongst us regardless of such differences. Thus, we determined that this argument was insufficient for justifying less consideration for the interests of animals under the law.

74
Title: Which is Better: Direct Democracy vs. Representative (Indirect) Democracy?
Presenter(s): Jessica Stai
Advisor: Dr. Brett Gaul, Philosophy
Abstract: Democracy is a form of government that more than half of all countries use, so we should obtain the knowledge to comprehend the two types: direct democracy and representative (indirect) democracy. This information was obtained by researching and studying multiple sources. Philosophers analyze the forms of democracy, and it is surprising how much they criticize them. Since it is in high use, democracy is thought to be very just. However, it has some flaws. Of the two main forms of democracy, which one appears to be better: direct democracy where all citizens get a vote or representative (indirect) democracy where elite, elected officials represent a group of people? Direct democracy may seem to be the better option, but it works for a smaller population and may develop into a demagoguery. Representative (indirect) democracy has its flaws but works for a larger population.

75
Title: Intended Effects of Rochester's Destination Medical Center
Presenter(s): Rachal Albrecht
Advisor: Dr. David Sturrock, Political Science
Abstract: Rochester is the third largest city in Minnesota and home of the world's best-known hospital complex, the Mayo Clinic. Recognizing competition from emerging medical hubs in the United States, the Middle East and elsewhere, the clinic and its host community have developed a 20-year Destination Medical Center plan. The program is estimated to cost $5.6 billion and will be the largest-ever economic development initiative in Minnesota. I have interviewed DMC board members, Mayo employees, community members, and tracked local news coverage, in hopes of analyzing the plan's effects on Rochester. The results indicate a mixed set of perceptions, with board members and Mayo staff expecting many benefits for the city and region while unaffiliated residents are concerned about such side effects as housing costs and traffic density.

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