

Wednesday, April 3

STUDENT ACHIEVEMENT CONFERENCE 2019

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Curiosity
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BEMIDJI
STATE UNIVERSITY

WELCOME



Dr. Faith Hensrud
President, Bemidji State University

Welcome to the 2019 Student Achievement Conference at Bemidji State University. This day of discovery marks another milestone of success in the intellectual development and personal growth of our students. It is testament to BSU's ongoing mission of teaching, exploration, and reflection — all crucial to fulfilling our vision of preparing students to lead inspired lives. This annual event is a culmination of learning and accomplishment across multiple disciplines as evidenced by the research, innovation, and creativity seen in the student's presentations, posters, and performances. The conference reflects the interactive relationship between students and faculty and exemplifies the university's rigorous and engaging academic environment. I encourage you to take part in these events, which I am sure you will find both invigorating and fascinating. We are very proud of our students and their fine work.



Dr. Mahmoud Al-Odeh
Director, Student Achievement Conference

It is my great pleasure to welcome you to the 2019 Student Achievement Conference, which celebrates students' high quality research and creative work. The conference is evidence of the extraordinary learning environment that we have at Bemidji State University. This is a great opportunity to show the significance of research and creative work across many fields and exchange ideas, methods, and views. A wide range of topics will be shared today including: scholarly research, case studies, community projects, art exhibits, and musical performances. I am very happy and grateful that so many distinguished students have come today to share their knowledge and experience. Thank you to all students, faculty, and staff members for their efforts in developing the presentations, and thank you to the many others who have generously helped plan this special day.



Dr. Ed Galindo
Keynote Speaker

Dr. Galindo (Yaqui, American Indian) is a faculty member at the University of Idaho, associate director for education and diversity for the NASA Idaho Space Grant Consortium, affiliate faculty member at Idaho State University (biology) and affiliate faculty member at Utah State University (physics). Galindo has extensive education and research in working with Native American students. While serving as chairman of the science department on the Shoshone-Bannock Indian Reservation, he was twice elected as the National Indian Teacher of the Year, awarded by the National Indian School Board Association. Galindo is currently serving as a board member with the Barry M. Goldwater Scholarship and Excellence in Education Foundation. Most recently, he was inducted as a lifetime (Sequoyah Fellow) member of the American Indian Science and Engineering Society (AISES) for research and educational outreach in the American Indian communities.



Savannah Corradi
Student Keynote Speaker

My name is Anna (Savannah) Corradi. I am currently a sophomore at BSU, and I am majoring in biochemistry with a cellular and molecular emphasis. When I was a junior in high school, I started doing research with Dr. Mark Wallert after he gave a presentation at my high school. Since then, I have been working on characterizing two ovarian cancer cell lines. I hypothesize that if we combine cariporide, a NHE1 inhibitor, with a common ovarian cancer chemotherapy drug, it will promote synergism. This means that the combination of these is more powerful at killing cancer cells, or stopping their growth, than either can alone.



ORAL PRESENTATIONS SESSION I

10:30 - 10:50 a.m.

HS 103

Facilitator: Jessica LeTexier

Title: *Marketing Management Figure Skating Project*

Presenter: Kallie Hoplin

Sponsor: Kelly La Venture

Abstract: During the months of January, February, and March, marketing materials were made for Bemidji Figure Skating Club's upcoming figure skating show. I will be presenting on the marketing materials that were made for this show.

HS 105

Facilitator: Veronica Veaux

Title: *Transforming Your Passion into a Planned Business: Solar Powered Food Dehydration*

Presenter: Lyliane Tchouamo

Sponsor: David Towley

Abstract: Food processing is the transformation of agricultural products into food of different forms, taste, and texture. I will present on the design, fabrication, and testing of a prototype food dehydrator that I developed using solar photovoltaic panels and standard household equipment.

HS 111A

Facilitator: Carl Isaacson

Title: *Star Island Forest Dynamics*

Presenters: Courtney Anderson, Nathan Anderson

Sponsor: Mark Fulton

Abstract: We investigated forest dynamics on a one-hectare (100 m x 100 m) plot within Star Island, Cass Lake, Minn. The plot was established in 2001 and contains 926 trees that have been mapped and re-measured at 3- to 8-year intervals. We measured stem diameter and tallied mortality of previously measured trees and ingrowth of new saplings. Every stem greater than 5 cm was measured. Mode of mortality, such as tip-ups, pins, trunk snaps, and standing dead trees were noted. Red and white pines continue to dominate the plot. The highest proportional mortality rates occur in the smallest sizes of shade-intolerant species such as jack pine, paper birch, and red pine. Red and white pine experienced the greatest amount of growth, whereas paper birch had moderate growth. The red maple and balsam fir showed slower growth at larger sizes. Some ingrowth of intermediate to high shade tolerance species occurred since the last survey. The observed changes are consistent with classical forest succession driven by competition for light.

HS 111B

Facilitator: Sarah Cronin

Title: *Equitable Counseling Services: Focus Groups at BSU*

Presenters: Gillian Boily, Zoey Griffin, Haley Hardy, Ashley Kirchoff, Madison Ulrich

Sponsor: Sarah Cronin

Abstract: This research is about the connection between retention and access to counseling on college campuses. The presentation consists of a literature review about the importance of counseling on college campuses and will discuss in-progress research. We will hold 90-minute focus groups with a semi-structured interview asking about student perceptions of the Student Center for Health and Counseling. We will hold three focus groups for three different student populations: students who have received counseling, indigenous students, and students who have not received on-campus counseling. Focus group data will then be transcribed and coded for themes. Results can help inform policies for student access to affordable counseling on campus. The findings can benefit BSU students and counselors.

ORAL PRESENTATIONS SESSION I

10:30 - 10:50 a.m.

CONTINUED

HS 113

Facilitator: Jim White

Title: *How Does Exercise Influence Quality of Life in Adults 50+ Years in Faith Communities?***Presenter:** Reed Marohn**Sponsor:** Jim White

Abstract: Mounting evidence indicates that older adults would benefit from regular physical activity. The purpose of my study was to explore trends and themes of the effects of exercise into the senior years. After receiving IRB approval, this study surveyed adults 50 years and older who are faith community members (FCMs) from the upper Midwest. Questions were asked about their physical activity levels from a demographic questionnaire (DQ) as well as their overall Quality of Life (SF-36). Responses were then tallied and analyzed to examine trends and differences in the data. Preliminary results suggest that a significant percentage of study participants felt that their health was limited by their inability to engage in vigorous physical activity. However, the results of the SF-36 and DQ suggest that regular physical activity and exercise positively impacts their career and work performance as well as their mental health and mood. Additional descriptive data of statistical differences between groups will be presented. This research investigated how gender, age and health status impacts FCM physical activity and exercise levels and quality of life. This research may help lend insight into the health and activity levels of older adults who are members of local faith communities.

HS 214

Facilitator: Patrick Donnay

Title: *For-Profit Prisons: How Lobbying Has Affected the Way America Houses Prisoners***Presenter:** Jacob Israel**Sponsor:** Patrick Donnay

Abstract: There seems to be limited research and understanding as to why for-profit prisons exist in the United States. The initial selling points used to sell private prisons to states and counties were that they would reduce recidivism and cost. Recent peer-reviewed studies have found, however, that neither is the case. This could lead one to ask why for-profit prisons are still used in America. That is what I hoped to answer in this research. After research and analysis of campaign donations by the two largest for-profit prison corporations (collected from the National Institute on Money in State Politics) and changes in the population of prisoners held in for-profit facilities (collected from the Bureau of Justice Statistics), I found that the states that have seen an increase in the number of prisoners in for-profit facilities have a higher mean number of dollars donated to elected officials. This seems to indicate that decisions regarding incarceration may have more to do with campaign donations than justice.

HS 228

Facilitator: Julie Curtis

Title: *Isolation of a Novel Bacteriophage that Infects Biofilm Forming Bacteria; Pseudomonas Aeruginosa***Presenter:** Krysta Sanders**Sponsor:** Holly LaFerriere

Abstract: The human mouth has a diverse ecosystem that includes both bacteria and bacteriophages. When this ecosystem becomes unbalanced, dental issues arise such as dental caries, dental abscesses, gingivitis, and periodontitis. Antibiotics can be used to treat some of these issues; however, bacterial strains have evolved that are resistant to antibiotics. When resistance occurs, bacteriophages may be utilized to restore dental health. However, this requires well-isolated bacteriophages that are fully characterized to be used in a procedure called phage therapy. Through the discovery and characterization of bacteriophages that kill the most common, harmful bacteria that affect dental health, we may obtain a new treatment tool. This research focuses on the isolation of a novel bacteriophage that infects *Pseudomonas aeruginosa*, a common cause of infection. An enrichment procedure was performed using nutrient broth, filtered wastewater, and *Pseudomonas aeruginosa*. Bacteriophages were isolated using the soft-agar overlay method and selection of well-isolated plaques. Following multiple rounds of isolation, a single bacteriophage strain was obtained. Characterization of the bacteriophage included the determination of a one-step growth curve, thermostability testing, electron microscopy, and DNA isolation and sequencing.

ORAL PRESENTATIONS SESSION I

10:30 - 10:50 a.m.

CONTINUED

HS 229

Facilitator: Tiffany Hommes

Title: *Strengthening the Bridge Between Church Communities and Sustainability*

Presenters: Kylie DeGrote, Michelle Holbeck

Sponsor: Jordan Lutz

Abstract: According to the Pew Research Center on Religion and Public Life, only 28 percent of Evangelical Christians believe that human activity is contributing to climate change. The majority of Evangelical Christians, 88 percent, believe that God does miracles. While this may be true, many Christians use this as a reason to not live sustainably, under the premise that God will intervene if climate change is really a problem. This ideology is also seen in plastic use, resource use, large scale meat production, and many other issues regarding sustainability. This study will outline this issue and provide possible solutions in bridging the gap between the Christian communities and science/sustainability based on current research, the researcher's personal experience, and the work being done in the Bemidji community.

HS 230

Facilitator: Tammy Bobrowsky

Title: *The Correlation Between Amphipod Density and Macroinvertebrates in the Minnesota Prairie Pothole Region*

Presenters: Alissa Chalberg, Brad Morris

Sponsor: Richard Koch

Abstract: The densities of Amphipoda (*Gammarus lacustris* and *Hyalella Azteca*) have substantially declined across the North Central and Prairie Pothole regions located in the upper Midwest in the U.S. Despite the importance of these invertebrates, as detritivores and food for wildlife, factors affecting their distribution in Minnesota have yet to be thoroughly examined. This study assessed macroinvertebrate diversity in three wetlands containing amphipods compared to three that did not. The wetland sizes range from 2 to 13 acres. Preliminary results suggest that wetlands having higher concentrations of amphipods have statistically more macroinvertebrates and a higher overall diversity. This finding could suggest that amphipods may enhance wetland diversity of other macroinvertebrates, or that amphipods are responding similarly to other invertebrates to unidentified environmental conditions.

HS 231

Facilitator: Miriam Rivera-Hokanson

Title: *Sonata Theory In Schubert*

Presenter: Bailey Harkins

Sponsor: Miriam Webber

Abstract: This paper intends to explore Sonata Theory and how it could work in art song. Sonata Theory mainly deals with instrumental music without considering any texted genres. I will argue that this theory is also applicable to art song, given harmonic and formal similarities between the two. The art songs that will be discussed are excerpts from Franz Schubert's song cycle titled *Winterreise* (Winter Journey). I will be talking about how exactly sonata form could work with these, and how specific processes such as the medial caesura help prove this argument. A connection between text and meaning within the form will also support this reading.

HS 233

Facilitator: Angela Fournier

Title: *Does Anyone Trust the Government Anymore? Or Does it Depend on Who You Ask and When You Ask Them?*

Presenter: Marliana Yerbich

Sponsor: Patrick Donnay

Abstract: Political scientists have been curious about trust and its impact on the government for years. They have learned that governments who have earned the trust of their citizens are more effective in serving the people and are generally able to accomplish more. However, do levels of trust in government depend upon a person's party affiliation and the party in power? Does partisan trust also vary depending on gender, race, education, or income level? I analyzed data from the American National Election Survey (ANES) over time and I concluded levels of trust in government rise and fall as the power in government shifts back and forth between the two major parties. I also found interesting variations to trust levels when I looked at the different demographics of the respondents. My research shows levels of partisan trust move up and down depending on which party controls the government. Further, there is not a significant level of change in trust for a 14-year period. This suggests the attention focused on the increasing polarization of society and how it affects our view of government may be overstated.

ORAL PRESENTATIONS SESSION I

10:30 - 10:50 a.m.

CONTINUED

HS 245

Facilitator: Danielle Smith

Title: *Student Spotlight***Presenters:** Jared Henning, Timothy Nelson, Tia Neuharth, Donelle Omer, Rupesh Thapa**Sponsor:** Michelle Frenzel

Abstract: Recognizing student success creates a positive culture at Bemidji State University, emphasizing the value of attending this institution. Each semester will highlight a diverse group of successful students who embody BSU's Shared Fundamental Values:

- Civic engagement and leadership
- International and multicultural understanding
- Belief in the power of the liberal arts
- Environmental stewardship

Join representatives from the President's Student Commission to learn more about how we will recognize students in the Student Spotlight.

HS 247

Facilitator: Amber Laffin

Title: *A Cross-National Analysis of Gun Ownership Rates and the Incidence of Firearm-Related Deaths***Presenter:** Codie Rasmussen**Sponsor:** Patrick Donnay

Abstract: In the United States, gun control laws are a highly controversial topic. Some researchers have concluded that having more guns in a country makes it more likely that there are more crimes committed with these guns. Other researchers conclude that having more guns will allow more people to defend themselves from possible attackers. I examined this to test which theory proves to be the most accurate. Other research that I read tested variables such as Gross Domestic Product (GDP), inequality, and government rule. The data I used for firearm ownership came from a Small Arms Survey, by the Graduate Institute of International and Development Studies in Geneva, Switzerland, published in 2017. Data on firearm deaths is from the International Classification of Diseases (ICD-10) from the World Health Organization. Tentatively, the data has shown that the higher gun rates lead to fewer gun deaths, but just as significant is the score of democracy, the effectiveness of the governments, and the country's GDP. This means that there isn't one catch-all solution to high rates of gun deaths, but an array of causes into a country's rate of firearm deaths.

HS 248A

Facilitator: Gabriel Warren

Title: *Capstone Project: Building a BSU 100 Year Anniversary Clock***Presenters:** Jake Dahlheimer, Derrick DeBoer, Tristin Linn, Nicholas Ogden, Trevor Zeppelin**Sponsor:** Mahmoud Al-Odeh

Abstract: For our capstone project, we are a group of five TADT students working on Bemidji State anniversary clocks. We chose a pendulum clock design, which will sport the original 1919 Bemidji State logo along with aesthetic shopbot technology. The purpose of this presentation is to discuss the process of material selection, design, collaboration, and construction. Throughout the duration of the project, we used advanced problem-solving skills and applied various engineering and management techniques. We will be sharing with the audience our experience in using Solidworks 3D design, V-Carve, Coral Draw, and the use of the shopbot technology. Project management skills were used to develop a schedule and budget, and to control potential risks.

ORAL PRESENTATIONS SESSION I

10:30 - 10:50 a.m.

CONTINUED

HS 248B

Facilitator: Larry Swain

Title: *Capstone Project: Building a Customized Coffee Table*

Presenter: Jeff Korpi, Zoe Lindgren, Casey Sura, Evan Edmundson, Matthew Rugloski

Sponsor: Mahmoud Al-Odeh

Abstract: During the spring semester of 2019, a team of four project management students and I will be building a customized coffee table for the lounge located on the second floor of Bridgeman Hall on the Bemidji State University campus. This coffee table will feature a steel support system, a hardwood tabletop, and a BSU logo that is routed into the top that will be filled with green epoxy. While the table will remain an accent piece to the lounge for long after we graduate and leave BSU, the process will remain with us forever. During this project, we were fortunate enough to reach out to several local vendors, suppliers, and contractors to fund the project. We were highly successful in this, as we managed to have our entire material list donated, thanks to the generous support by Northwoods Lumber Company, Bemidji Steel Company, and Ace on the Lake. I would like to take the time to offer proper gratitude to our wonderful BSU faculty, our dedicated students, and our gracious community that is always willing to lend a hand and provide for our students.

HS 249

Facilitator: Ryan Sayer

Title: *Benthic Carbon Accumulation and Macroinvertebrate Colonization on Artificial Zebra Mussel Substrate*

Presenter: Samuel Peterson

Sponsor: Debbie Guelda

Abstract: Conflicting reports on zebra mussel (*Dreissena polymorpha*) roles of benthic carbon accumulation and macroinvertebrate colonization requires further investigation. Literature predicting how *D. polymorpha* may fundamentally alter benthic communities and carbon is rare. Lake Bemidji, an open mesotrophic system currently uncolonized by *D. polymorpha*, had 160 artificial *D. polymorpha* communities at zero, low (1.06 / cm²), medium (1.84 / cm²), and high (2.63 / cm²) (densities placed onto suitable sites (n=10) for 4- and 8-month intervals. Carbon accumulation was measured using the ash free dry mass method on macroinvertebrate biomass and organic material. Preliminary results show a significantly positive response between overall carbon accumulation and artificial *D. polymorpha* densities (p-value = 0.02). Macroinvertebrate counts also had a significant increase between artificial treatments (p-value = 0.001). Amphipods, the dominant macroinvertebrate taxa, increased by 61% between control and artificial treatments. Zebra mussel engineering capabilities can lead to profound negative impacts on aquatic systems. However, this research suggests that macroinvertebrate communities are enhanced, providing beneficial resources to many other aquatic functions.

ORAL PRESENTATIONS SESSION II

10:55 - 11:15 a.m.

HS 105

Facilitator: Veronica Veaux

Title: *Hagg-Sauer Waste Audit*

Presenters: Jonathan Barcenas, Aili Kultala

Sponsor: Jordan Lutz

Abstract: After conducting multiple years of waste audits on trash and recycling in Hagg-Sauer Hall at Bemidji State University (BSU), data shows there is a large percentage of recyclable items thrown in the trash. In Beltrami County, landfill waste costs \$218.49 per ton of material whereas the cost for clean recyclables is \$150.55 per ton. These associated costs of landfill waste can be a burden for BSU. Improving recycling rates at BSU would reduce the cost paid to dispose of landfill waste. The presenters worked on a recycling project where they analyzed contamination trends of compostable materials, fibers (paper products), containers (plastic), liquids, and brown paper towels introduced into the garbage destined for the landfill. They found these products all have potential to be diverted from the landfill and instead be recycled or composted. Therefore, they believe there is potential to further reduce the percentage of recyclable items ending up in trash receptacles and ultimately the landfill. The presenters will share their project experience and will provide recommendations and tips on practices to improve recycling rates.

ORAL PRESENTATIONS SESSION II

10:55 - 11:15 a.m.

CONTINUED

HS 111A

Facilitator: Sarah Cronin

Title: *Building Mineral Packets to Measure Magnetic Susceptibility as Indicator of Biochemical Degradation of Oil in the Subsurface***Presenters:** Emily Rapp, Alexandra Torrance**Sponsor:** Miriam Rios-Sanchez

Abstract: Contamination by oil spills have long-term consequences and affect water resources. When the oil is spilled and contaminates groundwater, bacteria present in the subsurface use the oil as a food source. In using this food source, the bacteria generate strong redox gradients and promote the precipitation of iron minerals, creating conditions similar to the electrochemical cell in a battery (in this case a biogebattery). A collaborative project between Bemidji State University, Rutgers University, and the USGS was awarded a National Science Foundation grant to develop geophysics-based methods to measure degradation of oil spilled into the subsurface. The project area is Pinewood, Minn., which is one of the most studied oil spills in the country. Packets of minerals were assembled and installed in selected wells, to carry out magnetic susceptibility logs. Magnetic susceptibility has been used as an indicator of bacterial activity. This presentation will explain the methods to build the packets and the hydrological criteria to select the wells, establish the depth of installation, and some initial results.

HS 111B

Facilitator: Sarah Cronin

Title: *Healthy Minds Survey***Presenters:** Lamour Damar, Adrianna Horien, Anna Levene, Courtney Smith**Sponsor:** Sarah Cronin

Abstract: This presentation will outline a collaborative research effort between BSU students and a faculty member. Together they have created a research lab called PRICE (Promoting Retention, Improving Counseling Equity). The current study in this lab is to observe the relationship between mental health and retention. The Healthy Minds Survey (HMS) is a multi-faceted survey that measures topics about mental health, persistence, and retention. A random sample of 4,000 students will be invited to complete the HMS. The survey consists of the following modules: Persistence and Retention, Knowledge and Attitudes About Mental Health and Mental Health Services, Mental Health Status, Mental Health Service Utilization and Help-Seeking, and Demographics. Multiple regression analyses will predict what mental health factors lead students, especially students of color and low-income students, to seek services as well as persist in their academic progress. It is hypothesized that mental health symptoms and personal stigma about seeking counseling services will have a significant, inverse relationship with retention. That is, students who report more mental health symptoms and a stigma of seeking help will report lower likelihood of retention. Results will help us to understand BSU's retention and its relationship with student mental health.

HS 113

Facilitator: Jim White

Title: *Passive Solar Greenhouse and Aquaponics to Address Local Food Security***Presenter:** Rachel Schaap**Sponsor:** Anna Carlson

Abstract: Growing produce in northern Minnesota has always been a challenge given short summers and long winters. Usage of passive solar greenhouses allows for year-round vegetable production with little external utility input. By utilizing aquaponics, it further closes the input loop and helps stabilize inside greenhouse temperatures. The year-round growing capabilities will allow for continued availability of farm fresh, locally grown leafy greens, head lettuce, root vegetables, and much more. With this ability of year-round production, we can start to address food securities in the local area. My presentation will address how this project will help resolve many of the barriers community members face when trying to provide healthy foods for their families. During the summer growing season, many local farmers are able to provide a great selection of fresh produce at a very reasonable price point. By using passive solar greenhouses and an aquaponic system, local food production and low costs can continue throughout the year. I also will show how this approach will grow vegetables more rapidly with less water and energy consumption than traditional soil growing. My sustainability project design will be the first step in providing a solution to local food security while being responsible environmental stewards.



ORAL PRESENTATIONS SESSION II

10:55 - 11:15 a.m.

CONTINUED

HS 214

Facilitator: Mark Christensen

Title: *Languages Are Identity*

Presenter: Serena Graves

Sponsor: Vivian Delgado

Abstract: I am a sophomore at Bemidji State University, majoring in Indigenous studies. I am a peer advisor and tutor, and I host Ojibwe language table on campus. In addition to student work and being a full-time student, I also work at the Red Lake Immersion School. My presentation will provide direct insight into my road of being an Ojibwe student navigating academia, while simultaneously learning my language, inside and outside of school. With the identity that my language has given me, it has been the vessel to my success here at Bemidji State. I will be providing research that showcases what languages can do for Indigenous students, as well as how much Indigenous students thrive when they have their languages, which results in having their identities. The significance in implementing my story into this presentation would showcase not only suggested research, but also a product of that research. In addition, my presentation is also relevant to Bemidji State's geographic location, as it is in Ojibwe territory.

HS 228

Facilitator: Julie Curtis

Title: *CARE Training: A Bystander Intervention Program*

Presenters: Sydney Anderson, Breanna Baker, Jheanelle Channer, Autumn Huju, Corey Stockman

Sponsor: Jay Passa

Abstract: Scheduled Presentation CARE training is a sexual violence prevention program. We feel that it is on us to create an environment at Bemidji State University in which sexual assault is unacceptable and survivors are supported. Topics that will be discussed in this training will include steps to ending rape culture, what consent is and is not, bystander intervention, confidential campus, community resources, and reporting options. Bystander intervention is when someone steps in and interrupts a potentially harmful situation. This training is geared toward helping you to develop the knowledge and skills to intervene. This training is sponsored by the Lifestyle Educators, a peer education organization on campus that promotes health, wellness, and safety of students. Please join us to learn more about sexual violence prevention and how you can help promote a safe campus community.

HS 229

Facilitator: Kate Larson

Title: *We are Human PSA*

Presenters: Arianna Adams, Carissa Decko, Allyna Storms, Morgan Weller

Sponsor: Kate Larson

Abstract: For our project, we interviewed two different parties that had experience with a mental disorder. We asked about their experience with the disorder, stigma, how they feel that the stigma could be reduced, and how people with a disorder could be treated better. The first individual was a female in her mid-twenties who was incorrectly diagnosed with depression at age 16 and the other party we interviewed were a set of parents who gained legal custody of a fourteen-year-old child within the last five years. The child has a history of sexual and physical abuse and has behavioral problems that have led to a juvenile criminal record. In both interviews, the subjects felt that they were isolated and that people avoided them. Common themes between both parties were issues of professionals not taking their cases on an individual basis and over-generalizing, and seeing the disorder instead of the person. As a result, our PSA video inspires audiences to see the person instead of the disorder. Our presentation will consist of discussing our interviews, group dynamics, a showcasing of the PSA video, and the key takeaways we learned from conducting our "We are Human" public service announcement.

HS 230

Facilitator: Tammy Bobrowsky

Title: *Electoral Competitiveness and Social Media Strategies: Who Goes Negative, When and Why?*

Presenter: Connor Brown

Sponsor: Patrick Donnay

Abstract: Social media is becoming more integrated into every politician's career. Previous research suggests that throughout an election, a challenger is the one who is more likely to use negative campaigning while running for office. I analyze what strategies are being used by challengers and incumbent candidates. The data I use is provided by Zachary Auter and Jeffrey Fine (2016) accessed through the Harvard Dataverse. Their data looks at both the 2008 and 2010 elections where we began to see politicians use Facebook ads in their campaigns. I find that a challenger is more likely to adopt negative messages while they are running and are behind in the polls. I also examined several campaigns from 2018 and found similar social media strategies. This confirms the increasing importance of social media in American elections.

ORAL PRESENTATIONS SESSION II

10:55 - 11:15 a.m.

CONTINUED

HS 231

Facilitator: Miriam Rivera-Hokanson

Title: *Mexican-American War Through the Lens of Southern Newspapers***Presenter:** Miles Jensen**Sponsor:** John Ellis

Abstract: This presentation will analyze the newspaper coverage of James K. Polk's presidency to explore how southerners viewed the causes and consequences of the Mexican American War. It will compare the commentaries of Whig and Democratic newspapers published in the slaveholding South in order to determine each party's contrasting opinions on the war and the tensions over slavery that emerged in its aftermath. This presentation will also analyze how the opinions of both southern Whigs and southern Democrats differed from those of their northern counterparts. President Polk spent most of his presidency making controversial decisions in his pursuit of territorial expansion. His contemporary critics and recent historians both agree that he stoked southerners' support for the war by fostering their greed and racism and promising them new slave territories. This presentation will contend that the interregional and inter-party tensions that resulted from Polk's presidency planted the seeds of the American Civil War.

HS 233

Facilitator: Angela Fournier

Title: *Is Less Really More? Evaluating the Potential for Combination Therapies in Ovarian Cancer Treatment***Presenters:** Savannah Corradi, Alaina Larson**Sponsor:** Mark Wallert

Abstract: Chemotherapy drugs continue to be the main therapy utilized in ovarian cancer treatment. However, the universal praise of these pharmaceuticals is often compromised due to their adverse side effects. Such a reality fostered the development of this project. It is believed that the pairing of chemotherapeutics with direct and indirect NHE1 protein inhibitors, will procure a synergistic effect in which the combination is more proficient at reducing cancer growth than either compound can alone. The success of this combination therapy is primarily measured through XTT proliferation assays. These assays allow for a quantitative assessment of each inhibitor-drug combination and are used to facilitate dose-response profiles. Current data indicate that the inhibition of NHE1 may serve as a potential therapy in ovarian cancer treatment, allowing for a reduction in the required drug dosage and subsequently patient discomfort. Such combination therapies may also limit the rate of disease recurrence that is experienced by nearly 70% of ovarian cancer patients.

HS 245

Facilitator: Danielle Smith

Title: *Does Students United Matter? Analyzing the Strength of the Student Senate Association's Effect on State Higher Education Funding***Presenter:** William McNeely**Sponsor:** Patrick Donnay

Abstract: I look at the impact Student Senate Association types have on higher education funding at the public university and college level across all 50 U.S. states. Many factors affect higher education funding during a funding cycle, and there are many competing theories such as the business cycle model and the balance wheel model. These theories work to explain the amount of higher education funds allocated.

I address and compare these theories while seeking to analyze the influence of Student Senate Association on higher education funding. Data sources include Grapevine data from Illinois State University on higher education spending in the states from 2013 through 2018. Data from the Student Empowerment Training Project that identifies individual state Student Senate Association type was also used. My findings conclude there is no significant result of Student Senate Associations increasing higher education funding on average across the states. However, despite these mixed results, some individual state Student Senate Associations may aid in higher education funding.

ORAL PRESENTATIONS SESSION II

10:55 - 11:15 a.m.

CONTINUED

HS 247

Facilitator: Amber Laffin

Title: *A Graph Theory Problem to Engage Students in Generalizations*

Presenter: Kylie Higgins

Sponsor: Jenna O'Dell

Abstract: Learn how I used an unsolved graph theory problem to help students create generalizations and engage in mathematical discussions. I will share an interesting problem and how students worked through solutions. Leave with ideas of how to challenge your students' thinking!

HS 248A

Facilitator: Gabriel Warren

Title: *Evaluating the Role of NHE1 Palmitoylation in the Regulation of Cell Proliferation and Migration*

Presenter: Stephanie Hanowski

Sponsor: Mark Wallert

Abstract: The Na⁺-H⁺ Exchanger Isoform 1 (NHE1) is a key regulator of cell proliferation and migration in a range of cell types. Activation of NHE1 is an initial step in the development of the transformed phenotypes of cancer cells and therefore a key driver for tumor development and cancer progression. NHE1 contributes to two of the hallmarks of cancer; the activation of invasion, and metastasis and sustained proliferative growth. We have identified for the first time, that NHE1 undergoes reversible palmitoylation, the addition of a palmitic acid residue to the cytoplasmic regulatory domain of NHE1. This suggests that targeting the potential palmitoylation sites on NHE1 may provide a therapeutic target for cancer treatment. This research evaluates the role of NHE1 palmitoylation in two cell lines: 1) Chinese hamster lung fibroblasts expressing human NHE1 (PSN) and 2) Human embryonic kidney (HEK293). We hypothesize that inhibiting palmitoylation will alter the regulation of NHE1 and decrease the rates of cell proliferation and migration. Cell growth and migration were evaluated in the presence and absence of two different chemical inhibitors: 1) 2-bromopalmitate (2BP) and 2) cariporide. These data demonstrated that inhibiting the palmitoylation of NHE1 decreases both cell proliferation and the rate of cell migration.

HS 248B

Facilitator: Larry Swain

Title: *Engineering a Native American Style Flute*

Presenters: David Harris, Riley Pettit

Sponsor: David Towley

Abstract: In fall semester 2018, we were engaged in a project to research, design, and manufacture Native American-style flutes for Bemidji State University. This was for an experimental class headed by Dean Barta to teach students both how to play the flute and the cultural significance behind it. Part of the curriculum was allowing the students in the class to make their own flute, which required us to proceed from initial design through the fabricating process in less than a semester. The result was a batch of 30 flutes produced through a controlled but labor-intensive process that provided the students each a tuned flute of their own to which they could add their individual finishing touches. This semester we are designing a new mechanism to make the process faster, more accurate, and more repeatable. We will go over our progress and explain what we changed between the initial run of flutes and the improved process. There is certainly a lot to cover with lessons learned through this project.

HS 249

Facilitator: Ryan Sayer

Title: *Biodiesel for Bemidji State University*

Presenter: Lane Lipsy

Sponsor: Anna Carlson

Abstract: My project is about Biodiesel for Bemidji State University. Biodiesel is a form of diesel fuel that is converted from crop oils, waste oils, and animal fats into usable fuel in any diesel engine. Many universities have kitchens producing waste oil, so why not turn waste oil into fuel? The process can range from a university with basic chemistry tools being able to produce a beaker full of biodiesel, to large scale university investments pumping out fifty-gallon drums or more. The most important reason why I believe biodiesel is critical for Bemidji State University is our pledge to be carbon neutral by 2050. Biodiesel is a much less polluting diesel fuel meaning less carbon emissions. Everything in the process I am currently proposing has been tested and conducted by the University of Idaho. Insight from our faculty and students along the way may benefit from advancements in the process. We can implement the procedures to produce biodiesel in the lab courses that chemistry students take so they get hands-on experience producing fuel for Bemidji State University and the material is applicable to what the students are learning from chemistry class.

ORAL PRESENTATIONS SESSION III

11:20 - 11:40 a.m.

HS 103

Facilitator: Jessica LeTexier

Title: *Portfolio Show***Presenter:** Matthew Sauser**Sponsor:** Monika Lawrence

Abstract: I will present a photography portfolio which centers around my work as a photographer of campus activities, sports in particular. My presentation captures different aspects of student life in general with a focus on student athletes as well as events in the broader Bemidji community. In a video, I will demonstrate the process of editing of photos to give viewers an idea about how these images have been transformed. Students will be invited to ask questions about the entire photographic process from planning to capturing the images, to selecting the best, and to do the final edit.

HS 105

Facilitator: Veronica Veaux

Title: *Light Board***Presenters:** Nathan Gramse, Nicholas Ogden**Sponsor:** Michael Lund

Abstract: In this presentation, we will be introducing our light board project, which is our senior project in Applied Project Management, TADT 4893. The light board is a transparent, frontward facing clear dry erase board, designed for use as a teaching tool for online courses. Lectures are recorded and, after some post-video processing, uploaded to YouTube or D2L for online students. The purpose of this presentation is to discuss the process of material selection, design, collaboration, and construction. Throughout the duration of the project, we used advanced problem-solving skills, applied various engineering tools, such as SolidWorks, and put project management methodologies to practice.

HS 111A

Facilitator: Sandra Kranz

Title: *Historical Trends in People of the Environment Enrollment and Why this Class is Important***Presenter:** Courtney Anderson**Sponsor:** Erika Bailey-Johnson

Abstract: People of the Environment is an interdisciplinary course that has been offered since 1998 to fulfill Goal Area 10. Goal Area 10 objectives are to have students understand the relationship between ecosystems and human activity, patterns of bio-physical and socio-cultural systems, institutions various approaches to handling environmental issues, having students think critically about these issues, propose solutions or lifestyle changes to issues, and being able to defend the actions they take on environmental issues. The University previously offered this class as the only option to fulfill this goal area. Beginning in Spring 2014 the university allowed other courses such as biology or geology to fulfill this area with a companion sustainability class. Starting in Spring 2016 other courses were permitted to fulfill this goal area without the companion sustainability class. Students were able to take Biology I, Geology, Environmental Math, or Intro to Environmental Science instead. Because of these changes enrollment in People of the Environment has decreased. The learning outcomes of People of the Environment are different from other courses in Goal Area 10. Based on student surveys, People of the Environment has a stronger outcome of forming a pro-environmental mindset than the other courses.

HS 111B

Facilitator: Sarah Cronin

Title: *Evaluation Regarding the Barriers to Seeking Counseling***Presenters:** Danielle Maijala, Alyssa Pajari**Sponsor:** Sarah Cronin

Abstract: Due to various barriers, students often avoid seeking out counseling services. This evaluation recruited students via email and word of mouth to complete an online evaluation survey. The survey asked about barriers students experience if they desire to seek help at BSU's Student Center for Health and Counseling. The purpose of this evaluation was to identify demographically which students are less likely to use counseling services and to examine barriers that inhibit students' use of counseling services, especially for native students and students of color. This project is focused on the relationship between retention and student well-being. Preliminary results ($n = 343$) show evidence that students of color report being less likely to seek counseling services when insurance is billed, $X^2(12, 343) = 21.95$, $p < 0.05$, and that low-income students report being more likely to seek counseling when services are no cost to them, $X^2(8, 343) = 14.64$, $p < 0.05$. By understanding more about mental health and well-being on campus and barriers that currently exist to BSU students who want to seek services, BSU's Student Health and Counseling Services could improve their model to serve more students in need. Thus, creating greater opportunity for students to receive the support they need.

ORAL PRESENTATIONS SESSION III

11:20 - 11:40 a.m.

CONTINUED

HS 113

Facilitator: Jim White

Title: *Title IX: Reframing the Three-Prong Test to Assess Bias Against Male Athletes*

Presenter: Abigail Niles
Sponsor: Patrick Donnay

Abstract: Since its creation in 1972 Title IX has been, in theory, about giving equal opportunity to all. The Three-Prong Test was created to give institutions the “guidelines” they needed to comply with Title IX. Research has shown that since the creation of Title IX, the number of men’s athletic teams and participants in college sports have greatly declined, while women’s sports and the fight for “equal opportunity” have continued. Using data from the Equity in Athletics Data Analysis (EADA) I have compared the years 2006/07 and 2016/17. Over this decade, you can see an increase in male athletic participation. Using the institutional data from the EADA, I analyze institutional compliance via each of the three prongs of Title IX and find complex effects on male athletic opportunities.

HS 214

Facilitator: Mark Christensen

Title: *Poetry Reading: Stoking the Shadow*

Presenter: Christopher Sanderson
Sponsor: Mark Christensen

Abstract: I am a Graduate Student pursuing an M.A. in English. I have worked with published authors during the Northwoods Writers Conference put on by the University for the last two summers. This presentation is a poetry reading using selected poems from my in-progress Creative Thesis. *Stoking the Shadow*, the working title of my project, is a poetry collection that interrogates the construction of human identity in our digitized world. The Shadow is an archetype described by Carl Jung; it refers to the malicious, pessimistic, or depraved aspects of ourselves that we shun from society. The poems I will read probe the clashes between the human body, the queer, primal characteristics of the Northwoods, and the shadows of identity that we project on social media in an attempt to recover a silver lining in a world that sometimes feels desolate and empty.

HS 228

Facilitator: Julie Curtis

Title: *“I, Like the Arch Fiend, Bore a Hell [ish Enlightenment] Within Me”: and the Subversion of Patriarchal Science*

Presenter: Shelley Milton
Sponsor: Jessica Durgan

Abstract: Mary Shelley’s *Frankenstein* has a long-standing critical tradition of revealing the novel’s commentary on prevailing nineteenth-century social anxieties concerning new scientific methodology. However, few, if any, scholars extend this criticism to the way in which the novel and its characters interact with other texts that are themselves overt scientific commentary. Namely, I refer to the significant intertextual relationship *Frankenstein* shares with John Milton’s *Paradise Lost*. In contrast with Shelley’s apparent distrust of scientific endeavor, *Paradise Lost* has its own critical tradition as a pivotal endorsement of Enlightenment-era scientific progressivism. Here I intend to bridge the gap between these two critical traditions. In my presentation, I will propose that Milton’s *Paradise Lost* represents a disruption to *Frankenstein*’s manifest Promethean symbolism, a disruption that makes *Frankenstein* a potential threat to the scientific discourse it enters. Further, I show that by utilizing scientific connections between the two texts in their criticism of organized religion, political rebellion, and domestic hierarchies, Mary Shelley highlights the nature of this scientific discourse as an ideological structure, patriarchally constructed, and ultimately as artificial and monstrous as Victor’s creation itself.

HS 229

Facilitator: Tiffany Hommes

Title: *Form in Opera*

Presenter: Kari Norheim
Sponsor: Miriam Webber

Abstract: Nathan Martin has noted increasing scholarly interest around the topic of formal function in music theory. Still, he notes that little attention has been paid to vocal genres, especially opera. His analysis of Haydn’s works represents an important step toward reconciling this need. This paper will continue Martin’s work by looking into arias from the works of Mozart. I will only cover Martin’s methodology but will expand his research into Mozart’s broader and more complex *Don Giovanni*.

ORAL PRESENTATIONS SESSION III

11:20 - 11:40 a.m.

CONTINUED

HS 230

Facilitator: Patrick Donnay

Title: *State Campaign Finance Reform: Policies That Most Effect Electoral Competitiveness***Presenter:** Drake Wawro**Sponsor:** Patrick Donnay

Abstract: Campaign finance reform has been a topic of debate for some time now, with recent judicial decisions and state policy reforms having significant impacts on state-level campaign financing. The amount of money flowing into state politics continues to reach unprecedented amounts and this is potentially increasing incumbent advantages. This clearly shows the need for an in-depth look at state campaign finance regulation. Using data provided by the Campaign Finance Institute and Holbrook and Van Dunk's (1993) measure of electoral competitiveness, I evaluate state campaign finance regulation, specifically, public financing to candidates, public financing to parties, contribution limits for political action committees, and contribution limits for individuals. The effects of these regulations have differing impacts on the electoral competitiveness among the different states.

HS 231

Facilitator: Keith Gora

Title: *How Blockchain Technology Can Revolutionize Wall Street***Presenters:** Eshfaq Ullah, Zachary Thompson, Cole Schmitz, Kenneth Moen**Sponsor:** Zhe Li

Abstract: Since 2009, with the introduction of Bitcoin, more than 4,000 alternative cryptocurrencies have been created. As people started trading cryptocurrencies and the hype around it grew, the future of decentralized digital currencies has been surrounded by both skepticism and optimism among market participants. What is most interesting about the future of "crypto" is not the currency itself but the technology behind it – Blockchain. In this research, we study some of the macroeconomic effects of decentralized currencies and how blockchain technology is used by cryptocurrencies. Although the most interesting find of our study is the potential of blockchain technology to revolutionize financial transactions in the market. The rest of our research is entirely focused on the functionality and security features of blockchain technology. Our findings indicate that the decentralized ledger technology in blockchain can be the answer to eliminating several security risks and back-office costs for financial institutes in Wall Street. Moreover, the technology can streamline the way Wall Street processes its transactions using smart contracts, thereby eliminating the two major challenges of digital transactions today – controlling the information and avoiding duplication.

HS 233

Facilitator: Angela Fournier

Title: *“Ether”***Presenter:** Samuel Galatz**Sponsor:** Season Ellison

Abstract: Written from September 2016 to present, “Ether” is a multi-genre work following Jeremy, a young adult hospitalized after a mental breakdown. The initial writing stages revolved around the title: “Ether.” Before writing “Ether,” I had written two short stories, “Don’t Blame the Ether” and “Submergence; or, Good Hope Lake,” that revolved around Jeremy struggling with his mental health, college life, and his constant search for escapism. The word “ether” birthed this project as a prequel, with the idea of writing a “triptych” of fiction, non-fiction, and poetry that encompassed the “ether.” “Ether” is the transition of Jeremy’s darkness (his hospitalization) to light (his self-acceptance). The original intended audience was the BFA capstone instructor and honors committee that would review my piece, as it serves as a culmination of my BFA writing and honors studies, however the future intended audience will be young adults, approximately 16-25, looking to learn about mental illness from the perspective of a survivor and written by someone with firsthand experience with the topics discussed. The importance of disabled and under-represented voices is the reason the non-fiction piece at the end is included; to demonstrate the experiences in my personal life that led to this manuscript.



ORAL PRESENTATIONS SESSION III

11:20 - 11:40 a.m.

CONTINUED

HS 247

Facilitator: Amber Laffin

Title: *Retention Survey: President's Student Commission*

Presenters: Kristin Farris, Jalen Frye, Kallie Hoplin, Joseph Richmiller
Sponsor: Jesse Grant

Abstract: Students on the President's Student Commission were interested in examining student retention and satisfaction with a focus on the Gillett Wellness Center, Student Center for Health and Counseling, Academic Success Center, Dining Services, and the Outdoor Program Center. Using Qualtrics, an online survey research instrument, we gathered data from sophomores and juniors (30-90 credits) enrolled at Bemidji State University. Data collected from this study will be interpreted and presented.

HS 248A

Facilitator: Gabriel Warren

Title: *The Effect of Gender on the Recall of Occupations*

Presenters: Danielle Nelson, Nicholas Weidell
Sponsor: Travis Ricks

Abstract: This research investigates how gender of the participant affects the recall of stereotypical male and female occupations. Participants were presented pictures of faces selected from the Chicago Face Database paired with stereotypical male or female occupations. Participants were then presented either matching or mismatching pairings of gender-specific occupations with male or female pictures. Following the presentation of the face/occupation pairings, participants recalled the occupations to the best of their ability and attempted to recognize previously presented faces. It was observed that when male participants were presented pictures of females paired with occupations, they recalled the occupations less than when the occupations were paired with pictures of males. In addition, male participants when presented pictures of males recalled male occupations better than female occupations. These findings indicate that male participants presented a memory bias towards female stimuli by presenting lower recall of all occupations paired with pictures of females. This gender bias of males was also observed with decreased recall of female occupation paired with males.

HS 248B

Facilitator: Larry Swain

Title: *Grotesque or Actually Relatable? Disability in The Heart is a Lonely Hunter*

Presenter: Sarah Williamson
Sponsor: Gary Rees

Abstract: Disabled characters are often interpreted as symbols of the grotesque, especially in Southern literature. However, in the great Southern novel *The Heart is a Lonely Hunter* by Carson McCullers, characters with different disabilities surpass the stereotype of simply being symbols of the Southern grotesque. The experiences that come from having disabilities actually give characters strong connections to the complex issues of race, reform, and passing. My research explores how nonconformity to social constructs of normalcy makes these disabled characters relatable to a wide audience of readers rather than grotesque or different.

ORAL PRESENTATIONS SESSION III

11:20 - 11:40 a.m.

CONTINUED

HS 249

Facilitator: Ryan Sayer

Title: *Winter Stress on Conifer Needles***Presenter:** Kaylee Henagan**Sponsor:** Mark Fulton

Abstract: Conifers continue to carry their leaves through the winter, though they become dormant due to the cold harsh environment. Dormant needles perform minimal photosynthesis and transpiration because their photosynthetic biochemistry has nearly stopped. Dormant needles are more likely to experience higher stress caused by exposure to light than needles that are consistently shaded. In the spring, dormant needles begin to activate their photosynthetic biochemistry due to rising temperatures. Relative water content (RWC) and a measure of potential photosynthetic activity (QY) are two measures of needle physiology that respond to the stress of sunlight. For this experiment, the RWC and QY for a White Pine, a White Spruce, and a Balsam Fir were monitored from the end of February through the month of April. The focus of this experiment is how water content and physiological activity will adapt to light exposure (light vs. shade) through the changing seasons of winter to spring. It is hypothesized that needles exposed to light will be drier than needles in shade and, therefore, will have a lower relative water content. It is further hypothesized that needles exposed to light will activate their photosynthetic biochemistry faster than the shaded needles.

POSTERS

Time: 1 p.m. – 3 p.m. **Hobson Memorial Union Lakeside****Facilitators:** Julie Larson, Travis Ricks

Title: *Capstone Project: Little Free Library***Presenters:** Saige Glaser, Jeffrey Harris, Cooper Heimark, Raymond Rohl**Sponsor:** Mahmoud Al-Odeh

Abstract: Capstone is a class that offers students the opportunity to take what they have learned throughout their undergraduate technology, engineering, or management programs and apply this knowledge in an integrative experience. We are a group of four TADT students working on a project to support the residents of Bemidji, Minn. We are working on building "Little Free Library." Little Free Library is a nonprofit organization that inspires a love of reading, builds community, and sparks creativity by fostering neighborhood book exchanges around the world. We decided on a canoe-design library. This design is chosen to reflect the lake life in Bemidji. The library will serve as a place where the community can gather and keep traditional book-reading alive. After meeting with representatives from the City of Bemidji, they have agreed to have three of our little libraries around town in the city parks. We will explain and discuss the process of developing and implementing this project from start to finish. We will share some of the challenges that we have faced during the process.

POSTERS

Time: 1 p.m. – 3 p.m. **Hobson Memorial Union Lakeside**
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: Debunking Public Opinion: Analyzing Factors Contributing and Consequences of Youth Homelessness

Presenter: Madison Hahn
Sponsor: Rebecca Hoffman

Abstract: The purpose of this poster presentation is to debunk public opinion on youth homelessness, while analyzing factors contributing to and consequences of this social injustice issue. With many factors contributing to youth homelessness, most are centered around familial and social risks negatively impacting a child. These factors could include traumatic stress, aging out of foster care, lack of affordable housing, low wages, and mental health of parents. These factors have negative consequences for youth leading to lower outcomes in academics, mental and physical health, and future life outcomes for the youth. Certain things are currently already being done to address this issue like introducing the Homeless Children and Youth Act, and the development of an act to address barriers improving access to homeless youth. Finally, traps in public thinking are acknowledging current thoughts of homelessness and focusing on reframing the message to create change for this social injustice.

Title: Sexual Violence

Presenter: Elizabeth Jensen
Sponsor: Rebecca Hoffman

Abstract: Sexual violence is something that is not talked about. Society acts like it is nothing and there is no way that it can be happening in my own backyard. Sexual violence can be defined as the following: Some kind of sexual thing that is unwanted or forced onto someone else who does not want to engage in the sexual act (Nidirect, 2018). Sexual violence can be bigger than just rape or trafficking. Sexual violence affects not only the victim but also their friends, family, and loved ones. Sexual violence is more common than some people think. It is expected that every 98 seconds an American is a victim of sexual assault (RAINN, 2019). If that isn't bad enough, every 11 minutes there is a child who will experience sexual abuse/assault (RAINN, 2019). Not only is this an American problem but it is widespread. There is a way to stop or at least alleviate some of the horror that these victims go through so no one else has to deal with the trauma.

Title: The Effects of Zooplankton and Phosphate Concentrations on Chlorophyll-a

Presenters: Alissa Chalberg, Brad Morris, Kristina Rands
Sponsor: Andrew Hafz

Abstract: Phosphorus is often a limiting factor in aquatic ecosystems. Typically, with heightened quantities of phosphorus, the concentration of phytoplankton increases. Meanwhile, addition of zooplankton can decrease the amount of phytoplankton. While both zooplankton and phosphorus effects on chlorophyll-a have been analyzed separately, their combined effects have not been readily studied. This study looked at the effect of increased phosphate concentrations and zooplankton predation on chlorophyll-a production. Water samples from Lake Bemidji were treated with varying amounts of phosphates (32.4, 64.8, 97.2 PO₄/L) and zooplankton (zero, natural lake, doubled) totaling twenty-one samples. Comparing the control to the highest concentration of phosphorus (97.2 PO₄/L), there was a 324.5% increase in chlorophyll-a production. When doubling the amount of zooplankton, we saw a 229.9% increase in chlorophyll-a production. There was a statistically significant increase in chlorophyll-a concentrations with added phosphorus ($P < 0.01$). However, zooplankton's effect on chlorophyll-a concentrations were not significant ($P = 0.26$). Therefore, phosphorus had a more predominant impact on chlorophyll-a production compared to zooplankton. The results of this project can influence future of lentic management. Lake managers could regulate the amount of phosphorus entering an ecosystem to prevent algal blooms and eutrophication.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: Strategy in Implementing Information Technology to Gain Competitive Advantage

Presenters: Eric Ross, Judd Zaspel
Sponsor: Halhana Tarmizi

Abstract: In this study, we explore the ways Information Technology (IT) can be implemented into an organized business plan to give the business a competitive advantage and improve the company's overall efficiency. An efficient and organized company is more likely to have increased profits and more stable income. If used wisely, IT can be the greatest weapon in a company's arsenal. Successful, planned out implementation of IT technology is a mainstream and increasing business venture that many businesses are pursuing. IT can be dangerous. It is very powerful and has been known to take successful companies down with ease. If not used right, IT can swallow a company and create diminishing business structure. On the other hand, IT can organize and interpret business data and day-to-day activities to make data mining more efficient for the business. Employees can be more efficient with IT programs and be able to get more tasks done in a normal day. IT can also make it easier for top level managers to understand operational data at a lower level without giving them information overload. IT makes it easy to understand business operations and to perform data analytics with the various technologies offered.

Title: A Spatial Analysis of Bumblebee Population Over Time

Presenter: Kylee Roy
Sponsor: Jeffrey Ueland

Abstract: This study will examine the spatial dimensions of bumblebee populations in Minnesota. The bumblebee is an integral part of many natural systems. Recently, substantial declines in the population have been noted and it is increasingly among a host of ecological topics that have been linked to climate change. Using basic cartographic and statistical measures, this study will examine if there has been a statistically significant change in the spatial dimensions of bumblebee habit in recent times.

Title: A Third Wave Approach on Perfectionism: Acceptance and Commitment Therapy

Presenters: Sophia Maki, Celine Pliscott, Jon Westcott
Sponsor: Sarah Cronin

Abstract: In layman's terms, perfectionism is characterized by a need or urge to perfect things, which can lead to high stress, overwork/burnout, and/or not trying at all. One therapy that could be used to treat perfectionism is called Acceptance and Commitment Therapy (ACT). It is a new wave therapy that focuses more on learning to live and work with an issue than trying to fix or get rid of it. This systematic literature review sought to answer the question: How effective is ACT as a treatment for perfectionism? We reviewed articles from PsychINFO database to assess and define 'ACT' and 'perfectionism', specifically 'clinical perfectionism', separately and together. We found that ACT has been implemented effectively in several cases and that perfectionism is found in a wide variety of individuals, including college-age young adults or millennials. Results support the conclusion that more studies observing the integration of ACT and perfectionism are pivotal to the development of effective treatment for perfectionism.

Title: Accessing Satellite Imagery to Collect Creel Survey Data

Presenters: Paul Frisch, Hunter Richardson
Sponsor: Andrew Hafz

Abstract: Creel studies have been used in fish research and management in Minnesota as early as the 1930's. As advancements in technology progress, so has research. Individual watercraft counts are currently done via expensive flyovers. With the advancements of satellite imagery, it could be possible to adapt satellite imagery as a new and less expensive tool for obtaining creel information. In our research we examined creel information provided by the Minnesota Department of Natural Resources (MNDNR), and satellite imagery obtained from Planet Team. Images from days the MNDNR did flyover creel studies were reviewed and compared to see if a correlation exists between the two. Research results will be discussed along with the final correlation. If a strong correlation exists, a possible cost saving solution could be to use satellite imagery to compile this crucial information.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside

CONTINUED

Facilitators: Julie Larson, Travis Ricks

Title: Addressing the Injustice of Children's Mental Illness

Presenter: Sydney Biksen
Sponsor: Rebecca Hoffman

Abstract: Mental disorders in children are defined in the Diagnostic and Statistical Manual, fifth edition (DSM-5) as changes in the way they typically learn, behave, and handle their emotions and how it causes distress in their day-to-day lives. Children's mental health is impacted by different factors including family dynamics and stressors, stigma about mental illness, and limited knowledge of what mental illnesses are in children. When a child is experiencing mental illness, it does not just impact the individual, it also impacts the whole family system. Parents and siblings of individuals experiencing mental illness share experiences of the stigma and stress they face in direct correlation to the individual in their life with a mental illness. In the topic of children's mental illness there are commonly held traps in public thinking. The general public often believes that children cannot experience mental health, and the struggles the child is facing are often chalked up to kids just being kids. Children's mental illness has historically received limited attention, which is reflected in the lack of services directed directly toward children.

Title: Adolescent Substance Use

Presenter: Kayla Burt
Sponsor: Rebecca Hoffman

Abstract: Adolescent substance use is prevalent in today's society, especially in the field of social work. The community this presentation will be focused on is Hennepin County because of the high percentages of adolescents who drink and do drugs in this county. This poster presentation will cover the key points of the injustice. Factors that contribute to this injustice fall within the categories of social, behavioral, demographic, and individual risk factors. Each of these categories has more specific factors that fit into the category. Adolescent substance use is not without consequences. Consequences can differ from person to person but can include developing a binge drinking problem later in life, high levels of stress, low academic performance, and bad behaviors. This poster will also cover traps in public thinking, historical trauma, and reframing the injustice.

Title: A Spatial Analysis of Nitellopsis Obtusa Presence and Water Chemistry Parameters

Presenter: Stephen Smith
Sponsor: Jeffrey Ueland

Abstract: Starry stonewort (SSW), *Nitellopsis obtusa*, is the most recent exotic aquatic invader of concern in Minnesota lakes. Established invasive populations of this macro-alga can negatively impact fish habitat and spawning; overtake native macrophyte communities and disrupt and impede recreational uses of lakes. *Nitellopsis obtusa* seems to grow better in areas with rich organic sediments and above average water hardness and conductivity. For this project, I will look for statistical correlations between SSW presence and water quality parameters. Data from United States Geological Survey (USGS) on known SSW locations as well as data from published studies will be used. I may also examine clustering based on known locations.

Title: Applied Behavior Analysis Effectiveness for Treatment of Emotional and Behavioral Disorders

Presenters: Breanna Baker, Danielle Maijala, Alyssa Pajari, Chelsey Schwab
Sponsor: Sarah Cronin

Abstract: Emotional and Behavioral Disorders (EBD) affects roughly 20% of children and often has a negative impact on their academics and personal lives. If left unmanaged, emotional and behavioral disorders can even lead to possible issues in later adult life. Applied Behavior Analysis (ABA) can be used to help manage the symptoms of EBD. ABA is characterized by discrete presentation of stimuli with responses followed by immediate feedback, and an intense schedule of reinforcement. ABA does not have highly invasive or close and on-going proximity to the child compared to other treatments for EBD. This systematic literature review used PsychINFO to collect peer-reviewed articles published in the last 30 years discussing school-age children with EBD. Results from the articles provide evidence that ABA is effective in managing the symptoms of EBD.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: Artificial Intelligence: Assessing the Future Impact of AI

Presenters: Daniel Kranz, Yifan Mo, Robert Troje
Sponsor: Halbana Tarmizi

Abstract: With the recent advances in artificial intelligence (AI), this research will explore the future changes artificial intelligence will make in the workforce, the world of business, and its effect on society. We are going to discuss AI in general and look into the areas that will see the biggest impact because of AI implementation. Our discussions on AI include an outline of what AI is, how AI works, an introduction into machine learning, and the differences between weak and strong AI. We will look at the advancements in Artificial Intelligence over the last decade and try to envision what the future of AI could hold for business and society. This will also include looking at job creation and losses within technology, healthcare, manufacturing, and other related areas of business. Our research will look at which of these areas is most likely to see the biggest changes in the next decade, and how the workforce will be impacted by it. Our research will also cover the societal effects felt by AI, including the economic impact of AI, the challenges it could pose to humanities advancement, and the potential benefits it will have in changing society.

Title: Automotive Choices by Minnesota Regions

Presenter: Paul Hanson
Sponsor: Jeffrey Ueland

Abstract: This study examines the spatial variability of automotive manufacture choice in Minnesota over several decades. Utilizing data from the Minnesota Department of Transportation, this analysis will also include model choice (e.g., trucks, SUV or a sedan). Specifically, this study will test whether different time spans have influenced manufacturer choice and seek to determine if certain manufacturers are more dominate because of their options and quality of products at the time. A secondary hypothesis will also examine whether automotive model choice is influenced by location (i.e., Are more rural areas more likely to drive pick-up trucks? or Do suburban areas have higher concentrations of SUVs and sedans?).

Title: Avoiding Overstimulation with the Selective Use of Attention

Presenters: Jeremiah Johnson, Katie Knight, Julian Vrudny
Sponsor: Travis Ricks

Abstract: The purpose of this poster is to explain how the selective use of attention helps us to overcome the obstacle of too much information. The world is full of stimuli and we only have the attentional capacity to focus on one thing at a time. In this poster we will discuss how the central nervous system (CNS) is able to find what it should focus on quickly and efficiently. Additionally, we will also identify the situations and processes of the CNS that direct attention incorrectly and can put us at a disadvantage.

Title: The Spatial Dimensions of Coral Bleaching Events on the Great Barrier Reef

Presenter: Amanda Bortz
Sponsor: Jeffrey Ueland

Abstract: The Great Barrier reef is the largest coral reef system in the world, it has nearly 3,000 individual species that live in about 133,000 square miles. As such, this is a key global location for maintaining diversity on the planet. This study aims to analyze the spatial patterns of coral bleaching events on the Great Barrier Reef, off the coast of Queensland, Australia. To this end, I will employ a related sample T-test to assess statistically significant differences in bleaching activity from 1992-2009. The purpose is to assess if the location and intensity of activity has changed over time. Data for this analysis is predominately derived from reefbase.org along with other secondary data sources. This project is important as it may help shed additional light on coral reef health which has been a growing concern as oceans have warmed up over the last several decades.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: Blockchain and Cryptocurrencies: Exploratory Study

Presenters: Regan Pederson, Jameson White
Sponsor: Halbana Tarmizi

Abstract: In this study, we are exploring blockchain and cryptocurrencies such as Bitcoin. Blockchain is the record keeping technology behind Bitcoin. At the basic level of blockchain, it is digital information stored in distributed public databases. The digital information are the blocks, and the public databases are the chain of the operation. The blocks consist of three parts: 1. information about transactions; 2. participants of each transaction; and 3. unique code called hash; that distinguishes one block from another. Bitcoin is the most well-known cryptocurrency in the market. A cryptocurrency is broadly defined as virtual or digital money which takes the form of tokens or coins. While some cryptocurrencies have ventured into the physical world with credit cards or other projects, the majority of them remain entirely intangible. We are going to explore what potential blockchain and cryptocurrencies will have in the future and whether they could gain greater acceptance to become a commonly used payment method in the business community worldwide.

Title: Blockchain and Its Applications

Presenters: Kameron Moffatt, Jacob Pohl, Wyatt Stenberg
Sponsor: Halbana Tarmizi

Abstract: This study explores how blockchain can be applied to various industry sectors. Blockchain is a system in which a record of transactions made in Bitcoin or another cryptocurrency is maintained across several computers that are linked in a peer-to-peer network. A blockchain is a decentralized, distributed and public digital ledger that is used to record transactions across many computers. Its information is stored across multiple systems in a decentralized form that keep it from being tampered with or corrupted by an individual. We will describe how each transaction generates a hash. If a transaction is approved by a majority of the nodes, then it is written into a block. Each block refers to the previous block and together make the blockchain. We are also exploring many challenges related to Blockchain such as scalability (its limitations, size of data, cost, and response time) and security (attack and vulnerabilities). Furthermore, we will explore solutions and preventative measures to these challenges. With this study, we expect to be able to identify blockchain-based solutions that can help address challenges in our economy or even provide potential solutions to problems we might face in the future.

Title: Brown Bear Harvest Rates in Relation to Elevation and Landcover in Alaska

Presenter: Cianna Quien
Sponsor: Jeffrey Ueland

Abstract: There is an estimated 30,000 Brown Bears in the state of Alaska and approximately 214 active hunts. The hunts are then broken down into three different types for brown bears. The hunt types consist of general season hunts, registration hunts, and drawing hunts. This study will focus on using registration hunt data from the year 2007 to the year of 2017. I will analyze the location of harvested brown bears in relation to the landcover and elevation of Alaska to see if success rates are related to either of these landscape characteristics. I will also aim to look at the different rates in brown bear harvest per year. The data collected will be obtained from the Alaska Department of Fish and Game.

Title: BSU: A Bike Friendly University

Presenter: Karl Gorecki
Sponsor: Anna Carlson

Abstract: Biking is a healthy and fun activity for commuting and leisure. If BSU had more people biking, we would not only be healthier, but also the carbon footprint of BSU would be reduced because we would be saving on vehicle emissions. To encourage biking, it is essential that BSU makes some accommodations for those who choose to bike. There are a few simple ways that we can adapt to help make this change. A common barrier for people is the lack of knowledge on how, or why to bike, especially in the winter. Therefore, the sustainability office put on a winter biking panel discussion. This event got people aware of the fact that this is a possibility, even during a harsh Bemidji winter! Another issue is that bike racks often get plowed full of snow during the winter, so changing plowing routes to not do so would keep bike racks clear for bikers, and it would also encourage more to start biking if they see others doing it successfully. An application will be sent to the League of American Bicyclists to get recognized as a "Bicycle Friendly University."

POSTERS

Time: 1 p.m. – 3 p.m. **Hobson Memorial Union Lakeside**
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: *Calorimetry of Goldeye Hidon Alosoides*

Presenter: Jesse Mendel
Sponsor: Andrew Hafz

Abstract: Goldeye are found across North America and are a relatively unstudied group of fish, as they have little to no economic value. Ecologically speaking, these fish could have importance to the waters they inhabit, as they are prey to many different species of fishes. Goldeye could potentially be vital to predatory fish because of the amount of oil they contain, creating gram for gram more energy in comparison to other consumable substances. In this study, Goldeye were measured for length (mm) and weighed (g). Sex was determined for each fish, and age was determined by either otoliths or annuli on scales. Goldeye were put in an oven to dry so wet and dry weight could be determined. They were then homogenized, and energy density was estimated using a bomb calorimeter. All data collected was examined to conclude how different factors could change the energy densities for each fish.

Title: *Characterization of Bacteriophage KleverKiS*

Presenters: Rebecca Graika, Amanda Wright
Sponsor: Holly LaFerriere

Abstract: Antibiotic resistance is a growing problem in the field of medicine, especially in hospital settings where people can have compromised immune systems. Phage therapy is a possible alternative to traditional antibiotics. It works by using a bacteriophage that infects and kills bacteria and can be targeted to only kill the bacteria causing the infection. *Mycobacterium tuberculosis* is well known for its high resistance to antibiotics. KleverKiS is a bacteriophage that infects *Mycobacterium* spp. and lyses the *Mycobacteria* cells in the process, creating plaques. In order to isolate the bacteriophage, we performed several serial dilutions to ensure a homogenous population of KleverKiS. We have found that using KleverKiS to infect *Mycobacterium smegmatis*, a relative of *M. tuberculosis*, the plaques produced are clear, circular and about 2 mm in size. Our project focuses on isolating KleverKiS in order to perform DNA analysis and better cataloguing this bacteriophage for future study in hopes to create a more effective treatment for those individuals infected with *M. tuberculosis*. Further work to be done regarding KleverKiS would be to identify its characteristics including host range and electron microscopy to determine its morphology.

Title: *Characterization of Mycobacteriophage Mirai*

Presenters: Joshua Gage, Reid Rasmussen
Sponsor: Holly LaFerriere

Abstract: Antibiotic resistant bacteria have become a problem in the United States, making treatment of patients a nightmare for hospitals. Phage therapy has reemerged as a possible solution to this growing problem. Lytic bacteriophages can be used instead of, or in combination with, traditional antibiotic treatments. The research conducted focused around the bacteriophage Mirai. Mirai is able to infect a biosafety level 1 bacterium named *Mycobacterium smegmatis*. *Mycobacterium smegmatis* is in the same genus as *Mycobacterium tuberculosis* and *Mycobacterium leprae*, two organisms that are capable of causing devastating diseases. Characterization of phages could provide insights and tools that can be used in treatment of tuberculosis or Hansen's disease. For the best results, the tests were conducted with a PYCA agar and media. The bacteria were infected by the phage and grown on plates. Results included the formation of plaques. Plaques are noticeable spots on the plate where infection of the bacteria took place resulting in no growth. Each test was performed three times to isolate a single phage. The next step is DNA extraction and sequencing of the bacteriophage DNA and ensure there is enough of the sample. The research presented includes the plaque morphologies and DNA extraction and sequence data.

POSTERS

Time: 1 p.m. – 3 p.m. **Hobson Memorial Union Lakeside**
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: *Characterization of Pseudomonas Aeruginosa Bacteriophage Vanerele*

Presenter: Ashley Stiglich
Sponsor: Holly LaFerriere

Abstract: Pseudomonas aeruginosa is a gram-negative, asporogenous bacterium that may cause a variety of opportunistic infections, especially in hospital settings. These include blood infections, pneumonia, and infections following surgery that may lead to severe illness or even death. P. aeruginosa is also a major cause of lung infection in cystic fibrosis cases. There has been an increase in multidrug resistant strains of P. aeruginosa, and to combat the pathogen, the use of phage therapy is being investigated. Phage therapy is the use of lytic bacteriophages (bacterial viruses) to treat bacterial infections. There are a multitude of advantages for the use of phage therapy including bacteriophage activity as bactericidal agents; decreased likelihood of introducing resistance, especially with the use of phage cocktails; and minimal disruption of normal microbiota. Phage therapy studies rely upon the availability of many characterized bacteriophages. In the current study, a bacteriophage named Vanarele is being characterized. Vanarele is a novel bacteriophage isolated from wastewater. Characterization includes determining plaque morphology, phage morphology, host range, and the determination of the genome sequence and annotation of the genome. The ability of the bacteriophage to prevent formation of P. aeruginosa biofilms was examined.

Title: *Characterizing the Role of NHE1 in Pulmonary Fibrosis*

Presenter: Emily Withers
Sponsor: Mark Wallert

Abstract: Pulmonary fibrosis is a chronic, progressive lung disease in which lung tissue becomes stiffened, thickened, and scarred. This leads to difficulty breathing as the result of poor gas exchange across the alveoli. The tissue response to this damage is to increase deposition of extracellular matrix (ECM) proteins including collagen, recruit fibroblasts into the damaged area, and accelerate fibroblast proliferation. These events initiate release of Transforming Growth Factor Beta 1 (TGF-B1), which further enhances stiffening and thickening of the ECM. This results in a state of low blood flow and hypoxia within the lung tissue. Upregulation of the Na⁺-H⁺ Exchanger Isoform 1 (NHE1) is associated with conditions of low blood flow and hypoxia. NHE1 is a transmembrane transport protein that regulates intracellular pH by exchanging an intracellular H⁺ for an extracellular Na⁺. Increased NHE1 activity is known to support cell proliferation and migration. The purpose of this project is to first characterize the response of lung fibroblasts to TGF-B1 in their proliferation, migration, and collagen deposition. Once this is established, the role of NHE1 will be investigated. It is hypothesized that NHE1 may play a role in fibroblast proliferation and migration, and that inhibition of NHE1 activity may reduce these fibrotic effects.

Title: *Christianity's Impact on Norse Mythology*

Presenter: Amber Sorenson
Sponsor: Rucha Ambikar

Abstract: In this project, I examine Christianity's impact on Norse culture, the Eddas, and the new attempts to reconstruct the religion as seen in Asatru. What are the most prominent ways in which Christianity has impacted Norse mythology? If any, who were the biggest influential figures of the change? What were some of the methods and consequences of this? This poster will explore how religions interact with, and are affected by, regional mythologies.

Title: *Climate Change on a Small Scale: Examining the Effects of Climate Change on Ice-Out Periods on Minnesota Lakes*

Presenter: Samuel Potvin
Sponsor: Jeffrey Ueland

Abstract: Climate change has become a global issue in the past few decades, with there even being large, multiple-government agreements such as the Kyoto Protocol and the Paris accord to combat climate change. One of the more studied and recognized aspect of climate change is its effects of glaciers and the extent of winter sea ice at the poles. However, there is further need to understand how this phenomena plays out at more local scales. Using spatial statistical procedures, this study will examine whether similar patterns can be seen on a smaller-scale ice-out events on Minnesota Lakes. Additionally, this study will also test if there is a significant difference between these ice-out dates based on their location in Minnesota.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: Colorado Bighorn Sheep Study

Presenter: Tanner Beck
Sponsor: Jeffrey Ueland

Abstract: Since 2009, Colorado has had a plan of action in place until the year 2019 that will help restore heard numbers to their original state. The main goals of the management plan are to help track these sheep migration patterns to better understand how to help them survive their ever-changing environment and allow them to produce more young. Since reaching an all-time low for Bighorn Sheep harvest in 2003, the Colorado Parks and Wildlife (CPW) have invested massive amounts of time and money in restoring this native species of sheep. Using spatial analytic framework and cartographic visualization techniques, this project will investigate whether CPW efforts have been effective in reversing the negative trend seen in Bighorn Sheep populations throughout Colorado.

Title: Comparing Population Trends in Minnesota's Two Elk Herds

Presenter: Mitchell Anderson
Sponsor: Jeffrey Ueland

Abstract: Currently Minnesota has two distinct Elk (*Cervus elaphus*) herds that are located entirely within the state. There is a third herd that travels between Canada and Minnesota, but this study won't look at that herd. In recent years the Kittson county Elk herd has been increasing while the Grygla (Marshall County) herd has been in decline. The only Elk hunting that has taken place since 2012 is in Kittson County, meaning the Grygla herd has had no legal hunting pressure since then, but is still decreasing. Likewise, even though hunting has been allowed on the Kittson County herd, the population of that herd has managed to increase. One aspect that may partially explain these population trends is habitat quality. For this study, I will be looking at many different habitat quality attributes to see if there is a difference between the two counties. I will take into account distance from roads, nearest available water, and land cover type. More specifically for land cover type, I will be looking to see which herd has access to more ideal land cover (savanna, prairie, forests etc.).

Title: Comparing Similarity and Differences in Christianity, Islam and Judaism

Presenter: Jarrett Hastig
Sponsor: Rucha Ambikar

Abstract: My poster will be a visual description of the similarities with the beginnings of some of the most famous religions in our society, which are Christianity, Islam, and Judaism (not the most followers today but very famous historically). The poster will explore some common mythologies, origin stories, holy figures, and shared values in these religions. I will show what they have closely in common, and how they have branched out over the many years and now see themselves as complete opposites.

Title: Comparing the Health of Vegetation Regeneration with Prescribed Fires and Natural Fires in Northern California

Presenter: Matthew Kley
Sponsor: Jeffrey Ueland

Abstract: Prescribed burns are generally accepted as a suitable alternative for wildfires which benefit habitats by removing and cleaning the low-growing underbrush and reduce diseases. Additionally, prescribed burns can provide habitat shelters from many wildlife species. There are still concerns about how well-prescribed fires do in terms of ecological benefits when compared to naturally occurring forest fires. I will be using spatial data to compare the health of regenerated vegetation, post fire, the two types of fires in Northern California. To this end, Normalized Difference Vegetation Index (NDVI) and biomass calculations will be made to understand the total vegetation "greenness" and abundance after the fire event. If these traits are shown to be similar, it would support research that suggests prescribed burns are a healthy alternative to natural fires in habitat communities. If these characteristics are shown to be significantly different, this project would support more investigation in the legitimacy of prescribed burns. Additionally, this research will help to address questions of allowing prescribed fires to burn with fewer constraints as compared to wildfires to promote biodiversity and health of shrub-lands and under-story of forests habitats.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside

CONTINUED

Facilitators: Julie Larson, Travis Ricks

Title: Cowlar ERP System in Cattle Herd Management

Presenters: Kody Schommer, Grant VanElsberg

Sponsor: Halbana Tarmizi

Abstract: This study details the benefits of implementing the Enterprise Resource Planning (ERP) system called Cowlar, in dairy herds. While ERP systems have become part of various industry sectors, its adoption in the farming industry is still relatively low. Cowlar is one of the technologies developed to help dairy farmers in becoming more efficient in their operations. The benefits of this technology include heat cycling to improve reproduction rates, early disease detection, 24/7 operational efficiency that constantly reports data about any given cow within the herd. From these data reports, farmers are then able to use it to make more informed decisions on what steps are best for the health of their animals as well as the best ways to make their farm more profitable. These proper decisions can lead to higher profit margins, optimized feed strategies, and more effective farming practices. This is capable through the movement of healthier feeding practices and pushing away from the industrialization of large cattle feeds. By avoiding the common practices of large cattle farms that do not monitor the quality of their meat and dairy products, small farmers are now given a method to increase profit margins by proving the quality of their products.

Title: Cultural Appropriation

Presenter: Shayla Beaulieu

Sponsor: Rucha Ambikar

Abstract: My poster displays the differences between cultural appreciation and cultural appropriation within different cultures. It will showcase the history of Native American mascots that not only disrespect sacred items in the indigenous community, but it also fuels negative stereotypes among indigenous people. Appreciating a culture would consist of being educated on the culture as well as experiencing the culture you're learning about. Appreciating it is admiring the different components within that culture without altering it to fit your own idea or agenda. Cultural appropriation would be taking the culture and minimizing the culture into the stereotype that you see fit. Appropriating a culture leaves a negative impact of the people who are representing the culture, as well as using different sacred items for their own self-expression without caring how the people within that culture feels.

Title: Deciphering Changes in Walleye Population Dynamics Due to Stocking

Presenter: Jarret Janu

Sponsor: Jeffrey Ueland

Abstract: My research question is asking whether changes in walleye populations can be seen via Minnesota Department of Natural Resources (DNR) lake surveys that would indicate whether lakes that are frequently stocked show any difference within the walleye surveys after a few years. This would be important in knowing to determine whether or not frequent stocking is worth the time, and if it is actually helping the lakes' ecosystems. Carrying out the research will consist of gathering data from the DNR on frequented stocked lakes, lake id numbers, other information pertaining to each lake (acreage, location, county) and the surveys of the lakes over the past couple of years. After that, correlation analysis and graphs will be used to evaluate if any relationship between walleye sample sizes and stocking efforts exists. Some discussion points will include the other factors that could cause some discrepancies in my research. Other factors may include predation, lake size, location (fishing pressure, surrounding environment), and the type of lake.

Title: Dero ZAP Commuting at BSU

Presenter: Mathieu Veziés

Sponsor: Anna Carlson

Abstract: Dero Zap is an automated commuter tracking system that tracks individuals who are walking or biking. A tag is attached to the front wheel of the registered bikes, and a ZAP station detects bikes that pass by with the tag. ZAP was introduced to the Twin Cities and the University of Minnesota in an attempt by the Parking and Transportation Services to promote biking. If ZAP came to Bemidji State University, the ZAP stations would have to be strategically placed where common bike and walk paths are located. ZAP would be a great idea for not only the college students, but also commuters who may prefer to bike several miles to work. Their rewards program motivates more people to bike by awarding discounts and coupons to ZAP participants based on certain routes and distance traveled. The ZAP app for the commuter consists of a calendar showing how many ZAPs you had on a certain day, where you traveled, and other interesting statistics. For the administrator, their app will show number of trips recorded, positive effects on the environment, and other useful reports.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: Detection of Copper and Dimethyl Carbonate in Metallic Satin Bronze Spray Paint

Presenters: Drake Sime, Amanda Tran
Sponsor: Keith Marek

Abstract: Spray paint is a semi-permanent colored solution whose application requires aerosolization. This paint is typically comprised of a mixture of organics and inorganics that are dissolved in acetone and reflect light in the visible spectrum. The Rust-oleum and reg; Metallic Satin Bronze spray paint contains dimethyl carbonate and copper metal for color. This experiment was designed to determine the concentrations of these and to compare them to the Material Safety Data Sheet. The copper concentration will be determined with ultraviolet-visible spectroscopy and inductively coupled plasma mass spectrometry. Dimethyl carbonate concentration will be analyzed with gas chromatography-mass spectrometry and high-performance liquid chromatography.

Title: Determination of Iron and Sucrose in Breakfast Cereal

Presenters: Jenna Hamann, Stephen Nyegaard
Sponsor: Keith Marek

Abstract: Major cereal companies such as Kellogg's have advertised their products as a significant source of minerals needed in a balanced diet. This has caused breakfast cereals to be a major staple in the diet of a variety of people. Iron is an essential component of the hemoglobin in blood that carries oxygen throughout the body. Cereal companies have advertised iron as one of the vital minerals within their cereal products, and they use sucrose as an additive to make the taste of the cereal appealing to their consumers. The purpose of this experiment is to determine the concentration of iron and sucrose found within two different types of breakfast cereals. To determine the iron concentration, inductively coupled plasma optical emission spectrometry (ICP-OES) and an ultraviolet visible spectroscopy (UV-Vis) will be utilized. To determine the sucrose concentration, refractive index and high-pressure liquid chromatography (HPLC) will be performed. The results of this experiment will be compared to the nutrition facts provided by cereal companies to determine their accuracy.

Title: Determination of Iron and Vitamin B12 Content in Kombucha

Presenters: Lauren Bench, Abigail Halluska
Sponsor: Keith Marek

Abstract: Kombucha is an organic beverage that is a new health fad, stated to increase metabolism and benefit digestive health. The goal of this experiment is to develop and use procedures to determine amounts of iron and vitamin B12 in Kombucha. Vitamin B12 plays a large role in our health because metabolism in every human cell depends on it, as it plays a part in the synthesis of fatty acids and energy production. Vitamin B12 amounts will be determined using High Performance Liquid Chromatography (HPLC) and Gas Chromatography (GC). Iron levels will be determined using Ultra-Violet Visual Spectrometry (UV-Vis) and Inductively Coupled Plasma-Optical Emission Spectrometry (ICP-OES).

Title: Determination of Vitamin C and Iron in One a Day Women's Multivitamins

Presenters: Xiajun Deng, Emily Long
Sponsor: Keith Marek

Abstract: The human body does not have all the necessary vitamins needed to stay in proper balance, and a vitamin deficiency can cause chemical and biological imbalances across all systems. To help balance the vitamin levels in the body, many people take multivitamins daily, which are said to contain the recommended value of all the necessary vitamins and nutrients needed. The goal of this work is to determine the concentration of Vitamin C and Iron in One a Day Women's Multivitamins. The amount of vitamin C was determined using High Performance Liquid Chromatography and Gas Chromatography-Mass Spectrometry. The amount of iron was determined using Ultraviolet-Visible Spectroscopy and Inductively Coupled Plasma Optical Emission Spectrometry. The results of these experiments will be analyzed and compared to the concentrations reported on the label.

POSTERS

Time: 1 p.m. – 3 p.m. **Hobson Memorial Union Lakeside**
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: *Developing HEK293 Cell Lines to Characterize NHE1 Function*

Presenter: Hannah Leffelman
Sponsor: Mark Wallert

Abstract: The Na⁺-H⁺ Exchanger Isoform 1 (NHE1) is a 12-pass, 815 amino acid transmembrane transport protein that functions by exchanging one extracellular sodium for one intracellular proton. The transmembrane domain (amino acid 1 - 500) is involved in ion exchange, and the cytoplasmic tail (amino acid 501 - 815) is the regulatory domain of the transporter. NHE1 regulates pH_i, cell proliferation and migration. The regulatory mechanisms of NHE1 are complex and multifaceted including phosphorylation, palmitoylation, protein binding domains, and lipid binding domains. Our goal is to establish a human non-cancer cell line to study NHE1 function. To achieve this, the HEK293 cell line has been utilized. HEK293 (Human Embryonic Kidney 293) cells are an immortalized cell line which while not cancer derived, are tumorigenic; they have been found to form tumors in nude mice. In order to study NHE1, CRISPR-Cas9 gene editing was used to remove NHE1 expression and create HEK293NHE1KO cells. In doing so, we can evaluate cell proliferation in HEK293NHE1KO cells utilizing the XTT proliferation assay. Through the study of proliferation in this cell line, we hope to provide a new platform to study NHE1 and gain the ability to insert mutated NHE1 genes back into these cells.

Title: *Differences in Jeavons' Syndrome and Tonic-Clonic EEGs*

Presenter: Harley Waller
Sponsor: Li Zhou

Abstract: A neurological condition called epilepsy is the foundation for seizures. Epilepsy is the term used to refer to a state of recurrent seizures, which are abnormal electrical activities within the brain. Distinguishing the differences between seizures that are not related to epilepsy and ones that are is critical to understanding the neurobiology of epilepsy itself. The purpose of this project is to compare and contrast adults and adolescents with both tonic-clonic and Jeavons' Syndrome, and how long the seizures have lasted and the differences in severity by using electroencephalogram (EEG) technology. The EEGs will discriminate how long the seizure lasts and the extremities of the seizure. A main symptom of Jeavons' Syndrome is a sudden closing of the eyes as a seizure is occurring. Symptoms of this disorder including hyperventilating, IPS (intermittent photic stimulation) will increase the chances of the epilepsy network being initiated by the occipital cortex including the brainstem, and thalamocortical and transcortical pathways. During a tonic-clonic seizure, the individual may lose consciousness and muscles contract. The person has rhythmic contractions and it lasts for 10-20 seconds, or even longer depending on the severity of the seizure.

Title: *Disabled People's Perception of Discrimination as Illegitimate*

Presenters: Lacie Hines, Brooke Mimmack, Elizabeth Pouliot
Sponsor: Thomas Dirth

Abstract: People with disabilities' psychological well-being is more negatively affected by discrimination, because the legitimacy of the treatment is often ambiguous (Schmitt et al., 2015). The reason for this ambiguity is that disability is typically conceptualized as a medical issue, located within a person's body and requiring individual-level solutions. Alternatively, disability advocates propose a social model of disability that externalizes the source of disability limitations to inaccessible environments, biased social attitudes, and discriminatory behaviors. Our project suggests that the social model disability can potentially decrease the ambiguity surrounding disability discrimination, thereby strengthening disabled people's resolve to contest this negative differential treatment. Our study experimentally tests the impact of disability model on perceptions of discrimination legitimacy and subsequent collective action intentions. Participants with disabilities sampled online will be randomly assigned to social vs. medical model conditions. Following the disability model induction, they will be asked to rate the legitimacy of hypothetical scenarios where disabled people are the target of discrimination. Participants will also complete survey items including a measure of collective action intention. This study will provide additional evidence of the social model's capability as a psychological resource to people with disabilities and as a catalyst for disability collective action.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: Eating Disorders and Art Therapy

Presenter: Katie Knight
Sponsor: Sarah Cronin

Abstract: The purpose of this poster is to examine eating disorders, such as anorexia and bulimia nervosa, with regard to causes, statistics, and treatments. Eating disorders, namely anorexia, cause severe psychosocial and physical impairment in its patients, and has one of the highest mortality rates among mental disorders. With the ever-growing desire and pressure for the ideal body image, the rate of eating disorders is ever on the rise, as well as the research to prevent and treat these disorders. As we try to understand the underlying cause of these mental disorders, and why some individuals have such a skewed perception of how they look to send themselves into a downward spiral of starvation and a long road to recovery, I will dive into the enigma that is eating disorders. In this poster, I will also be examining art therapy by itself, as well as tying eating disorders and art therapy together by reviewing the effectiveness of art therapy in a group setting of adults who have eating disorders.

Title: Effect of Heat Treatment on Microstructure and Hardness of 440c Stainless Steel

Presenter: Casey Den Ouden
Sponsor: Michael Lund

Abstract: The effect of tempering on the microstructure and hardness of 440c stainless steel is of interest because 440c has excellent machinability, good corrosion resistance, and has applications in ball bearings, valve seats, tools, and even cutlery. Plate quenching is the ideal hardening method for cutlery applications, as it reduces the chance of warping. Unfortunately, there are limited studies on the heat treatment of plate-quenched 440c. We plate-quenched 440c from 1900F and tempered samples at temperatures between 300-900F and for a period between 1-4 hours. The overall trend is a decrease in hardness with tempering time up to three hours followed by an increase in hardness for the four-hour temper. We have also observed a decrease in hardness for the one- and two-hour tempers, with a minimum hardness at 700F, then a slight increase in hardness at 900F.

Initial metallography images indicate that the Martensitic plates decrease in size at higher temperatures for the one-hour temper, which explains the decrease in hardness with increasing temperature for the one-hour temper. However, the slight increase in hardness at 900F is unusual. We suspect that small carbide precipitates are forming at grain boundaries, leading to this secondary hardening effect.

Title: Effectiveness of Dry Needling

Presenter: Lauren Stock
Sponsor: Jim White

Abstract: A treatment modality that is used in physical therapy and that I have found interesting is called dry needling. I am curious about its effectiveness and if it helps patients. The purpose of this research is to study the overall effectiveness of dry needling in the shoulder and lower back. Additionally, this research will compare and contrast acupuncture to dry needling. Lastly, this study will explore if dry needling is more effective in the shoulder or in the low back. A meta-analysis of the literature will be performed from peer-reviewed, indexed journals published in the last eight years. Journal articles will be selected for inclusion based on the following criteria: 1) Article describes research including real subjects who have undergone treatment. 2) Article is a meta-analysis focused on relevant therapy modalities. Additionally, an interview of a local physical therapist (co-worker) that uses dry needling in his practice will be incorporated into the discussion of this paper's results. The results will provide supporting data and descriptive statistics that help lend insight into the effectiveness of dry needling. Discussion: This research will help the researcher and others better understand the emerging therapy of dry needling.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside

CONTINUED

Facilitators: Julie Larson, Travis Ricks

Title: Effects of Rainbow Trout on Brook Trout Populations in Lake Superior Tributaries**Presenter:** Craig Tangren**Sponsor:** Andrew Hafz

Abstract: Historically, Lake Superior and its tributaries hosted spawning migrations of Brook Trout known as Coasters. In the late 1800s and early 1900s, habitat loss and overfishing significantly depleted Coaster populations, which remain low. Today there are large numbers of introduced species, including three species of Pacific Salmon, Brown Trout, and migratory Rainbow Trout, known as Steelhead. Steelhead population declines in the 1970s caused fisheries' managers to stock juvenile Steelhead above natural migratory barriers to increase populations of returning Steelhead. Anecdotal evidence suggested the presence of Steelhead above natural barriers harmed Brook Trout populations. Stocking was largely discontinued beginning in the early 1990s. This study will attempt to determine: 1) if Steelhead influenced the size of Brook Trout populations above migratory barriers, 2) if there is a continuing effect on below barrier populations of coaster Brook Trout, and 3) if downstream migration contributes to Brook Trout populations below migratory barriers. Results will be presented on populations effects above barriers and on other objectives completed by the time of the conference.

Title: Evaluation of Ethics Program: Under Armour**Presenter:** Cole Schmitz**Sponsor:** Joann Fredrickson

Abstract: Founded in 1996, Under Armour soon rose to become a top competitor in athletic clothing. I became interested in Under Armour's operations after reading about politically controversial statements made by their CEO, which had the impact of distancing some younger shoppers. For my project, I will be collecting Under Armour's published resources for its ethics program, including their Code of Conduct, Supplier Code of Conduct, and their approach to labor laws, as well as additional documentation if needed. The structure of this project will include an assessment of Under Armour's stakeholders, an identification of the ethical issues targeted by the company, a comparison of Under Armour's ethics program and training relative to industry and legal expectations, and my recommendations on what Under Armour can do to improve its ethical culture and ethics training programs.

Title: Examining Black Bullhead Age and Growth in Shallow Minnesota Lakes**Presenters:** Michael Collins, Anna Estes**Sponsor:** Andrew Hafz

Abstract: The Black Bullhead (*Ameiurus melas*) is a widely distributed ictalurid fish species found throughout much of Minnesota and are often highly abundant in southern Minnesota lakes. Highly abundant populations of Black Bullhead and other benthivorous fish contribute to increased turbidity and declining macrophyte production, thus reducing habitat for wetland-dependent wildlife. The purpose of this study is to evaluate aging methods for Black Bullhead by comparing lapilli otolith and pectoral spine structures. Additionally, this study seeks to determine if spine lengths measured on live fish are correlated to estimated age. If correlated, this might allow for simplified, non-lethal aging estimates. Calcified aging structures were collected from 320 individuals across six Minnesota lakes within two distinctly different regions: a northern region in the Chippewa National Forest and a southern agricultural region near the Iowa border. Using sectioned otolith and pectoral spines, ages were determined by two readers in a typical blind reading procedure. Early data analysis shows variability in growth between regions. Analysis of spine age is currently underway to present final reports of lowest coefficient of variation among aging methods, and to compare growth trajectories and age structures among lakes.

Title: Exploring the Idea of the Devil**Presenter:** Cassandra Larson**Sponsor:** Rucha Ambikar

Abstract: The idea of the devil, or a hell gatekeeper, has been present long before Christianity. There are variations on the idea of the devil through different religions and cultures, and some are not so different from Christianity's own hellish demon. Christianity argues that the devil is the epitome of all evil and seeks to lure people into his own darkness. Think the devil made me do it. Logically speaking, however, it doesn't follow that the devil himself is evil if he punishes those who do evil. Is the devil a punisher or an evil being? Is this only in Christianity, or do most religions argue evil being? This is an anthropological look into how the devil is perceived by different religions, and what role the devil serves in the mythology of that tie and place. The poster explores how these religious depictions differ by culture or time period.

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Facilitators: Julie Larson, Travis Ricks

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Title: Exposure Therapy Effectiveness in Treating Young Adults with a Spider Fear

Presenters: Kaysi Florek, Lucy Hansen
Sponsor: Sarah Cronin

Abstract: Exposure therapy is often used in treating maladaptive fears. One of the most common fears among people today is the fear of spiders. This study is a systematic literature review that examines the effectiveness of exposure therapy in treating young adults with a spider fear. The terminology used to gather research for the study is exposure therapy, spider, and young adults. PsychInfo and ScienceDirect are the databases utilized to search the terminology for the study. The search results provide evidence that exposure therapy is effective to reduce the fear of spiders in young adults.

Title: Food Security Awareness Panel

Presenter: Zachary Nelson
Sponsor: Anna Carlson

Abstract: With many students paying thousands of dollars in college tuition, there is often little money left over for food and other necessities. Many students and local citizens resort to eating twenty-five cent packets of ramen and other cheap processed foods. These choices bring about unhealthy habits and increased packaging waste. People often don't realize the resources that they have available to access local and healthy food around the area. The purpose of the Food Security Awareness Panel is to educate students, staff, and the general public in the Bemidji area on Food Security Awareness and the local resources available. Questions will be asked to each panel participant on local issues, such as food security, food insecurity experiences, food waste and local resources that are available to address the problem. Speakers and the local organizations represented include representatives from Bemidji State University faculty, Joel Anastasio from the Headwaters Regional Development Commission, Jordan Lutz from the Bemidji State University Sustainability Office, Mary Mitchell from the Bemidji Area Food Shelf, and Bemidji State University Student Valerie Winter.

Title: Framing Racial Disparities within the Criminal Justice System: Minnesota

Presenter: Lindsay Ermatinger
Sponsor: Rebecca Hoffman

Abstract: This poster presentation will help define racial disparities within the United States Criminal Justice System. Furthermore, there will be a brief overview of the impact of historical trauma and the Jim Crow era of the 20th century. Also, inter-generational trauma will be thoroughly discussed as an important piece of this presentation. In this poster, I will also go over the causes and lifelong consequences of racial disparity. Also, the poster will address how the United States public tends to blame criminal acts solely on the individual, rather than looking at intricate oppressive attributions. This is known as the Individualism trap. I will not be focusing on micro-level solutions, rather there will be talk of thematic solutions that integrate the individual and community. Lastly, I will present a discussion of education, intervention, and reforming of policies that effect racial minorities.

Title: Giving Green Technologies a Try

Presenter: Katelyn Rinicker
Sponsor: Anna Carlson

Abstract: BSU has committed to become carbon neutral by 2050. Seventy percent of the carbon emitted is from energy alone. My project aims to explore green energy as a strategy to reduce carbon emissions. Geothermal, waste water energy, and piezoelectricity are some strategies to becoming carbon neutral. Oregon State University has revolutionized waste water power production. Their technique produces 10-50 times more electricity. The biodegradable properties of waste water could provide more energy than is currently being made. Carleton College has plans to use geothermal to reduce their ecological footprint by reducing the amount of power needed to heat their campus. Other green technologies like piezoelectricity are less developed. Imagine a rush of students walking from class to class generating enough energy to light the hallway. Energy is created from materials rubbing against each other. It happens when it is walked on, driven over, or biked across. Researching green technologies and implementing them can decrease our impact on the earth. It is important to our environment that we use renewable resources and green technologies. We need to be open the possibilities that these new technologies provide.



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Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside

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Facilitators: Julie Larson, Travis Ricks

Title: A Spatial and Temporal Analysis of Algae Bloom Chlorophyll Activity in the Great Lakes

Presenter: Andrew Burns

Sponsor: Jeffrey Ueland

Abstract: This project aims to identify spatial and temporal dimensions large Algae Bloom events that have occurred in the Great Lakes over recent time. The study will look to test if there is a significant pattern to these events and see if there is any relationship to several variables, including water surface temperature, wind, air temperature, and pressure to the level of chlorophyll-a concentrations. Data for this study will be derived from various multi-spectral satellite platforms including MODIS, and secondary and modeled data from the National Oceanographic and Atmospheric Administration (NOAA) and the University Center for Atmospheric Research (UCAR).

Title: Growth of the Channel Catfish within the Horseshoe Chain of Lakes

Presenter: Garrett Ober

Sponsor: Andrew Hafz

Abstract: Channel Catfish is a species that can be found in almost every state. Their population is growing, which makes the study of their growth more important because the effect they may have on an ecosystem is more prevalent. In this research study, Channel Catfish from the Horse Chain of Lakes, Minnesota, were obtained from two different sampling areas (Horseshoe Lake and Knaus Lake). The samples were examined for growth difference between the two locations as a group and then by the sex at each site. If a difference was found between the groups from each site, both locations would be examined for the water quality, littoral area, and geography surrounding the area to look for any factors that could have an impact on the growth of the groups. Once all the data has been examined, the results of this experiment will be displayed graphically to provide a visual for people viewing my work.

Title: Hockey Day Minnesota 2019 Recycling Initiative

Presenters: Jonathan Barcenas, Aili Kultala

Sponsor: Jordan Lutz

Abstract: Students from BSU's Sustainability Office coordinated recycling efforts at this year's Hockey Day Minnesota (HDM) events in Bemidji. We worked with Waste Management to provide recycling carts and pick-up services. Over the three day event, we worked with HDM volunteers to coordinate the strategic placement and servicing of the bins. We also created signage to help inform attendees of the items they could and could not recycle. The bins collected and diverted 1,780 lbs. of recyclables from ending up in a landfill. The initiative helped highlight BSU's shared fundamental value of sustainability and the importance of recycling.

Title: Hot Mouth? Drink Milk!

Presenters: Stephanie Doyle, Moriah Trautman

Sponsor: Keith Marek

Abstract: The pungent taste and spicy sensation that comes from chili peppers and hot sauce is caused by capsaicinoids. How can we get rid of that sensation? Simply, drink some milk. Milk counteracts the capsaicin heat because it is fatty and capsaicinoids are soluble in fats. The calcium-casein complex in milk is what makes the capsaicinoids soluble in milk. The goal of this experiment is to determine the Scoville heat value (SHV) of different local hot sauces, and the amount of calcium in four different milks. High pressure liquid chromatography (HPLC) and gas chromatography - mass spectrometry (GC-MS) were used to determine the varying amounts of capsaicin from the local hot sauces. Inductively coupled plasma optical emission spectrometry (ICP-OES) and atomic absorption spectroscopy (AAS) were used to determine the amount of calcium in each of the four milk samples.

POSTERS

Time: 1 p.m. – 3 p.m. **Hobson Memorial Union Lakeside**
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: *How Color Helps Us Succeed and Fail in Our Environment*

Presenters: Brittany Czerny, Haley Hardy, Spenser Larson, Hannah Schaufler

Sponsor: Travis Ricks

Abstract: The purpose of this poster presentation is to explain how the eye and nervous system uses color to help us overcome the obstacle of too much information to process. In this poster, we will provide background into how the eye and nervous system senses and perceives color as well as how that structure and function enables us to identify important stimuli such as dangers and opportunities. In addition, we will also discuss how variations in the biology of the eye along with varying circumstances prevent us from seeing color, thus leading us to be less successful.

Title: *How Do Minnesotans Get to Work?: An Analysis of Twin Cities Transportation Methods*

Presenter: Margaret Donnay

Sponsor: Jeffrey Ueland

Abstract: The Twin Cities are known for their sprawling suburbs, but because of a limited public transportation system, most professionals have no choice but to drive to their jobs. My project looks at the number of workers ages 25 to 44 versus the number of workers ages 55 to 59 to assess if there is a significant difference in the mode of transportation (e.g. cars, trucks, vans, public transit) that each group tends to use. My hypothesis is that the younger age bracket of people will be more likely to carpool or take public transportation than those that are older. This research is important because it adds to the discussion on the demographic preference of Twin Cities commute patterns. It could also serve to further the discussion on the needs for additional support for public transit in the Twin Cities to serve its expanding population base and help to reduce daily traffic levels.

Title: *How Effective is Acceptance and Commitment Therapy for Opioid Addiction?*

Presenters: Adrianna Horien, Kelsie Murray

Sponsor: Sarah Cronin

Abstract: It is known by many that the United States is currently in an opioid epidemic. Since the start of the epidemic, many therapies, including Acceptance and Commitment Therapy (ACT), have transitioned to assist those who are suffering from an opioid addiction. There have been recent studies conducted to recognize what treatment would be the most beneficial for this specific population. Acceptance and Commitment Therapy guides individuals to improve their psychological conformity by decreasing erroneous thoughts, feelings, and behaviors. This systematic literature review used the search terms 'Acceptance and Commitment Therapy' with either 'Substance Abuse' or 'Opioid Addiction' to locate peer-reviewed articles in the database PsycINFO. Results provide evidence that ACT is an effective therapy for treating opioid addiction. Using ACT has shown to be effective to the well-being of adult opioid addicts compared to other substance abuse counseling.

Title: *How Effective is Expressive Arts Therapy for LGBTQ Adolescents?*

Presenters: Micaelah Foss, Briana Smith, Harley Waller

Sponsor: Sarah Cronin

Abstract: It is generally known that lesbian, gay, bisexual, trans, and queer (LGBTQ) individuals have a higher susceptibility to mental health problems in relation to gender and sexual identity development. This poster presentation examines the implementation of expressive arts therapy when counseling with LGBTQ individuals. Research has shown that during the coming out process, the levels of emotional and physical well-being among these individuals decreases tremendously. However, there is a growing set of research that connects creative self-expression and coming out as a way for individuals to be able to find themselves and foster growth. Implementing activities that help these individuals express themselves will eventually lead them to exploring positive social groups by finding people that are 'like them,' which in turn increases their overall mental, emotional and physical health. In order to fully understand what individuals are experiencing during the coming out process, counselors and advocates should be educated on the topic in order to successfully guide the individual. This systematic literature review focuses on the peer-reviewed literature of expressive arts therapy and provide evidence that the techniques and strategies within it can be accommodating, especially during the coming out process for LGBTQ individuals.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside

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Facilitators: Julie Larson, Travis Ricks

Title: How Effective is Mindfulness-Based Stress Reduction for Veterans with PTSD?**Presenters:** Emily Kos, Jeffrey Olson, Madison Ulrich, Kenna Yutzenka**Sponsor:** Sarah Cronin

Abstract: War veterans have shown a higher risk of suffering from PTSD than the general population (Reisman, 2016). Mindfulness-based stress reduction utilizes methodologies of science, medicine, psychology, and Dharma to help treat chronic pain, anxiety, and stress (Ackerman, 2019; The Center for Mindfulness, 2016). The research question of this systematic literature review is to see how effective mindfulness-based stress reduction is for veterans with PTSD. The phrase 'Mindfulness-Based Stress Reduction for Posttraumatic Stress Disorder Among Veterans' was used in PsychINFO to locate peer-reviewed articles. Findings show that mindfulness-based stress reduction therapy decreases PTSD symptoms as long as treatment is consistently attended until completion.

Title: How Optical Illusions Demonstrate Ambiguity in Our Environment**Presenters:** Isaiah Fofanah, Heather Glime, Danielle Maijala, Danielle Nelson**Sponsor:** Travis Ricks

Abstract: The purpose of this poster presentation is to explain how the central nervous system deals with an ambiguous world, as demonstrated by optical illusions. Optical illusions occur because the visual information in the environment is ambiguous so that our brain does not know how to interpret it. Therefore, our brain will either interpret it incorrectly and/or switch back and forth between multiple interpretations. In this poster we will provide background into how the structure and function of the central nervous system leads to these optical illusions. We will also discuss how varying circumstances and situations lead us to fail or succeed in overcoming the ambiguity in our world. One way that we overcome this ambiguity is through experience. As we gain experience, we learn how a particular interpretation of an ambiguous scene was more likely to lead to success. On the other hand, these decisions of our ambiguous world can lead to failure by misleading our visual system into grouping information inaccurately.

Title: Implications of DO and Temperature Changes for Rainbow Trout in Bad Medicine Lake**Presenter:** Alexander Binsfeld**Sponsor:** Richard Koch

Abstract: Bad Medicine Lake is a spring fed lake composed of three basins. The lake is in Becker County, Minnesota, and is managed as a Rainbow Trout lake. Rainbow Trout become stressed in water temperatures at 23° C and dissolved oxygen concentrations below 6 mg/l. With restrictions being imposed from rising temperatures above and depleted oxygen below, trout populations may be squeezed out from some areas in Bad Medicine Lake. Temperature and DO concentrations were collected using a YSI multi-probe at 1-meter intervals from top to bottom biweekly in each of the three main basins from ice-out (early-May) to fall turnover (late-November) in 2018. Critical depth zones based on temperature and dissolved oxygen varied between basins and dates ($p = 0.05$). The critical depth for DO varied significantly by date ($p = 0.001$), and by basin ($p = 0.037$). Critical depths of temperature varied significantly by date ($p < 0.001$), but not basin ($p = 0.844$). With the basins being as deep as they are, there should always be water habitat cool enough, but the oxygen depletion could push the trout into warmer surface waters, especially if warm surface temperatures extend longer into autumn.

Title: Internship with the Midwest Regional Forensics Laboratory**Presenter:** Emily Long**Sponsor:** Keith Marek

Abstract: This presentation describes the internship I spent at the Midwest Regional Forensics Laboratory. The Midwest Regional Forensics Laboratory looks at the forensic evidence from crimes committed in Anoka County, Sherburne County, Wright County, and parts of Hennepin County. I worked primarily in the drug chemistry lab and became familiar with the methods and instrumentation required for accurately determining different kinds of drugs. At the conclusion of my internship, I used color tests, Ultraviolet-Visible Spectroscopy, Fourier-Transform Infrared Spectroscopy, and Gas Chromatography - Mass Spectrometry to run a series of presumptive and confirmatory tests to accurately determine five different unknown drug samples.

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Time: 1 p.m. – 3 p.m. **Hobson Memorial Union Lakeside**
Facilitators: Julie Larson, Travis Ricks

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Title: *Land Use Effects on Freshwater Amphipod Population Density and Distribution in Western Minnesota's Wetlands*

Presenter: Breanna Keith
Sponsor: Jeffrey Ueland

Abstract: Increasing demands to meet the resource needs of a growing human population have led to the continuous development of more intensive agricultural practices throughout the North American Prairie Pothole Region (PPR), thereby threatening the integrity of many remaining prairie ecosystems. Freshwater amphipods are an important constituent of prairie wetland food webs, but their populations may have declined dramatically throughout the PPR, and there is a limited understanding of the factors driving their current distribution across the landscape. Amphipods are sensitive to a wide range of environmental contaminants, warranting the further assessment of surrounding land use activities that may impact the aquatic habitats they occupy. The objective of this study was to examine the relationship between land use and amphipod population density throughout western Minnesota, and I hypothesized that amphipod density would exhibit a negative relationship with the proportion of cropland in the immediate upland watershed. Regression modeling revealed that trends in land use alone generally don't exhibit strong correlations with amphipod population densities. My future work will further examine the effects of select environmental contaminants (e.g. insecticides and road salts) on amphipod populations.

Title: *Losing the "Kidneys" of Martin County*

Presenter: Crystal Hotzler
Sponsor: Jeffrey Ueland

Abstract: This project aims to observe the decline in the amount of area that once were wetlands/prairie potholes in Martin County, Minnesota. These depressional areas are considered the "kidneys" of the Prairie Pothole Region, because of the ability to filter water before it recharges the water table. These areas are also important habitats for waterfowl, invertebrates, and countless other animals. The pothole region has been drastically impacted by agricultural practices, such as tilling or just plowing through the wetland areas. I hypothesize that there will be a significant decline in the amount of land considered a prairie pothole, wetland, or slough in Martin County. I will examine this by taking 1854 field surveys and digitizing them so spatial analysis tools can be used to compare data collected in recent years. This will allow for an accurate account of the loss of wetland areas in 1854 to the area of wetlands currently.

Title: *Mathematics and the Rubik's Cube*

Presenter: Kevin Lauderbaugh
Sponsor: Hannah Altmann

Abstract: For my presentation I would like to display a mathematical approach behind the moves of a standard Rubik's cube. In particular, I will discuss the group theory behind the configurations of the Rubik's cube. Additionally, I will explain the strategies that I have used to solve a Rubik's cube.

Title: *Mental Health*

Presenter: Toni Ferdig
Sponsor: Rebecca Hoffman

Abstract: The focus of this poster presentation is to provide an overview of mental health that shows the background behind it, along with historical trauma. I will also identify the traps in public thinking about mental health and how to shift the focus on mental health to help with education on thematic responses within the community. The main focus is to help the community prevent mental illness by understanding the risk factors and consequences.

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Facilitators: Julie Larson, Travis Ricks

Title: Mental Illness: An Injustice Faced by Minnesota's Arrowhead**Presenter:** Gabriella Suihkonen**Sponsor:** Rebecca Hoffman

Abstract: Mental illness is a social issue which is faced in many regions of the state, the country, and even the world. Specifically, in northern St. Louis County of Minnesota, the injustice of mental illness is quite prevalent. This poster presentation will present some of the key points of this injustice. This poster will give a more in-depth definition of mental illness. The factors of mental illness, such as Adverse Childhood Experiences (ACES), poverty, and the family system of origin will be discussed. Some of the consequences, such as higher levels of incarceration, and higher genetic disposition for mental illness will also be available. I will focus on the St. Louis County level data. Some of the current public traps in thinking will be outlined. Finally, I will aim toward reframing this injustice. Mental illness will be reframed for social change. Social work is a practice profession, this poster is real life research, which can be readily implemented into practice.

Title: Music Therapy and Adolescent Depression**Presenters:** Simon Olmstead, Nicholas Weidell, Kaitlyn Westphal**Sponsor:** Sarah Cronin

Abstract: Music has been used as a therapy for hundreds of years. According to the American Music Therapy Association, it promotes an individualized approach between clients, groups, and sessions, so no two experiences are exactly alike. Trends show an increase of depression in adolescents in current years (Mojtabai, Olfson, Han, 2016). This systematic literature review focused on peer-reviewed articles about the efficacy of music therapy as a tool to treat depression. The database PsycINFO was used to narrow down to eight articles about using music therapy to treat adolescents with depression. Results have evidence that music therapy was found to be effective in treatment of adolescents with depression. Music-based interventions were shown to reduce symptoms of depression and anxiety (Geipel, Koenig, Hillecke, Resch, Kaess, 2018) as well as other behavioral and cognitive abnormalities (Barry, O'Callaghan, Wheeler, Grocke, 2010). This literature review gives a brief history of music therapy, requirements to become a music therapist, and the average effectiveness of music therapy, as well as a review of the specified articles in the database.

Title: Prime Substrate for Wildlife Track and Sign Evaluation around Bemidji, Minnesota**Presenter:** Kimberly Shelton**Sponsor:** Samantha Jones

Abstract: While sign of wildlife can be found in every corner of the natural world, this map shows areas that are not only easily accessible and on public land but are also located on prime substrate and within natural habitat. These combined attributes display the most ideal areas for capturing a diverse array of wildlife track and sign.

Title: Purification of Palmitoyl Protein Thioesterases and Acyl Protein Thioesterases for Use in In Vitro Depalmitoylation Reactions**Presenter:** Dave-Preston Esoe**Sponsor:** Michael Hamann

Abstract: Palmitoylation is the attachment of palmitate to protein cysteine residues and assists with protein localization to the plasma membrane. Palmitoylation is often a dynamic process and involves the attachment of the palmitate by palmitoyl transferases and removal of the palmitate by palmitoyl protein thioesterase (PPTs) or acyl protein thioesterases (APT). Currently, the techniques to study palmitoylation are difficult to perform and involve the use of harsh chemical reagents like hydroxylamine (HAM) to depalmitate proteins, often leading to destruction of the proteins being studied. Recombinant, purified PPT/APTs could be used as an alternative reagent to depalmitate proteins. In order to purify PPTs and APTs, the coding sequences of human PPT1 and 2 were PCR amplified and cloned into a pGEX plasmid. The proteins were then purified as GST-tagged fusion proteins and analyzed for purity using SDS-PAGE. Results were not as expected, and PPT1 and 2 purified poorly with no detectable enzyme-activity. Currently, cloning procedures are being repeated with PPT cDNA for PPT 1 and 2 being cloned into a pMAL plasmid and expressed as maltose binding protein fusion proteins to potentially improve stabilization and purification of the proteins.

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Facilitators: Julie Larson, Travis Ricks

Title: *Quantification of Sun Lotion***Presenters:** Cole Hartje, Nathaniel Larson**Sponsor:** Keith Marek

Abstract: Zinc oxide and octinoxate are common active ingredients used in sunscreen and sun lotions. Zinc oxide works by absorbing both UV-A and UV-B rays. Octinoxate is an organic compound that acts as a UV-B filter. The goal of the experiment is to analyze Coppertone Kids Tear Free Sun Lotion and develop a method for examining the two compounds. Zinc oxide was evaluated by first separating it from the other compounds in the lotion. It was then analyzed by Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) and Ultraviolet-Visible Spectroscopy (UV-Vis). Octinoxate was analyzed by High Pressure Liquid Chromatography (HPLC) and Gas Chromatography-Mass Spectrometry (GC-MS). The amount of each were quantitatively analyzed to determine if the content of the bottle match the concentration listed.

Title: *Quantitation of Amygdalin and Metals in Apricot Kernels***Presenters:** Cody Blanchard, Stefan Charon, Matthew Griggs**Sponsor:** Keith Marek

Abstract: Apricot kernels were chosen because of the supposed anti-cancer effects that are currently undergoing research. The specific ingredient in apricot kernels known as amygdalin is the compound that has possible anticancer effects. In this experiment, amygdalin, and the metals manganese, iron, and cobalt, will be extracted and analyzed to find the concentrations of each. This experiment will incorporate various techniques of analysis. For preparation of the metals to be measured, the kernels will be ashed and dissolved into a hydrochloric acid solution. The manganese, iron and cobalt will then be analyzed with inductively coupled plasma optical emission spectrometry, and the manganese will be measured using UV-vis spectrophotometry. For measurement of the amygdalin, the substance will be extracted in a soxhlet extractor with methanol as the solvent to be measured with fluorescence spectroscopy and UV-vis spectrophotometry.

Title: *Quatrefoil Light Trap Sampling of Juvenile Muskellunge in Rearing Pond Nurseries***Presenter:** Daniel Smith**Sponsor:** Andrew Hafs

Abstract: Esox masquinongy are an important game fish in northern Minnesota and their populations are often dependent on stocking efforts. This has led to the rearing of juvenile Muskellunge in nursery ponds. Habitat preferences of Muskellunge and the vegetation provided by nursery ponds in the summer months make monitoring and estimating numbers and condition of fish difficult. Quatrefoil light traps are effective for collecting larval fishes in dense vegetation such as that in a nursery pond. During the month of June 2018, eight quatrefoil light traps were deployed and monitored for their effectiveness in collecting juvenile Muskellunge. Light traps were tested for the most effective sampling duration among set times of one hour, two hours and overnight (6-7 hours). Mortality of trapped fish was also monitored. A total of 209 juvenile Muskellunge were collected in six light trapping sessions. Results related to effectiveness of trapping duration and growth rates of fish sampled will be presented.

Title: *Reducing Mental-Illness Stigma with a Humorous Intervention***Presenter:** Kylie DeGrote**Sponsor:** Angela Fournier

Abstract: The purpose of this study is to test the effectiveness of a social marketing theory-based humorous intervention in reducing mental-illness stigma. The study followed a between-groups posttest only design with clustered random assignment. Anti-Stigma posters were randomly assigned to the dormitory buildings on campus. After 30 days, the Day's Mental Illness Stigma Survey was administered to participants, along with a posttest survey. It was hypothesized that mental health stigma scores would be lower for the participants in the intervention condition than those in the control condition.



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Facilitators: Julie Larson, Travis Ricks

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Title: Reframing the Injustice of Children's Mental Illness

Presenter: Mikayla Patterson
Sponsor: Rebecca Hoffman

Abstract: The injustice being discussed in this poster is children's mental illness. On this poster, there will be an explanation of the factors and consequences of this injustice, the traps in public thinking towards this injustice, and the reframing of the injustice towards social change. The purpose of this poster is to inform students about this injustice and reframe it in a way towards social change and fixing the problem at hand. My hope is to be able to talk to other students about this issue that I am passionate about in order to make this injustice known and inform them about how to make this social change.

Title: Religion and Racism

Presenter: Kristen Lynch
Sponsor: Rucha Ambikar

Abstract: I want to look at how certain forms of Christianity see themselves as superior to other races, see how this forms into hate groups like the KKK and how that still exists today in 2019. The poster will explore what claims are made that are religious in nature and how these work to support claims of racial superiority. At some level, the poster will examine if this ideology of racial superiority is purely based on religion or is part of a larger cultural phenomenon where racial supremacy is justified using any means available.

Title: Safe Sidewalks

Presenter: Scott Kelley
Sponsor: Anna Carlson

Abstract: There is a separation issue between the weather at Bemidji State University and the ability to use environmentally friendly modes of transportation. While our grounds crew at BSU does a wonderful job keeping the sidewalks clear, what if they did not have to? What if there was a way to create at least one sidewalk that connects the buildings on campus, that does not need the use of salt, sand or vehicles to keep them clear of snow and ice? The project that I am proposing here is suggesting that BSU install heated sidewalks through campus to create safe sidewalks. This project would promote an increased use in environmentally friendly modes of transportation. This directly relates to BSU's sustainable goal 3, which is to encourage alternative modes of transportation. Implementing these sidewalks would also help reduce salt and sand use, which will also reduce degradation to our facilities from the salt and sand. These sidewalks will not only make our campus cleaner and safer to travel, but it will also help create a more green sustainable campus as well.

Title: Security Breaches

Presenters: Emma Schmidt, Natalia Ziegler
Sponsor: Halbana Tarnizi

Abstract: Cyber security breach has become a daily occurrence for the business world. Cost of the average data breach to a U.S. company is around \$7.91 million, with average time to identify a breach is around 196 days. In this study, we are looking into cyber security breaches that have happened in well-known companies worldwide in recent years. Examples of these include Target and Wells Fargo's security breaches as well as Facebook's data collecting breach. Our study focuses on finding commonalities across those breaches including how it happened and what each company did after the breach occurred. Number of potential victims, types of data that are stolen, and efforts by companies to regain customer trust will be discussed in this study. Furthermore, we are also looking into best practices that companies can do in minimizing security breaches, and what we, as individuals, can do to minimize potential negative impact in the aftermath of a breach. Comparison between what the company said about those breaches and what they did in the aftermath, and what outside sources say about the breaches will be discussed.

POSTERS

Time: 1 p.m. – 3 p.m. **Hobson Memorial Union Lakeside**
Facilitators: Julie Larson, Travis Ricks

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Title: *Shamanism: The Magic of Perception*

Presenter: Aaron Lisle
Sponsor: Rucha Ambikar

Abstract: Shamanism is seen around the world in many different forms. I hope to explore these forms and present any difference between the many tools, spirits medicines, and maladies that they may utilize. I feel that people as a whole base their view of the world on perspective and perception. I will explore if Shamanism is one of the oldest forms of religion; showing up in many hunter gatherer societies and examine the role played by Shamans in their groups. The Shaman is a master of both perspective and perception in order to achieve a goal, whether that is for personal gain or the greater good of the society.

Title: *Spatial Analysis of Banding Data on Canvasback Ducks (Aythya valisineria) in the Mississippi Flyway States*

Presenter: Parker Vrolson
Sponsor: Jeffrey Ueland

Abstract: Canvasbacks (*Aythya valisineria*) are a popular diving waterfowl species that has been getting greater focus within the waterfowl conservation world. This project focuses on banding and observation data collected through the last 50 years, from 1968 to 2018. It will assess if there has been significant changes in the patterns of banding and recovery locations over this time. This study aims to inform the broader discussion about banding quantities and Canvasback encounters overtime.

Title: *Spatial Analysis of Urban Sprawl Encroaching on Forest Lands Over Time*

Presenter: Merissa Stevens
Sponsor: Jeffrey Ueland

Abstract: There has been large amounts of research on the loss of forests to urbanization and the effects it can have on the natural environment and on wildlife habitat. It is often viewed as a necessity, as economic utility is often given priority over ecological needs and preservation. Utilizing census boundary data to quantify “urban areas” and landcover data from the United States Geological Survey (USGS) to identify forested areas, this study will test to see if there has been a statistically significant change in location and pattern in forest loss to urbanization over several decades. The importance of this research is to help understand how original forests have been affected by the development of urban areas over time in the United States. Further discussion points will include better understanding the relation of urban sprawl on the forested lands around those areas and how they could look in the future.

Title: *Spatial Analysis of Wild Parsnip Distribution in Minnesota*

Presenter: John Hanrahan
Sponsor: Jeffrey Ueland

Abstract: Wild Parsnip (*Pastinaca sativa*) is an invasive plant in Minnesota. Wild parsnip is highly invasive and can spread rapidly, creating large mono-cultures. This replaces native animal and plant habitat and decreases forage crops for wildlife. The plant sap is toxic and is activated by sunlight causing burns and blisters. The purpose of the research is to look at the correlation of Wild Parsnip distribution to roadways in Minnesota to test if there is a significant relationship. By looking at the spread of Wild Parsnip in correlation to roadways management plans can be developed to reduce the future spread, also determining hot spots that can be watched. Looking at nearest neighbors and distance band will allow us to determine if a correlation of Wild Parsnip to roadways exists.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside

CONTINUED

Facilitators: Julie Larson, Travis Ricks

Title: The Analysis of Caffeine and Calcium in Pre-workout Supplements**Presenter:** Jessica Burlingame**Sponsor:** Keith Marek

Abstract: Caffeine and calcium are common additives found in pre-workout supplements used by many athletes. Some formulas are complex and designed for specific athletes such as females, with the Athena brand, and others target people with specific goals such as weight loss and the C4 ripped supplement. C4 Ripped and Athena Intense were analyzed for their concentrations of calcium and caffeine. Calcium is often found as an additive in workout supplements because it helps to maintain gradient concentrations for muscular responses, which increases the speed and endurance of muscle contractions. Calcium also increases bone strength and the ability to accommodate stress applied by exercise. UV-VIS and ICP are used to determine calcium concentrations. Caffeine is added to supplements to improve the motivation and energy levels of the athlete. HPLC and GC-MS are utilized for caffeine concentration determination. Differences between formulas in concentrations of calcium and caffeine may be due to the specificity of the goal outcomes of each supplement.

Title: The Effectiveness of Cognitive-Behavioral Therapy for People who Suffer with Substance Abuse**Presenters:** Brittany Czerny, Jared Rushing, Hannah Schaufler**Sponsor:** Sarah Cronin

Abstract: The objective of our research was to look at the effects of cognitive-behavioral therapy (CBT) on substance abuse. Twenty-one and a half million American adults (age 12 and older) battled a substance abuse disorder in 2014. We conducted a systematic literature review with emphasis on peer-reviewed articles found using the phrases 'cognitive-behavioral therapy AND substance abuse' and 'cognitive-behavioral AND addiction' in PsychINFO. Results provided evidence that CBT is effective for people who struggle with substance abuse. Furthermore, CBT was effective for substance abuse across multiple age groups, ethnicities, different substance types, and genders.

Title: The Effectiveness of EEG in Migraine Studies**Presenters:** Jonathan McNicholes, Jaymi Nelson, Connor Newby**Sponsor:** Li Zhou

Abstract: There have been numerous research studies looking into the effectiveness of electroencephalogram (EEG) in the use of examining migraines. The use of EEG is considered minimal in examining migraine headaches in the scientific community (Kroon, Ernst, Slater, & Powers, 2017). However, there are starting to be some small breakthroughs regarding observable features to help notice and distinguish between migraine headaches. In our presentation we will present some of the recent results that have been discovered in these numerous studies. Some of the findings in the new studies include slow waves and depression of background activity were observed during migraines during visual auras, along with patterns of increased alpha rhythm variability (Sand, 1991). In addition, occipital alpha power was found decreased contralateral to the affected hemifield and increases in delta power in the frontal lobes increased in a study based on children regardless of age. (Seri, Cerquiglini, & Guidetti, 1993). All the new results show that there is premise to using EEG in migraine studies.

Title: The Effects of Temperature on Freshwater Snail Density**Presenter:** Luke Rambow**Sponsor:** Andrew Hafz

Abstract: There are many factors that contribute to the overall health of an aquatic ecosystem. Indicator species, such as mussels, are commonly used to give aquatic biologists a good idea as to how well these ecosystems are doing. Snails, being one of the more commonly used indicator species, interested us because of their large roll within the ecological niche of these communities, especially in Lake Bemidji. The goal of our research was to determine whether the temperature fluctuations in Lake Bemidji change snail behavior in terms of their distribution. We took thirty-gallon glass tanks filled with water at different temperature increments of 3° C ranging from 11-20° C. Four measurements were taken at each temperature for a total of 16 trials. We did four trials with each trial consisting of tanks at 11° C, 14° C, 17° C, and 20° C. Taking the starting positions and ending positions of the snails after each trial, we were able to compare the total area of their movements among temperature treatments using an ANOVA statistical test.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: *The Effects of Wetland Connectivity and Fish Presence on Amphipod Density in Western Minnesota*

Presenter: Jake Carleen
Sponsor: Jeffrey Ueland

Abstract: Amphipods are key wetland biota in the Prairie Pothole Region. Amphipod populations are thought to have declined, coinciding with increased wetland hydroperiods and increased wetland connectivity from agriculture. Fish have benefited from the stable hydrologic regimes and increased paths for dispersal, and may predate on amphipods and/or alter habitat quality. I assessed over 100 wetlands in western Minnesota in spring 2018 to determine amphipod densities and fish presence. Amphipod densities ranged from 0 to 1477 individuals/m³ with high density wetlands clustered around Detroit Lakes and Fergus Falls, Minn. Using GIS, I analyzed distance to streams or ditches and the nearest Type 4 or Type 5 wetland as a wetland connectivity measure. I found that wetlands within 100m of a stream or ditch had 81% lower median amphipod densities. Distance to nearest Type 4 or Type 5 wetland or visual presence of fish had no significant effect on amphipod densities. In spring 2019 and 2020, I will visit over 100 wetlands using more robust methods to sample amphipods, fish, and habitat. Increased sample size and a stronger gradient of fish abundances and amphipod densities will allow us to further elucidate the effects of fish on amphipods.

Title: *The Functional Processes Involved in Facial Recognition*

Presenters: Madison Hahn, Aleisha Mason, Celine Pliscott, Madison Ulrich
Sponsor: Travis Ricks

Abstract: Our brain helps us recognize faces in a fraction of a second by overcoming the obstacle of too much information. The recognition of faces is extremely difficult because of the variability in faces, which are composed of many lines with an infinite number of way to groups those lines together. The purpose of this poster presentation is to explain how our nervous system allows us to quickly identify an individual based off their significant facial features. Specifically, we will explain how facial recognition functions by examining the relation between the facial features. In addition, we will also discuss how varying circumstances and situations in our environments lead us to fail in overcoming the obstacle of too much information like prosopagnosia.

Title: *The Future of Artificial Intelligence*

Presenters: Garrett Lenzen, Brandon Voigt
Sponsor: Halbana Tarmizi

Abstract: This study explores the field of artificial intelligence to elaborate and discover how it will impact the future of mankind. The popularity and use of artificial intelligence have exponentially increased with the advancement in data volumes, algorithms, and enhancements in computing power and storage. People start using artificial intelligence in everyday life to increase efficiency and make decisions. Artificial intelligence is opening new opportunities for mankind, allowing computers to complete tasks that normally require human intervention. This technology has positively impacted everyday business operations and transactions. Researchers are focusing on assessing the future sustainability of artificial intelligence. This includes evaluating the impact of voice recognition, the impact of artificial intelligence on decision-making, and the impact of new functions of artificial intelligence on society. Researchers want to discover if or how artificial intelligence will become a sustainable technology in the future and if the growing popularity of artificial intelligence will allow for humans to still function efficiently.

Title: *The Future of Microfinance*

Presenters: Xiyuan Cao, Minrui Zhu
Sponsor: Zhe Li

Abstract: As you all know, the United States is a coffee-consuming country and a fast-food kingdom, but the Payday Loans has more stores than Starbucks or McDonald's. We will investigate the public's attitudes toward microfinance and what kind of microfinance is the most popular and take the Payday Loans as a case study. Then list the main modes of microfinance in the United States and the scope of the loan projects. Through research and investigation, we will draw relative conclusions about the status quo and future development of microfinance.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: The Inability to Use the Gestalt Principles When Looking at Camouflage

Presenters: Kaysi Florek, Jaymi Nelson, Breanna Thompson, Nicholas Weidell
Sponsor: Travis Ricks

Abstract: The purpose of this poster presentation is to explain how our visual and central nervous systems fail to utilize the Gestalt Principles when looking at camouflage. Research indicates that the visual and central nervous systems use the Gestalt Principles to group and organize lines together to help us identify objects in our environment. In this presentation we will define and demonstrate each of these principles and how they enable us to overcome the ambiguity of visual stimuli. Camouflage defies the Gestalt Principles, thus undermining our visual and central nervous system's ability to group and organize lines into objects.

Title: The Injustice of Child Abuse and Neglect

Presenter: Shianne Morris
Sponsor: Rebecca Hoffman

Abstract: Child abuse and neglect is a serious issue across the world, where some agencies and communities find it difficult to define the issue. According to Hollie Hendrikson (2015) child abuse could be defined as intentional or deliberate acts of harm, or threats of harm, committed against a child, and child neglect is the failure to meet a child's basic needs, including housing, food, clothing, education, and access to medical care. Abuse and neglect also have sub-terms, such as physical abuse, sexual abuse, and inadequate care. Focusing on Beltrami County, some risk factors could be alcohol and drug use, poverty, historical trauma or intergenerational, parenting skills, mental health, etc. These risk factors could lead to long-term effects, which could be mental and physical health, incarceration, alcohol and drug use, prostitution, and more. Child abuse and neglect leads to different perspectives within cultures and communities. An example could be parenting skills and how they discipline their children, and where to draw that line when it becomes abusive (Aubrun & Grady, 2003). We examine how historical trauma impacts abuse and neglect within our Indigenous communities, and conclude how educating our communities could prevent child abuse and neglect.

Title: The Usage of Wood Duck Boxes by Waterfowl in the Bemidji Area

Presenters: Zachary Forsberg, Matthew Tomoson
Sponsor: Richard Koch

Abstract: Artificial nesting structures, such as Wood Duck boxes, often play an important role in enhancing waterfowl populations. Boxes must be maintained and inspected annually to maximize their productivity. In order to assess the utilization of Wood Duck boxes placed in different areas around the Bemidji area, we performed a study checking 60 wood duck boxes in Fall 2018. Eggs were identified and counted, and boxes were cleaned out and refilled with new wood chips for potential use in the next nesting season. Of the boxes we checked, only 29 boxes were utilized. A total of 163 eggs were counted from those boxes, but only 122 of them were successfully hatched out. The three species that used the boxes were Wood Duck, Hooded Merganser, and Common Goldeneye. Wood Ducks contributed nine of the eggs, with an 89% hatch rate. Hooded Mergansers accounted for 79 of the eggs, with a 62% hatch rate. Common Goldeneyes accounted for 75 of the eggs, with an 87% hatch rate. Further studies need to be performed analyzing the placement of the boxes in relation to habitat types, natural cavities, and distance from water to determine reasons for lack of Wood Duck production.

Title: Toothpaste Contents: Fluoride and Sorbitol

Presenters: Michael Buhman, Isaac Londo
Sponsor: Keith Marek

Abstract: The sole active ingredient in most toothpastes is fluoride. This is because fluoride ions limit tooth decay by reducing the amount of acid produced by plaque located on the surface of teeth. The fluoride is found in toothpaste as a fluoride salt which dissociates into its ion form when dissolved in water. Many manufactures also use artificial sweeteners, like sorbitol, to give their toothpaste a more pleasant taste for their consumers. These sweeteners are used rather than sugars, since sweeteners like sorbitol do not promote plaque growth. The goal of this experiment was to develop methods to determine amounts of fluoride and sorbitol in a specific brand of toothpaste. Fluoride and sorbitol contents were examined for Crest Pro-Health Whitening Power toothpaste. The fluoride content was determined potentiometrically using an ion selective electrode and spectroscopically using ^{19}F NMR. The sorbitol content was determined spectroscopically using high-pressure liquid chromatography and spectroscopically using gas chromatography-mass spectroscopy. The results from the experiment were compared to the labels provided by the manufacturer.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: A Spatial Analysis of Vehicle Collisions with White-tailed Deer in Minnesota

Presenter: Timothy Paquin
Sponsor: Jeffrey Ueland

Abstract: Vehicle collisions in the state of Minnesota with white-tailed deer is an on-going issue causing vehicle damage and injury to drivers every day. The purpose of this study is to look to see if there is any correlation between counties in Minnesota with population densities, road activity and resident deer populations. To this end, the study will employ data from the Minnesota Department of Transportation and the Minnesota Department of Natural Resources on reported vehicle collisions between 2013-2017. The goal is to obtain a better understanding of which counties have the highest level of vehicle/deer interactions. The results of this study could be used to inform the discussion on where these events are the most problematic and to target prevention and mediation measures to help lower the number of deer hit by cars by creating different management plans for deer in those given counties for future years to help prevent this issue.

Title: Water Uptake Capabilities of Sphagnum Moss

Presenters: Mattie Osborn, Nikki Shaw
Sponsor: Kristina Cirks

Abstract: Sphagnum moss is well known for its water holding capabilities, in some cases absorbing more than 16 times its dry weight. Currently, 33 species of Sphagnum have been identified in Minnesota wetlands. The purpose of the research was to determine whether water uptake capabilities vary between different species of Sphagnum commonly found in northern Minnesota. Due to the similarities in size, habitat, and location of collection, no differences in water uptake capabilities were expected between the two Sphagnum species studied. Our results, however, indicated distinct variations in the amounts of water absorbed by different moss species. We found that Sphagnum capillifolium held 34% more water than Sphagnum fallax. Sphagnum capillifolium had an average uptake of 14.808 mL/g, and that Sphagnum fallax had an average uptake of 11.017 mL/g. Peatlands dominated by species that store more water are likely to have increased resistance to drying and prolonged hydroperiods. These results may have implications for selecting Sphagnum moss species in wetland restoration, or, if used in conjunction with climate change models and species distribution maps, to predict peatland loss.

Title: Where is Waldo? A Demonstration of Visual Crowding

Presenters: Beatriz Costa, James Daker, Connor Newby, Abby Skwira
Sponsor: Travis Ricks

Abstract: Visual crowding is the clutter of objects in our visual field, which negatively effects our peripheral object recognition. We will discuss how features of the visual system lead to the failure of visual crowding and what strategies we use to overcome this obstacle in the children's books called Where is Waldo?. The purpose of this poster presentation is to explain how the structure of the eye and central nervous system leads to failure and success in overcoming visual crowding. We will also provide the background into the structure and function of the visual system and how these features enable us to focus on the most relevant information in our environment.

Title: Zooplankton Population Dynamics and Community Structure on Bad Medicine Lake

Presenter: Mark Love
Sponsor: Richard Koch

Abstract: This project aims to assess the temporal variations in vertical and spatial distribution of zooplankton community structures in Bad Medicine Lake, an oligotrophic, deep-water lake in Hubbard County, Minn. Zooplankton communities were sampled across three locations at five-meter increments from surface to bottom during May-November 2017 and 2018. Zooplankton were collected using a 12.5 cm diameter Birge-self closing plankton net and preserved in the field using 70% isopropyl alcohol. Samples were later identified with microscopy to the lowest possible taxa. Initial results show the highest zooplankton densities occur from June through August, while significantly declining in the fall. Significant differences among densities by depth are also expected, with greater depths having higher densities. Zooplankton community structure within the lake is quite diverse, 38 species of Rotifer, 24 species of Cladocera, 10 species of Cyclopoid, and three species of Harpacticoid. Temporal zooplankton density variations are hypothesized to be attributed to changes in phytoplankton abundance. Density is greatest in the summer due to warming water temperatures causing algal blooms, which can support higher zooplankton densities.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: Divine Mandate

Presenter: Brian Hawkins
Sponsor: Ruca Ambikar

Abstract: I will be focusing on the “Divine Mandate,” and its evolution into the divine right of kings. There is a long extending narrative here concerning the implication of power for western society, and how this notion is used both religiously and politically to shift power balances. I start with the Christian scripture which supports the divine right of kings and point to things, such as Luther’s 95 thesis, and Henry the VIII’s break with papal authority in creating the English church. I explore ways this notion has influenced further western aggressions, such as the pursuit of slavery and colonialism which further opens the divine right to include nations of people. What instances can we find in history where this notion of God’s mandate has been used to shift power structures in religious and social authority? How did the doctrine influence the English reformation? Where can we see the influence of this religious notion affecting larger social movements? What connections if any can be made between western Christianity and western nationalism? Where can links be drawn between the divine right of kings and the later Manifest destiny which continued to use Christian notions of divine providence to justify land/resource theft, slavery, and incidents of massive death experienced by the invaded indigenous populations. Finally, I discuss some parallels that can be drawn between earlier western society and today’s society which reflect this notion of divine right.

Title: Oral Traditions as Knowledge

Presenter: Sedona Lindstrom
Sponsor: Ruca Ambikar

Abstract: For my project I will be asking the question, “Can oral tradition be used as knowledge?” The reason I chose this is because I think that there is much truth to the knowledge that is passed down through generations. There is some speculation that many religious stories hold truth. Many beliefs stem from natural occurrences on this earth, otherwise oral traditions would have nowhere to stem from. Other questions that set up my project will be how we decide the legitimacy and how the knowledge will be used. What I hope to show via this project is how the knowledge could be taken as fact and then used.

Title: Mexico and Catholicism

Presenter: Tabitha Hiemenz
Sponsor: Ruca Ambikar

Abstract: For my poster I will examine the effects of the colonization of Central America, specifically Mexico, in regard to religion. When conquistadors arrived in what is now Mexico, many indigenous people were forced to convert to Catholicism, as it was the official religion of Spain. Some indigenous traditions and beliefs were maintained and can still be seen in Mexican Catholicism. Some of the questions I would like to answer are: What are some of the traditions unique to Mexican Catholicism and how are they received by Catholicism at large? How has Catholicism affected Mexican culture in recent centuries? What, if any, were the initial attempts at preserving traditional practices and how did they turn out? Through research, I want to understand in what ways indigenous practices were preserved and continued and how they mixed with Catholicism. In the presentation, I include a brief background of Spain’s colonization of Central America before examining the evolution of religion in Mexico.

Title : Bilingual Processes of Semantic Translation

Presenters: Nicholas Weidell, Madeline Halfmann
Sponsor: Li Zhou

Abstract: Many people go on to learn a second language in their lifetimes, but there still may be many things unknown about how bilinguals are affected by learning a second language. Semantics is an area in language that deals with the meaning of a sentence. This poster presentation was conducted through a systematic literature review and looks at how semantics are translated from one language to the other language in bilingual individuals. The mechanisms involved in bilingual language has been examined using event-related potential (ERP) collected data from bilinguals. Translation tasks were used to find a difference in semantic recognition for both bilingual individuals and native speakers. N400 effects were delayed when comparing non-native bilingual language comprehension to native speakers. This delay has been found to be contributed to a higher number of words that are accessible to bilingual individuals in comparison to monolinguals. There was also a smaller N400 amplitude observed in the posterior scalp and a larger amplitude in the anterior scalp. This suggests that the translation of semantics occurs in the first language before meaning is made in the second language.

POSTERS

Time: 1 p.m. – 3 p.m. Hobson Memorial Union Lakeside
Facilitators: Julie Larson, Travis Ricks

CONTINUED

Title: Big Data: Exploring its Use and Potential in the Business World

Presenters: Jesse Granfors, Austin Olson, Derek Ertl
Sponsor: Halbana Tarmizi

Abstract: As social media becomes part of our everyday life, a large amount of data is generated every second through posting of text, pictures, video clips, and others. This large amount of data, also known as Big Data, has attracted companies to explore possibilities of using it for their own benefits. In this study, we are going to explore Big Data / Data Analytics and its potential. We will discuss what Big Data is, how it is collected and used, as well as how companies benefit from Big Data. Furthermore, we explore other potentials for Big Data and Data Analytics in various sectors. We are going to discuss a number of companies that are currently using Big Data to their advantage, along with showing how Big Data could potentially improve a business. Big Data will bring major changes in the way that decisions are made, companies are financed, and the marketing techniques for companies. There is a lot to be uncovered when Big Data is collected and analyzed, we will touch on how a business can use these discoveries to gain competitive advantage. Big data can analyze extremely large scale and complex data in order to find previously unrecognized patterns, connections, trends and customer preferences that will help a business make an informed business decision.

Title: Reframing Mental Illness for Social Change

Presenter: MacKenzie Bernardson
Sponsor: Rebecca Hoffman

Abstract: Mental illness is defined as the problem that was researched in the County of El Paso, Colorado. There are many risk factors and outcomes involved around the topic of mental illness, but there are a few that really show the story of how mental illness impacts us and those around us. Those that will be discussed are: Child abuse and neglect, socioeconomic status, rates of suicide, and homelessness. These are important to discuss, because they show the true picture of what mental illness presents as in society. With this information, the traps in public thinking really start to be shown through terminology, prevalence, cultural models, and stigma. In order to enact social change, terminology, language, explanatory chains, and prevention efforts are all going to aid in this process and to help reframe the way society views mental illness.

EXHIBITS

Time: 1 p.m. – 3 p.m. HMU Lakeside 2nd Floor

Facilitators: Mitchell Blessing, Steven Sundahl

SCHOOL OF TAD EXHIBITS

Exhibit- Lexie Tabbert, Kylee Beaver
Design- Cailey Bircham, Kaitlin Montebello
Illustration- Emma Brechlin, Jarod Her
Printmaking- Madina Usmonova, Megan Gallagher
Ceramics- Corey Stockman
Sculpture- Daniel Coffin, Shayna Fellman

FINE ART EXHIBIT

Sponsor: Natalia Himmirska
 Antonia Bailey
 Sarah Barge
 Savannah Dela Hunt
 Lydia Johnson
 Chihiro Miroguchi
 Elizabeth Stone
 Jessica Vidor
 Kaitlyn Westphal

ELEVATOR SPEECH CONTEST

Time: 2 p.m. – 3 p.m. Bridgeman 100

JUDGES

Thank you to Bemidji Area Toastmasters for volunteering to judge the Elevator Speech Contest

- Traci Ohren
- Ashley Charwood, Minnesota Council of Nonprofits
- Jeff Sullivan, General Manager/President, Northern Industrial Design, Inc.

Facilitators: Mahmoud Al-Odeh & Season Ellison



Title: *Capstone Project: Little Free Library*

Presenter: Saige Glaser

Sponsor: Mahmoud Al-Odeh

Title: *Debunking Public Opinion: Analyzing Factors Contributing and Consequences of Youth Homelessness*

Presenter: Madison Hahn

Sponsor: Rebecca Hoffman

Title: *For-Profit Prisons: How Lobbying Has Affected the Way America Houses Prisoners*

Presenter: Jacob Israel

Sponsor: Patrick Donnay

Title: *Isolation of a Novel Bacteriophage that Infects Biofilm Forming Bacteria; Pseudomonas Aeruginosa*

Presenter: Krysta Sanders

Sponsor: Holly LaFerriere

Title: *Sexual Violence*

Presenter: Elizabeth Jensen

Sponsor: Rebecca Hoffman

Title: *Strengthening the Bridge Between Church Communities and Sustainability*

Presenter: Kylie DeGrote

Sponsor: Jordan Lutz

Title: *The Correlation Between Amphipod Density and Macroinvertebrates in the Minnesota Prairie Pothole Region*

Presenter: Alissa Chalberg

Sponsor: Richard Koch

Title: *The Effects of Zooplankton and Phosphate Concentrations on Chlorophyll-a*

Presenter: Kristina Rands

Sponsor: Andrew Hafs

***Student Achievement Conference
Committee Members***

Sandy Beck
Vivian Delgado
Angie Gora
Andy Hafs
Julie Larson
Tammy Mayer
Gary Rees
Travis Ricks
Mahmoud Al-Odeh

MN Undergraduate Conference

Mahmoud Al-Odeh, BSU Facilitator
Kristina Cirks

Student Presenters at the MN Conference

Zachary Baker
Jon Barcenas
Alissa Chalberg
Dave-Preston Esoe
Aili Kultala
Brad Morris
Mattie Osborn
Nikki Shaw
Ashley Stiglich

Sponsors for the MN Conference

Kristina Cirks
Debbie Guelda
Holly LaFerriere
Katie Peterson
Mahmoud Al-Odeh

Elevator Speech Judges

Bemidji Area Toastmasters
Ashley Charwood
Traci Ohren
Jeff Sullivan

Special Exhibits

Natalie Himmirska, Fine Art Exhibit
Mitchell Blessing, TAD Exhibit

Conference Volunteers

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CONFERENCE SCHEDULE - APRIL 3, 2019

8:30 - 9 a.m. Registration & Breakfast (Beaux Arts Ballroom)

9 -10:15 a.m. Opening Ceremony (Beaux Arts Ballroom)
Dr. Faith Hensrud, President of Bemidji State University
and Northwest Technical College

Ms. Savannah Corradi, Student Keynote Speaker
Dr. Ed Galindo, Keynote Speaker
Dr. Mahmoud Al-Odeh, Director Student Achievement Conference

10:30 - 11:40 a.m. Oral Presentations Sessions (Hagg-Sauer Hall)
Session I - 10:30 am to 10:50 am
Session II - 10:55 am to 11:15 am
Session III - 11:20 am to 11:40 am

1:45 a.m. - 12:55 p.m. Lunch
Frybread Taco Sale (American Indian Resource Center)
"Thank You!" Lunch- by Invite Only (Crying Wolf Room)
Einstein Bros. Bagels (Lower Hobson Union)

1 - 3 p.m. Poster Presentations Session (Lower Hobson Union)

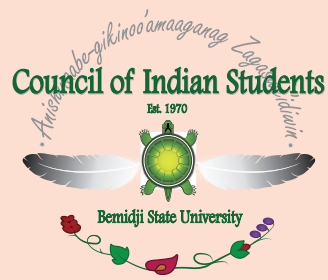
2- 3 p.m. Elevator Speech Contest (Bridgeman Hall 100)

STUDENT ACHIEVEMENT CONFERENCE 2019



Demonstrate Your *Curiosity* for Life & Learning

WEDNESDAY, APRIL 3 • AMERICAN INDIAN RESOURCE CENTER 11 A.M. - 1:30 P.M.



Council of Indian Students FRYBREAD TACO SALE

MENU

Frybread Taco & Tater Tot Hotdish	\$10
Frybread Taco	\$7
Tater Tot Hotdish	\$5
Frybread	\$3
Pop	\$2



Pre-orders & takeouts are welcomed! Call 218-755-2032
All proceeds go directly to events sponsored by the Council of Indian Students



If you need an accommodation for this event, please contact Accessibility Services at (218) 755-3883. If an interpreter is needed, two weeks notice is requested. A member of the colleges and universities of Minnesota State, Bemidji State University is an affirmative action, equal opportunity educator and employer.