22nd Annual

Dickinson State University

2024 Celebration of Scholars:

Achievement in Research, Humanities, and the Arts

Saturday, April 20, 2024
7:30 a.m. to 2:30 p.m.
Murphy Hall & Student Center Ballroom
Dickinson State University

About the Celebration of Scholars:
Dickinson State University Celebration of Scholars is a forum in which students in all disciplines present scholarly work to an audience of peers, faculty, and community members. These scholarly endeavors include scientific research, explorations in humanities and the arts, and summations of scholarly accomplishments such as portfolios. Along with student presentations, the conference features a keynote address by a faculty researcher who has engaged in and published research in collaboration with undergraduate students.

CELEBRATION OF SCHOLARS ORGANIZING COMMITTEE & ACKNOWLEDGEMENTS

Dr. Wendy L. Wilson (Chair)
Professor of Psychology

Dr. George Seror III (Co-Chair)
Assistant Professor of Psychology

Dr. Chip Poland
Professor of Agriculture & Technical Studies

Dr. Jeremy Wohletz
Associate Professor of Music

Dr. Colin Strine
Associate Professor of Biology

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Introduction of Keynote and Closing Remarks: Dr. Wendy L. Wilson

Oral Presentation Moderators: Dr. George Seror, Dr. Wendy L. Wilson, Dr. Eric Grabowsky, Dr. Colin Strine

Keynote Speaker

Dr. Miriam Webber
Associate Professor of Music
Director, Honors Program
Bemidji State University

"Isolation, Creativity and the Artistic Response: Musical Innovations in Soviet Russia"

Associate Professor of Music at Bemidji State University. She holds a Bachelor's of Music from Ball State University in Bassoon Performance, and Master's of Music from McGill University and the University of Kansas in Bassoon Performance and Music Theory, respectively, and a PhD candidate at the University of Kansas. Her dissertation research investigated narrative processes within Shostakovich's works as these processes relate to Soviet literary theory. Other research interests include emotion, pedagogy and performance studies. She has presented several papers at university events and international conferences.
In 2019, Dr. Webber co-founded Silent Voices Project, a large-scale project formed to help create opportunities for women and non-binary composers engaging in compositional pursuits of writing, publishing, performing, and recording music for chamber woodwinds. Silent Voices Project has commissioned and premiered new works at a number of national and international conferences, including those hosted by the International Double Reed Society, International Clarinet Association, Music By Women, College Music Society and SHE: Festival of Women in Music. Currently principal bassoonist of the Bemidji Symphony and Heartland Symphony Orchestras, Dr. Webber has performed with orchestras across the country, including the Duluth Superior Symphony, Fargo Moorhead Opera, Northern Lights Music Festival, Simphonietta Memphis, Symphony of Northwest Arkansas, Muncie Symphony, Kokomo Symphony, Southeast Kansas Symphony, Fort Hays Symphony, Springfield Symphony, St. Joseph Symphony, and Springfield-Drury Civic Orchestras. She was named Region 2 Arts Council Artist Fellow for 2022–2023.

2024 Celebration of Scholars Schedule

7:30 a.m.
Registration and Social
Murphy Hall

7:50 a.m.-10:00
Session I – Oral Presentations
Session 1A Rm 117 (Stroup Auditorium)
Session 1B Rm 155 (Thompson Auditorium)
Session 1C Rm 160

9:50 a.m.-11:00
Poster Presentations

11:00 a.m.-12:30
Session II – Oral Presentations
Session 2A Rm 117 (Stroup Auditorium)
Session 2B Rm 155 (Thompson Auditorium)

12:30 p.m.-1:30
Lunch
Student Center Ballroom

1:30 p.m.
Keynote Address by Dr. Miriam Webber
Associate Professor of Music at Bemidji State University
Student Center Ballroom

2:30 p.m.
Closing Remarks

Session 1: Oral Presentations

7:50 a.m. – 10:00 a.m. Oral Session 1A, 1B, and 1C

Oral Session 1A, Stroup Auditorium (Room 117) *Agricultural Sciences*
(Moderator: Dr. Eric Grabowsky)

- "Comparing the Differences of Non-Windrowed vs. Windrowed Hay" By Katya Baranko
- "Iodine Status in a Goat Trip that has Displayed Classical Deficiency Symptoms" By Riley Faller
- "Effect of Protein Supplementation on Average Daily Gain for Nursing Calves on Native Pasture in Western South Dakota" By Kailyn Groves
- "Effect of Breeding Time and Sire on Pregnancy Rate Utilizing Timed Artificial Insemination" By Hannah LaBree
- "The Effect of Seed Treatments on wireworms in a Barley Crop" By Keegan Nelson
- "How Management and Environment Affects Pregnancy Rates in Artificially Inseminated Heifers" By Tate Nordby
- "The Characteristics and Treatments of Horses With Navicular" By Macey Sabrosky

Oral Session 1B, Thompson Auditorium (Room 155) *Natural Sciences*
(Moderator: Dr. Colin Strine)

- "Exploring the Relationship Between Grip Strength and Key Performance Metrics in Dickinson State University Baseball Players: A Case Study" By Mathias Dufner
- "Black Bullhead (Ameiurus melas) and Walleye (Sander vitreus) Populations in North Dakota Lakes" By Dawson Dassinger
- "The Use of Stretching for Rapid Range of Motion Change in Basketball Athletes" By Josiah Haaland
- "Correlation Between Talon Size and Feeding Habits in Ground-Foraging Birds" By Ty Hornbacher
- "Effects of Creatine and Ibutamoren on Freshwater mussel mass (Elliptio complanate)" By Lance Kettering
- "Different Light Conditions and its Effects on Peripheral Shape Discernment in Dickinson State University Students" By Kaden Kuntz
- "Nurturing Nature: Exploring Hydroponic and Soil-Based Gardening" By Elly LeBlanc
- "What is the impact of interactive virtual laboratories on improving practical skills and knowledge acquisition in university-level biology education, as evidenced by randomized controlled trials?" By Marley McChesney
- "Stratigraphic reassessment of Coahuilaceratops magnacuerna (Ornithischia: Ceratopsidae) from the Late Cretaceous of Mexico and the origin of Triceratopsini" By Daniela Barrera Guevara

Oral Session 1C, Room 160 *Psychology and Nursing*
(Moderators: Dr. George Seror III & Dr. Wendy L. Wilson)

- "Industrial-Organizational Psychology: Empowerment Influences on Job Satisfaction in Long-Term Care Facilities" By Paige Balliet
- "Art Therapy: Origins and Modern Applications" By Brittany Helm
- "Psychodrama Therapy as a Treatment for Addiction, Adult Children of Addicts, and Trauma" By Autumn Martin-Geerts
- "Intersections of Anatomy, Physiology, and Sports Medicine in the 19th and 20th Centuries" By Eniola Soetan
- "Impact of Telehealth Settings on the Perceived Quality of Treatment by Counselors in the Rural Mental Health Field in North Dakota" By Luisa Popp
- "The Role of Impulsivity in Substance Use Disorders" By Casey Cutbirth
- "The Effects of Naltrexone Compared to other Pharmacotherapies in the Treatment of Alcohol Use Disorder" By Sydney Mosset, Jaylen Baxter, Dakota Auck
- "Does Providing Access to Narcan Harm or Help the Public" By Jessica Olson, Maxinne Mosqueda, Audrey Emerson
- "Nonpharmacological Therapies & Treatments Compared to Pharmacological Therapies for Dementia" By Ava Schneider, Abigail Semerad, Styrling Sickler-Zietz
- "To identify the negative cognitive effects in children who have been exposed to maternal MDD for over a year" By Emmy Dockter

Session 2: Oral Presentations

11:00 a.m. – 12:30 pm Oral Session 2A and 2B

Oral Session 2A, Stroup Auditorium (Room 117) *Natural Sciences*
(Moderator: Dr. Eric Grabowsky)

- "Effect on use of Fertilizers on Zebra Haworthia in Greenhouse" By Alexius Miller
- "Effects of Over Counter Medication on Heart Rate of Ghost Shrimp" By Jerika Miller
- "Effect of Max Back Squat on Peak Vertical Jump on Male Dickinson State University College Track Athletes" By Nickolas Page
- "Biotic and Abiotic Predictors of Winterkill Events on Northern Temperate Lakes in Northwest Montana and Northwest North Dakota" By Braedy Santens
- "Wetland Credits: A Scoping Narrative Review Of Wetland Mitigation Banking Programs and the Wetland Credits they Produce" By Jonathan Schendel
- "Tigers in North Dakota (Ambystoma tigrinum) eDNA Surveying for Presence in Cattle Ponds" By Evan Showalter
- "Leukocyte count in pre & post parturition (gravid or non-gravid) females of Sceloporus jarrovii (Yarrow's/ Mountain spiny lizard)" By Alycia Winters

<u>Oral Session 2B</u>, Thompson Auditorium (Room 155) *English, Arts, Music Education & Nursing*
(Moderator: Dr. George Seror and Dr. Wendy L. Wilson)

- "Fiction and Poetry at the End of the World" By Eniola Soetan, Hannah Rebsom
- "Adapting a Novel into a Script: Calvin by Martine Leavitt" By Autumn Martin-Greets
- "From Ground to Sound" By Joanne Pollard
- "Peace Garden: An Album Celebrating Composers of North Dakota" By Dr. Jeremy Wohletz
- "Secondary Instrumental Music Education in the Rural Great Plains: Philosophical Approaches to Teaching Band in Small Communities" By Amanda Housel
- "The Effect of Positive Psychological Intervention in Patients with Cardiovascular Disease" By Alyssa Kessel, Kaitlyn McColly, Brianna Price
- "Does Maternal Smoking Affect the Occurrences of SIDS" By Mattie Mastel, Taylor Vandal, Jadyn Steiner

Poster Presentations, 9:50 a.m. to 11:00 a.m.

AGRICULTURE

- "Comparing the Differences of Non-Windrowed vs. Windrowed Hay" By Katya Baranko
- "Iodine Status in a Goat Trip that has Displayed Classical Deficiency Symptoms" By Riley Faller
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CRIMINAL JUSTICE

- "The Dark Side of the Boom" By Jackson Willems, Austin Dennis

MUSIC EDUCATION

- "Secondary Instrumental Music Education in the Rural Great Plains: Philosophical Approaches to Teaching Band in Small Communities" By Amanda Housel

NATURAL SCIENCE

- "The Impact of Max Squat on Force Generation and Sprint Acceleration in Track and Field Athletes" By Galen Brantley III
- "The Impact of Various Drinks on Plaque Development" By Jenna Novotny
- "Evaluating Macrosphelide A for antimicrobial activity against Staphylococcus aureus and Streptococcus pyogenes" By Jewel Olson
- "Comparison of Common Hydrogen Sulfide Scavengers" By Ryan Wagner
- "Exploring the Relationship Between Grip Strength and Key Performance Metrics in Dickinson State University Baseball Players: A Case Study" By Mathias Dufner
- "Black Bullhead (Ameiurus melas) and Walleye (Sander vitreus) Populations in North Dakota Lakes" By Dawson Dassinger
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- "Correlation Between Talon Size and Feeding Habits in Ground-Foraging Birds" By Ty Hornbacher
- "Effects of Creatine and Ibutamoren on Freshwater mussel mass (Elliptio complanate)" By Lance Kettering
- "Sweat analysis – Comparison of male and female sweats as a preliminary study" By Kamryn Kuntz
- "Different Light Conditions and its Effects on Peripheral Shape Discernment in Dickinson State University Students" By Kaden Kuntz
- "Nurturing Nature: Exploring Hydroponic and Soil-Based Gardening" By Elly LeBlanc
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NURSING

- “The Effects of Naltrexone Compared to other Pharmacotherapies in the Treatment of Alcohol Use Disorder” By Sydney Mosset, Jaylen Baxter, Dakota Auck
- “The Effect of Positive Psychological Intervention in Patients with Cardiovascular Disease” By Alyssa Kessel, Kaitlyn McColly, Brianna Price
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- “Nonpharmacological Therapies & Treatments Compared to Pharmacological Therapies for Dementia” By Ava Schneider, Abigail Semerad, Styrling Sickler-Zietz

PSYCHOLOGY

- “Post-COVID Syndrome: SARS-CoV-2 Virus Induced Impacts on Mental Health Disorders” By Isabela Bulgan
- “How Exercise Can Help Maternal Mental Health, Both During Pregnancy and the Perinatal Period” By Johna Edwards
- “Treating cPTSD with EMDR Therapy” By Kiah Jahner
- “The Detrimental Reality of Chronic Traumatic Encephalopathy (CTE): The Case of Aaron Hernandez” By Dallis Mitchell
- “Exploring the Link Between Psychopathy and Adverse Childhood Experiences” By Piper Perez
- “Effects of Short-Term Beta Frequency Binaural Beat Entrainment on Stroop Interference” By Zach Stanley

Abstracts

Arranged alphabetically by last name of first author

Paige Balliet

Sponsored by Dr. George Seror III and Dr. Wendy L. Wilson

Program in Psychology

"Industrial-Organizational Psychology: Empowerment Influences on Job Satisfaction in Long-Term Care Facilities"

Industrial-organizational psychologists have highlighted workplace trends where job satisfaction has been declining. The purpose of this research is to expand awareness of the field of industrial-organizational psychology and its recent focus on empowerment influencing job satisfaction in long-term care facilities. The issue has been addressed indirectly in recent research on job satisfaction and empowerment in nurses; however, the analysis of recent research on long-term care is scarce. Hence, this systematic review focuses on providing an overview of the insufficient research on empowerment influences on job satisfaction in long-term care facilities from 2013-2023. Recent research has established that empowerment in long-term care facilities is correlated and is a strong predictor of job satisfaction. Other factors associated with empowerment were also shown to have a significant influence on job satisfaction scores in nurses in long-term care. By acknowledging the literature systematically reviewed, a finer perspective can be made for the field of industrial-organizational psychology to improve experiences within the workplace.

Katya Baranko

Sponsored by Dr. Chip Poland

Program in Agricultural and Technical Sciences

"Comparing the Differences of Non-Windrowed vs. Windrowed Hay"

The goal as a beef cattle producer is to be as efficient as possible. In North Dakota an essential part, and cost, is putting up winter feed. Using different cutting can change several factors including quality of hay as well as inputs and efficiency. This study compared different implements in cutting hay of Bromus inermis (smooth brome), some Medicago sativa (alfalfa) and native grass. Cooperators resulted in this project being delayed until July 20 to July 22. The same implements were then used to rake and baled (round) the hay. Forage samples were taken in September and December to evaluate if there were any differences in nutrient quality of the forage. Research was done on inputs and requirements for different types of cutting implements and the tractors needed for them. The forage tests revealed differences, which tended to favor hay that was not windrowed immediately following cutting. Crude protein was significantly different, with the non-windrowed average of 7.66, compared to that of windrowed at 6.71 (P=.015). The Nem was also significantly different with a non-windrowed average of 49.83, and windrowed being 48.25 (P=.03). The cost per acre was less in non-windrowed hay ($6.90) compared to that of windrowed ($12.40). Time it takes from cutting to baling was also different, as non-windrowing took 18 hours, compared to that of windrowing at 51 hours.

Daniela Barrera Guevara

Sponsored by Dr. Elizabeth Freedman Fowler

Program of Natural Sciences

"Stratigraphic reassessment of Coahuilaceratops magnacuerna (Ornithischia: Ceratopsidae) from the Late Cretaceous of Mexico and the origin of Triceratopsini."

Very few remains of ceratopsid dinosaurs have thus been recovered so far from the Difunta Group of Coahuila Mexico. The enigmatic chasmosaurine Coahuilaceratops magnacuerna was previously described on the basis of two partial skulls purportedly derived from the Cerro del Pueblo Formation (~ 73 - 72.5 Ma ?). On the basis of a new measured section and sedimentology of the host rock, here we reassign Coahuilaceratops

to the overlying Cerro Huerta Formation (~ 71.5 - 70.5 Ma ?). Thus, herein we formally assign the first dinosaur taxon to the Cerro Huerta Formation. This reassignment is more consistent with the relatively derived phylogenetic position of Coahuilaceratops, due to it exhibiting some craniofacial features also seen in the Triceratopsini. It is here hypothesized that it may represent the earliest member of this clade/lineage, lending credence to the southern-Laramidia hypothesis for the origin of the Triceratopsini.
The recognition that Coahuilaceratops derives from the Cerro Huerta demonstrates the utility of accurate stratigraphic data in enhancing paleobiological analysis. We suggest that other fossil specimens purportedly from the Cerro del Pueblo Formation be reassessed in case of similar misallocation due to the complex stratigraphic relationships of the lower Difunta Group. Finally, this demonstrates the great potential for further discoveries of dinosaur fossils in the Cerro Huerta, which, as a Maastrichtian unit, may prove to be of great importance in understanding the evolution of North America's final dinosaur fauna immediately preceding the K-Pg boundary mass extinction.

Galen Brantley III
Sponsored by Dr. Elizabeth Freedman Fowler
Program of Natural Sciences

"The Impact of Max Squat on Force Generation and Sprint Acceleration in Track and Field Athletes."

In athletic training, there is a quest for optimal performance seeking in the precise balance between physiological prowess and biomechanical efficiency. Strength training remains the cornerstone of many athletes' training regiments, and of the many different lifts available, the squat remains one of the main fundamental movements. This study aims to evaluate the intricate relationship between an athlete's squat max and how it relates to their ability to generate force and accelerate. A nuanced understanding of this relationship can inform training methodologies, potentially optimizing performance outcomes, and minimizing injury risks. With this aim, the study will be conducted at Dickinson State University's Ben C. Frank Human Performance Center, utilizing state-of-the-art equipment including force plates and an electronic timing system. 30 male and female collegiate track and field athletes will participate in the study, divided into 3 treatment groups based on their maximal squat strength relative to body weight. On the day of testing, participants will undergo a standardized warm-up routine before conducting three maximal effort vertical jumps on the force plates. Additionally, they will perform three 20-meter sprints, timed using the electronic timing system. Maximal squat performance will be recorded from previous assessments. By comprehensively examining the effect of maximal squat strength on force generation and sprint acceleration, this research aims to contribute valuable insights to the field of sports science, facilitating advancements in training methodologies and performance optimization strategies for track and field athletes.

Isabela Bulgan
Sponsored by Dr. Wendy L. Wilson
Program in Psychology

"Post-COVID Syndrome: SARS-CoV-2 Virus Induced Impacts on Mental Health Disorders"

Post-COVID syndrome is a novel collection of symptoms that describe the long-lasting effects of the SAR-CoV-2 virus infection. Evidence suggests that the SAR-CoV-2 strain is primarily responsible for respiratory impacts on humans. However, novel research has indicated that this strain, not only has implications on our respiratory system, but has also shown to have significant implications on the brain. The implications caused by the strain are associated with an increased susceptibility to several neurological disorders. This research review will discuss the post-SAR-CoV-2 infection mechanism with a particular focus on analyzing trends of the rising development of mental health disorders.

Casey Cutbirth
Sponsored by Dr. Wendy L. Wilson and Dr. George Seror III
Program in Psychology

"The Role of Impulsivity in Substance Use Disorders"

This research focuses on the identification of characteristics and biological causes of impulsivity. The National Institute of Health defines impulsivity as "a predisposition toward rapid, unplanned reactions to internal or external stimuli with diminished regard to the negative consequences of these reactions to the impulsive individual or to others". Research has shown that dysregulated brain structures responsible for the development of goal-directed behaviors, such as motivation and cognition, are found within individuals struggling with impulse control. Although impulsivity is a symptom listed in a wide variety of disorders within the DSM-V, the primary focus of this research is on substance use disorders and the role that impulse-control has in an individual's recovery. This review concludes by discussing easily implementable and cost-effective treatment options that could be beneficial in lowering an individual's impulsivity, therefore increasing the likelihood of recovery.

Dawson Dassinger
Sponsored by Dr. Colin Strine
Program of Natural Sciences

"Black Bullhead (Ameiurus melas) and Walleye (Sander vitreus) Populations in North Dakota Lakes"

The interactions among different fish species within freshwater ecosystems play a role in shaping population dynamics and community structure. In North Dakota lakes, the relationship between Black Bullhead (Ameiurus melas) and Walleye (Sander vitreus) populations because their habitats and resources overlap. This study investigates Black Bullhead on Walleye population characteristics in North Dakota lakes through statistical analysis through length (mm) and mass (g) of fish caught in trap nets and gill nets. Fish were measured after being captured using mouth to tail measurement and on a scale to measure in grams. Statistical analysis was used to seek correlations between Black Bullhead and Walleye variation and overall length and mass of these species of fish. The findings in this study are expected to contribute insights in ecological population dynamics of freshwater fish communities. There were 775 Black Bullhead captured in total from both lakes, Bowman-Haley Lake (n = 222, mean mass = 76.52 g, mean length = 162.3 mm) and Tschida Lake (n = 553, mean mass = 198.8 g, mean length = 216.5 mm). There were 199 Walleye captured in total from both lakes, Bowman-Haley Lake (n = 47, mean mass = 479.6 g, mean length = 352.7 mm) and Tschida Lake (n = 152, mean mass = 403.9 g, mean length = 319.3 mm). Walleye and Black Bullhead counts were significantly different from each other within both Tschida and Bowman-Haley Lake. After assessing sizes of Black Bullhead and Walleye populations, there were significant correlations between the two species in length comparisons and mass comparisons resulted in significant differences. This could suggest that Walleye population sizes are influenced by Black Bullhead predation pressures.

Emmy Dockter
Sponsored by Dr. Wendy L. Wilson
Program in Psychology

"To identify the negative cognitive effects in children who have been exposed to maternal MDD for over a year"

Very little research exists surrounding the effects of maternal major depressive disorder (MDD) has on children. Depression or MDD can be caused by several factors such as genetics, life stressors, or medical conditions. This research seeks to provide more insight into the negative cognitive effects of maternal depression on children. Although extensive research on this topic did not begin until the early 2000s, there is evidence for problems in children who had a mother with major depressive disorder. Some of the negative cognitive effects discovered through this research include low social competence, increased psychopathology, emotion dysregulation, and less positivity. Through longitudinal studies completed on both mothers and their child(ren) there is validation for the research findings. Future research on the negative cognitive effects of maternal depression on children will require more extensive longitudinal work to reveal effects on these children across the lifespan from adolescence and into adulthood and should look further into how the mother's condition has improved.

Mathias Dufner
Sponsored by Dr. Elizabeth Freedman
Program in Natural Sciences

"Exploring the Relationship Between Grip Strength and Key Performance Metrics in Dickinson State University Baseball Players: A Case Study"

The role of grip strength in baseball performance has been a topic of debate within the sports community. This study aimed to investigate the potential correlation between grip strength and key performance metrics in baseball, including throwing velocity, bat speed, spin rate, and time to contact. Twenty-seven collegiate baseball athletes participated in the study, where grip strength was measured using a dynamometer, and performance metrics were assessed using various tools such as Rapsodo for pitching data and Blast motion sensors for batting metrics. The results revealed no significant correlation between grip strength and any of the performance metrics examined. Despite slight trends observed in scatterplots, statistical analysis indicated non-significant p-values ($p > 0.1$) for all variables, leading to the acceptance of the null hypothesis. While previous studies have suggested potential associations between grip strength and baseball performance, including throwing distance and bat speed, this study failed to provide evidence supporting such relationships. Limitations were acknowledged including the small sample size and potential inconsistencies in player performance. Future research could expand the number of participants and incorporate longitudinal studies to obtain a more comprehensive understanding of the relationship between grip strength and baseball performance. Additionally, exploring different types of grip strength and their impact on performance could offer insights into optimizing training programs for baseball athletes. Despite the non-significant findings in this study, the importance of grip strength in sports performance remains an area worthy of continued research. Understanding the interactions between grip strength and athletic performance could lead to more narrowed training programs and enhanced player development strategies in baseball and other similar sports.

Johna Edwards
Sponsored by Dr. Wendy L. Wilson
Program in Psychology

"How Exercise Can Help Maternal Mental Health, Both During Pregnancy and the Perinatal Period"

Maternal mental health, both during pregnancy and the perinatal period, can fluctuate. About one in seven new mothers can develop postpartum depression. Postpartum depression is a diagnostic mental health disorder involving depressed mood, amongst other key symptoms. This can affect both a mother's ability to have a healthy relationship with her infant, as well as her ability to return back to a normal functioning life. When a woman develops postpartum depression, she tends to have a variety of symptoms, which can include severe fatigue, anxiety, sadness, and irritability, amongst others. Lifestyle modifications, such as regular exercise and a healthy diet, can help to alleviate mental health dysfunction. One major predictor of postpartum depression is a mutation in the serotonin transporter, also known as 5-HTT. While this can be treated with medication, drugs can stay active in breast milk, causing a potential effect on infant development. Exercise is a non-pharmacological treatment, that when done regularly, boosts serotonin levels in the brain by route of the 5-HT3-IGF 1 mechanism, contributing to antidepressant effects. Regular exercise can also result in a significant increase in GABAAR (yaminobutyric acid type A receptors) and a reduction of neurodegenerative disorders that are caused by GABA imbalances. Exercise also enhances neurogenesis and prevents the neurodegeneration that has been associated with depression.

Riley Faller
Sponsored by Dr. Chip Poland
Program in Agrucultural and Technical Sciences

"Iodine Status in a Goat Trip that has Displayed Classical Deficiency Symptoms"

A goat deficient in iodine will struggle to conceive, carry to term, birth a fully developed fetus, and provide optimal nutrition for their offspring. Iodine is involved in thyroid processes including the production of triiodothyronine (T3), thyroxine (T4), free thyroxine (FT4) which influence reproductive success in goats. The symptoms of iodine deficiency are an enlarged thyroid gland, and in the offspring, they can be thin haired, present goiter, weak, or dead. The objective of this study is to monitor iodine levels of a previously deficient goat trip from the last trimester through parturition. The goat trip has been supplemented with an iodized salt block as of July 2023. The T3, T4, FT4, and iodine serum levels were monitored on five does monthly from November 2023 to January 2024. The group, date, and interaction were the variables analyzed. Serum T3 values were significantly affected by group, serum T4 values were significantly affected by date. Serum FT4 and Iodine values did not have any significance statistically.

Kailyn Groves
Sponsored by Dr. Chip Poland
Program in Agrucultural and Technical Sciences

"Effect of Protein Supplementation on Average Daily Gain for Nursing Calves on Native Pasture in Western South Dakota"

The dynamic nature of forage vitamins and minerals are moving targets as they are needed to meet cattle nutrient requirements. When forage conditions are not ideal, supplementation of nutrients can be beneficial. Supplementing calves, in particular, may increase weight gain during the suckling period, reduce eventual weaning stress, and consequently, improve post-weaning performance. This project focused on analyzing the average daily gain of individual calves within two groups, where one group received a free-choice protein supplement, and the other group did not receive any supplement. Data collection occurred from March through August of 2023. The results may have been influenced by above average moisture, yielding adequate nutrients in the forage, or limiting of external stress on the livestock by providing salt and mineral supplements, fly control, and fresh water. Thirty-nine pairs were sorted into test and control groups and summered in various native range pastures. There was a significant difference between mean male and female calf weights at birth and branding ($P<0.05$); however, there was no significant difference between the mean weight of each sex at pre-conditioning ($P>0.50$). For intermediate and overall average daily gains, there were no significant differences identified for sex, treatment, or their interaction ($P>0.50$). Thus, the supplement did not affect average daily gain or performance between the test and control groups. Further research may be conducted with a larger study group, longer period of time, or more precise supplementation strategies to determine if there are actually no statistical differences between nursing calves on native range receiving or not receiving protein supplementation.

Josiah Haaland
Sponsored by Dr. Elizabeth Freedman
Program of Natural Sciences

"The Use of Stretching for Rapid Range of Motion Change in Basketball Athletes"

This experiment assessed benefits of implementing targeted therapeutic style stretching into the warmups of basketball athletes to assist in the prevention of injury. The question that was asked was, will target therapeutic stretching produce a significant difference in range of motion in the knee of college basketball athletes? DSU basketball athletes were divided into two groups and had their range of motion in their right knee. Tested each group was then given a different stretching regimen to perform four sets of 20 seconds or 20 repetitions per exercise with three exercises in total. These stretches included calf quad and hamstring stretches for group one and towel slides knee extension hangs from prone and elevated for group two. Immediately following the exercise each group was measured for their final range of motion. The groups were found to produce an average of 3.375° increase in range of motion. The minimum range of motion was found to be 112° and the maximum was 138°. The median value of both groups landed at just above 120°. Once statistical tests were completed it was found that there was not a statistically significant difference in the range of motion change between the two groups with a P value of 0.238. From this we were able to

conclude that there is no statistically significant difference in the range of motion improvement given by targeted therapeutic stretching versus traditional static stretching in a single sitting.

Brittany Helm

Sponsored by Dr. Wendy L. Wilson and Dr. George Seror III

Program in Psychology

"Art Therapy: Origins and Modern Applications"

This research discusses the effectiveness of art therapy (AT) as an empirically tested and well-supported treatment method for those who struggle with mental health disorders. Included is an analysis of early and contemporary research studies surrounding the benefits of AT in treating psychiatric disorders. The discussion begins with the early works and leading figures of AT, such as art historian Corrado Ricci and the work of psychologist Carl Jung and his successors. Furthermore, a discussion of the American Art Therapy Association (AATA), its foundations, and current requirements for membership will be addressed. The project will explore numerous studies demonstrating the benefits of AT when treating individuals with Alcohol Use Disorder (AUD), victims of Intimate Partner Violence (IPV), and adolescents diagnosed with anxiety and depression. These studies suggest that after receiving visual arts-based therapy, patients demonstrate improvements in both mental and physical health.

Ty Hornbacher

Sponsored by Dr. Elizabeth Freedman

Program in Natural Sciences

"Correlation Between Talon Size and Feeding Habits in Ground-Foraging Birds"

There is very little information known about foot use in feeding habits of ground-foraging birds. We wanted to know if differences in talon sizes correlated with feeding habits when controlled for various species of ground-foraging birds. The sampled species included order Galliformes, Passeriformes, and Charadriiformes. We expected that talon sizes would directly correlate to similar taxa of avian species and would demonstrate a trend based upon feeding habits. To do so, we photographed each digit on 15 different preserved bird specimens. We took several measurements on each talon to obtain our dataset and ran a principal component analysis to demonstrate certain trends. Various trends were noted that confirmed relative talon size among digits can differentiate similar taxa in birds. In addition, trends in feeding habits were found in birds of different taxa. These results suggest that talon size relates directly to feeding habits in ground-foraging birds, as we predicted. This study determined the relationship between talon size and feeding habits in ground-foraging birds and provides knowledge in an area that is lacking, giving rise to furthering bird research in numerous areas.

Amanda Housel

Sponsored by Dr. Brian Holder

Program in Music

"Secondary Instrumental Music Education in the Rural Great Plains: Philosophical Approaches to Teaching Band in Small Communities"

This research project began as an effort to fill the gap in available information about teaching band in rural areas to better prepare music education majors who had a desire to fill these roles upon graduation. The study involved collaboration with anonymous rural teachers from North Dakota, South Dakota, and Montana. The findings were then organized for use in current undergraduate music education courses. This presentation summarizes the gathered information, highlighting trends in areas like student enrollment and program structure and exploring philosophical topics such as recruitment, retention, and student achievement. In addition to informing and motivating young teachers, it is our hope that professional music educators will also be able to find value in the information presented.

Kiah Jahner
Sponsored by Dr. Wendy L. Wilson
Program of Psychology

"Treating cPTSD with EMDR Therapy "

Eye movement desensitization and reprocessing (EMDR) is a type of therapy used for many psychopathologies including complex post-traumatic stress disorder (cPTSD). EMDR is a therapeutic technique that aids in trauma recovery through reprocessing the traumatic events and memories. cPTSD is similar to PTSD but instead of being caused by one traumatic event, it originates by many traumas over a chronic period. EMDR and cPTSD are both novel developments within the last 40 years but have become prominent topics in the mental health field. This research review focuses on how EMDR has become a beneficial therapeutic tool for cPTSD and explores the reorganization of cognitive reasoning caused by trauma memories.

Alyssa Kessel, Kaitlyn McColly, Brianna Price
Sponsored by Ms. Taina Traub
Program of Nursing

"The Effect of Positive Psychological Intervention in Patients with Cardiovascular Disease"

Cardiovascular disease (CVD) is widespread across the United States impacting health and worsening the morbidity and mortality of citizens. Poor mental health is also prevalent with high rates of stress, anxiety, and depression. It was concluded that CVD patients with psychological distress are linked with poorer health outcomes and higher risk for complications including heart attacks, stroke, and heart failure. Conversely, a diagnosis of cardiovascular disease increases the patient's psychological distress related to fear of complications. Positive psychological interventions (PPIs) are aimed at reducing this psychological distress. These interventions were found to be successful in improving the mental well-being of patients with CVD both long term and short term. It was also concluded that reducing psychological distress regulated the stress response within the body, causing improved management of cortisol, blood pressure, and heart rate. Improved mental health was also associated with higher rates of optimism, motivation, and physical activity. Each of these physical effects from reduced psychological distress related to positive psychological interventions, were indirectly correlated with improved health outcomes and lower risk for complications. However, studies addressing a causative, direct effect of interventions on patients with CVD, are lacking and should be interpreted with caution. Despite lack of causation, nurses can consider these correlations to advocate for better mental health in their patients with CVD.

Lance Kettering
Sponsored by Dr. Colin Strine
Program in Natural Sciences

"Effects of Creatine and Ibutamoren on Freshwater mussel mass (Elliptio complanate)"

Muscle has been a major component of the athletic community with each athlete targeting improvement even using substances to reach humanly impossible strengths sizes and speed. We aimed to assess creatine and Ibutamoren impacts on muscle mass without and resistance training since these two substances are the most popular today. We picked freshwater mussels (Elliptio complanate) because they make a good human proxy as the muscle tissue in freshwater mussels is very similar to the muscle tissue in humans. There were 13 test subjects that were split up into 3 tanks, a control tank and two treatment tanks. The substances were given to the treatment tanks once a week on Monday and they were weighed twice a week on Monday and Thursday. The control average mass of the control was 17.94 grams with a standard deviation of ± 8.005 grams. The treatment group of Ibutamoren had an average mass of 18.05 grams and a standard deviation of ± 6.790 grams. The treatment group that used creatine had an average mass of 18.975 grams with a standard deviation of 11.745 grams. We did conclude that creatine is lethal to freshwater mussels as all subjects who took creatine died. The Creatine treatment group died at week 2 of the 3-week experiment. This information can be used to understand if these two substances affect muscle mass in a

controlled environment without resistance training and give us a better understanding of which substances can increase muscle mass.

Kamryn Kuntz
Sponsored by Dr. Samanthika Hettiarachchi
Program of Natural Sciences

"Sweat analysis – Comparison of male and female sweats as a preliminary study"

Sweat is mainly water but has some salt dissolved in it. Sweat secretion is a bodily process that is mainly done to maintain the body's temperature. As the water in the sweat evaporates, the surface of the skin cools. Sweat is produced by sweat glands in the deeper layer of the skin called the dermis. Sweat glands are all over the body but mostly concentrate in abdomen, armpits, forehead, palms, and soles of feet.
The purpose of this study was to find out whether one's sex influences on sweat production. Sample collection was carried out at the West River Community Center at Dickinson where 18 individuals (9 males, 9 females) did the high intensity cycling workout for 35 minutes. Sweat samples were collected every other day within a period of one month (15 days) during the period of November 1 to November 30, 2022. Collected sweat samples from the forehead, back, and abdomen were tested for pH, salinity, and conductivity.
Results of the sweats collected from females had higher pH compared to males while the conductivity and salinity were higher in males than female. However, further investigations are needed with a bigger sample size to come to a concrete conclusion.

Kaden Kuntz
Sponsored by Dr. Elizabeth Freedman
Program in Natural Sciences

"Different Light Conditions and its Effects on Peripheral Shape Discernment in Dickinson State University Students"

This study investigates the performance of peripheral vision in discerning shapes under different light settings among Dickinson State University students. The research was motivated by existing studies on peripheral vision and its performance in light and dark settings, but it uniquely focuses on the discernment of shapes. The study was conducted in a computer lab with controlled lighting conditions, and the sample consisted of 21 voluntary participants from the university. The experiment involved measuring the degrees it took for subjects to identify shapes in their peripheral vision under normal and low light settings. The results showed that students were able to discern shapes peripherally, on average, 20.3° sooner in a low light setting than in a normal light setting. This finding supports the alternative hypothesis that there would be a significant difference in peripheral vision performance of shape discernment in a normal light setting vs a low light setting and aligns with existing research suggesting that peripheral vision performs better in darker settings. It also further supports that rods and cones are mixed throughout the retina, and that peripheral vision is associated with the light-sensitive rods in the eye. However, the study was limited to a sample of 21 DSU students, which may not fully represent the entire population's peripheral shape discernment abilities. Despite this limitation, the study contributes to our understanding of how our peripheral and overall visual system adapts to different light conditions, and it could inform future advancements in this area. This study is important because it will add to this ever growing knowledge of peripheral vision, and future research could further explore how peripheral vision works neurologically and how it adapts to different lighting environments.

Hannah LaBree
Sponsored by Dr. Chip Poland
Program in Agricultural and Technical Sciences

"Effect of Breeding Time and Sire on Pregnancy Rate Utilizing Timed Artificial Insemination "

Producers are beginning to adopt timed artificial insemination (TAI) as a management practice to reduce the time required in heat detection and to make the protocol more time efficient. The primary

objective of this study was to evaluate the effect of insemination time post prostaglandin (PG) injection on pregnancy rate in mature beef cows utilizing TAI. A secondary objective was to determine if semen source (i.e. bull) affected TAI pregnancy rate. Registered Red Angus cows (n = 323) were synchronized using a 5-day Co-Synch+CIDR® TAI protocol and inseminated 72 ± 2 hrs after the first PG injection to one of 12 different bulls. Ultimately, there were 658 cows exposed to TAI over the three years. Cows were pregnancy tested by a veterinarian at least 80 days post-TAI, and classified as pregnant to TAI, pregnant to natural service, or not pregnant (open). Overall pregnancy rate was reduced in 2023 (92.1, 95.2, and 87.1% for 2021, 2022, and 2023, respectively; p = 0.008). However, pregnancy rate to TAI, did not differ across years (p = 0.40). Pregnancy rate to TAI was also not influence by insemination time post-PG injection (p = 0.13). When analyzing pregnancy rate to individual bulls, rates were affected by year (p = 0.01) and bull (p = 0.04). Pregnancy rate to TAI was greatest in 2021 and similar in 2022 and 2023 (70.3, 52.4, and 48.3%, respectively). The top four bulls in pregnancy rate to TAI (average = 70.3%) were significantly different than the bottom six bulls (average = 47.3%). In conclusion, insemination time post-PG injection, within the recommended breeding window of the protocol, did not negatively affect pregnancy to TAI. However, individual bulls can impact pregnancy to TAI. Producers considering the use of TAI should adhere to the recommended protocols and care given to bull selection to enhance pregnancy rates to TAI.

Elly LeBlanc

Sponsored by Dr. Sarah Manka

Program in Natural Sciences

"Nurturing Nature: Exploring Hydroponic and Soil-Based Gardening"

This study compares the efficacy of hydroponic and soil gardening methods in promoting plant growth. to conduct the hydroponic system vs soil gardening experiment, a new hydroponic system was built for the water-based plant test and data collection. Standard pot containers were used which allowed for soil-based testing and data collection. The hydroponics system is a form of crop cultivation that involves the growth of crops using a planting media, air pump, and water. Soil gardening is the traditional approach that involves growing crops in soil. This study examines the benefits of the hydroponics gardening approach over the traditional soil gardening technique in agriculture. Hydroponic gardening involves supplying nutrients directly to plant roots through a water-based medium, while soil gardening relies on nutrients in the soil. When I conducted experiments using masculine, basil, arugula, Swiss chard, spinach, and lettuce in hydroponic and soil setups. Measurements of plant height, root length, stem length, leaf count, plant mass, and pH levels were taken to evaluate growth parameters. Results indicate that hydroponic gardening promotes faster growth due to better nutrient uptake, reduced exposure to pests and diseases, and controlled environmental conditions. The study highlights the potential of hydroponic systems to enhance plant growth and suggests adopting sustainable agriculture practices. Through a detailed literature synthesis, this paper explains the benefits of hydroponics, such as the fact that it minimizes exposure to diseases and pests, enhances the uptake of plant nutrients, and provides the plant with adequate space, which enhances the growth of crops, unlike the traditional soil gardening approach. Based on my experiment hydroponic plants grow faster than soil plants.

Autumn Martin-Geerts

Sponsored by Dr. George Seror III and Dr. Wendy L. Wilson

Program in Psychology

"Psychodrama Therapy as a Treatment for Addiction, Adult Children of Addicts, and Trauma"

Expressionism therapies are traced back to Ancient Greece and have been on the rise in recent decades. The purpose of this review is to investigate what psychodrama therapy is and how this form of therapy can be used in the clinical setting as a treatment tool. This research will focus on the history of drama therapy, clinical-research and practices, as well as the exploration of the benefits of psychodrama therapy for those afflicted with addiction, adults who were raised by addicts, and individuals negatively affected by trauma.

Autumn Martin-Geerts
Sponsored by Mr. Jarvis Jahner
Program in Theater

"Adapting a Novel into a Script: *Calvin* by Martine Leavitt"

Have you ever read a book and thought that it would be really good for the big screen or the stage? That was my reaction when I read *Calvin* by Martine Leavitt, which is why I chose to adapt *Calvin* into a script with the intention of being a theatrical production. In my talk, I will be discussing the process of adaptation and the steps I took in adapting *Calvin* into a theatrical script. Then wrapping up by explaining what the next steps would be if the play were to be produced.

Mattie Mastel, Taylor Vandal, Jadyn Steiner
Sponsored by Ms. Taina Traub
Program in Nursing

"Does Maternal Smoking Affect the Occurrences of SIDS"

Sudden infant death syndrome (SIDS) is the unexpected or unexplained death of an infant less than one year of age. Ninety percent of SIDS cases occurring within the first six months of an infant's life. A comprehensive review if literature was reviewed. The research reviewed focused on analyzing the occurrence of SIDS in infants born to women who smoked before, during, and after their pregnancy compared to those who did not smoke in those timeframes. One research study attributed 22% of all sudden infant death syndrome events to maternal smoking every year. There are 250 million women who smoke during their pregnancy worldwide. The impact of Maternal smoking impacts the pregnancy by the transfer of nicotine from the mother to a fetus via the fetal circulation. This transfer causes harmful effects on the fetus's developing organs and is linked to an increased risk of SIDS. In one study women who participated in smoking cessation or reduced smoking by the third trimester were found to decrease the risk by 23% of their infant dying due to sudden infant death syndrome. The usage of nicotine products during pregnancy is the leading modifiable risk factor to help decrease the risk of sudden infant death syndrome. Proper education and support for expecting mothers could decrease the risk of sudden infant deaths worldwide.

Marley McChesney
Sponsored by Dr. Colin Strine
Program in Natural Sciences

"What is the impact of interactive virtual laboratories on improving practical skills and knowledge acquisition in university-level biology education, as evidenced by randomized controlled trials?"

When it comes to higher education it is always changing and evolving. Traditional teaching methods have been changing due to technological advancements. One change that has gained importance in recent years is the use of interactive virtual laboratories in the university-level biology classrooms. As universities attempt to provide an effective and engaging learning environment, the benefits of the interactive virtual laboratory in developing practical skills and enhancing knowledge have been piquing interest. In 2020 the world was faced with a pandemic that caused lockdown measures to stop the spread of the virus. Social distancing was one of the most effective strategies to limit the spread of the virus. To adjust to the pandemic, schools were forced to go remote. That includes laboratories, regular classrooms, and lecture halls. This affected the in-person traditional classroom dynamics. This research attempts to systematically investigate the impact of virtual interactive laboratories on their practical skills and knowledge within the university-level of biology education. To assess the efficacy of this educational approach, this study will focus on evidence found from randomized controlled trials (RCTs), which is a form of experiment that randomly selects participants to an experimental or control group. This study will be a systematic review of randomized controlled trials. To avoid bias and for groups to be valid in their comparisons they must be as alike as possible. By combining findings from a range of studies, this research aims to provide a comprehensive understanding of the impact that interactive virtual laboratories have on practical skill development and acquiring knowledge in biology education.

Alexius Miller
Sponsored by Dr. Colin Strine
Program in Natural Sciences

"Effect on use of Fertilizers on Zebra Haworthia in Greenhouse"

Succulent plants are slow growing species that often take years to mature, in order to enhance growth, ideal fertilizers must be selected. Potash is a fertilizer to help strengthen their root systems and to protect the plants from wilting. All-purpose fertilizer can be used on many different plants, including succulents. My hypothesis is that the all-purpose fertilizer will promote growth more-so than the potash fertilizer. The results from the hypothesis were the opposite, the potash fertilizer did better than the all-purpose fertilizer. Control succulents one and two shrunk 1 cm or more, while control succulents three and four grew less than 1 cm. All-purpose fertilized succulents all shrunk 0.2 cm to 1 cm more than when the research started. Potash fertilized succulents all grew from 0.1 cm to over 1.5 cm while number three grew then shrunk back to the starting height. The potash fertilizer helped the succulents grow while the all-purpose fertilizer and the control group actually shrunk. The soil test showed there were multiple similarities between each group, with the potash being the most like just the soil that was tested before the research was started. For the results, all four of the potash fertilized succulents grew (average growth rate was 0.55 cm), the four all-purpose succulents shrunk (average shrink rate was -0.625 cm) and after the end date succulent one and two died, and three of the control group of succulents also shrunk, number three succulent grew (average shrink rate was -0.325 cm). Further studies into the mechanisms for these differences and the causes of shrinking should be conducted.

Jerika Miller
Sponsored by Dr. Colin Strine
Department in Natural Sciences

"Effects of Over Counter Medication on Heart Rate of Ghost Shrimp"

Despite the widespread use of over-the-counter medications, especially in human medicine, their effects on non-human organisms, particularly aquatic species, have been understudied. This research aimed to fill that gap in knowledge. This study specifically investigates the impact of common over-the-counter medications, Ibuprofen, Tylenol, and Aspirin, on the heart rate of ghost shrimp (Palaemon paludosus). Despite their widespread use in humans, the potential effects of these medication on aquatic organisms remain understudied. Utilizing ghost shrimp as a model organism due to their transparent bodies allows for direct observation of physiological function. We hypothesize that exposure to this medication will lead to changes in heart rate. A controlled laboratory experiment was conducted, exposing ghost shrimp to each medication at a concentration of 375 mg and observing their heart rate under a microscope for 30 seconds after a 3-minute acclimation period. Statistical analysis, including descriptive statistic and the Kruskal-Wallis test, was employed to assess differences between treatment groups and the control. Results indicated the control group displayed the highest median heart rate, serving as a baseline for comparison with the treatment groups. While the Ibuprofen treatment group exhibited high variability and outliers, suggesting an impact on ghost shrimp heart rate. In contrast, the Aspirin and Tylenol treatment groups showed lower median heart rates. These findings highlight the need for further research on the environmental impacts of pharmaceuticals and underscores the importance of understanding their effects on aquatic organisms.

Dallis Mitchell
Sponsored by Dr. Wendy L. Wilson
Program in Psychology

"The Detrimental Reality of Chronic Traumatic Encephalopathy (CTE): The Case of Aaron Hernandez"

Chronic traumatic encephalopathy, also referred to as CTE, has been known to affect a large number of athletes involved in collision-like sports or those exposed to repetitive mild traumatic head injuries, such as concussions. CTE is a progressive degenerative disease that causes symptoms that appear years or even decades after the last brain impact has occurred. Studies of CTE are limited, since definitive diagnosis is only made postmortem via identification of protein cellular protein abnormalities such as hyperphosphorylated tau (p-tau) buildup in the brain. CTE is concerning because it is a progressive disease and there are currently no therapeutic treatments. The case of Aaron Hernandez, famous football athlete, exposed the importance of repeated concussive head injuries and the detrimental reality of the seriousness of CTE.

Sydney Mosset, Jaylen Baxter, Dakota Auck

Sponsored by Ms. Taina Traub

Program in Nursing

"The Effects of Naltrexone Compared to other Pharmacotherapies in the Treatment of Alcohol Use Disorder"

Alcohol use disorder is defined as the abuse of or dependence on alcohol, with an inability to control alcohol use despite its detrimental effects. This research aims to assess the effects of naltrexone therapy compared to other prescribed pharmacological therapies commonly used in the treatment of alcohol use disorder. A comprehensive literature review was conducted which integrated study findings from diverse sources. These studies provided insight into the efficacy, safety, and effectiveness of naltrexone compared to other pharmacotherapies such as baclofen, disulfiram, acamprosate, and prazosin. Naltrexone is an opiate antagonist used to manage dependance on alcohol or opioids. Findings suggest that naltrexone demonstrates promising efficacy in reducing alcohol consumption, cravings, and relapse. These findings also provide a greater understanding of pharmacological interventions available for the treatment of alcohol use disorder. They emphasize the need for individualized treatment approaches, further research to optimize outcomes, and the need to address improvement of current treatment modalities.

Keegan Nelson

Sponsored by Mr. Toby Stroh

Program in Agricultural and Technical Sciences

"The Effect of Seed Treatments on wireworms in a Barley Crop"

Farmers are faced with many challenges on their way to successfully raising a profitable crop. Wireworms are one of those challenges that impose a threat on a farmer's crop. Wireworms damage crops by eating the seed, roots, and underground stems of the plant, and are hard to eliminate due to their extended life cycle of 1-6 years. The objective of this study is to observe the difference in yield of a barley crop in a field where wireworms are present using three different kinds of seed treatment. This study was conducted southwest of Westby, Mt on an 80 acre field, split into 3 equal sections, that has a history of wireworm infestation causing severe yield loss in recent years. The 3 treatments used were Warden Cereals II, CruiserMaxx Vibrance Cereals, and Teraxxa F4. The 3 treatments used varied in price and mode of action. On June 2, 2023, stand counts were conducted to obtain a general idea of the emergence rate of the barley within each strip of the three separate treatments. On August 12, 2023, all three strips were harvested and weighed to determine the bushels per acre that each strip yielded. The results of the stand counts determined that the plant population per acre was 363,000 plants for the Warden Cereals II strip, 358,160 plants for the CruiserMaxx Vibrance Cereals strip, and 611,050 plants for the Teraxxa F4 strip. The results of the post-harvest yield test determined that the Warden Cereals II strip yielded 49.9 bushels per acre, the CruiserMaxx Vibrance Cereals strip yielded 57 bushels per acre, and the Teraxxa F4 strip yielded 62.4 bushels per acre. This study found that seed treatments intended to reduce the amount of wireworm damage can help produce a higher yielding crop.

Tate Nordby

Sponsored by Mr. Toby Stroh

Program in Agricultural and Technical Sciences

"How Management and Environment Affects Pregnancy Rates in Artificially Inseminated Heifers"

Managing heifers to make sure they are in the best shape to be AI'd (artificially inseminated) can be a very complicated matter as there is a lot different factors . It takes a lot of work, planning, and money to get this project done. This is why it can end up being very frustrating when it comes to the time of year when the heifers are brought in to check for pregnancy and the percentage of them being AI bred is low. The idea behind this project was to collect information from producers around the area to see if the people who got a good catch on their replacement heifer pregnancy rate are doing anything drastically different than everyone else or if it is just the luck of the draw. The data was collected from various producers in south west North Dakota with heifers bred in 2021 and calved out in 2022. This was to ensure that all cattle went through similar weather conditions from when they were born to when they were AI'd. The data consists of management factors like what rations they were fed, minerals they were supplemented, products that were used during breeding, body condition score (BCS), and other decisions that producers have to make that could have an impact of the outcome on the pregnancy rate. There is a wide range of different management techniques and products at their disposal which makes every producer unique.

Jenna Novotny

Sponsored by Dr. Sarah Manka

Program in Natural Sciences

"The Impact of Various Drinks on Plaque Development"

This study examines the impact of various drinks on plaque development and teeth erosion on teeth. Plaque formation is a significant oral health concern that can lead to dental cavities and periodontal diseases. Understanding the relationship between different beverages and plaque accumulation can help individuals make informed decisions regarding their oral health.

This study evaluated the effect of carbonated and non-carbonated beverages, and our control (tap water), on the erosive potential of dental enamel with and without fluoride varnish protection. Beverages used in this study included: Coca-Cola, Diet Coca-Cola, Sprite, Apple Juice, Red Bull, orange juice, tap water, sugar infused water, lemon juice, and sports drinks. With tap water being the control group. Enamel surfaces were then observed and different calculated results to show the overall effect for further observations.

Jessica Olson, Maxinne Mosqueda, Audrey Emerson

Sponsored by Ms. Taina Traub

Program in Nursing

"Does Providing Access to Narcan Harm or Help the Public"

There is an opioid overdose epidemic that has continued to trend upwards. Approximately 645,000 people died from an opioid overdose from 1999-2021. In 2022, over 78,000 overdose deaths were due to opioids. Policymakers have worked to address these alarming statistics, with one intervention being distributing Narcan in communities. Narcan is the brand name of naloxone, an opioid antagonist that can quickly reverse the deadly effects of an opioid overdose. This review aims to compare if providing communities with easy access to Narcan harms or helps the community, as this is a common concern when looking at enacting community programs. The findings suggest that community based Narcan distribution significantly decreases the number of opioid related deaths and is economically worthwhile for community investment. However, there are limitations to the findings as there is a lack of data on what amount of the Narcan that is distributed in these programs are used or held onto. The results of this review suggest that providing access to Narcan does help the public to reduce mortality.

Nickolas Page

Sponsored by Dr. Elizabeth Freedman

Program in Natural Sciences

“Effect of Max Back Squat on Peak Vertical Jump on Male Dickinson State University College Track Athletes”

The vertical jump is used as an indicator of athletic ability and power utilization. Squat is a general lift used by many training programs to improve strength and athletic ability. We set out to find if there was a direct correlation between a higher max barbell back squat and a higher vertical jump. We had three event groups: sprinters, jumpers and throwers. 15 Male Dickinson State University track and field athletes participated. Each participant performed a max squat and had three attempts at a vertical jump test. The average vertical jump for sprinters was 82 cm, jumpers 78 cm, and throwers 50 cm. The average max squat for sprinters was 159.7 kg, jumpers 143 kg, and throwers 174.5 kg. We found that max squat did not have a significant effect on vertical jump. However, weight and being a thrower had a negative significant impact on vertical jump compared to the sprinter and jumper groups. The average weight for sprinters was 84.4 kg, jumpers 86 kg, and throwers 117.3 kg. The sprinters and jumpers had significantly higher vertical jumps from the throwers, while the throwers had the highest average weight. Comparing the differences in these groups could give us insights about what makes athletes better at the vertical jump and what factors impact it. Investigating what movements are best for performance, and how much of each training exercise is appropriate will benefit many athletes for both performance longevity and injury prevention.

Piper Perez

Sponsored by Dr. Wendy L. Wilson

Program in Psychology

“Exploring the Link Between Psychopathy and Adverse Childhood Experiences”

Ted Bundy, Jeffery Dahmer, and Charles Manson; are often names associated with the term “psychopath”. Most individuals are aware that these individuals exhibit psychopathic behaviors, but what defines them? Is there a possible explanation for their behavior? Or were they just born that way? In recent research, psychologists have revealed a connection between Adverse Childhood Experiences (ACEs) and the development of psychopathy, a severe sub-type of antisocial personality disorder. ACEs are potentially traumatic events that occur at any stage of development from birth to young adulthood. These events have an everlasting negative impact on the health and well-being of the individual. Early life trauma has been shown to alter a child's mental state and may even be a major precipitating factor in the cause of a personality disorder. Looking into our “favorite psychopaths' ”, Bundy, Dahmer, and Manson, there is evidence suggesting that childhood adversity may have led to their psychopathic tendencies. Exploring the connection between ACEs and psychopathy may lead to a better understanding of the etiological underpinnings of this pathology.

Joanne Pollard

Sponsored by Dr. Jeremy Wohletz

Program in Music

“From Ground to Sound”

This project embarks on an exploratory journey into the art and science of crafting traditional clay flutes. Drawing upon a foundational understanding of modern flute mechanics and an expertise in ceramics, the endeavor aims to rediscover and replicate the ancient processes that might have been employed by early instrument builders. Through a hands-on, progressive approach, the project seeks to delve into the nuances of different clay bodies, construction techniques, and the intricate adjustments necessary to achieve musical functionality.

Luisa Popp

“Impact of Telehealth Settings on the Perceived Quality of Treatment by Counselors in the Rural Mental Health Field in North Dakota”

The aim of this research is to examine therapist’s attitudes towards telehealth and its impact on the quality of counseling sessions compared to in-person sessions. Telehealth counseling services delivered via telephone or video are the main interest. With the Covid-19 pandemic impacting all aspects of life, mental

health counseling has also been influenced. Especially in rural North Dakota this has an effect on therapists and counselors and their methods. This qualitative and quantitative study aims to answer the questions of whether this impact has been positive or if it had negative effects on counselors, such as self-mirroring, exhaustion, decrease in ability, difficulties building rapport, or the inability of picking up client's emotions. So far, results in both the survey and the interviews have shown a general preference for in-person counseling sessions, especially for intense trauma. Additionally, there has been a lack of training for conducting sessions via telehealth prior to Covid-19, as well as after. With the rurality of North Dakota, telehealth can make counseling more accessible to those who otherwise would not have access to any services. The interviews suggest though that methods that can be utilized within telehealth are limited, an example for that is eye movement desensitization and reprocessing (EMDR), as well as accelerated resolution therapy (ART), or play therapy. It was also highlighted that patient's preferences play a role. Therefore, telehealth is a great addition, but in some cases cannot substitute in-person therapy.

Macey Sabrosky

Sponsored by Dr. Chip Poland

Program in Agricultural and Technical Studies

"The Characteristics and Treatments of Horses With Navicular"

Navicular disease, also known as navicular syndrome, is one of the most common causes of chronic forelimb lameness within the equine species. Navicular is a progressive, inflammatory, and degenerative condition occurring within the horse's navicular bone, navicular bursa, deep digital flexor tendon (DDFT), and surrounding soft tissues. Due to its complexity, there is no single treatment option. Horses diagnosed with navicular are treated on a case-by-case basis. There are certain characteristics that make some horses more prone to navicular than others. There are also certain treatments that may better treat or address certain navicular related characteristics. The objective of the study was to find the most common characteristic(s) among horses diagnosed with navicular disease and determine if the treatment(s) those horses were receiving for such characteristics were successful. Eight horses that had been diagnosed and treated at West Dakota Veterinary Clinic of Dickinson, North Dakota were used to evaluate the most common ages, disciplines, severities, characteristics, treatments, and outcomes of horses with navicular. Lameness exams, nerve blocks, x-rays, ultrasounds, MRIs, and CT scans were used to diagnose navicular severity before and after treatment. Specific treatments used included therapeutic farriery, targeted joint injections, medical therapy, cryotherapy, or surgery. The results showed barrel horses amongst the ages of eight and up to be the most prone to navicular issues. Many of them had low heels accompanied by long toes that were usually addressed with therapeutic farriery, targeted joint injections, or medical therapy. The American Association of Equine Practitioners (AAEP) lameness scale was used to determine average lameness before and after treatment. The average lameness score before treatment was 3.44, while the average lameness score after treatment was 2.37. This indicated that the horses had significantly improved with treatment.

Braedy Santens

Sponsored by Dr. Colin Strine

Program in Natural Sciences

"Biotic and Abiotic Predictors of Winterkill Events on Northern Temperate Lakes in Northwest Montana and Northwest North Dakota"

Winterkill negatively impacts fish communities throughout the Northwest United states. We sampled twelve lakes between northwest Montana and northwest North Dakota to determine the best biotic or abiotic predictor of winterkill. Predictors of winterkill events on northern temperate lakes are widely debated leading to many suggesting either biotic or abiotic factors to be the sole trigger of these events. This study aimed to use both biotic(nitrates, phosphates, pH) and abiotic(elevation, surface area, average depth, temperature) predictors of the binomial variable winterkill (1 = winterkill, 0 = no winterkill), using logistic regression paired with AIC values, we determined which candidate model best fits the binomial variable between 12 sites in two states. Winterkill occurred at one site in Montana and at five sites in North Dakota out of six total sites in each state. Both states predictor variables were averaged with standard deviations to

indicate differences, Montana : phosphates(ppm) – 1.79±4.03, nitrates(ppm) – 0.83±2.04, pH – 7.4±0.48, elevation(meters) – 1179.03±318.0, average depth(meters) – 29.60±31.58, surface area(acres) – 922.78±1195.14, temperature(Celsius) – 21.56±1.52, North Dakota : phosphates(ppm) – 0.63±0.43, nitrates(ppm) – 2.5±2.89, pH – 6.48±0.77, elevation(meters) – 757.73±44.60, average depth(meters) – 6.85±3.86, surface area(acres) – 254.9±461.36, temperature(Celsius) – 23.06±1.90 . We found from analysis that average depth was the strongest predictor of winterkill in northern temperate lakes. Our results along with an adequate literary review of available articles suggest that accurate predictability of winterkill is a site-specific issue.

Jonathan Schendel

Sponsored by Dr. Colin Strine

Program in Natural Sciences

"Wetland Credits: A Scoping Narrative Review Of Wetland Mitigation Banking Programs and the Wetland Credits they Produce"

Wetlands naturally filter out many different pollutants and varieties of chemicals that would otherwise be negatively affecting the quality of many water sources, freshwater or otherwise. When damage to a wetland ecosystem occurs, there are processes and procedures in place in attempts to remediate this. This is commonly done through wetland mitigation banking programs (WMBPs). However, naturally occurring wetlands have many spectra associated with their effectiveness and efficacy, therefore making them very hard to replicate. Thus, the measures taken for WMBP procedures, evaluations, and wetland credit productions will be explored herein with a focus being given to the effectiveness of the policies in place. A scoping narrative approach was taken throughout this review to develop further understanding of topics and gather quantifiable measures considering associated topics and their interconnected levels of pertinence. The results found have strong implications that the processes and policies currently in place that attempt to remedy or mitigate damage to our wetland resources in the United States, are not effective in doing so. The data shows that naturally occurring wetlands are an effective contributor to global biospheres. Wetlands were found to be responsible for significant levels of carbon sequestration, a total more than twice that of global forests. Additionally, more than 40% of all plant and animal species either breed or live in a wetland. Yet, wetlands are being damaged or removed at an alarming rate, commonly for anthropogenic means, i.e. urbanization and agriculture. In a report to congress, taken over about a 10-year time span, there was a net loss of just under 2 million acres of wetlands. The loss of these natural wetlands then is compensated or replaced, statistically, in a form of greenwashing through mitigation banking, with non-vegetated wetlands that lack the key component to successful ecosystems, primary producers.

Ava Schneider, Abigail Semerad, Styrling Sickler-Zietz

Sponsored by Ms. Taina Traub

Program in Nursing

"Nonpharmacological Therapies & Treatments Compared to Pharmacological Therapies for Dementia"

People experiencing cognitive impairment, such as dementia, there is currently no treatment available to cure the disease or even significantly slow the progression of memory and functional loss. There is no long-term pharmacologic treatment available for dementia. Professionals and individuals are seeking strategies to help address the behavioral and psychological symptoms of dementia. Many non-pharmacological therapies have proven to assist with the effects of dementia. The therapies include Aroma, psychological, exercise, music, dance, bright light, reminiscence, massage, non-invasive brain stimulation, and acupuncture therapies. These therapies will not cure or improve memory loss but they will assist with treatment of the symptoms of dementia. These therapies will overall improve the quality of life in individuals with dementia.

Evan Showalter

Sponsored by Dr. Colin Strine
Program in Natural Sciences

"Tigers in North Dakota (Ambystoma tigrinum) eDNA Surveying for Presence in Cattle Ponds"

Environmental DNA (eDNA) allows for efficient and convenient data collection using DNA segments to confirm species presence. There is little literature using eDNA to specifically examine tiger salamander presence in North Dakota. I sampled 8 different cattle ponds in Western North Dakota twice each using a set eDNA collection method from the United States Department of Agriculture. After collecting water samples, the filters were sent to Jonah Ventures for DNA extraction and metabarcoding. Samples were incubated, extracted, ran through a first round of Polymerase Chain Reaction (PCR) inspected on agarose gel. Then the amplicons–product of an amplified or replicated piece of DNA, were cleaned, a second round of PCR followed, then the amplicons were cleaned again. Finally sequencing and bioinformatics took place. Salamanders (genus Ambystoma) were detected at 5 of the 8 sites. Average single season Bayesian occupancy point estimate was 0.655 ± (.165), with a detection probability of 0.735± (.156) over the two site visits. Of the covariates including elevation, surface area, and air temperature, air temperature on visit 2 had the best model but still was not significant. There was no significant correlation between any of the covariates and the naïve detections. This method was effective in detecting the genus Ambystoma, however more work and greater sample site variation could elucidate impacts of species level presence absence data.

Eniola Soetan, Hannah Rebsom
Sponsored by Dr. Tony Vinci
Program in English

"Fiction and Poetry at the End of the World"

Contemporary America expresses an overwhelming fascination with the concept of the end of the world. After the COVID-19 pandemic heightened our thinking towards what the "end of the world" may look and feel like to each of us, dystopian and apocalyptic narratives have become more popular and relevant than ever. "The Pause" and "How It Is With The Tangled Things" are student created narratives that use fiction and poetry as tools to conceptualize the end of the world, grappling with questions about what or whose world is being ended in the first place, along with imagining what is left when the world we may know and be familiar with no longer exists. Such artworks compel readers and listeners to engage with both challenging ethical aporias and the all-too elusive landscape of unaddressed human emotions that are often silenced or marginalized.

Eniola Soetan
Sponsored by Mr. TJ Dempsey
Program in Psychology

"Intersections of Anatomy, Physiology, and Sports Medicine in the 19th and 20th Centuries"

The field of sports medicine is a relatively new and developing field. In the 19th and 20th centuries, the process of sports medicine growing into its own realm was largely spearheaded and pushed by discussions surrounding other pertinent topics at the time such as race, gender, and health and wellbeing. The development of sports medicine as its own field during the 19th and 20th centuries differed considerably across geographical locations, resulting in different ways of thinking that challenged the universality of sports medicine. Even as further breakthroughs, innovations, and connections were made between anatomy, physiology, and sports medicine, differences in the conceptualization of sports medicine continued to manifest themselves, proving to have ramifications on the way sports medicine is approached and perceived even today in the 21st century.

Zach Stanley
Sponsored by Dr. George Seror III
Program in Psychology

"Effects of Short-Term Beta Frequency Binaural Beat Entrainment on Stroop Interference"

Sound waves of differing frequencies, when perceived at the same time, can interact in ways that create an altered experience of the sound. Binaural beats are the result of the brain perceiving an interaction between two sound waves differing in frequency (presented through headphones with one frequency per ear) that add and subtract from each other in such a way that creates a new wave with a "beat" or a "pulse." The new wave has a frequency equal to the difference between those original. This experiment utilizes a "beat" with a frequency of 27 hertz, falling in the beta range. Entrainment with binaural beats in this range has been shown to alter the waves of the brain, yielding various effects on cognitive functioning, including changes in impulsivity. This experiment seeks to observe the effect of short-term binaural beat entrainment on performance in a Stroop task, a test relating to visual attention, stimulus selection, and response inhibition. The findings could reveal potential for using binaural beats as a viable, non-invasive intervention for impulsive behavior and other cognitive variables.

Ryan Wagner

Sponsored by Dr. Samanthika Hettiarachchi

Program in Naturnal Sciences

"Comparison of Common Hydrogen Sulfide Scavengers"

Hydrogen Sulfide (H2S) is a toxic, corrosive, and explosive gas entrained in the petroleum product extracted during oil and natural gas production. H2S is responsible for an average of six fatalities per year in the US oil and gas industry and incurs substantial costs to eliminate the hazardous gas from the product streams. To eliminate H2S from product streams, oil and gas producers start at the well site using chemicals called "scavengers." MEA-triazine in formaldehyde solution is the most common, but many competitors are developing new compounds regularly. As wells age, rising concentration of H2S tends to develop, and oil and gas producers must tune their H2S elimination procedures by choosing the right scavenger for specific well sites. This experiment aims to evaluate the performance of different brands of prevalent scavengers by constructing miniaturized reaction vessels and manipulating flow to simulate realistic field conditions. The results will expand the current knowledge base, and provide companies better informed choices for which scavenger they'll need for their specific operational scenarios to eliminate this deadly hazard more efficiently.

Jackson Willems, Austin Dennis

Sponsored by Mr. Michael Jennings

Program in Criminal Justice

"The Dark Side of the Boom"

All over the world people are controlled and influenced by the concept of oil. Oil is a very influential material that has the power to control economies. Countries across the planet dedicate countless hours in pursuit of this valuable product. In America, North Dakota has grown into one of the largest oil-producing states. Many people have immigrated to the state in pursuit of financial wealth. North Dakota's growth as an oil powerhouse began after the discovery of the Bakken oil formation. The Bakken Formation is a sedimentary basin that covers three states and carries an abundant amount of oil. The North Dakota portion of the Bakken is mainly around the town of Williston. The Bakken oil formation has created numerous employment opportunities for eager laborers. North Dakota has experienced a major population increase since the start of the oil boom in the early 2000s. This has changed the lives of western North Dakota residents, specifically in the Bakken region. With the population increasing, the rate of crime experienced a similar spike. This poster examines the influence of the oil boom on crime in North Dakota. Crime rates have been significantly impacted by the oil industry. Data suggest an increase in multiple types of crime in the Bakken area. This shift can be examined in western North Dakota but was not apparent throughout the entire state. The oil production industry in North Dakota has shifted the well-being of residents in numerous counties in the western half of the state. This poster and presentation will allow the audience to have an in-depth look at the influence oil has had on crime.

Alycia Winters
Sponsored by Dr. Sarah Manka
Program in Natural Sciences

"Leukocyte count in pre & post parturition (gravid or non-gravid) females of Sceloporus jarrovii (Yarrow's/ Mountain spiny lizard)"

Female Sceloporus jarrovii (Yarrow's spiny lizard) are ovoviviparous and live bearing. Counting two of the five subtypes of leukocytes per 105 cells (white blood cells) I aimed to determine if there are significant differences in lymphocyte & heterophil count in pregnant and non-pregnant (pre-parturition & post-parturition) females. Leukocytes include five different forms: basophils, eosinophils, lymphocytes, monocytes, & neutrophils (in humans). The purpose of examining lymphocytes and heterophils was because lymphocytes are first to detect when there is anything foreign or pathogenic within the body and heterophils are later going to respond to this, so a change in ratio would have let us know that a specific lizard was having an immune response. The technique of utilizing a light microscope to examine fifty-one slides of female S. jarrovii was chosen to provide insight into the immune system and reproductive efforts of the species. The slides were collected in 2018 by Dr. S. Manka and colleagues, and the female S. jarrovii blood sample slides information was masked. Two to six blood sample slides at 40x, were scanned for approximately 25-35 minutes, counting between 90 and 105 cells per slide and classifying them into leukocyte subtypes to later create a dataset. The null hypothesis states there is no difference between heterophils and lymphocytes in gravid or non-gravid groups with both having a sample size of 25 female lizard prepared blood smears. The alpha critical value used for this experiment was 0.01 and a box chart was used to view deviation in either group, which was insignificant. The study found no significant differences (failing to reject the null hypothesis). This meant that none of the individuals had been or were immunologically compromised as if they were there would have been a spike in the number of heterophils. The analysis of immune response in live-bearing lizards further informs the evolutionary origins of maintaining gestation.

Dr. Jeremy Wohletz

"Peace Garden: An Album Celebrating Composers of North Dakota"

The category of "Arts and Culture" was within the top three contributors to the U.S. GDP in 2021 according to the Arts and Cultural Production Satellite Account (ACPSA), U.S. Bureau of Economic Analysis, and National Endowment for the Arts. The growth between 2020 and 2021 was 13.7%, which was higher than the overall increase of U.S. economy at 5.9%. While North Dakota maybe does not contribute to this portion of the economy as much as say New York or Chicago, I would argue that there is more to this state than long, cold winters and oil. Throughout my over 10 years of living in North Dakota, I have discovered some incredibly talented composers that reside within this state.