23rd annual

Dickinson State University

2025 Celebration of Scholars:

Achievement in Research, Humanities, and the Arts

Saturday, April 26, 2025
8:00 a.m. to 2:30 p.m.
Murphy Hall & Student Center
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)
Associate Professor of Psychology

Dr. Chip Poland
Professor of Agriculture & Technical Studies

Dr. Colin Strine
Associate Professor of Biology

Mr. TJ Dempsey
Assistant Professor Psychology

ACKNOWLEDGMENTS

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Food Services: Sodexo

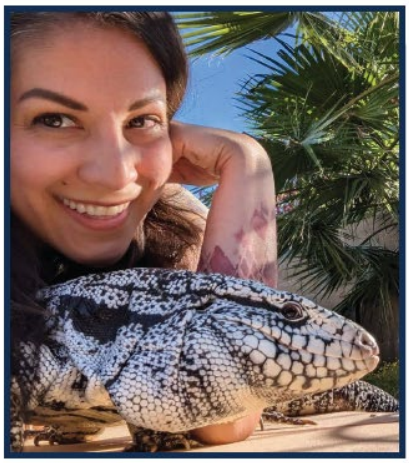
Program Development: Dr. Wendy L. Wilson

Faculty Sponsors: Dr. Chip Poland, Mr. Toby Stroh, Dr. George Seror III, Dr. Elizabeth Freedman, Dr. Colin Strine, Dr. Sarah Manka, Dr. Samanthika Hettiarachchi, Dr. Jinasena Hewage, Mr. Trevor Hann

Opening Remarks, Introduction of Keynote and Closing Remarks: Mr. Ty Orton DSU President, Dr. Wendy L. Wilson, Dr. Colin Strine

Oral Presentation Moderators: Dr. George Seror III, Dr. Wendy L. Wilson, Dr. Colin Strine, Dr. Sarah Manka, Dr. Chip Poland

In addition to multiple Student Volunteers



Keynote Speaker

RACHEL PIKSTEIN

MS Ecologist, Herpetologist, & Environmental Biologist
Founder & Lead PI of Pikstein Laboratory for Conservation Research & Education.

"COLLABORATION IN CONSERVATION: THE IMPORTANCE OF ENGAGING WITH STAKEHOLDERS AND PUBLIC OUTREACH"

Rachel Pikstein is a conservation-focused biologist specializing in native species preservation and invasive species management.

She is the founder and lead scientist of the Pikstein Laboratory for Conservation Research and Education. Rachel brings over eight years of experience teaching Biology and Environmental Science at Grand Canyon University in Phoenix, Arizona, where she also taught K–12 science. During her time at GCU, she was recognized by the university's Arizona Chapter of Health Occupations Students of America for her outstanding contributions as a faculty member.

She currently serves as an associate editor for the Journal of North American Herpetology and has been featured as a guest on five science and education-focused podcasts.

A dedicated mentor, Rachel has worked closely with undergraduate researchers throughout her academic career. Rachel is currently pursuing her PhD in Biology at Loma Linda University, where she conducts research in the Behavior, Ecology, and Venom Lab.

2025 Celebration of Scholars Schedule

7:45a-8:10a

Registration and Social

Murphy Hall

8:10a-9:00a

Welcome Reception

Keynote Address: ***Rachel Pikstein***

Stroup Auditorium

9:10a-11:00a *(Short break 10:15-10:20)*

Session I – Oral Presentations

Session 1A Rm 117 (Stroup Auditorium)

Session 1B Rm 155 (Thompson Auditorium)

Session 1C Rm 160

11:00a-12:05p

Lunch, Student Center Ballroom

12:05p-1:05p

Session II– Oral Presentations

Session 2A Rm 117 (Stroup Auditorium)

Session 2B Rm 155 (Thompson Auditorium)

Session 2C Rm 160

1:10p-2:30p

Poster Presentations

Session 1: Oral Presentations 9:10am-11:00am

Oral Session 1A, 1B and 1C

Oral Session 1A, Stroup Auditorium (Room 117) *Agricultural Sciences*

(Moderator: Dr. Chip Poland)

- "Evaluating the Effects of PEMF Therapy as well as nebulization treatments on Barrel racing times with a performance horse that is diagnosed with PSSM and EIPH" **Charley Heuchert**
- "Soil Characteristics of Productive vs. Unproductive Areas of Irrigated Alfalfa, Northeast Montana" **Loden Idler**
- "The Effect of Vegetation Height and Type on Ring-Necked Pheasant Populations in Bowman County" **Brendon Rasmussen**
- The Influence of Variety and Nitrogen Fertility on Vitreousness in Durum Wheat" **Nathan Unruh**
- "Comparing Altosid & Garlic as Fly Control on Angus Cattle in Eastern Montana" **Jazlyn Schmidt**
- "Effect of Dietary Roughage Concentration on Nutrient Digestibility in Beef Steers on High Concentrate Diets" **Lea Mittleider**
- "A Comparative Analysis of Labor and Cost Effectiveness of Traditional and Modern Taxidermy Techniques" **Victoria Moreno**

Oral Session 1B, Thompson Auditorium (Room 155) *Natural Sciences*

(Moderators: Dr. Sarah Manka & Dr. Colin Strine)

- "Diesel Exhaust Fluid (DEF) to Lawn Care: Does DEF Enhance Kentucky Bluegrass (*Poa pratensis*) Growth Rate in the First 15 days After Germination?" **Robert Flowers**
- "The Effects of Moon Phase on the Frequency of Odocoileus virginianus (White-tailed Deer) Camera Trap Sightings" **Clay Prell**
- "Sex Matters: Regulation of DNA integrity PRDM16?" **Jewel Olson**
- "What's in Your Water: Evaluating the Impact of Distance on Groundwater Quality VS Surface Water Quality" **Zane McCormick**
- "Antagonistic or Synergistic: Bacterial Growth in the Presence of Fungi" **Dawson Kuylen**
- "Effects of Beverage Acidity and Sugar Content on Dental Plaque Formation" **Jenna Novotny**

Oral Session 1C, Room 160 *Psychology*

(Moderators: Dr. George Seror III & Dr. Wendy L. Wilson)

- "Understanding and Improving Mental Health Outcomes in Student Athletes" **Edward Aranda Calixto**
- "Stigma Surrounding People with Disabilities" **Bradyn Palmer**
- "Violent Media and the Influence on Children" **Katarina Messmer**
- "Positive Psychology Integration in Education" **Morgan Aune**

Session 2: Oral Presentations 12:05 pm – 1:05 pm

Oral Session 2A, 2B, 2C

Oral Session 2A, Stroup Auditorium (Room 117) *Agricultural Sciences* (Moderator: Dr. Chip Poland)

- "Finishing Performance in Confinement: A Comparative Analysis of Breed and Sex in Beef Cattle" **Clayton McAllister**
- "Factors Affecting Price of Show Goat Prospects" **Shelby Carr**
- "Comparison of Growth and Carcass Characteristics of Aberdeen and Conventional Angus Cattle" **Laney Jones**
- "Effect of Age and Body Condition on Pregnancy Rates of Cows in Eastern Montana" **Rachel Kelly**

Oral Session 2B, Thompson Auditorium (Room 155)

(Moderators: Dr. Sarah Manka & Dr. Colin Strine)

- "Speed vs Agility: Are there differences in the relationship between two performance metrics based on sex or sport?" **Tinley Pierson**
- "Speedy Reactions: How Sounds and Words Reduce Reaction Time Among Dickinson State University Students" **Griffin Obrigewitch**
- "Investigating H2S Scavenger Performances at Variety of Flow Conditions" **Ryan Wagner**
- "Linking Strength to Athletic Performance: The Impact of Maximum Squat on Force Generation and Acceleration in Collegiate Track and Field Athletes" **Galen Brantley III**

Oral Session 2C, Room 160 *Psychology*

(Moderators: Dr. George Seror III & Dr. Wendy L. Wilson)

- "Therapeutic Uses of Altered States of Consciousness" **Chase Miller**
- "Effect of Opioids, Marijuana, and Alcohol in Prenatal and Postnatal Development" **Maegan Fox**
- "The Challenges of Withdrawal and Detox: Understanding Addiction Recovery in Adults" **JaLynn Olson**
- "School-Based Mental Health Programs" **Amy Voll**

NOTE: Live/Remote Streaming Links are posted Last page of this program (pg 25)

Poster Presentations, 1:10pm to 2:30pm

AGRICULTURE

- *The Effect of Vitamin A Supplementation on the Weaning Weight and Carcass Traits of Angus Calves* **Kailey Brimmer**
- *Factors Affecting Price of Show Goat Prospects* **Shelby Carr**
- *Evaluating the Effects of PEMF Therapy as well as nebulization treatments on Barrel racing times with a performance horse that is diagnosed with PSSM and EIPH* **Charley Heuchert**
- *Soil Characteristics of Productive vs. Unproductive Areas of Irrigated Alfalfa, Northeast Montana* **Loden Idler**
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- *A Comparative Analysis of Labor and Cost Effectiveness of Traditional and Modern Taxidermy Techniques* **Victoria Moreno**
- *The Effect of Vegetation Height and Type on Ring-Necked Pheasant Populations in Bowman County* **Brendon Rasmussen**
- *Comparing Altosid & Garlic as Fly Control on Angus Cattle in Eastern Montana* **Jazlyn Schmidt**
- *The Influence of Variety and Nitrogen Fertility on Vitreousness in Durum Wheat* **Nathan Unruh**

NATURAL SCIENCE

- *Unraveling the Phytochemistry, Biological, and Pharmacological Activities of Plants Native to North Dakota* **Carl Askins**
- *Investigating the effects of supplemental antioxidant presences in cells undergoing induced oxidative stress* **Madison Beckler**
- *Linking Strength to Athletic Performance: The Impact of Maximum Squat on Force Generation and Acceleration in Collegiate Track and Field Athletes* **Galen Brantley III**
- *Rabbits and Roads: Occupancy, activity periods and mortality of Eastern cottontail rabbits (Sylvilagus floridanus) in Dickinson City* **Miranda DiBenedetto**
- *Deisel Exhaust Fluid (DEF) to Lawn Care: Does DEF Enhance Kentucky Bluegrass (Poa pratensis) Growth Rate in the First 15 days After Germination?* **Robert Flowers**
- *Antagonistic or Synergistic: Bacterial Growth in the Presence of Fungi* **Dawson Kuylen**
- *Hands-On Hygiene: Evaluating the Efficacy of Real-World vs. Recommended Handwashing Practices* **Natalie Lile**

- *What's in Your Water: Evaluating the Impact of Distance on Groundwater Quality VS Surface Water Quality* **Zane McCormick**
- *The Effect of Upper Leg Length, Lower Leg Length, and Foot Length on Sprinting Speed with Collegiate Track and Field* Sprinters **Kori Nagel**
- *Effects of Beverage Acidity and Sugar Content on Dental Plaque Formation* **Jenna Novotny**
- *Speedy Reactions: How Sounds and Words Reduce Reaction Time Among Dickinson State University Students* **Griffin Obrigewitch**
- *Sex Matters: Regulation of DNA integrity by PRDM16* **JewelOlson**
- *Speed vs Agility: Are there differences in the relationship between two performance metrics based on sex or sport?* **Tinley Pierson**
- *The Effects of Moon Phase on the Frequency of Odocoileus virginianus (White-tailed Deer) Camera Trap Sightings* **Clay Prell**
- *Evaluating the Impact of Compensatory Crosslinkers and Scaffold Composition on the Tensile Strength and Elasticity of Anterior Cruciate Ligaments (ACL) using both Normal Type and Genetically Mutated Synthesized Type I Collagen* **Eniola Soetan**
- *Investigating H2S Scavenger Performances at Variety of Flow Conditions* **Ryan Wagner**

PSYCHOLOGY

- *Short-Term Entrainment with Gamma Frequency Binaural Beats Reduces Stroop Interference* **Rose Anderson**
- *Unilateral Spatial Neglect, Memories, and Dreams: A Literature Review* **Darian Haug**
- *Gender Differences in the Presentation of ADHD* **Ella Peterson**

Abstracts

Arranged alphabetically last name of first author

Rose Anderson

Sponsored by Dr. George Seror

Psychology

Short-Term Entrainment with Gamma Frequency Binaural Beats Reduces Stroop Interference

Entrainment with gamma frequency binaural beats has been implicated in the improvement of cognitive processes such as working memory (Rakhshan et al., 2022; Sharpe et al., 2020; Wang et al., 2022), though there have been mixed findings across studies (Borges et al., 2023). This study was performed to examine the effects of gamma frequency binaural beats on top-down control of automatic processes as demonstrated by the Stroop test, and to resolve some of the methodological inconsistencies of previous studies. Binaural beats are an auditory phenomenon that occurs when two pure tones at slightly different fixed frequencies are played into each ear simultaneously, creating the illusion of a beating tone. The beating tone occurs at a frequency equal to the difference in Hz between the two fixed tones. Participants were randomly assigned to one of two groups: the control group or the experimental group. The control group received an auditory intervention of a fixed tone at 400 Hz. Participants in the experimental condition were presented with tones at frequencies of 380 Hz and 420 Hz, to create a beating tone of 40 Hz in the gamma frequency band. Both groups performed the Stroop test before and after auditory intervention, and the observed reduction of Stroop interference was compared. Preliminary data suggest that the experimental group experienced a greater reduction in Stroop interference than in the control group, suggesting that short-term entrainment with gamma frequency binaural beats may have enhancing effects on top-down control of automatic processes.

Edward Aranda Calixto

Sponsored by Dr. George Seror

Psychology

Understanding and Improving Mental Health Outcomes in Student Athletes

Early research reveals that first-year college student-athletes frequently experience stress and anxiety from balancing their sport commitments and academic demands. This presentation will examine studies of stress and anxiety experienced by collegiate student-athletes, highlighting areas where athletes need additional support. However, it is important to note that non-athlete students were also included in these studies and showed similar levels of stress to their student-athlete counterparts. Later studies also revealed that many collegiate student athletes' form of social support was provided by their institution, either their coaches or faculty members/staff, and that this was the primary coping mechanism. The type of institutional source of athletes would seek help from also differed depending on the type of stress they were experiencing. Additional factors, from time management skills to academic pressures also contributed to the stress experienced by student-athletes. Current research focuses on examining the higher rates of mental health issues and substance abuse among student-athletes compared to regular students and how their state of mind may influence how athletes navigate their daily lives.

Carl Askins

Sponsored by Dr. Jinasena Hewage

Natural Sciences

Unraveling the Phytochemistry, Biological, and Pharmacological Activities of Plants Native to North Dakota

Natural medicinal plants have long been of interest to researchers due to their potential therapeutic applications. North Dakota is home to a variety of native plants with potential medicinal properties, yet many remain underexplored. This research aims to analyze the phytochemistry, biological, and pharmacological

activities of selected North Dakota plants. The project consists of two phases: (1) the qualitative and quantitative analysis of secondary metabolites. Dried plant samples will be extracted using a Soxhlet apparatus with a gradient of solvents (hexane, ethanol, and water) to isolate a broad range of phytochemicals. Qualitative screening will employ classical reagent-based methods, including Dragendorff's reagent for alkaloids, Fehling's solution for reducing sugars, and tannic acid for tannins. Quantitative analysis will involve colorimetric and gravimetric techniques, with absorbance readings taken via UV-Vis spectrophotometry. (2) The investigation of their biological activities, including antimicrobial and anticancer properties. Findings from this study could contribute to drug discovery and expand knowledge of North Dakota's medicinal flora. Additionally, it promotes undergraduate engagement in multidisciplinary scientific research at Dickinson State University.

Morgan Aune

Sponsored by Dr. George Seror

Psychology

Positive Psychology Integration in Education

Historically, education models have focused on outcomes such as literacy and numeracy, neglecting the psychological health of students. Positive Psychology, a recently developed field, argues that educational institutions should take a comprehensive approach to traditional education, concentrating on building health and well-being in addition to addressing existing pathologies. Aiming for a prevention-based approach versus a pathological approach, it proposes a shift in focus in terms of program outcomes. The shift occurs when the focal point moves from reducing ill-being to building well-being. This presentation will address the origins of positive psychology as a field; it will explore Martin Seligman's contribution, operational definitions used within the field relating to educational settings, and several evidenced based integration methods that align with current educational practices. These methods apply to the holistic well-being of the student, covering academic performance, relationships, and mental health.

Madison Beckler

Sponsored by Mr. Trevor Hann

Natural Sciences

Investigating the effects of supplemental antioxidant presences in cells undergoing induced oxidative stress

Oxidative stress – the imbalance between reactive oxygen species (ROS) and antioxidants in the cell has some known links to cancer. An increase in oxidative stress can contribute to tumor progression by directly oxidizing macromolecules or oxidative stress-caused aberrant redox signaling. Given the significance of oxidative stress in carcinogens and cancer progression, research towards antioxidant therapies has been increasing. Using HeLa cells, an immortal human cancer cell line, I aim to distinguish the effects of supplemental antioxidant presences in cells undergoing induced oxidative stress. Hydrogen peroxide (H2O2) will be used to induce oxidative stress in HeLa cells, testing various concentrations increasing by 100uM each, I expect to see a curve of increased ROS leading to cell death. Once selected the concentration of H2O2 will be applied to all treatments. Specifically looking at antioxidant's vitamin c and NAC, I intend to compare the ROS values of the control (no supplemental antioxidants), ROS values of produced on cotreatment with antioxidants Vitamin C, and NAC. Fluorescence-based assays, DCFH-DA for the general ROS, and DHE to measure cytolytic ROS will be used to quantify ROS in all samples. Widening the understanding of the effects of cotreating HeLa cells has implications in the use of antioxidant therapies for cancers, neurodegenerative disorders, cardiovascular diseases and aging-related conditions.

Galen Brantley III

Sponsored by Dr. Elizabeth Freedman

Natural Sciences

Linking Strength to Athletic Performance: The Impact of Maximum Squat on Force Generation and Acceleration in Collegiate Track and Field Athletes

This study investigates the relationship between maximum squat strength, force generation, and sprint acceleration in collegiate track and field athletes, with a focus on how these variables are influenced by sex and primary track event. Maximum Squat, Vertical jump and 20-meter sprint were evaluated from 26 male and female athletes on the Dickinson State University track and field team. Results indicate that males exhibited significantly higher maximum squats, vertical jumps, and faster 20-meter sprint times compared to females. This study also revealed that an increase in squat strength generally improved vertical jump performance and sprint acceleration, with notable variations based on gender and event group. Specifically, male sprinters and jumpers benefited from a higher squat maximum, though male jumpers did not show improvement in sprint times with heavier maximum squats. Conversely, female athletes showed a positive correlation between squat strength and vertical jump, and a negative correlation between squat strength and 20-meter sprint times. These findings suggest that event-specific training should be considered when designing strength training programs to optimize performance for the best return on training outcomes.

Kailey Brimmer

Sponsored by Dr. Chip Poland

Agriculture and Technical Studies

The Effect of Vitamin A Supplementation on the Weaning Weight and Carcass Traits of Angus Calves

In the cattle industry, it's all about raising the highest quality, best producing cattle that you can market. What if there was a way that to give your calves a boost on their growth? What if this could give them the edge they needed, especially in dry or unfavorable years? Well, maybe Vitamin A, which is crucial for growth and development, is the answer for heavier weaning weights as well as improved carcass measurements. To investigate this, I have started by giving 500,000 IUs of Vitamin A, at birth, to every other heifer calf and every other bull calf born to a group of two-year-old heifers. This way I could be sure of an equal number in the control as well as in the treatment group. These calves were also weighed at birth and this data was recorded in correspondence with their ear tag number. In mid-April, around two months of age, the treatment group was given a booster to the Vitamin A supplementation. Then, at weaning, all the calves will be weighed and the data recorded. Also, a sample of control and treatment calves will be ultra-sounded to record their carcass measurements. After all the data is collected, it will be analyzed to determine if, in fact, Vitamin A supplementation at birth affects the weaning weight and carcass traits of Angus calves.

Shelby Carr

Sponsored by Mr. Toby Stroh

Agriculture and Technical Studies

Factors Affecting Price of Show Goat Prospects

The transformation of the livestock show industry over the last five years has shown an increase in the price of show goats. The objective of this study was to determine what factors (breeder, genetics, sex, or year) influence the prices in the show goat industry. Information was gathered from different online sale platforms and included data from 15 different breeders and the sale of 1574 individual goats. This data included the breeder, sire, sire of the dam, sex, year of sale, and purchase price. An ANOVA sum of squares statistical analysis was used to identify significant sources of variation. The results of this study showed that in a full dataset, the breeder, sire, sire of the dam, sex, and year were all significant in relation to purchase price ($p < 0.004$). Significant differences in the measured variable were observed between breeder categories ($p < 0.05$) based on post-hoc analysis. Notably, Stork Livestock (mean = $7379) had a significantly higher sale price than several other breeders. The other breeders in this study were found to be similar, with four breeders having a higher average and five being lower than average. Certain sires appear to contribute to the higher end of this significant difference. For instance, offspring of sires such as "Swap Meet Louie" (mean price: $22,000) and "Cinderella Man" (mean price: $14,210) command substantially higher average sale prices. The study also showed that in a dataset where both the sire and the sire of the dam were analyzed if used only five or more times, the breeder, sire, sire of the dam, sex, and year were insignificant ($p > 0.05$). In conclusion analysis of goats sold out of any particular sire or sire of the dam shows significance. When selecting prospects to purchase for breeding, there are multiple different sires that increase value, as well as breeders that increase value.

Miranda DiBenedetto

Sponsored by Dr. Colin Strine

Natural Sciences

Rabbits and Roads: Occupancy, activity periods and mortality of Eastern cottontail rabbits (Sylvilagus floridanus) in Dickinson City

Eastern cottontail rabbits (Sylvilagus floridanus) are present and abundant in Dickinson city municipality, North Dakota. They utilize human dominated landscapes including private properties and parks, even being recorded via iNaturalist throughout the year. I aim to assess 1) presence of the rabbits, 2) activity and 3) road mortality within this urban landscape to Eastern cottontail rabbits. I hypothesize that the larger green spaces will have higher occupancy, more activity and less road mortality than sites with less green space and greater human activity. I will collect the rabbit's presence rate with equal numbers of foot survey hours in each size class of the green area. Equal numbers Bushnell ™ camera traps within each habitat type will be used to validate survey data. I will survey through the course of 3 separate weeks throughout the year which will be from May 1 to May 7 2025, August 20 to August 21 2025, and October 24 to October 31 2025; while also using the camera traps I will record the results. I will visualize my response variable with maps of rabbit occurrence from surveys, barcharts of number of rabbits observed on each survey, and boxplots for median number of observations per habitat type as a factor of number of days. I will analyze my results with a simple linear model if my response variable (number of rabbits) is normally distributed, with the response being number of rabbits and predictor being fragment size and other measured covariates. This can be extremely useful for future research on Eastern cottontails. Future research can include predicting the population in Dickinson and potential conflicts with humans in the city, monitoring habitat use change in Dickinson, and identifying ways to help preserve the rabbits and rabbit's habitats.

Robert Flowers

Sponsored by Dr. Colin Strine

Natural Sciences

Deisel Exhaust Fluid (DEF) to Lawn Care: Does DEF Enhance Kentucky Bluegrass (Poa pratensis) Growth Rate in the First 15 days After Germination?

Kentucky bluegrass is a popular choice for lawns in the United States and is spread across the northern two thirds of the nation. Kentucky bluegrass is known for its deep green color and its durability in cooler climates. A well-kept lawn is desirable among homeowners, and some strive to find the perfect balance between fertilizer application and water supply. I sampled forty-five potted samples of Kentucky bluegrass across three trays. The grass seeds were planted into three trays with fifteen pots in each tray. Three fertilizer applications were used during the course of the experiment including a control, diesel exhaust fluid (DEF), and Osmocote 14-14-14 fertilizer. The numbers 1, (control) 2, (osmocote 14-14-14) and 3 (DEF) represented treatment types and were randomly distributed across potted grass using a random number generator. Three grow lights hung above the potted grass in the Dickinson State University greenhouse for the two-week study. The potted grass was watered once a day. These samples of potted Kentucky bluegrass were tested for two variables. The two variables measured were maximum height and minimum height achieved in each of the grass pots. Both variables were shown to be normally distributed and have equal variances between groups, so I elected to assess groups with the equal One-Way Analysis of Variance (ANOVA) test. Neither maximum height, nor minimum height differed based on experimental treatment. My sample was small, and the duration short, which may have impacted my findings. Additionally, I performed my studies in greenhouse conditions which may not accurately simulate natural environments of the region.

Maegan Fox

Sponsored by Dr. George Seror

Psychology

Effect of Opioids, Marijuana, and Alcohol in Prenatal and Postnatal Development

The use of drugs and alcohol during pregnancy continues to be an issue due to lack of awareness and educational resources for individuals and communities in need. This presentation focuses on the use of alcohol, opioids, and marijuana during pregnancy and the effects on both prenatal and postnatal development. Research has demonstrated that the use of alcohol and drugs during pregnancy can drastically affect the cognition, physical development, and emotional regulation of the child. Major findings suggest that using drugs or alcohol during the first trimester of pregnancy is particularly harmful, a time when women often do not realize they are pregnant. One challenge to research is that individuals are often poly-drug users, making it difficult to isolate the effects of specific drugs. A second challenge is difficulty in following up with patients due to a lack of resources and other barriers to seeking care. Recommendations for helping women avoid using drugs and alcohol during pregnancy consist of education, getting women the care they need when they need it, and not letting stigma about drug and alcohol use hinder their access to care and support. Findings such as these provide insight into how our community needs to make changes to help alleviate stigma and get people the help they need so the use of drugs and alcohol during pregnancy is diminished.

Darian Haug

Sponsored by Dr. George Seror

Psychology

Unilateral Spatial Neglect, Memories, and Dreams: A Literature Review

Unilateral spatial neglect (USN) is an acquired neurological disorder, typically caused by damage to the right parietal lobe, resulting in the failure to perceive or respond to stimuli on the left side of space. Lesions can occur on the left side of the brain as well, which would lead to neglect of the right side of space. These lesions are commonly found in stroke patients, impacting 10% to 82% of individuals following a right-hemisphere stroke and 15% to 65% following a left-hemisphere stroke. The effects of USN on an individual's spatial awareness have been well documented, but the impact the disorder has on the unconscious mind remains understudied. The current project examines research and patient reports to gain a better understanding of the internally generated experiences of individuals suffering from neglect, explores recurring patterns in the mental representations of these individuals, and determines where further research on this topic might be beneficial.

Charley Heuchert

Sponsored by Dr. Chip Poland

Agriculture Sciences

Evaluating the Effects of PEMF Therapy as well as nebulization treatments on Barrel racing times with a performance horse that is diagnosed with PSSM and EIPH

"Polysaccharide Storage Myopathy (PSSM) is a genetically inherited muscle disorder that impairs energy metabolism and muscular function in horses, often presenting as stiffness, reluctance to move, excessive sweating, and cramping—symptoms that hinder performance. This study investigated the use of electronic shockwave therapy and nebulizer treatment to manage PSSM and Heaves, emphasizing their combined effects on muscle repair, respiratory function, and athletic performance. A case study involved a horse diagnosed with both PSSM and Exercise-Induced Pulmonary Hemorrhage (EIPH). Diagnostic methods—including genetic testing, ultrasound, muscle enzyme analysis, and endoscopy—were used to assess disease severity and treatment efficacy. Shockwave therapy targeted key muscle groups and the thoracic region over three sessions within five months to promote blood flow, reduce inflammation, and stimulate cellular repair. Imaging confirmed improved tissue recovery, while endoscopy showed reduced pulmonary bleeding and lung scarring. Results suggest that shockwave therapy is a non-invasive adjunct treatment for PSSM and respiratory complications. It may enhance muscle regeneration and improve respiratory health in horses with comorbid conditions like Heaves and EIPH. While not a cure, it complements traditional management

strategies such as diet and exercise. Broader studies are needed to confirm these findings and optimize treatment protocols for performance horses. "

Loden Idler

Sponsored by Dr. Chip Poland

Agriculture Science

Soil Characteristics of Productive vs. Unproductive Areas of Irrigated Alfalfa, Northeast Montana

This project took place along the Milk River in Northeast Montana, where what most people call "winterkill" is a common, yearly occurrence. The objective of this project is to identify productive and unproductive areas within irrigated alfalfa fields, take soil samples from these areas and determine if there are any similar characteristics across fields. This project focused on four irrigated alfalfa fields with similar “unproductive” and “productive” zones. Rather than assuming that winterkill was the sole cause of the differences in productivity, this study aimed to investigate other possible soil factors. Two soil samples were taken from each field, with zone maps created for them. The red zone (unproductive) and green zone (productive) were sampled, along with the water sources for all four fields. Also, two fields were grazed and two were not. Thus, variations included productivity areas, grazing, and their interaction. Productivity areas tended ($p<0.15$) to influence potassium (K) and copper (Cu) concentrations in the soil. Soil K and Cu concentrations were lower in productive areas. Grazing also affected ($p<0.05$) the percentages of calcium (Ca) and magnesium (Mg) in the soil and influenced ($p<0.15$) the concentrations of zinc (Zn), copper (Cu), calcium (Ca), organic matter (OM), and carbonate. Grazing increased Zn, OM, and %Mg, while decreasing Cu, Ca, carbonate, and %Ca. Furthermore, there tended to be interactions ($p<0.15$) between productivity areas and grazing that affected soil concentrations of phosphorus (P) and Cu. Soil P concentrations were higher in unproductive areas with grazing, while they were lower in productive areas with grazing. Also, Cu concentrations were close in productive areas but grazing increased Cu concentrations in unproductive areas. The data describes differences in soil characteristics between productivity and grazing. In general, these soil characteristics do not help understand the difference in high and low productivity areas.

Laney Jones

Sponsored by Mr. Toby Stroh

Agricultural Studies

Comparison of Growth and Carcass Characteristics of Aberdeen and Conventional Angus Cattle

In the beef and ranching industry, fat cattle are bought and sold daily to meet consumer demand, typically with final live weights ranging from 1,300 to 1,600 lbs and ribeye sizes between 13 to 18 in^2. Although some consumers may prefer smaller animals that offer a more manageable amount of meat. The main objective of this study was to compare growth and carcass characteristics of full-blood Aberdeen (FB), regular Angus (R), and half-blood Aberdeen/Angus (HB) steers. A total of 37 steers (12 FB, 11 R, and 14 HB) were evaluated for initial and final weights, days on feed, total weight gain, and average daily gain (ADG). Carcass traits, including carcass weight, ribeye area (REA), back fat, kidney, pelvic, and heart fat (KPH), quality grade, and yield grade, were also assessed. In terms of total gain ($P \leq .05$), the R group gained the most, while the HB and FB were lower. The R group had the highest ADG, followed by the HB, and the FB having the lowest ADG ($P \leq .05$). For backfat, the FB and HB had similar amounts of backfat, and the R group had the most ($P \leq .05$). The KPH was similar across all groups ($P \geq .05$), with the HB having the highest, FB in the middle, and R having the lowest. For quality grade, the FB and R groups were similar, while HB tended to be lower ($P \leq .10$). Lastly, in terms of yield grade, FB to HB groups showed significant differences ($P \leq .05$), while the HB to R group tended to differ ($P \leq .10$), and the FB to R groups were similar to each other. With HB having the highest yield, and the FB lowest. Thus, proving that there were significant differences, but the differences varied depending on the group of data that was analyzed. Variations in feeding duration and sample sizes may have influenced the outcomes. Larger studies with more controlled conditions could provide more conclusive results. This research highlights breed differences in growth and carcass traits, with implications for meat production strategies.

Rachel Kelly
Sponsored by Dr. Chip Poland
Agricultural Studies

Effect of Age and Body Condition on Pregnancy Rates of Cows in Eastern Montana

"Beef cattle are a vital part of the lives of many ranchers all over America. The main source of income from these animals is through the sale of their offspring. A cow's ability to produce offspring depends on many factors, including age and body condition. The objective of this study was to determine if age and body condition influenced the pregnancy rates of Angus beef cows in Eastern Montana.
A total of 187 Angus beef cows were included in this study that took place in Ismay, Montana at the Kelly Ranch. Ten bulls were turned out on June 16 for forty-two days to complete the breeding process. In late fall of 2024, photos as well as written notes were taken to determine body condition of the cows. Instead of the usual Body Condition Scoring system, a scale of one to three was used. Cows that were thin were given a rating of 1. Those determined to be in average condition were given a rating of 2, and the animals that were fatter were given a score of 3. Assessing the cows for pregnancy via ultrasound was completed in September. The relationship between age and pregnancy rate was determined to be nonsignificant (P=0.16). The relationship between body condition rating and pregnancy rate was also determined nonsignificant for the groups with a rating of 1 and 2. However, the group of cows with a rating of 3 had significance in lower pregnancy rates (P= <0.05). Although this study found little to no connection between pregnancy rates and age or body condition, other studies have demonstrated that these factors can impact an animal's reproductive ability. The cows in this study had similar body conditions, and the age range did not reflect that of a typical cow/calf operation. These factors resulted in the lack of significant findings."

Dawson Kuylen
Sponsored by Mr. Trevor Hann
Natural Sciences

Antagonistic or Synergistic: Bacterial Growth in the Presence of Fungi

Bacterial infections are a widespread ailment that has been affecting humans since the birth of our species (Tyler 2009). There are currently many different types of antibiotics on the market, but there is a need for more every year. Agar plates were given an individual plate ID. The first two letters of the Plate ID denote the fungal species that it contains, THE: Trichoderma harzianum, CAE: Candida albicans, and SOE: Schizosaccharomyces octosporus. The third letter (E), represented the species Escherichia coli. Each plate ID corresponded with a method of plate streaking denoted as .5, 1, or mix. E. Coli. was incubated for 48 hours before the introduction of Trichoderma harzianum, Candida albicans, or Schizosaccharomyces octosporus. Each plate ID had a sample size of 5. It was hypothesized was that the introduction of fungi will cause a decrease in median colony forming units in Escherichia coli regardless of the streaking method and fungal species. Mann-Whitney U tests were used to determine if there was a significant difference in median colony forming units before and after the introduction of fungi. It was found that only Plate ID's THE1 ($W = 25$, $p = .0007$), CAEMix ($W = 23$, $p = 0.036$), and SOE1 ($W = 25$, $p = 0.012$) showed a significant difference after the introduction of their respective fungal species, rejecting my hypothesis. These findings show potential mechanisms used by Trichoderma harzianum, Candida albicans, and Schizosaccharomyces octosporus that could be used clinically to form new antibiotics.

Natalie Lile
Sponsored by Mr. Trevor Hann
Natural Sciences

Hands-On Hygiene: Evaluating the Efficacy of Real-World vs. Recommended Handwashing Practices

Handwashing is a fundamental practice for preventing disease transmission, yet discrepancies persist between recommended protocols and real-world behaviors, potentially increasing infection risks in community settings. Proper hand hygiene not only protects individuals but also ensures the safety of vulnerable populations who may be unable to protect themselves. This research aims to compare the efficacy

of recommended handwashing procedures with those commonly performed in everyday public settings. Variations in handwashing, such as differences in soap type, water temperature, lather duration, and overall technique, may lead to increased infection risks and suboptimal bacterial reduction. I propose an experimental design in which approximately 100 participants are randomly assigned to one of two treatment groups: one following CDC-recommended handwashing procedures and the other replicating real-world practices. Participants will perform handwashing at a designated study site at Dickinson State University under controlled conditions, with variables such as soap type, water temperature, and lather time subject to manipulation. Hand swabs will be collected pre- and post-wash to quantify bacterial reduction, measured in colony-forming units (CFUs). Observational assessments will also document compliance with proper handwashing techniques. Statistical analyses will compare CFU reductions across treatment groups to evaluate efficacy. The impact of this experiment is twofold: narrowly, it will refine handwashing guidelines to optimize microbial removal and instill strong handwashing techniques in participants, while broadly, it will inform public health policies aimed at reducing the spread of infections. This research will provide critical insights into the behavioral and procedural factors influencing hand hygiene effectiveness, ultimately contributing to improved hygiene practices for individuals and communities alike.

Clayton McAllister

Sponsored by Mr. Toby Stroh

Agriculture Sciences

Finishing Performance in Confinement: A Comparative Analysis of Breed and Sex in Beef Cattle

"Finishing performance of cattle directly impacts profitability, production efficiency and market readiness—key factors in a beef industry focused on maximizing output while minimizing input costs and time to market. This study evaluates the impact of breed and sex on the finishing performance of beef cattle in a confinement system located in Sheldon, Vermont. A total of 80 head—including Angus, Hereford, and Angus x Hereford crossbred (Baldy) steers and heifers—were monitored from October 2023 to August 2024. All animals were fed a uniform total mixed ration and managed under consistent conditions within a modern confinement barn. Average daily gain (ADG) was calculated using arrival and departure weights and days on feed. ANOVA tests were conducted at a 90% confidence interval to determine the statistical significance of differences in performance across sex, breed, and their interaction. Sex alone showed no significant impact on ADG ($p = 0.764$), nor did initial weight differ significantly across groups ($p = 0.526$). However, breed was a significant factor affecting ADG. Herefords underperformed significantly, with a mean daily weight loss of 0.95 lbs. Key p-values include Angus vs. Hereford ($p = 0.002$), Baldy vs. Hereford ($P = 0.013$), and Angus vs. Baldy ($p = 0.715$), indicating Herefords were statistically different from both Angus and Baldies, having a much lower ADG then their counterparts which performed similarly.These results highlight the importance of breed selection in confinement-based finishing systems, particularly under the specific feeding, management, and housing conditions utilized at this Vermont facility. "

Zane McCormick

Sponsored by Dr. Samanthika Hettiarachchi

Natural Science

What's in Your Water: Evaluating the Impact of Distance on Groundwater Quality VS Surface Water Quality

Groundwater is an integral part of water use in the United States and accounts for 79.6 billion gallons of water a day. It can be found throughout the county at a higher rate than that of surface water and is a supplier of Surface water. I sampled 28 sites between Helena, Montana, and Dickinson, North Dakota. 14 samples from each location, with 2 being from surface bodies of water and 12 well water samples. These samples were then tested for 18 variables, 13 of them being regulated by the Environmental Protection Agency. These variables were then compared against the distance from the surface body of water. There were variables over the regulated limit in all samples taken in North Dakota, and Montana only had 5 samples with variables over the regulated limit. North Dakota had 4 variables where their overall average was over the regulated limit: Sulfate = 338.471 mg/L, TDS = 1088.071 mg/L, Manganese = 0.175071 mg/L, and Iron = 0.65.2143. In Montana, there was not a single average that was over the regulated limit. Manganese in Montana had a

significant correlation with a decrease in concentration with an increase in distance (slope = -1.48050271158428e-05, p-value = 0.01423). This was the only variable that had any significance when compared to distance. The data showed that distance was not a significant predictor for groundwater quality to surface water quality.

Katarina Messmer

Sponsored by Dr. George Seror

Psychology

Violent Media and the Influence on Children

The purpose of this presentation is to define four forms of media that can contain violent content including television/movies, video games, music/music videos, and pornography. A review of literature covering the effects of violent media on children and adolescents shows a strong connection between exposure to any of these forms of media and a shift in perception, actions, or thought. Starting from the introduction of television in the home, violent media has been put under a lens to piece together how consumption of said media leads to someone committing violent acts. This presentation reviews and summarizes many studies on violent media with focus on the four forms of media listed before. The reasoning behind studying this topic comes from the consistent problem seen particularly in the U.S. of young individuals enacting violence in words and actions. While media cannot be solely blamed for this persistent phenomenon, a large part of the blame can be pointed towards early exposure to media that promotes and normalizes committing violent acts against others. Violence is a prominent feature of popular media and access has only become easier, especially to the younger population who are very susceptible to the negative effects. A lack of censorship and moderation for media leads to even more distribution of violence to vulnerable populations of easily influenced youth. With the help of counseling and parental intervention in a child's access to media, I believe this problem can be lessened in society.

Chase Miller

Sponsored by Dr. George Seror

Psychology

Altered States of Consciousness

The purpose of this presentation is to show how altered states of consciousness have been used therapeutically in the field of psychology. In the 1950s psychiatrist Stanislav Grof was a medical resident tasked with investigating the potential of LSD as an adjunct to psychotherapy. His findings from thousands of therapy sessions demonstrated how altered states of consciousness can be beneficial in the reprocessing of traumatic events with facilitation of a professional. Due to the Controlled Substance Act of 1970's almost all therapeutic research involving the use of psychoactive drugs with no immediate relation to medical use was stopped. Although psychedelic research was stopped, the benefits of altered states still interested psychologists. Techniques to induce an altered state of consciousness such as meditation, hypnosis, and holotropic breathwork were now being used in place of psychedelic substances. Due to the therapeutic benefits of these techniques, there was a push for new psychedelic research, to more easily produce these therapeutic benefits. This ushered in what is often referred to as the psychedelic renaissance, with a resurgence of research on psychedelic psychotherapies. Some of the most promising results of this therapy involve veterans with Post Traumatic Stress Disorder (PTSD), people suffering from alcohol use disorders (AUD), and even the basic treatments of anxiety and depression. What makes altered states of consciousness particularly effective, especially when combined with existing psychotherapy, is that they appear to rewire existing neural pathways, ultimately causing new beneficial cognitions that reprogram a person's thought patterns and stimulus responses.

Lea Mittleider

Sponsored by Mr. Toby Stroh

Agriculture Sciences

Effect of Dietary Roughage Concentration on Nutrient Digestibility in Beef Steers on High Concentrate Diets

Rumen health is important for ruminants to be able to successfully utilize feed given to them. Including roughage in the diet of ruminants is a common way to maintain or improve gut health. The purpose of this study is to see the effect of dietary roughage concentration on nutrient and fiber digestibility in beef steers on high concentrate diets. A total of 13 beef steers were fed a diet including 5%, 10%, or 15% roughage in dry matter. Collections of feed, orts, and fecal matter samples took place over an experimental period of five days. Samples were analyzed for dry matter, neutral detergent fiber (NDF), and acid detergent fiber concentrations (ADF). Intake, fecal output, and total tract digestibility of dry matter and NDF were not affected ($P>0.10$) by roughage inclusion levels. Fecal output of ADF was not affected by inclusion level ($P>0.10$); however, intake and total tract digestibility of ADF was increased ($P<0.01$) by the 15% inclusion level. These data suggest that when cattle are fed high concentrate diets, fiber inclusion does not affect DM or NDF dynamics but does increase total tract digestibility of ADF.

Victoria Moreno

Sponsored by Dr. Chip Poland

Agriculture Studies

A Comparative Analysis of Labor and Cost Effectiveness of Traditional and Modern Taxidermy Techniques

"This capstone project explores the differences in cost and labor between traditional and modern taxidermy techniques, using mule deer shoulder mounts as the focal point. The inspiration for this study began years ago with a father's passion for taxidermy—a craft he learned as a teenager—and was later passed down to his daughter, who took that inherited skill and began questioning long-standing methods. The result is a side-by-side comparison of both traditional and contemporary approaches, with a focus on identifying the most efficient, affordable, and high-quality process.Four mounts were completed—two using traditional materials and methods such as Bondo, fiberglass, and alcohol-based paint, and two using modern products like ear liners, water-based paint, Mod Podge, and Elmer's glue. Each step of the process was carefully timed and documented to determine how the two approaches differed in labor intensity, material cost, and final presentation. While modern methods tended to be quicker and slightly less expensive, traditional techniques offered greater control and detail, especially in the finishing stages.The findings of this project highlight that while modern advancements can streamline the process, traditional craftsmanship still holds value—particularly when realism and fine detail are a priority. For taxidermists seeking a balance between efficiency and quality, this study offers insight into how blending both approaches can result in a mount that honors the artistry of the past while embracing the tools of the present."

Kori Nagel

Sponsored by Dr. Elizabeth Freedman-Fowler

Natural Sciences

The Effect of Upper Leg Length, Lower Leg Length, and Foot Length on Sprinting Speed with Collegiate Track and Field Sprinters*

Track and field* is popular all over the world and these athletes put in multiple hours each week to try to maximize their skill and speed. There are many different factors that can make an athlete as fast as they are, one of these being genetics. The aim of this study will be to see if femur length, tibia length, and foot length have any correlation with sprinting speed on collegiate track and field athletes. A better understanding of how a sprinter achieves their top speed can help both athletes and their coaches identify potential strengths and weaknesses related to their abilities. This also helps to develop different strategies that can help improve performances in sprinting speed. This study will involve around 50 athletes and will be conducted at the track located in the Henry Biesiot Activities Center in Dickinson, North Dakota. The athletes will be divided into both male and female groups. On the day of testing, I will measure their femur length, tibia length, and foot length. After performing their standard warmup routine, each athlete will be instructed on the proper protocols. Each athlete will then run a 20m sprint though an electric timing system. Athletes sprint for three total trials with their average used for calculations. Up to three minutes rest is allowed between trials. Longer legs often results in longer strides; therefore, this study will add valuable insight to the

field of sports science. This could potentially aid in performance optimization strategies and methodologies for track and field runners.* (* - Subject to change)"

Jenna Novotny

Sponsored by Dr. Elizabeth Freedman

Natural Sciences

Effects of Beverage Acidity and Sugar Content on Dental Plaque Formation

Dental plaque, a structured microbial biofilm, is influenced by diet, especially beverage acidity and sugar content. This study investigated the effects of eight commonly consumed beverages (Distilled Water, Diet Coke, Coke, Red Bull, Gatorade, Apple Juice, Orange Juice, and Lemon Juice) on plaque accumulation over a 15 day period using jaw models. Bacterial colonies were sampled at 5 day intervals and quantified to assess plaque formation. Results revealed that beverages with both low pH and high sugar content, particularly lemon juice (pH ≈ 2.5, 110 colonies) and orange juice (pH ≈ 3.2, 100 colonies), caused the most significant plaque buildup. Sugar free yet acidic drinks, like Diet Coke, still promoted microbial growth, although less aggressively. Distilled water, with a neutral pH, exhibited the lowest plaque formation (12 colonies on day 15), affirming its role as a non cariogenic control. ANOVA analysis ($p < 0.05$) confirmed statistically significant differences across beverages. These findings underscore the dual threat of acidity and sugar in plaque development and challenge misconceptions about the safety of sugar free drinks. Implications extend to public health, suggesting that both pH and sugar should be considered in dietary guidelines. This research advances understanding of beverage induced oral biofilm dynamics and provides actionable insight for reducing dental disease risk through informed consumption.

Griffin Obrigewitch

Dr. Sarah Manka

Natural Sciences

Speedy Reactions: How Sounds and Words Reduce Reaction Time Among Dickinson State University Students

Reaction time is a necessary function of everyday life that aids in normal interaction and responses to stimuli from the world. There are many stimuli, also known as distractions, that may contribute to an increase in reaction time. Verbal and audio stimuli are a part of everyday events like driving, walking, or recreation. Using an online simple reaction time test and speakers to replicate background noise, I tested the effects of verbal and auditory stimuli on simple reaction time. Subjects performed four trials of responding to the simple reaction time test. The first familiarized them with the program and results were not recorded. The second was recorded as the baseline simple reaction time at a decibel level of 50 dB, which is considered normal in quiet areas. The third round introduced 80 dB of background noise while the subject reacted to the test. In the fourth round, the subject turned off the sound and proceeded to count out loud at a conversation tone while reacting. The results revealed that auditory stimulation at 80 dB did not prove to cause a significant increase in reaction time (p-value of 0.04191). Alternatively, simple verbalization of just counting out loud produced a significant increase in reaction time in all groups (p-value of 2.662 E -4). There was an insufficient number of non-athlete males to run a comparison of athlete vs non-athlete. The results of a t-test comparing the female athletes vs non-athletes were insignificant (p-value= 0.122.) With this knowledge of the significant increase in reaction time due to vocalizing some practices may be called into question. Even in this simple experiment of testing it can be applied to all the areas forementioned. Systems like handless phone systems in cars and Bluetooth devices for wear, although proven to improve receptibility to one's environment, may still be limiting reaction time to an extent.

Jewel Olson

Sponsored by Dr. Sarah Manka

Natural Sciences

Sex Matters: Regulation of DNA integrity by PRDM16

"Sex-specific differences in cardiovascular disease progression are often overlooked, yet they may be driven by genetic mechanisms that remain poorly understood. One example is 1p36 deletion syndrome, which occurs in ~1 in 5,000–10,000 births and involves the loss of multiple genes, including PRDM16. This gene plays a crucial role in heart development by regulating gene expression needed for cardiomyocyte maintenance and myocardial function. Its absence has been linked to cardiomyopathies, particularly with sex-dependent differences in severity, though the mechanisms remain unclear.To determine whether PRDM16 deletion leads to sex-dependent differences in DNA damage during cardiac development, immunofluorescence staining for yH2AX, a marker of DNA double-strand breaks, was used in cardiomyocytes from male and female PRDM16 knockout (KO) and wild-type (WT) mice. yH2AX-positive nuclei were quantified, and a Kruskal-Wallis test revealed significant differences among groups (X^2 = 30.68, df = 7, p = 7.11e-5). Dunn's post hoc analysis showed female KO mice (n=4) had significantly higher DNA damage than male KO (n=5; p=0.0001), female WT (n=5; p=0.0040), and male WT mice (n=5; p=0.0001), while male KO and WT groups did not differ significantly.These findings indicate that PRDM16 loss disproportionately increases DNA damage in females, potentially contributing to more severe cardiomyopathy progression in female 1p36 deletion patients. This supports the idea that biological sex influences the cardiac response to genetic perturbations. Future research should investigate mechanisms such as the STING pathway to better understand how DNA damage responses are regulated in a sex-specific manner. These insights highlight the importance of considering sex as a critical variable in genetic cardiovascular research."

JaLynn Olson

Sponsored by Dr. George Seror

Psychology

The Challenges of Withdrawal and Detox: Understanding Addiction Recovery in Adults

This presentation examines the intricate process of addiction rehabilitation in adults, with a focus on difficulties with detoxification. First, an overview of the science of addiction is provided, emphasizing how substance use changes brain behavior and function, and providing background to understand the physical and psychological signs of withdrawal. Next, the detoxification process is discussed. Typical issues associated with detoxification include cravings, mood swings, sleep issues, and physical pain. To better understand the challenges faced by individuals suffering from addiction, obstacles to effective detox are examined including co-occurring mental health disorders, lack of access to care, and stigma. The objective of this presentation is to increase awareness of addiction as a chronic illness and to advance evidence-based, compassionate strategies that will help people with addiction into long-term recovery.

Bradyn Palmer

Sponsored by Dr. George Seror

Psychology

Stigma Surrounding People with Disabilities

A large majority of people with disabilities face challenges with inclusion. The unfair treatment that they receive takes a toll on their mental health, dignity, and opportunities. This presentation will show how unfair treatment of individuals with disabilities affects them and their health. Disabilities are often depicted in an unrealistic way in movies, tv shows, and the media in general, and this also plays a big role in shaping public perception. The purpose of this talk is to raise awareness of the effects of stigma and mistreatment on the quality of life of individuals with disabilities. The presentation shares research and personal real-life stories along with things I have seen firsthand through my internship and continued work in this field. Overall, the goal of raising awareness is to contribute to more inclusive and respectful treatment of individuals with disabilities.

Ella Peterson

Sponsosred by Dr. George Seror

Psychology

Gender Differences in the Presentation of ADHD

Attention-Deficit/Hyperactivity Disorder (ADHD) is a neurodevelopmental disorder characterized by inattention, hyperactivity, and impulsivity. Although it affects individuals of all genders, differences in symptom presentation contribute to disparities in diagnosis and treatment. Males with ADHD are more likely to exhibit hyperactive-impulsive behaviors, leading to earlier diagnosis, whereas females often present with inattentive symptoms, which are frequently misinterpreted as anxiety or mood disorders. This misinterpretation often results in underdiagnosis or delayed diagnosis. Research indicates cognitive differences between genders, with males displaying greater impulsivity-related deficits and females struggling more with sustained attention and verbal working memory. Additionally, diagnostic disparities are influenced by the ability of females to mask symptoms, delaying recognition until adolescence or later. Understanding these gender differences is essential for improving ADHD diagnosis, treatment, and support systems. Raising awareness among educators, parents, and healthcare professionals can enhance early detection and intervention, ultimately promoting better outcomes for individuals with ADHD.

Tinley Pierson

Sponsored by Dr. Elizabeth Freedman

Natural Sciences

Speed vs Agility: Are there differences in the relationship between two performance metrics based on sex or sport?

Speed and agility are not synonymous terms in the world of athletics. Speed is interpreted as the amount of distance an individual covers in a specific amount of time while agility is quick, controlled directional changes. This study dives into the relationship between male and female athletes across different sports in relation to speed and agility. Previous research regarding athletics was drawn from to create a study that extends previously found information to understand how sex and sport contribute to speed and agility differences. 40 yards and the Illinois agility test course were taped out in the Weinbergen Field House at Dickinson State University. Before testing, each subject filled out a questionnaire to reveal the sport in which they participate (results had mens and womens basketball, baseball, football, and no sport affiliation). A stop watch was used to take all of the data. From the data collected t-tests were run to show men out performing women in both aspects (speed and agility) with a p-value of less than 0.001 for speed and 0.004 for agility. Speed differences regarding sport type were not significantly different ($p > 0.125$), though regression analysis did provide evidence for sex indicating speed and agility performance. Averages were similar, with men averaging 5.09 seconds in the speed test and the agility result average being 16.3. For women average results, 5.85 seconds for speed and 18.4 seconds for agility. Within this sample males were dominant in both speed and agility even though the sample was limited. Even with few subjects, the findings within this study support the need for sport specific performance metrics.

Clay Prell

Sponsored by Dr. Sarah Manka

Natural Sciences

The Effects of Moon Phase on the Frequency of Odocoileus virginianus (White-tailed Deer) Camera Trap Sightings

This study investigates the correlation between moon phases and the frequency of White-tailed Deer (Odocoileus virginianus) observations via camera traps in Cartersville, Montana. Camera traps were deployed over 62 days, and data was analyzed using Poisson regression. Results indicate a significant increase in deer observations during the waxing and waning crescent phases compared to the full moon, while other phases showed minimal to no significant effects. These findings suggest that lunar cycles may influence deer activity patterns, possibly due to factors like predator-prey dynamics and foraging behavior.

Brendon Rasmussen

Sponsored by Dr. Chip Poland

Agricultural Studies

The Effect of Vegetation Height and Type on Ring-Necked Pheasant Populations in Bowman County

This study investigates the habitat preferences of ring-necked pheasants (Phasianus colchicus) in Bowman County, North Dakota, with a focus on vegetation height and type as key determinants of pheasant abundance. Native to Asia and widely introduced across North America, ring-necked pheasants are not only ecologically significant but also play a central role in regional economies and hunting culture. Through a combination of roadside and walking surveys conducted from June to October 2024, this study categorized vegetation into three height classes—low (0–1 ft), medium (1–2 ft), and high (2+ ft)—and analyzed their correlation with pheasant presence. The data showed a statistically significant preference for medium-height vegetation (1–2 feet) across all pheasant types (roosters, hens, and unidentified individuals), suggesting that this height offers optimal cover, food access, and protection from predators. Vegetation types such as sideoats grama, little bluestem, and smooth brome were most commonly associated with high pheasant counts. These findings have valuable implications for landowners and wildlife managers aiming to enhance pheasant habitat and sustain healthy populations. By prioritizing medium-height vegetation in land management practices, stakeholders can support biodiversity, preserve hunting traditions, and boost local economies.

Jazlyn Schmidt

Sponsored by Dr. Chip Poland

Agriculture Sciences

Comparing Altosid & Garlic as Fly Control on Angus Cattle in Eastern Montana

Flies, particularly Horn flies, are a significant pest of cattle, causing substantial economic losses in production and loss in cost control, with an estimated $780 million in annual losses in the United States. This study aimed to evaluate the effectiveness of various fly control supplements on cattle in Eastern Montana, focusing on Angus cattle at the Gibson-Reeves Ranch. The research involved supplementing two pastures with different feed products: the Gibson Pasture received Altosid, while the Reeves Pasture received garlic. Both pastures were supplemented with Purina Wind and Rain mineral and Trace mineral salt with EDDI. The study spanned 60 days, from mid-June to mid-August, with fly counts and mineral consumption data collected throughout the period. Results indicated that although both pastures experienced an increase in fly populations, the Reeves pasture—supplemented with garlic—was more effective in controlling flies during the study, as evidenced by a lower fly count according to collected data. Mineral disappearance, used as a proxy for cattle consumption, was monitored to ensure that cattle were receiving adequate supplementation for the products to be as effective as possible. These findings provide insight into the varying impacts of fly control products and offer a foundation for further investigation into the optimization of fly control in beef cattle management.
Keywords: Horn flies, fly control, cattle, Angus, Altosid, Garlic, mineral supplements, Eastern Montana

Eniola Soetan

Sponsored by Dr. Samanthika Hettiarachchi & Mr. Trevor Hann

Natural Sciences

Evaluating the Impact of Compensatory Crosslinkers and Scaffold Composition on the Tensile Strength and Elasticity of Anterior Cruciate Ligaments (ACL) using both Normal Type and Genetically Mutated Synthesized Type I Collagen

Collagen is a fibrous structural protein crucial for wound healing, organ protection, fibroblast formation, and blood clotting. Type I collagen, the most abundant in the body, is a key component of tendons and ligaments. Its triple-helical structure, stabilized by glycine, proline, and hydroxyproline in a Gly-Pro-X or Gly-X-Pro sequence, allows for efficient crosslinking, ensuring strength and integrity. However, genetic disorders such as Type I Osteogenesis Imperfecta (OA1) and Ehlers-Danlos Syndrome Arthrochalasia (EDS ARTH) introduce sequence mutations that disrupt helix formation and crosslinking, weakening collagen integrity.
This study investigates the effects of these mutations on the mechanical properties of mock ligament grafts formed from such collagen. It also evaluates compensatory strategies including glutaraldehyde and genipin

crosslinking agents, as well as gelatin methacrylate (GelMa) hydrogel versus gelatin scaffolds, to improve tensile strength and elasticity. Collagen will be synthesized using Komagataella pastoris induced with plasmids encoding normal and mutated collagen genes. Synthesized collagen will undergo fibrillation and characterization via Fourier Transform Infrared Spectroscopy (FTIR). The remaining soluble collagen will be molded into mock Anterior Cruciate Ligament (ACL) grafts under two crosslinking agents and scaffolding treatments, followed by mechanical testing of tensile strength and elasticity.This research contributes to bioengineered ligament and tissue graft development, potentially improving structural integrity and mechanical function in individuals with collagen-related genetic disorders, particularly in cases of ligament repair and reconstruction. These findings could also improve ligament reconstruction strategies broadly, even for individuals without genetic disorders, by eliminating the need for autograft harvesting, thereby reducing surgical morbidity and improving patient outcomes.

Nathan Unruh

Sponsored by Mr. Toby Stroh

Agriculture Studies

The Influence of Variety and Nitrogen Fertility on Vitreousness in Durum Wheat

All U.S. durum wheat produced for human consumption is submitted to a strict grading and evaluation process established by the Federal Grain Inspection Service (FGIS) of the United States Department of Agriculture Grain Inspection, Packers, and Stockyards Administration. One important quality grade factor of the evaluation process is vitreousness; the hard, glassy appearance of a wheat kernel indicative of high milling and cooking quality. The objective of this study is to determine if variety, nitrogen fertility, or their interaction has any effect on vitreousness in durum wheat. Three North Dakota durum varieties (Joppa, ND Riveland, and Tioga) and three nitrogen fertility treatments (150, 100, and 0 lb./ac additional N) were used. The plots were planted, hand-fertilized, and harvested at the North Dakota State University Dickinson Reasearch Extension Center. Harvested samples were separated by treatment combination and individually assessed for vitreousness following FGIS guidelines. Data were collected and analyzed using an ANOVA test. The average percent vitreousness in this experiment was 96.1% with a standard deviation of 2.43%. Percent vitreousness was affected by variety ($p < .0001$) and rep ($p < .0005$) but not significantly affected by fertility ($p = .33$) or the interaction between variety and fertility ($p = .29$). Percent vitreousness was similar between Joppa and Tioga, and both were greater than ND Riveland (97.1, 94.2, and 96.8%, for Joppa, ND Riveland, and Tioga, respectively). Rep 1 had the lowest percent vitreousness (94.7, 96.8, 96.7, 95.9% for Reps 1, 2, 3, and 4, respectively). These data suggest that there is a significant variety effect on vitreousness in durum wheat, but vitreousness is not significantly affected by fertility or their interaction. Producers are encouraged to consider varietal selection if concerned about durum vitreousness.

Amy Voll

Sponsored by Dr. George Seror

Psychology

School-Based Mental Health Programs

Changes in social and educational development during the progressive era that began in 1890 led to the beginning of school-based mental health programs. School-Based Mental Health Centers (SBHCs) are an important resource for student mental health. Research comparing SBHC users and nonusers confirmed that SBHCs are valuable for students who have mental health concerns. This presentation examines research on the effectiveness of SBHCs and Decode Mental Health and Wellbeing, a program designed to help students and teachers increase their knowledge of mental health and wellbeing. This is followed by a discussion of the cost vs. benefits of school-based mental health programs. Finally, new school-based mental health interventions and opportunities will be addressed. Key Words: School-Based Mental Health, SBMH, Decode Mental Health and Wellbeing, Student's Mental Health, Interventions

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Natural Sciences

Investigating H2S Scavenger Performances at Variety of Flow Conditions

Hydrogen Sulfide (H2S) is a natural by-product of oil and gas extraction. It is either preformed and trapped in rock layers near the oil containing formation which causes it to be released when the hydrocarbons are extracted, or the H2S is produced from hydrocarbon consuming anaerobic bacteria as a byproduct of metabolism. H2S is explosive, toxic, and corrosive, representing a major obstacle to safe and efficient petroleum extraction in petroleum industries in the USA.

Capturing H2S from natural gas flows is a major concern for oil and gas companies. A relatively simple and cost-effective approach of designing a small reaction vessel that closely mimics the dynamics at play in on-site H2S capturing structures were designed and constructed in this study. Triazine based scavengers are the most common in regular use in the oil industry in the USA. Therefore, two different triazine based scavengers, 50% MEA triazine and 30% MMA triazine, both entrained in a methanol-based solution were used. H2S removal by 50% MEA triazine solution at varying concentrations and flow rates showed that the scavenger is 100 % effective at the low concentrations and low flow rates. On the other hand, the ability of the 30% MMA triazine scavenger to absorb 100% of the incoming H2S was observed only at the high initial concentrations and range of flow rates. However, the thresholds and tolerances were lower than for the 50% MEA triazine solution.

In this designed reaction vessel, H2S scavengers in a variety of flow conditions were utilized to show the optimal ranges of H2S recovery. The concept was also proven that a miniature reaction vessel can accurately model conditions in industrial scale H2S removal from natural gas process streams. Use of this experimental methodology may prove useful towards the goal of developing a standardized procedure for testing novel H2S scavengers.

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Session Links for live streaming

Session I – Oral Presentations9:10a-11:00a

Session 1A Rm 117 (Stroup Auditorium) Ag Sci
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Session 1B Rm 155 (Thompson Auditorium) Nat Sci
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Session 1C Rm 160 Psychology
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Session II– Oral Presentations 12:05p-1:05p

Session 2A Rm 117 (Stroup Auditorium) Ag Sci
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Session 2B Rm 155 (Thompson Auditorium) Nat Sci
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