



2023

*Celebration of Scholars*

*21<sup>st</sup> Annual*

Dickinson State University

# 2023 Celebration of Scholars:

## Achievement in Research, Humanities, and the Arts

*Saturday, April 22, 2023*

*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. Jundong Chen (Chair)**

Associate Professor of Math & Computer Sciences

**Dr. Wendy L. Wilson (Co-Chair)**

Professor of Psychology

**Dr. Chip Poland**

Professor of Agriculture & Technical Studies

**Dr. George Seror III**

Assistant Professor of Psychology

**Dr. Jeremy Wohletz**

Associate Professor of Music

**Dr. Christopher Mallery**

Assistant Professor of Biology

## ACKNOWLEDGMENTS

**Website and maintenance:** Dr. George Seror III, Dr. Wendy L. Wilson, Mr. Josh Nichols

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**Special Events and Scheduling:** Mr. Trent Myran

**Food Services:** Sodexo

**Program Development:** Dr. Jundong Chen and Dr. Wendy L. Wilson

**Faculty Sponsors:** Dr. Chip Poland, Mr. Toby Stroh, Dr. Wendy L. Wilson, Dr. George Seror III, Dr. Elizabeth Freedman, Dr. Colin Strine, Dr. Samantha Hettiarachchi, Dr. Debora Dragseth, Ms. Taina Traub, Dr. Maira Carrillo

**Opening Remarks, Introduction of Keynote and Closing Remarks:** Dr. John Miller DSU Provost, Dr. Maira Carrillo

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

**In addition to multiple Student Volunteers**

# Keynote Speakers



**DR. COLIN STRINE**

*Assistant Professor of Biology  
Department of Natural Sciences*

**“Fall of the Monarchy: A population of Thai King Cobras (*Ophiophagus hannah*) experiencing strong pressure from humans.”**



**DR. MARCUS FRIES**

*Chair  
Associate Professor of Mathematics  
Department of Mathematics and Computer Science*

**“Machine Learning, Non-natural images, Cancer”**

**PRIYANKA DAVIS**

*Student*

# 2023 Celebration of Scholars Schedule

**7:30 a.m.**

Registration and Social  
Murphy Hall

**8:00 a.m.**

Welcome Reception  
Stroup Auditorium

**8:05 a.m.-9:45**

Session I – Oral Presentations  
Session 1A Stroup Auditorium  
Session 1B Thompson Auditorium

**9:45 a.m.-10:50**

Poster Presentations

**10:50 a.m-12:00**

Session II – Oral Presentations  
Session 2A Stroup Auditorium  
Session 2B Thompson Auditorium

**12:10 Noon**

Lunch, The Perch, Student Center Basement

**1:10 p.m.**

Keynote Address by Dr. Strine and Dr. Fries  
Student Center Ballroom

**2:15 p.m.**

Closing Remarks

## **Session 1: Oral Presentations**

### **8:05 a.m. – 9:50 a.m. Oral Session 1A and 1B**

#### **Oral Session 1A, Stroup Auditorium**

(Moderator: Dr. Eric Grabowsky)

- “Evaluating Different Direct Marketing Strategies for a Small Farm Business” By Martin Ferver
- “Evaluating the Efficacy of Laparoscopic Artificial Insemination in Hampshire X Suffolk Sheep” By Rebecca Schmidt
- “The Effects of High Stock Density Rotational Grazing on Plant Tissue and Organic Matter in Southeast Montana” By Brooklyn Tronstad
- “Vegetative Diversity and Frequency After Juniper Mastication” By Kia Ward
- “The Effects of Hemp Seeds on Equine Respiratory Health” By McKell Meidinger
- “Profitability of Backgrounding Feeder Calves” By Dakota Aaseth
- “Infiltration Rates on New and Historic Reclaimed Oil Well Sites” By Jace Winter

#### **Oral Session 1B, Thompson Auditorium**

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

- “The Default Mode Network: The Neurological Basis of the Self?” By Christian Crews
- “Physical Activity as Treatment for the Symptoms of Autism Spectrum Disorder” By Cody Chapel
- “Conditions Affecting Perception Accuracy in Two-Voice Melodies” By Kirstyn Bohn
- “The Wonderful World of Music” By Skylar Sheffield
- “TRHLP Honors Seminar Course Presentation” By Brendan Johnson
- “The Unspoken Obsession of Theodore Roosevelt” By Logan Greef

## **Session 2: Oral Presentations**

### **10:50 a.m. – 12:00 pm Oral Session 2A and 2B**

#### **Oral Session 2A, Stroup Auditorium** (Moderator: Dr. Eric Grabowsky)

- “Using automated acoustic monitoring to determine site use by multiple anurans of waterbodies in Iowa” By Cole Werner
- “Tretinoin Downregulates Basal Markers EGFR, KRT1 and Upregulates Luminal Markers CD24, KRT20 in Arsenite Transformed Urothelial Cancer Cells” By Isabel Lopez
- “Downregulation of KRT5, KRT6A, KRT6B, and KRT6C in Tretinoin Treated As3+ Transformed UROtsa Cells” By Victoria Trochez

- “Occupancy of Swainson’s Hawks (*Buteo swainsoni*) in southwestern North Dakota” By Kyle Heiser
- Does shoulder mobility impact throwing velocity in Dickinson State University baseball players? By Jacob Clinton

### **Oral Session 2B, Thompson Auditorium**

(Moderator: Dr. George Seror)

- “The Effects of Ketamine Compared to Traditional Therapies in the Treatment of Resistant Depression in Adults.” By Jocelyn Ott, Jayd Culey, Demyrie Maher
- “Are Female Non-Smokers with Exposure to Second-Hand Smoke More Likely to Develop Breast Cancer Compared to Female Non-Smokers Without Exposure to Second-Hand Smoke?” By Elizabeth Widmer, Alyssa Andress, Micayla Miske
- "In Pregnant Women, Does Prenatal Care vs. No Prenatal Care Decrease Maternal Mortality in Low-Income Communities?" By Skye Murphy, Erica Martinez-Meza, Bailey Percy, Tylee Dey
- "Is Telehealth an Effective Means of Providing Care to Patients with Chronic Illness Compared to Traditional Face-to-Face Healthcare Over a Period of 1 Year?" By Akintunde Ibikunle, Emmanuel Ofori, Ruth Arthur
- “The Use of Kangaroo Care Compared to Incubators in Preterm Babies in the NICU” By Lindsey Dvorak, Hannah Kessel, Jayne Ayrakwa

## **Poster Presentations, 9:45 a.m. to 10:50**

### **AGRICULTURE**

- “Profitability of Backgrounding Feeder Calves” By Dakota Aaseth
- “Evaluating Different Direct Marketing Strategies for a Small Farm Business” By Martin Ferver
- “The Effects of Hemp Seeds on Equine Respiratory Health” By McKell Meidinger
- “Evaluating the Efficacy of Laparoscopic Artificial Insemination in Hampshire X Suffolk Sheep” By Rebecca Schmidt
- “The Effects of High Stock Density Rotational Grazing on Plant Tissue and Organic Matter in Southeast Montana” By Brooklyn Tronstad
- “Vegetative Diversity and Frequency After Juniper Mastication” By Kia Ward
- “Infiltration Rates on New and Historic Reclaimed Oil Well Sites” By Jace Winter

### **NATURAL SCIENCE**

- “Investigation of cytotoxic effect of phenolic plant extracts on bone metastatic breast cancer using 3-D bone-mimetic in vitro model” By Aisosa Bello
- “Effects of Creatine, Tongkat Ali, Ashwagandha and MK-677 on Cultured Skeletal Muscle Cells” By Lance Kettering

## **NURSING**

- “The Use of Kangaroo Care Compared to Incubators in Preterm Babies in the NICU” By Lindsey Dvorak, Hannah Kessel, Jayne Ayrakwa
- "Is Telehealth an Effective Means of Providing Care to Patients with Chronic Illness Compared to Traditional Face-to-Face Healthcare Over a Period of 1 Year?" By Akintunde Ibikunle, Emmanuel Ofori, Ruth Arthur
- "In Pregnant Women, Does Prenatal Care vs. No Prenatal Care Decrease Maternal Mortality in Low-Income Communities?" By Skye Murphy, Erica Martinez-Meza, Bailey Percy, Tylee Dey
- “The Effects of Ketamine Compared to Traditional Therapies in the Treatment of Resistant Depression in Adults.” By Jocelyn Ott, Jayd Culey, Demyrie Maher
- “Are Female Non-Smokers with Exposure to Second-Hand Smoke More Likely to Develop Breast Cancer Compared to Female Non-Smokers Without Exposure to Second-Hand Smoke?” By Elizabeth Widmer, Alyssa Andress, Micayla Miske

## **PSYCHOLOGY**

- “The Triple Network Model: The Dynamic System That Underlies Attention” By Christian Crews
- “Sinister Sleep: Sleepwalking Killers” By Alison Ellertson
- “The Impact of Youth Sports on Neurological and Psychosocial Development” By Lauren Gangl
- “The role of psychological therapy in chronic pain management” By Ayomide Oyeneyin
- “Forensic Genetic Genealogy: A Rising Investigative Technology” By RaiLeigh Strommen

## **Abstracts**

*Arranged alphabetically by last name of first author*

### **Dakota Aaseth**

**Sponsored by Dr. Chip Poland**

**Department of Agriculture and Technical Studies**

#### **“Profitability of Backgrounding Feeder Calves”**

When weaning time comes around for ranchers, they must decide what they are going to do with their calves so they can receive the greatest economic return. Selling at weaning or background feeding are both options. Backgrounding does several things. It provides time for calves to get through the stress of weaning and develop immunity from vaccines recently administered. Backgrounding adapts calves to a feeding bunk and totally mixed rations that may include grains, silages, distillers’ grains, and hays (Hoppe, 2022). The objective of this study was to compare the profitability of selling these feeder calves at weaning time and after background feeding to determine feasibility and efficiency. The 160 steers were chosen, compared to their size and weight, to be backgrounded for roughly an 80-day period. The calves were weaned on November 21 and 22, and during this time, the calves were given shots and weighed at Aaseth Farm and Ranch. The first group of calves, Group A, had an average weight of 473 lb and the second group of calves, Group B, had an average weight of 535 lb. The calves were then placed on a growth ration. The average daily gain for Group A was 2.36 lb and they ended with an average weight of 626 lb. The average daily gain for Group B was 2.42 lb with which they ended at 719 lb. The average market price for Group A that

was determined during weaning time was \$1,073.71 before expenses. The average market value for Group B was \$1,139.55 before expenses, as seen in Figure 3. The value Aaseth's obtained from the calves before expenses was \$1,421.02 for Group A and \$1,438.00 for Group B. This was above the market that day, which was at \$1,283.83 for 626 lb steers and \$1,373.29 for 719 lb steers. Therefore, the profitability was \$203.41 per head for Group A and \$154.55 per head for Group B also shown in Figure 3.

## **Aisosa Bello**

**Sponsored by Dr. Samantha Hettiarachchi**

**Department of Natural Sciences**

**"Investigation of cytotoxic effect of phenolic plant extracts on bone metastatic breast cancer using 3-D bone-mimetic in vitro model"**

Potential cytotoxicity of three different phenolic plant extracts, *Rhodiola crenulata*, *Vaccinium macrocarpon*, *Origanum vulgare* on bone metastatic breast cancer and healthy bone cells were investigated. 3-D bone-mimetic in vitro model was used to recapitulate the tumor microenvironment. Two different genes, P53 (anti-apoptotic) and Bcl-2 (pro-apoptotic) and two different cancer cell lines, MM 231 and MCF-7, were focused on in this study.

The concentration of bone cell P53 was not altered after treatment with three different phenolic plant extracts compared to the concentrations of both cancer cell lines. But, there was a significant increase in the concentrations of this gene in both cancer cell lines compared to the control and treated group providing evidence that three phenolic plant extracts induce apoptosis in bone metastatic breast cancer.

In cancer cells treated with *V. macrocarpon*, and *O. vulgare*, there was a significant decrease in the concentration of the Bcl-2 gene in both cancer cell lines compared to the control and treated groups while *R. Crenulate* only appeared to affect the gene concentration only in MCF-7. The concentrations of this Bcl-2 gene in bone cells seemed not to be affected by either *V. macrocarpon*, and *O. vulgare*. However, cancerous cells treated with *V. Macrocarpon*, and *O. Vulgare*, demonstrated a notable reduction in Bcl-2 gene concentrations while *R. Crenulate* seemed to affect only the cancer cell line MCF-7.

In conclusion, all three phenolic plant extracts induce apoptosis in bone metastatic breast cancer but among three extracts, *V. macrocarpon*, and *O. vulgare* showed a significant inducement upon apoptosis.

## **Kirstyn Bohn**

**Sponsored by Dr. George Seror**

**Department of Social Sciences**

**"Conditions Affecting Perception Accuracy in Two-Voice Melodies"**

This experiment explored the factors affecting perception of two-voice melodies. This is a replication of previous work from the University of Albany (Seror 2016). Participants listened to a standard two-voice melody and a comparison melody. The participant had to determine whether the standard melody and comparison melody were the same or different by pressing a computer key. When the comparison melody was different, only the last note in the upper or lower voice was changed. Changes in the comparison melody had an equal probability of being in the upper or lower voice. Several main effects and interactions showed there are many variables affecting perception in two-voice melodies. These results were consistent with the original experiment despite the geographical difference.

## **Cody Chapel**

**Sponsored by Dr. Wendy L. Wilson**

**Department of Social Sciences**

**"Physical Activity as Treatment for the Symptoms of Autism Spectrum Disorder"**

This presentation is a comprehensive review of current research and programs aimed at treating the symptoms of autism spectrum disorder (ASD) with the use of physical activity. The focus of this presentation

will be to provide supporting evidence for the ameliorating effects of physical activity on specific ASD symptoms. Primary features of ASD include underdeveloped social and communication skills. Identification of specific types of physical activity in relation to the symptomology is paramount to improve functionality and quality of life. This presentation will outline ways in which physical activity can help better such symptoms and lead to healthier and more enjoyable social interactions.

## **Jacob Clinton**

**Sponsored by Dr. Elizabeth Freedman**  
**Department of Natural Sciences**

“Does shoulder mobility impact throwing velocity in Dickinson State University baseball players?”

The relationship of how a baseball player’s shoulder mobility in their throwing arm can affect the velocity they can throw has been studied before. The potential correlation was observed in college and professional athletes and has been supported to exist by multiple studies. Our aim in this study was to retest this correlation with the hypothesis of higher shoulder mobilities leading to higher throwing velocities. We recorded the throwing velocity of the participants by having them perform a max effort throw into a net with a pocket radar calculating the ball’s miles per hour(mph). Shoulder mobility was measured with a goniometer which was used to read the degrees of movement forward and back that the individual could produce from an original position. We included seventeen participants covering all four major categories of positions outfield, infield, catcher, and pitcher. The average throwing velocity of all participants was 76.76 mph and the average total mobility was 161.53 degrees. Our data found no correlation between throwing velocity and shoulder mobility however, a small sample size given certain limitations could have caused unclear results. Overall, the methods of this experiment were proven to be very effective, time efficient, and affordable for producing high-quality data for research. The main result of our study was that our methods produced usable data that somebody will hopefully recreate on a bigger stage to create more functional results.

## **Christian Crews**

**Sponsored by Dr. Wendy L. Wilson and Dr. George Seror**  
**Department of Social Sciences**

“The Triple Network Model: The Dynamic System That Underlies Attention”

The triple network model is a recent development in the field of neuroscience that is theorized to hold valuable insight into how attention works and how its dysfunction can lead to a variety of neuropsychiatric illnesses. It is comprised of three large-scale networks in the brain; the default mode network responsible for self-representation, the salience network responsible for encoding relevant behavioral strategies, and the goal-oriented central executive network. Although each network has a distinct function, the three networks also interact in a dynamic way, enabling the allocation to meet current demands.

## **Christian Crews**

**Sponsored by Dr. Wendy L. Wilson and Dr. George Seror**  
**Department of Social Sciences**

“The Default Mode Network: The Neurological Basis of the Self?”

The Default Mode Network (DMN) is a large-scale network in the brain that has been associated with a state of wakeful rest, such as daydreaming or mind wandering. This network within the brain is also responsible for thinking about oneself, thinking about other people, remembering one’s past, and planning for one’s future. Because of this, the DMN can potentially be viewed as the neurological basis for the self. This talk goes over what the default mode network is, the role it plays in normal and abnormal life, and how it can be utilized for psychological health.

**Lindsey Dvorak, Hannah Kessel, Jayne Ayrakwa**

**Sponsored by Ms. Taina Traub**  
**Department of Nursing**

**“The Use of Kangaroo Care Compared to Incubators in Preterm Babies in the NICU”**

According to the World Health Organization, 15 million babies are born prematurely every year in the US. Of those babies, approximately one million pass away due to complications related to their premature births. Nurses strive to use evidence-based practice to educate patients on methods they can use to improve health outcomes. Recent research has indicated that there are many health benefits to providing kangaroo care (skin-to-skin contact) to premature infants in the NICU. This review will compare kangaroo care to the standard method of incubators and the outcomes provided to premature infants born between 27 and 36 weeks.

**Alison Ellertson**

**Sponsored by Dr. Wendy L. Wilson**  
**Department of Social Sciences**

**“Sinister Sleep: Sleepwalking Killers”**

Somnambulism is a parasomnia also known as sleepwalking. During an episode of somnambulism, the person is in an altered conscious state and will often engage in activities in a seemingly awake state, with no awareness nor recollection of events. Neurobiological studies suggest key areas in consolidation (memory formation) are modified leading to an amnesic state following the episode. Somnambulism has been used in the past as a defense in murder trials dating as far back as the 1840's. Using this defense in legal matters is an extremely complex process due to the defendant's lack of awareness and the amnesic properties of somnambulism. The defendant must be able to prove without a doubt that they were in a somnambulistic state during the time of the crime. This research will focus on the role of consciousness with regards to criminal intent, in addition to the history of the sleepwalking defense used in the criminal justice system.

**Martin Farver**

**Sponsored by Dr. Chip Poland**  
**Department of Agriculture and Technical Studies**

**“Evaluating Different Direct Marketing Strategies for a Small Farm Business”**

Effective marketing is essential for the success of small businesses. Farver Farms LLC is a value-added farm business in Scobey, Montana. Their main product is a lentil snack consisting of seasoned and processed lentil seeds. Lentils are a legume, meaning they are able to fix atmospheric nitrogen into the soil via a symbiotic relationship with soil microbes. The plant is closely related to soybeans, peas, and other types of beans. The seed is high in protein and fiber. The objective of this study was to determine which marketing strategies best suit Farver Farms LLC. Three marketing strategies were evaluated based on their ability to generate revenue, increase exposure, and remain cost effective. Marketing strategies studied included television marketing, radio advertising, and social media marketing. Each marketing campaign was run for the duration of the month of November 2022. The social media and television marketing campaigns were both performed in Dickinson, North Dakota and the surrounding area. The radio advertising campaign was performed on a talk show that is broadcast by 25 stations throughout Montana. Each marketing campaign received similar but not identical funding. Each marketing medium was allotted appropriate funding to reach a similar sized audience. All three mediums failed to achieve a net profit throughout the duration of the campaign. Despite this, it was determined that the radio advertising campaign generated the greatest return on investment (ROI) during the time period. During the studied time period, the television radio campaign generated an attributed ROI of -90%, social media marketing generated an attributed ROI of -85%, and the radio advertising generated an attributed ROI of -34%. The results of this study suggest that brand recognition and public advocacy for a product affects the success of a marketing campaign more than the marketing medium or the funding allocated to each medium.

## **Lauren Gangl**

**Sponsored by Dr. Wendy L. Wilson**  
**Department of Social Sciences**

### **“The Impact of Youth Sports on Neurological and Psychosocial Development”**

Adolescence is a critical period in the lifespan, in which individuals experience rapid growth physically, neurologically, and socially. During this interim, habits are often developed and solidified that will have an effect throughout the lifetime. Adolescents today encounter challenges such as childhood obesity and depression. Research on the effects of youth sports show many positive impacts on development that could combat these aforementioned issues. Examples include an increase in brain development, improved decision-making processes, and enhancement of social development in peer groups. The aim of this research is to highlight the lifelong positive influence that youth sports have on individuals.

## **Logan Greef**

**Sponsored by Dr. Debora Dragseth**  
**Department of Social Sciences**

### **“The Unspoken Obsession of Theodore Roosevelt”**

This research examines how Theodore Roosevelt displayed behaviors that are not synonymous with his well-known mission of conservation. A pattern of behavior is established that details accounts of inflicting violent urges on wildlife. (Dalton, 2002, p. 43) Although Theodore Roosevelt is responsible for conserving vast tracts of land in the American West, protecting many species, his legacy must be held accountable for his overzealous killing of wildlife.

## **Kyle Heiser**

**Sponsored by Dr. Colin Strine**  
**Department of Natural Sciences**

### **“Occupancy of Swainson’s Hawks (*Buteo swainsoni*) in southwestern North Dakota”**

Occupancy models are utilized by lawmakers, landowners, and researchers in making conservation and research decisions. Species occupancy can vary greatly between landscapes. Occupancy models have yet to be created for the Swainson’s hawk (*Buteo swainsoni*) in North Dakota. We set out to find occupancy and detection probability for Swainson’s hawk in southwestern North Dakota. Independent sites were randomly selected within Stark and Billings counties. Sites were surveyed for five hour windows (5:00 a.m. – 10:00 a.m. MT) over seven days in the fall of 2022 using bioacoustic recording equipment. Recorders were collected after the seventh day and presence/absence data was extracted from the recorders. Four sites were sampled (Stark n = 3, Billings n = 1). We estimate occupancy to equal 0.68 and detection probability to equal 0.49. Prevalent habitat type, condition of the bioacoustic recorder when recovered, distance to the nearest trees, distance to the nearest road, and presence of cattle in the site were analyzed as covariates. We found the best predictor of Swainson’s hawk occupancy of these covariates to be the presence or absence of cattle from the site (AICc = 26.09588). The rate of occupancy and detection probability in North Dakota populations of Swainson’s hawks is consistent with other populations in the United States.

## **Akintunde Ibikunle, Emmanuel Ofori, Ruth Arthur**

**Sponsored by Ms. Taina Traub**  
**Department of Nursing**

**“Is Telehealth an Effective Means of Providing Care to Patients with Chronic Illness Compared to Traditional Face-to-Face Healthcare Over a Period of 1 Year?”**

Many people across all age groups live with chronic diseases and consequently, there is a continuous increase in demand for healthcare services. The management of chronic diseases is associated with a high cost of healthcare over long periods of time. Many patients who live in rural communities are even more disadvantaged in their abilities to access healthcare services. In recent times, the high demand of healthcare services has also put a strain on healthcare delivery. However, with the advancement in technology globally, telehealth or telemedicine provides an alternate option for both patients and healthcare providers to access and deliver healthcare services. This presentation aims to analyze the effectiveness of telehealth in comparison with the traditional face-to-face delivery of healthcare services based on existing research.

**Brendan Johnson**  
**Sponsored by Mr. Niles Haich**  
**Department of Social Sciences**

“TRHLP Honors Seminar Course Presentation”

This presentation will be about the work I completed in my final leadership class, Honors Seminar. For this class I had to build a website and a blog. My website consists of information about me as well as my experiences from here at DSU through academics, athletics, and the Theodore Roosevelt Honors Leadership Program. One part of my website also contains different aspects of leadership that I will go through. Lastly, for this class we had to create a blog that was based on a leadership campaign. My blog is called “Reverse the Stigma”. This campaign or blog talks about the bad wrap that police officers currently get. It talks about what cops sacrifice to serve their community as well as the fact that all cops aren’t bad cops. Not all cops are power hungry or racists. I chose to do this topic because it relates to my major in criminal justice. This will be about a 10 minute presentation. I will just be going through my website and blog.

**Lance Kettering**  
**Sponsored by Dr. Maira Carrillo**  
**Department of Natural Sciences**

“Effects of Creatine, Tongkat Ali, Ashwagandha and MK-677 on Cultured Skeletal Muscle Cells”

Muscle growth is a major part of any athletics, with money being used to fund research to find out the best way to increase muscle mass and size so athletes at any level can be at their strongest and best performance. My question is what substance is best to increase muscle growth? Specifically what substance is best to increase muscle mass and size in cultured skeletal muscle without any resistance training? Substances that will be used are Creatine, Tongkat Ali, Ashwagandha, and MK677. I predict that all substances will show a significant difference except for Creatine.

**Isabel Lopez, Victoria Trochez**  
**Sponsored by Dr. Colin Strine**  
**Department of Natural Sciences**

“Tretinoin Downregulates Basal Markers EGFR, KRT1 and Upregulates Luminal Markers CD24, KRT20 in Arsenite Transformed Urothelial Cancer Cells”

Urothelial cancer is the fifth most common cancer in the United States. Prolonged exposure to the environmental toxicant arsenic has been identified as one of the causes of this cancer. Recently, retinoids are being studied as anticancer agents in vitro and in vivo studies. However, the role in urothelial cancers is not investigated extensively. Our objective is to identify the signaling pathways that can modulate the aggressive nature of urothelial cancer. We hypothesized that retinoids like All-trans Retinoic Acid (ATRA) could modulate the gene expression profile of urothelial cancer toward less aggressive behavior of such cells by reducing the basal markers. In this study, we used All-trans Retinoic Acid (ATRA, Tretinoin) to treat two independent clones of arsenite (As<sup>3+</sup>) transformed malignant urothelial cells (UROtsa) as a model of aggressive basal muscle-invasive bladder cancer, then we performed real-time qPCR to measure the gene

expression of the basal markers: Epidermal Growth Factor (EGFR), and Keratin 1 (KRT1), in addition to the luminal markers Cluster of Differentiation 24 (CD24), and Keratin 20 (KRT20). Western blot was used to measure protein levels of EGFR. Tretinoin treatment significantly reduced the expression of the basal markers (EGFR and KRT1) and increased the expression of CD24 & KRT20. Also, EGFR protein levels were significantly reduced by tretinoin treatment. Our results indicate that the retinoid signaling pathway drives the basal urothelial cancer UROtsa cells toward a less aggressive status, evidenced by the reduction in the basal markers (EGFR, KRT1).

## **McKell Meidinger**

**Sponsored by Dr. Chip Poland**

**Department of Agriculture and Technical Studies**

### **“The Effects of Hemp Seeds on Equine Respiratory Health”**

The objective of this project is to decipher whether hemp seeds sustain a horse’s respiratory system due to allergies. Hemp is derived from the cannabis sativa plant that contains very little Tetrahydrocannabinol (THC). This plant, cultivated for fiber, has been used throughout the centuries for many purposes including medication, oil, and paper. Hemp seeds are one of many supplemental options to administer to livestock as well as humans. There are different benefits to these seeds including omega-3 and omega-6 fatty acids as well as being rich in fiber and protein. To target a specific area in horses, this has been said to benefit inflammation and respiratory health.

This study was done by using two personal horses and simply feeding 1 scoop of hemp seeds. The measurements were done in the months of May (control month), June (fed hemp), and July (off hemp), two weekends per month on Saturday and Sunday. The horses were measured by walking and trotting for two minutes on flat ground. Switching off the horses, there was a two-minute break for one while the other was measured. The measurement was based on if there was any present cough, relieving it or creating it, and any noticeable symptoms.

With the results, there was no presence of cough. Since there was an anticipated cough by the researcher of this project, the results brought a different light to the project. That is specifically the presence of mucus in increased activity. Since the environmental conditions were in a moist state, this impacted the project’s results. In conclusion, this project could not be measured by a cough, but the appearance of mucus could be analyzed with data. An implication from this project is no cough being present, but the appearance of mucus could be led to continue this project with further study.

## **Skye Murphy, Erica Martinez-Meza, Bailey Pearcy, Tylee Dey**

**Sponsored by Ms. Taina Traub**

**Department of Nursing**

### **“In Pregnant Women, Does Prenatal Care vs. No Prenatal Care Decrease Maternal Mortality in Low-Income Communities?”**

Maternal mortality remains a significant public health challenge globally, particularly in low-income communities where access to quality healthcare is limited. This systematic review aimed to examine the impact of prenatal care on maternal mortality in low-income communities. The results indicate that prenatal care is associated with a significant reduction in maternal mortality in low-income communities. Women who received prenatal care had a 50% lower risk of maternal mortality compared to those who did not receive prenatal care. The review also highlights that the frequency and quality of prenatal care were important factors in reducing maternal mortality. Leading causes of mortality involve obstetric hemorrhage and hypertensive disorders. Risk factors for maternal mortality include poverty, lack of access to healthcare, and low levels of education. Additionally, women who received comprehensive prenatal care, including screening and management of high-risk pregnancies, had a lower risk of maternal mortality. These findings underscore the importance of ensuring access to quality prenatal care in low-income communities to reduce maternal mortality.

**Jocelyn Ott, Jayd Culey, Demyrie Maher**  
**Sponsored by Ms. Taina Traub**  
**Department of Nursing**

**“The Effects of Ketamine Compared to Traditional Therapies in the Treatment of Resistant Depression in Adults”**

This review investigates the effects of Ketamine compared to traditional therapies in the treatment of resistant depression (TRD) in adults. TRD is a complex condition that poses a significant challenge to treatment. The traditional therapies such as selective serotonin reuptake inhibitors, monoamine oxidase inhibitors and tricyclic antidepressants have shown some efficacy, but a significant number of patients still experience symptoms. Ketamine is a dissociative anesthetic that has recently been studied as a potential alternative therapy for resistant depression. This review aims to compare the efficacy and safety of Ketamine with traditional therapies, and encompasses relevant articles on the use of Ketamine in treating resistant depression in adults. The findings suggest that Ketamine may have a faster onset of action, a more significant reduction in symptoms, and fewer adverse effects than traditional therapies. However, further research is needed to evaluate the long-term effects of Ketamine on depression and its potential for abuse. The results of this review suggest that Ketamine may be a promising alternative for the treatment of resistant depression in adults.

**Ayomide Oyeneyin**  
**Sponsored by Dr. Wendy Wilson**  
**Department of Social Sciences**

**“The role of psychological therapy in chronic pain management ”**

**The Role of psychological therapy in chronic pain management**  
Pain serves an important biological function but can also act as a stressor in the body. Chronic pain is a very common problem that affects people of different ages. Reports from the National Health Interview Survey in 2019 show that the prevalence of chronic pain was 20.4% in the United States. Chronic pain is defined as pain that persists for four to six weeks or longer which may or may not be due to physical injury. Chronic pain can impact functional aspects of one’s life. Medical interventions are not always effective for chronic pain management, hence the need for psychological interventions. Psychological treatment for chronic pain focuses on different domains of functioning and improves the quality of life instead of eradicating the pain. Several studies have shown that psychological therapies such as virtual reality (VR), acceptance commitment therapy (ACT), and transcranial magnetic stimulation (TMS) have proven to be effective in managing and reducing the impact of chronic pain. This research will explore different studies using these psychological therapies and highlight their efficacy in chronic pain management. These findings are essential to understand how psychological treatments are used to manage chronic pain.

**Rebecca Schmidt**  
**Sponsored by Dr. Chip Poland**  
**Department of Agriculture and Technical Studies**

**“Evaluating the Efficacy of Laparoscopic Artificial Insemination in Hampshire X Suffolk Sheep ”**

Sheep have been a major sector of the agriculture industry for decades and are a great source of recreational enjoyment as well as meat and wool production. Unlike larger species, sheep have a smaller reproductive tract which makes traditional artificial insemination (AI) more difficult and often less effective than natural breeding. The objective of the study was to evaluate the growth differences between lambs that were conceived through laparoscopic artificial insemination (LAI) and natural service in Hampshire X Suffolk sheep. The project took place over the course of one breeding season and consisted of 25 ewes bred to LAI and 10 ewes bred through natural service. To achieve LAI in this study, 25 ewes were selected to undergo the LAI procedure beginning with a synchronization process which began with Controlled Internal Drug Release

devices (CIDR's). Eight days later, PG600, an injection of pregnant mare serum gonadotropin and chorionic gonadotropin was administered, followed by a Lutalyse injection and the removal of the CIDR's on the fourteenth day. LAI took place approximately 50 hours later. There was a 76% lambing rate among the ewes exposed to LAI. Data showed that the LAI lambs gained more total weight ( $p=.01$ ) than the natural service lambs. However, average daily gain ( $p=.105$ ) was similar between lambs from the two breeding groups. For future studies, recommendations include collecting data over more breeding seasons, and gathering data on different breeds and species.

## **Skylar Sheffield**

**Sponsored by Dr. Wendy L. Wilson**

**Department of Social Sciences**

### **"The Wonderful World of Music "**

This presentation is a comprehensive review of current research and programs aimed at treating the symptoms of autism spectrum disorder (ASD) with the use of physical activity. The focus of this presentation will be to provide supporting evidence for the ameliorating effects of physical activity on specific ASD symptoms. Primary features of ASD include underdeveloped social and communication skills. Identification of specific types of physical activity in relation to the symptomology is paramount to improve functionality and quality of life. This presentation will outline ways in which physical activity can help better such symptoms and lead to healthier and more enjoyable social interactions.

## **RaiLeigh Strommen**

**Sponsored by Dr. Wendy Wilson**

**Department of Social Sciences**

### **"Forensic Genetic Genealogy: A Rising Investigative Technology"**

A novel technological approach has created diverse pathways in the world of criminal investigation, an interdisciplinary approach that uses genetics and ancestry to solve crime, also known as forensic genetic genealogy. With the mastery of obtaining forensic DNA evidence, SNP testing, and genealogical database research, forensic genetic genealogy has emerged to be a tool to answer long time cold cases. As there becomes more interest in individual genetic history through websites like Ancestry.com or GEDMatch.com, the population of individuals who have given DNA has increased, making forensic genetic genealogy easier. Forensic genetic genealogy uses thousands of DNA markers which are sequenced through whole genome sequencing generators then the Genetic Genealogy Databases, like FamilyTreeDNA, are searched. This new approach was used to close the four decade long cold case of the Golden State Killer, which brought forensic genetic genealogy to the front line of investigative measures and several other cases will be discussed.

## **Victoria Trochez, Isabel Lopez**

**Sponsored by Dr. Colin Strine**

**Department of Natural Sciences**

### **"Downregulation of KRT5, KRT6A, KRT6B, and KRT6C in Tretinoin Treated As3+ Transformed UROtsa Cells"**

Bladder cancer remains a health challenge that impacts many people each year. Arsenic is an environmental toxicant that leads to the development of basal muscle-invasive bladder cancer which has the worst prognosis. Recently, All-Trans Retinoic Acids (ATRA) have been observed to have several biological effects, like gene regulation, that could benefit in cancer treatment. Our objective is to understand the effect of ATRAs on aggressive arsenic induced bladder cancer. We hypothesized that ATRAs (Tretinoin) reduces the expression of basal keratins, which are bad prognostic genes that drive the aggressive behavior of basal bladder cancer. We used human urothelial cells that were malignantly transformed by chronic arsenic exposure (UROtsa-As) as a model for aggressive basal bladder cancer. After 72 hours of treatment with either

ATRA (Tretinoin) or DMSO as a control, the expression levels of the basal keratins (Keratin 5 (KRT5), Keratin 6A (KRT6A), Keratin 6B (KRT6B), and Keratin 6C (KRT6C)) were measured using real-time qPCR in two different clones of UROtsa-As cells (UROtsa-As#2D) and (UROtsa-As#6D). A Western blot was used to measure the protein levels of KRT5 in both cell clones. Tretinoin treatment significantly downregulated the gene expression of KRT5, KRT6A, and KRT6B in both cell clones. The gene expression of KRT6C was downregulated in one cell clone (UROtsa-As#2D). KRT5 protein levels were also reduced in both cell clones. Tretinoin, a retinoid derivative, significantly downregulates the expression of bad prognostic genes in the basal bladder cancer cells. Therefore, Retinoids such as Tretinoin could be a potential candidate to use in combination with chemotherapy to reduce the aggressiveness of basal bladder cancer after extensive in vivo investigation to further understand its gene regulation capabilities.

## **Brooklyn Tronstad**

**Sponsored by Dr. Chip Poland**

**Department of Agriculture and Technical Studies**

**"The Effects of High Stock Density Rotational Grazing on Plant Tissue and Organic Matter in Southeast Montana "**

With grassland degradation happening all over the world, it is important to know how our soils and plants are doing, and if the grazing practices that are being used are either creating a positive or a negative effect on them. Agriculture utilizes 38% of the world's land, with  $\frac{1}{3}$  of that being crop and the other  $\frac{2}{3}$  used as pastures for grazing animals. Proper use of this 38% of the world's land is crucial. Using a plant tissue analysis can help determine whether nutrient needs of grazing animals are being met. The objective of this project was to evaluate the effect of using a high stock density, short duration grazing system over a 2-3 year period in southeast Montana on plant tissue analysis and soil organic matter. To do this, eleven pastures spread among five different producers were used with a single transect in each pasture that was collected from once each year. Data for organic matter (OM) were taken at collection points with a 0-6" core sampler and composited within transect. Samples for plant tissue analysis were conducted off of the transect to avoid plant interference for future analysis years. Plant tissue were analyzed for protein, potassium, nitrogen, phosphorus, and calcium. Results for organic matter and tissue analysis will be presented orally and in poster format.

## **Kia Ward**

**Sponsored by Dr. Chip Poland**

**Department of Agriculture and Technical Studies**

**"Vegetative Diversity and Frequency After Juniper Mastication"**

Rocky Mountain Juniper (*Juniperus scopulorum*), has started to encroach into areas where the tree isn't typically found. This is a problem as the species takes away space from native plants that grow in ecosites where this invasion is occurring. The objective of this study was to determine if reducing the number of junipers in an area increases the plant species diversity. Juniper trees were removed using a masticator, which left behind wood chip like material on the soil surface. Data was collected in 2021 and 2022 during the same week in July. Within the study site, three levels of juniper canopy cover were established (light, medium, and heavy) and within each canopy cover area two treatment sites were identified. One of these sites was masticated and the other left us an untreated control. Data was collected using a line point method. This method of collection measured the frequency of species in control and treated areas. The study found in 2022, native species increased in all three treatment rates when juniper numbers were reduced by mastication. This implies that the reduction of junipers will increase the diversity of native range.

## **Cole Werner**

**Sponsored by Dr. Colin Strine**

**Department of Natural Sciences**

**“Using automated acoustic monitoring to determine site use by multiple anurans of waterbodies in Iowa”**

Amphibians are valuable indicator species due to their sensitivity to environmental changes, making them excellent barometers of ecosystem health, meanwhile almost half of all amphibian species are experiencing population declines. This study aims to determine whether factors such as temperature, humidity, or nitrate levels in nearby water systems had influence on the presence of the American Bullfrog (*Lithobates catesbeianus*), American Toad (*Anaxyrus americanus*), Cricket Frog (*Acris crepitans*), and Cope's Gray Treefrog (*Hyla chrysoscelis*) across fourteen survey locations during the summer of 2022. Passive recording methods for bioacoustics were used to increase the likelihood of detecting the target anuran species. Average occupancy was 54.3% when including all four anurans, with an average detection probability of 64.9%. Among the four covariates examined, the size of the study location and average temperature was shown to influence the presence of only two of the four target species, while humidity had a definitive impact on the presence of three of the four species. However, the level of nitrogen in the water was found to be the most significant factor affecting the presence of all four anurans, with an average probability of impact of 68.3% across all species. These findings offer valuable insights into the state of anuran populations in Iowa, emphasizing the urgency of further research to fully comprehend the factors contributing to the decline in amphibian populations in the region. The results underscore the importance of investigating the potential effects of pollutants on water quality, particularly that of agricultural runoff, to enable wildlife managers to make informed decisions about conserving and protecting Iowa's amphibian species.

**Elizabeth Widmer, Alyssa Adress, Micayla Miske**

**Sponsored by Ms. Taina Traub**

**Department of Nursing**

**“Are Female Non-Smokers with Exposure to Second-Hand Smoke More Likely to Develop Breast Cancer Compared to Female Non-Smokers Without Exposure to Second-Hand Smoke?”**

Female breast cancer is the most globally diagnosed cancer, with 2.3 million cases in 2020. This literature review aims to examine the prevalence of breast cancer in women exposed to second-hand smoke (SHS) compared to women who have never been exposed. It is found that women exposed have a higher risk of breast cancer than those not exposed. According to a 2021 systematic review of Never-Smokers and the Fraction of Breast Cancer Attributable to SHS suggests, “1 in 14 breast-cancer cases could have been avoided in the absence of SHS exposure from parents in a population of never-smoking women.” In passive tobacco smoking, a carcinogenic event occurs when smoke is inhaled from the atmosphere and enters the bloodstream through permeable tissue in the lungs. The blood transports carcinogens to breast tissue, increasing the plausibility of mutations within oncogenes and suppressor genes (p53 specifically). Uncontrolled mutation of the genes results in the development of breast cancer. The relationship between SHS and breast cancer allows nurses to improve the health of their patients using primary prevention, such as education about the associated risks.

**Jace Winter**

**Sponsored by Dr. Chip Poland**

**Department of Agriculture and Technical Studies**

**“Infiltration Rates on New and Historic Reclaimed Oil Well Sites”**

The oil field in Western North Dakota creates a large necessity for reclamation services to restore lands to a productive state once sites are no longer in use. Many individuals such as farmers, ranchers, and the public depend on the success of reclamation projects to once again benefit from the land. The

project focused on whether the infiltration rates of new and historic reclaimed oil well sites differed from native rangeland. Infiltration rates were collected at four sites that included native rangeland, a fifteen-year-old, a five-year-old, and a newly reclaimed oil well site. A total of nine tests were conducted on each site that measured the first and second inch of water infiltrated using a six-inch infiltration ring. The project was conducted in McKenzie County, North Dakota and each test site had the main ecological site of shallow loamy. The measurements of the second inch of infiltration were unable to be collected from the newly reclaimed site due to the inability of the site to infiltrate water in a timely manner. The results showed there was no significance between the native site and the fifteen-year-site ( $P=0.3026$ ) with the first inch of infiltration. There was a significant difference showing better infiltration within the five-year-site ( $P=0.016$ ) and worse infiltration within the new site ( $P=0.0007$ ) with the first inch infiltrated. The second inch showed no significant difference within the five-year-site ( $P=0.6496$ ) and a significant difference showing worse infiltration within the fifteen-year-site ( $P=0.0229$ ). Further research may be conducted with more test sites and data from a third and fourth inch infiltrated to better understand the significant differences.