

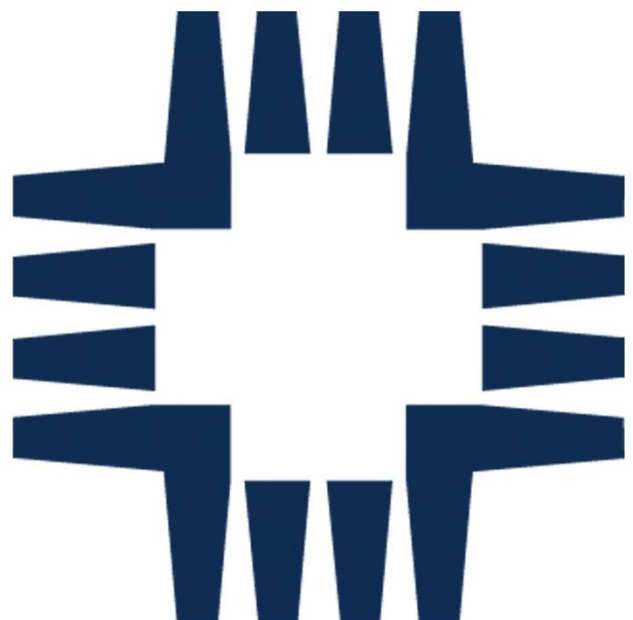


11th Annual

Academic and Research Symposium

Concordia University, Nebraska

April 2022



ACADEMIC AND RESEARCH SYMPOSIUM – PRESENTER SCHEDULE

	THOM Auditorium	THOM Main	THOM 111	THOM 113	THOM 106
2:30 PM - 3:30 PM	Art Session A	Poster Session A	Oral Session A1	Oral Session A2	Oral Session A3
	Sarah Armbrust Claire ParksFlood Dylan Cookus	Zach Bennetts Kailey Weichel Logan Srna Jorre Luther Gabrielle Luehr Shane Whittaker Jordyn Hilyard Erin Mapson Cyrus Marshall	Abi DeLoach Miranda Rosenkranz Morgan Fischer Callum Goldsmith	Adler Rickords Brynna Bruxellas (grp) Daniel Campbell Jacob Melchor	Korrell Koehlmoos Ellie Eason Rose Grothaus Jayson Klaumann
3:40 PM - 4:40 PM	Art Session B	Poster Session B	Oral Session B1	Oral Session B2	Oral Session B3
	Celia Askelsen Jacob Brandt Emily Niemeier	Logan Matters Kira Heinselman Madalyn Woodburn Rachel Battershell Malia Rolf Simon Higgason Simon Higgason Victor Meneses	Camry Moore Bennett Shane Decker Mattimoe Kira Heinselman	Logan Adam Kaetlyn Todd Brynna Bruxellas (ind) Nathan Kieser	Lizbeth Vargas-Tapia Haley Compton Caleb Gierke Abigail Mullen (grp)
4:50 PM - 5:50 PM	Art Session C	Poster Session C	Oral Session C1	Oral Session C2	Oral Session C3
	Tiffany Hovendick	Mario Ybarra Tavoris Smith Kenna Miller Katherine Anderson Nicole Breese Grace Boganowski Katherine Bauer Megan Garbe	Nicole Breese Avery Stillahn Abigail Mullen (ind) Chris Shelton	Lauren Holmlund Tabitha Ristvedt Drew D'Ercole Nicholas Totenhagen	Matthew Kamm Mackenzie Koepke Colten Uitermarkt Joel Rathe
6:00 PM - 7:00 PM	Oral Session D4	Poster Session D	Oral Session D1	Oral Session D2	Oral Session D3
	Benjamin Toenjes Kyle Berg Jarod Reed Annah Heck	Brynna Walgate Emma Singer Ashlee Long Matthew Kamm Kira Heinselman Kira Heinselman Nicholas Engebretson Matthew Kamm Emily Rasmussen	Kathryn Castens Adler Rickords Cheyenne Smith Ellie Eason	Joshua Marlatt Andy Amos Hunter Cole Maccoy Menke	Cale Mathison Bree Green



Special Thanks

Thank you to all presenters, faculty sponsors, staff, judges, administrators, and attendees for supporting the symposium!

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- Bekah Guilford
- Madison Kurtz
- Stephanie Mashuga
- Kenna Miller
- McKenzie Moore
- Julie Oetting
- Tori Ritzma
- Hannah Schaefer
- Olivia Walsh



Art Session A

Monday April 25, 2022

Thom Auditorium

Wonder

Sarah Armbrust

2:30-2:50p

Faculty Sponsor: Don Robson

This body of work focuses on the wonder found in the mundane. All of the surfaces were found, recycled, and chosen for their interesting shapes, sizes, or deformities. The only alteration to these surfaces was paint. The subjects of each artwork were derived from those original unique features. The goal of these pieces is to inspire people to look more closely at their surroundings and ponder the ordinary. Beauty and wonder is in the mundane. This work encourages others to stop and consider it.

Art25: A Commentary on the Art World

Claire ParksFlood

2:50-3:10p

Faculty Sponsor: Seth Boggs

The art world in general has fallen out of touch with the rest of the world. In a short animated/live-action mockumentary I explore and expose the art world's absurdities. The film is less of a commentary and more of a parody of modern-day art documentaries. The characters throughout the film are composed of handmade wool puppets that utilize both stop motion and digital animation.

Visual Representation

Dylan Cookus

3:10-3:30p

Faculty Sponsor: Seth Boggs

Music and art have many elements that that can be translated between mediums. These elements have the power to inflict or pronounce various emotions to the viewers. I have paired a digitally printed color field with a soundscape that corresponds with the visual. Using the elements and principles of art, I worked to make the pieces behave in a similar way. For example, the brightness of an image can be translated to the volume level of sound. As the observer views the visual, and listens to the audio, they should also be struck with similar emotions.



Art Session B

Monday April 25, 2022

Thom Auditorium

Post Mortem

Celia Askelsen

3:40-4:00p

Faculty Sponsor: Don Robson

This work is a study to find an intimate space, a space of comfort and safety, in what seems to be the aftermath of destruction. I am very interested in the internal workings of human beings, particularly in the ways specific interactions with others affect our mental and emotional experience of being alive. This work explores where we find peace in the mental turmoil following a destructive act of one person against another. It is about decay, but also the strength in what remains, where contentment has come to coexist with the ruins. Evidence that beauty and value can be found still.

Texture and Form in Ceramics

Jacob Brandt

4:00-4:20p

Faculty Sponsor: Justin Groth

My artistic practice focuses on the relationship of texture and form through wheel-thrown ceramics. In this presentation, I will discuss this relationship as it is seen in my BFA thesis art show. My work, which is displayed in the Marxhausen Gallery, consists of several groupings of vases that highlight how the inherent qualities of wheel-thrown pottery can be revealed and complimented by the surface treatment applied.

Pepto Dismal

Emily Niemeier

4:20-4:40p

Faculty Sponsor: Don Robson

This presentation reflects on a body of work created for my BFA thesis show. The series of paintings focuses on self-expression and the process of making. This show is a playful look at the difficulties that come along with creating art. Central to this work is a search for authenticity. This presentation will discuss process-based artwork, self-expression, and will likely use the word "vomit" a few times too many.

Art Session C

Monday April 25, 2022

Thom Auditorium

"Honour" * "Dishonour"

Tiffany Hovendick

4:50-5:10p

Faculty Sponsor: Don Robson

This presentation focuses on the aspects of my Bachelor of Fine Arts Exhibition: "Honour" * "Dishonour". It focuses on the theme by looking into the traditional means of honouring and dishonouring our military veterans and service members, while also approaching non-traditional mediums to do so. Through research, color and material symbolism, viewers are invited and encouraged to reflect on what this means to them.



Poster Session A

Monday April 25, 2022

2:30-3:30p

Thom Main Street

Etiology, Treatment, and Prevention of Medial Tibial Stress Syndrome

Zach Bennetts

Faculty Sponsor: Nolan Harms

Medial tibial stress syndrome is the most common running related injury, and it is characterized by pain along the distal third of the tibia. With more people choosing to exercise throughout their week, understanding how tibial stress injuries occur and ways to manage them is becoming more prevalent. This literature review investigates the dominant etiology for this injury accompanied by the prevailing treatments and preventions correlated with the cause. This review discovered that the cause of tibial pain is related to the structures and functions of the tibial bone itself and the surrounding muscles that insert and originate on its surface. There are several treatments that have been tested based on this discovery, but only extracorporeal shockwave therapy and rest have been found reduce pain and promote healing. The last of the findings indicate that three prevention tactics; strengthening lower leg muscles, orthotic inserts, and improving improper running technique, decrease risk of medial tibial stress syndrome.

Applied Neuroplasticity for Clinical Rehabilitation and Functional Recovery

Kailey Weichel

Faculty Sponsor: Nolan Harms

Neuroplasticity is the brain's ability to modify, change, and adapt both structure and function throughout life and in response to experience and exercise (Schaffer, 2016). There are billions of neurons in the human body, and they are constantly changing throughout the lifespan. The effect of numerous neuroplasticity mechanisms used in the clinical rehabilitation setting can have numerous positive direct and indirect effects to promote functional recovery of many different conditions.

The Effectiveness of Spinal Manipulation on Low Back Pain

Logan Srna

Faculty Sponsor: Nolan Harms

Low back pain (LBP) is a leading cause of pain and disability in the United States and affects up to 80% of people at some point in their lifetime. Spinal manipulation (SM) has been introduced as a possible treatment to decrease LBP. Researchers differ on their opinions as to whether SM truly aids those struggling with LBP. The bottom line – SM can help those who are known to be 'responders' as well as when the treatments are applied with other therapies such as exercise therapy. However, the effects of SM are not immediate and will be observed weeks and months after treatment, rather than hours or days.

The Effects of Dry Needling on Musculoskeletal Pain

Jorre Luther

Faculty Sponsor: Nolan Harms

The objective of this literature review is to fully examine the effectiveness of dry needling on musculoskeletal pain. Throughout this review, I will be providing background information on dry needling and explaining key terminology that may be unfamiliar to the public. Additionally, I will examine various research studies that include topics such as a placebo treatment versus real treatment, the long-term



effects of dry needling, the effects of dry needling on muscle pain and balance, the effects of dry needling on post-stroke patients, and a general study on the effects that dry needling has on musculoskeletal pain. Finally, I will conclude by incorporating the main findings of each of these studies to show the effectiveness of dry needling and the benefits it has on the human body.

Impact of Core Stability Training on Chronic Nonspecific Low Back Pain

Gabrielle Luehr

Faculty Sponsor: Nolan Harms

Throughout the last several decades, the prevalence of chronic nonspecific low back pain (CNLBP) has been increasing, leading to potentially devastating consequences for the afflicted individuals. As the diagnosis proves to be both relevant and variable in nature, research efforts continue to search for a treatment consensus. This subsequent literature review summarizes the efficiency of traditional core stability training and combination training for individuals with CNLBP in order to effectively reduce pain and inflammation, while allowing for optimal activation of deep core musculature.

The Effectiveness of Blood Flow Restriction Training on Knee Injuries

Shane Whittaker

Faculty Sponsor: Nolan Harms

In today's society, there has been a rising rate of chronic and acute musculoskeletal injuries occurring at the knee joint in all age demographics. As technology advances, the development of new modalities has helped improve the recovery process. This literature review examined the effectiveness of Blood Flow Restriction (BFR) training for the rehabilitation of lower-body musculoskeletal injuries. Specifically, this literature review analyzed how the use of BFR training during resistance and aerobic exercise promotes muscular strength and hypertrophy, while preventing muscular atrophy. BFR training also known as occlusion training, involves a partial restriction of arterial inflow and a complete restriction of venous outflow to the musculature surrounding the injured area. To assess the efficacy of BFR training, this literature review used data from systematic reviews, meta-analyses of peer-reviewed literature, and cohort studies. In addition, the age of participants in these studies ranged from adolescents to geriatrics with an emphasis on the athletic population. The results suggest that BFR training provides a more effective approach to low-load and a more tolerable approach to heavy-load rehabilitation. Furthermore, evidence shows that BFR training induces physiological responses equivalent to conventional weightlifting without subjecting the individual to a significant mechanical load. Therefore, BFR training is a safe and more effective technique to help reduce recovery time and increase muscular strength for all age populations following a musculoskeletal injury.

The Female Athlete Triad: Energy Deficiency in Sport

Jordyn Hilyard

Faculty Sponsor: Nolan Harms

The female athlete triad is a condition characterized by low energy availability, menstrual irregularities, and low bone mineral density. This triad affects many athletes today and can lead to serious long term consequences if not identified and/or treated properly. By learning the signs and symptoms of this condition, coaches and health care providers can protect female athletes from things such as infertility, cardiovascular problems, and osteoporosis.



Effectiveness of Chiropractic Care on Migraine Headaches

Erin Mapson

Faculty Sponsor: Nolan Harms

Migraine headaches are the cause of debilitating pain for millions of people in America. Currently, the most common treatments are pharmacological medications, but this type of treatment is costly and can have many side effects. Studies have indicated that chiropractic care may be a more sustainable migraine treatment by providing long-term relief through spinal manipulations.

Effects of Lower Body Training for Injury Prevention in Athletic Women

Cyrus Marshall

Faculty Sponsor: Nolan Harms

Part of playing sports is accepting the risk of injury. One of the most common injuries in athletics is an Anterior Cruciate Ligament (ACL) tear and the rate at which it happens is significantly higher in athletic women than in athletic men. Men and women are built differently in both strength and anatomy. This has an effect on the prevention of athletic injuries and on the differences in workout that should be implemented for women. Having a training program that includes resistance and plyometric training can significantly reduce the risk of a lower body injury in an athletic woman. Researchers have found that with a correct training plan, proper diet, and proper recovery, females can significantly reduce the risk of an ACL tear.



Poster Session B

Monday April 25, 2022

3:40-4:40p

Thom Main Street

Measuring Drag Force in a Desktop Wind Tunnel

Logan Matters

Faculty Sponsor: Nolan Harms

Medial tibial stress syndrome is the most common running related injury, and it is characterized by pain along the distal third of the tibia. With more people choosing to exercise throughout their week, understanding how tibial stress injuries occur and ways to manage them is becoming more prevalent. This literature review investigates the dominant etiology for this injury accompanied by the prevailing treatments and preventions correlated with the cause. This review discovered that the cause of tibial pain is related to the structures and functions of the tibial bone itself and the surrounding muscles that insert and originate on its surface. There are several treatments that have been tested based on this discovery, but only extracorporeal shockwave therapy and rest have been found reduce pain and promote healing. The last of the findings indicate that three prevention tactics; strengthening lower leg muscles, orthotic inserts, and improving improper running technique, decrease risk of medial tibial stress syndrome.

Characterizing Perfluorooctanoic Acid and Industrial Substitutes by Electron Structure Calculation

Kira Heinselmann

Faculty Sponsor: John Jurchen

Perfluorooctanoic acid (PFOA) has been banned in the US for health and environmental contamination concerns. Since industries have replaced PFOA with other perfluorinated substances suspected of maintaining the same physical properties. A collection of substitutes are characterized by electron structure calculations which determine dipole moment, structure, and polarity. These calculations have revealed that both protonated and unprotonated substitutes strongly resemble the physical characteristics of PFOA. Caution is called for in the direct adoption by industry of such substitutes.

Estimating the thermodynamics of trans-cis-diol isomerization by electron structure calculations

Madalyn Woodburn

Faculty Sponsor: John Jurchen

It is estimated that less than 2% of bacteria can be grown in a lab setting partially due to the lack of availability of rare sugars with unique chiralities and structures. Here, we use molecular modeling to characterize the thermodynamics of trans- and cis-diol conversions required for the synthesis of these sugars. The transition molecules necessary for these conversions were also calculated for their effects on thermodynamic control. The limits of our molecular modeling were also tested by making electron structure calculations at different levels of theory.



Characterization of Novel Small Molecules Designed to Promote Axonal Outgrowth from Neural Scars

Rachel Battershell

Faculty Sponsor: John Jurchen

The formation of chondroitin sulfate proteoglycan (CSPG) scars represents a barrier to neural regeneration by interacting with axonal receptors such as protein tyrosine phosphatase sigma. Here, novel small molecules HJ-01 and HJ-02 inspired by the natural product illudalic acid with nanomolar restorative properties are characterized by electron structure calculations to determine their polarity and molecular orbitals. We further identify molecular orbitals associated with a key step in the synthesis of HJ-01. Finally, the energetics of HJ-01 and HJ-02 bonding to cysteine is investigated.

The Comparison of Thermodynamic and Structural Characteristics of Diketopiperazine Molecules

Malia Rolf

Faculty Sponsor: John Jurchen

Bacteria use small molecules to communicate and detect the size of their populations. This is known as quorum sensing. For example, *V. fischeri* produces a novel stereoisomer of cyclo(His-Pro), a dipeptide in the diketopiperazine family. Here, we compare the structures, physical properties, and molecular orbitals of stereoisomers of this molecule and other diketopiperazines by electron structure calculation. We also investigate the role of proline in the thermodynamics of similar cyclic dipeptides and speculate on the role of solvent in the structure and thermodynamics of these molecules.

A Comparison of a Novel Effective and Several Ineffective BACE 1 Inhibitors Using Electron Structure Calculations

Simon Higgason

Faculty Sponsor: John Jurchen

Medicinal chemistry programs around the United States are concerned with slowing the progression of Alzheimer's disease by preventing the processing of the amyloid precursor protein (APP) which is responsible for the aggregation of amyloid plaques on the brain. Here, we investigate a novel compound known to interfere with APP processing using electron structure calculation to compare its structure, polarity, and other properties with a series of molecules that have previously failed as pharmaceutical agents.

Detecting Alpha Particle Radiation with a Handheld Spectrometer

Simon Higgason

Faculty Sponsor: Robert Hermann

A small, handheld spectrometer, based on a previous design, has been used to detect alpha particle radiation. The particle sources under consideration are Americium and Thorium. As alpha particles from the source collide with a photodiode, the collisions produce an electrical input whose magnitude is proportional to the energy of the incident particle. The input signal is sent to a microprocessor indicating the detection of an alpha particle. The energy spectra of Americium and Thorium are analyzed and compared to published spectra as a method to calibrate the spectrometer.



Sports Injuries and Mental Health

Victor Meneses

Faculty Sponsor: Sara Brady

Whenever an athlete gets injured, that can be very challenging in many ways. Previous studies have shown that injuries can have negative psychological impacts in the athlete, but there are not many studies that focus specifically on college athletes. The current study intends to determine the relationship between sports injuries and mental health of college athletes. Athletes currently attending Concordia University, Nebraska completed questionnaires to measure injury severity, depression, anxiety and stress. A person's correlation was conducted to determine the relationship between the variables. The results from this study might help the colleges to be aware of the impacts of sports injuries on the mental health of college athletes in order to provide help to the student athlete.



Poster Session C

Monday April 25, 2022

4:50-5:50p

Thom Main Street

Bluetooth Microprocessor Quadcopter Controlled Drone

Mario Ybarra

Faculty Sponsor: Robert Hermann

An Arduino nano is used to control the movement of a drone and integrate other circuits. The frame of the drone was 3-D printed with PLA filament and supports the components. A Bluetooth module connected to the Arduino allows the drone to be controlled by a smartphone that is capable of Bluetooth connection. The drone carries an accelerometer that tracks flight data.

The effects of cutting weight among a sample of collegiate wrestlers

Tavoris Smith

Faculty Sponsor: Sara Brady

No wrestler is oblivious to cutting weight. Cutting weight is the rapid weight loss in a short time for a competition. It is a common theory in the wrestling community that when athletes cut weight they tend to get more "moody", aggressive, and short-tempered. Research shows that rapid weight loss can have negative effects on the body (Rezaeipor, 2014; Yang, 2015). The purpose of my study is to determine the correlation between mood and rapid weight loss among a sample group of collegiate wrestlers. Participants of my study tracked their weight and took the brief mood introspection scale four days leading up to a competition. With that data, I determined whether there was a correlation between mood and cutting weight in my sample. Results and implications of the research study will be discussed.

Study of the Fluorescent Probe YDGAL, Used in Testing Anti-aging Drug Efficacy

Kenna Miller

Faculty Sponsor: John Jurchen

The study of anti-aging drugs is an area of interest for prolonging the quality of human life. YDGAL, a probe used for testing anti-aging drugs, can be synthesized in a four-step synthesis involving formation of two compounds that form the scaffold for the final probe. In this study we used Spartan 3D modeling program to examine the HOMOs and LUMOs involved in two of the synthesis steps as well as those involved in the fluorescence of YDGAL when it is converted to its hydrolyzed form YDOH.

Endemism in the Galápagos Islands

Katherine Anderson and Rebecca Yox

Faculty Sponsor: Jennifer Freund

The Galápagos islands are a hotspot for biodiversity and specifically endemism, because they are located on the equator and far from the mainland. Many species that are on the islands only exist in the Galápagos, and we call this Endemism. Multiple ocean currents and winds have brought these species to the Galapagos islands, allowing for unique adaptations to this new environment and the varied habitats on each island. Some endemic species of the Galápagos islands include the Galápagos penguin, the blue footed booby, the magnificent frigatebird, the flightless cormorant, the giant Galápagos tortoises, and the marine and land iguanas.



Investigation of Structural Rigidification of N-Aryl-pyrroles into Indoles for the Treatment of Drug-Resistant Mycobacteria

Nicole Breese and Kaetlyn Todd

Faculty Sponsor: John Jurchen

Mycobacterium tuberculosis, through drug resistance, has mutated to cause one of the most deadly diseases in the modern world. Two medications used in the treatment of drug-resistant mycobacteria were compared using electron structure calculation to determine three-dimensional structure, dipole moments, and surface polarity. Barriers to rotation and molecular orbitals involved in key synthetic steps were also calculated.

Investigation into Characteristics of Fluorescent “ON” Switch, MBMD, for Melanoma and Physical Properties of its Functional Groups

Grace Boganowski

Faculty Sponsor: John Jurchen

Methylene blue (MB)-m-borate, (MBMD), has recently been synthesized to be a fluorescent “ON” switch for the early and precise detection of Melanoma. Here, we use electron structure calculations to determine molecular orbitals involved in the fluorescence and determine the physical properties of functional groups such as carboxylic acid and free amines important to MBMD.

Analyzing AmaZOOnico

Katherine Bauer and Haley Compton

Faculty Sponsor: Jennifer Freund

This poster shares the experience of the students enrolled in Bio 365: Conservation of Tropical Systems in Ecuador and the Galapagos Islands during their service learning experience at Amazonico Wildlife Refuge. It will share the value of service learning, particularly during an immersive study tour. We will also explore aspects of animal care, demand for wildlife rehabilitation, and issues of illegal wildlife trade. Finally, we will share reflections on partnerships with local stakeholders and indigenous people to assure the successful conservation efforts of places like Amazonico.

Age of first social media account usage and self-esteem

Megan Garbe

Faculty Sponsor: Sara Brady

The age an individual receives and uses social media is younger than what is used to be according to a census by Pew Research Center in 2020. In developed countries over 70% of all teens use a social media platform or multiple platforms including Instagram, Snapchat, and Facebook (Anderson & Jiang, 2018; Steinsbekk et al., 2020). While research has been done to find a correlation between social media usage and self-esteem, there is little research regarding the age individual’s start using social media and self-esteem later in life. This study aims to determine whether there is a relationship between the age females receive their first social media account and how their self-esteem is impacted in college. Participants were asked to complete the Rosenberg Self-Esteem Scale, the Iowa-Netherlands Comparison Orientation Measure, and then lastly questions about the age they created their first social media account and how much they used it. Results and implications will be discussed.



Poster Session D

Monday April 25, 2022

6:00-7:00p

Thom Main Street

***Trichodesmium erythraeum*: Abnormal Free Fatty Acids in the Ocean**

Brynna Walgate

Faculty Sponsor: John Jurchen

The globally significant marine cyanobacteria *Trichodesmium erythraeum* is found in blooms in tropical and subtropical oceans where it contributes up to 30% of the nitrogen fixed globally. *Trichodesmium erythraeum* produces natural oil slicks full of the abundant free fatty acids, 2-methyldecanoic acid and 2-methyldodecanoic acid. Here, we characterize these with electron structure calculation to determine dipole moments, enthalpy of formation, surface polarity, and structural dependence on chirality.

Risks to Tropical Marine Systems

Emma Singer and Brynna Walgate

Faculty Sponsor: Jennifer Freund

Tropical marine systems are delicate and important for all life on Earth. Problems such as sunscreen runoff, boat spills, garbage, overfishing, blast fishing, and invasive species are a handful of what was observed in Ecuador during our service learning trip there. Humans are stewards of the environment and as such we should be aware of the impacts we have on the environment around us and be open to incorporating changes in lifestyle, worldview, and beliefs to minimize negative impacts. The best way to face environmental degradation is education, reducing harmful impacts, and researching new technology to reduce unintentional harm globally.

The Power of Immersive Experiences

Ashlee Long and Colten Uitermarkt

Faculty Sponsor: Jennifer Freund

Given two opportunities to immerse in a travel experience to Ecuador and the Galapagos Islands: Learning from the comfort of home with interactive learning platforms or traveling to fully immerse in Ecuador, its culture, and its habitat, which would you choose? Immersive travel experiences employ one of the greatest tools of meaningful learning—allowing participants to step boldly outside of their comfort zones and be uncomfortable in a new experience. We grow in this leap of faith and wildly new or different experiences. Study tours here at CUNY allow students to learn deeply about new places, but we also learn deeply about ourselves. It is a powerful tool for learning content of biology, but also culture, language, environment, and it is a gift to help us value our own home.



The Synthesis of Selective Androgen Receptor Modulator, RAD-140, with Comparisons of Molecular Properties between GLP & GSK SARMS

Matthew Kamm and Brandon Vega

Faculty Sponsor: John Jurchen

Through recent study, the selective androgen receptor modular (SARM), RAD-140, suppresses cell proliferation of breast cancer cells. In the synthesis of RAD-140, molecular orbitals were discovered to help describe and understand the nucleophilic substitution. By comparing RAD-140 to multiple SARMS, GSK-2881078, and GLPG-0492, the molecular polarity, structure, and dipole moments were analyzed through electron structure calculations. These calculations have revealed the structural features of all three SARMS to help determine the blocked hydroxylation by cytochrome P450.

A Literary Analysis of the Political Influence That Would Produce Animal Farm, 1984, and Endgame

Kira Heinselman

Faculty Sponsor: Lisa Ashby

While the Cold War was focused between the United States and the Soviet Union, the fear of yet another war would begin to weigh on the conscience of people around the globe. The impact of war or threat on outside nations has received little attention. The politically influential novels *Animal Farm* and *1984* by George Orwell, and "Endgame" by Samuel Beckett were analyzed to determine the impact of the Cold War on the mindset of those on the fringes of war. This provides insights into the societal implications when the threat of war, or war itself, becomes the new normal.

A Psychological Case Analysis of Stephen King Through the Scope of His Published Literature

Kira Heinselman

Faculty Sponsor: Kim Boyce

Stephen King is a world-renowned author known for his prolific writing and ability to create otherworldly terrors. This ability may be attributable to the presence of his personal trauma and drug addiction embedded in his literature. Since many of the characters within his books are representative of different pieces of his experience, an analysis of King's characters leads to insights regarding his mental status. Due to the plurality of mental illnesses, King's trauma as a child, and later drug abuse, indicates an underlying mental illness should be considered as a possible corollary.

Ecuador's Exotic Endemism

Nicholas Engebretson, Lyle Whitney, and Xavier Ross

Faculty Sponsor: Jennifer Freund

A study tour into Ecuador was offered in Spring 2022, giving us students a view into the largest biological hotspot on earth. We were tasked to recap our experiences and research how and why Ecuador, and the Galapagos Islands, offer biodiversity on a large scale. Visual analysis of the Amazon Basin and Galapagos Islands gave us insight into what species lived where. Information was also gained through our guides and prior study. Ecuador sits on the equator, serving a warm and wet climate for many land and water species to thrive in. Geography can vary, offering rainforests, rivers, oceans, mountains, and even deserts. Conservation efforts through AmaZoonico, which rehabilitate endemic species, and Galapagos National Park assist in preserving the uniqueness and diversity of Ecuador. As Ecuador develops, conservation efforts will need to work with the government and locals to do what is best for everyone.



Impacts of a Magnetic Field on Particle Decay inside Cloud Chamber detector

Matthew Kamm

Faculty Sponsor: Robert Hermann

A chamber with isopropyl alcohol is built to create a cloud environment to detect alpha radiation. The source of radiation is thorium encapsulated in tungsten welding rods. The apparatus is placed inside a pair of Helmholtz coils which produces a uniform magnetic field. Adjusting the magnitude of the magnetic field affects the curvature of the particle decay paths. The tracks can be photographed to analyze the effects of a magnetic field on charged particles. The curvature can be found to determine the energy of the particles.

Modeling Ulatorant and its Derivatives for the Treatment of Schizophrenia

Emily Rasmussen

Faculty Sponsor: John Jurchen

Ulatorant has been identified as a possible molecule to treat schizophrenia through interactions with the TAAR1 receptor. Here, we use electron structure calculation to contrast Ulatorant derivatives with Ulatorant structures reported in the literature through docking simulations. We also calculate enthalpies of reaction involved with the synthesis of Ulatorant and estimate the role of solvent in molecular modeling in this molecule.



Oral Session A1

Monday April 25, 2022

Thom 111

Self-care and Mental Health

Abi DeLoach

2:30-2:45p

Faculty Sponsor: Sara Brady

Self-care is a term that has gained popularity in recent years, yet its definition is ambiguous. Past research has found that specific self-care strategies are associated with greater levels of well-being, whereas other strategies are actually detrimental to a person's well-being (Hanson et al, Vincent & Terry). This study aims to examine whether self-care strategies previously associated with greater well-being are correlated with better mental health (i.e, lower levels of depression, anxiety, and stress) and whether strategies previously associated with poor well-being are correlated with poorer mental health (i.e, higher levels of depression, anxiety, and stress). Results and implications of the study will be discussed.

The Impact of Facial Attractiveness on Face/Name Recall Among College Students

Miranda Rosenkranz

2:45-3:00p

Faculty Sponsor: Sara Brady

The experience of being unable to recall an acquaintance's name is nearly universal and unpleasant, leading to awkward social encounters. Because the perception of beauty triggers the hippocampus region which is known to aid in memory encoding, the purpose of this study was to determine whether highly attractive target's names are recalled with higher frequency than targets lower in facial attractiveness. The study used 36 faces selected from the Chicago Face Database, pre-rated for attractiveness and divided into one of three conditions: attractive, average, and unattractive. Using a within-subjects design, college students were shown randomly-ordered and randomly-named target faces and asked to accurately recall the target's name a short time later during a facial recognition task. An ANOVA was conducted to determine if facial attractiveness condition was significantly associated with successful face-to-name recall. Results of the study will be presented. Limitations and areas of further study will also be discussed.

Modern Philosophy's Perspective of the "Sublime"

Morgan Fischer

3:00-3:15p

Faculty Sponsor: David Coe

Our physical world is capable of extreme, violent, and foreboding scenes of nature. Despite observable phenomena (such as lightning, mountain precipices, and sea storms), modern philosophers have asserted that nature is capable of a much more intrinsic and personal effect. Gripping an individual's attention, aesthetic philosophy throughout the 18th, 19th, and 20th centuries wrestles with the idea that violent nature can be conducive to contemplation, an uplifted state of mind, and make the introspective person "lose their individuality." This idea is called the "Sublime."

Anxiety and Pressure in Sport: "String" Athletes vs Individual Sport Athletes and Team Athletes

Callum Goldsmith

3:15-3:30p

Faculty Sponsor: Sara Brady

Does competition for an athlete's position in a team sport affect perceived levels of performance anxiety? Research shows that individual sport athletes usually experience higher levels of performance-related anxiety than team sport athletes (Paunescu et al., 2016). The purpose of this study was to examine how team pressures influence athletes' performance anxiety. Using a correlational design, student athletes from Concordia completed a survey on their role within their team and performance anxiety. Results will be discussed.



Oral Session A2

Monday April 25, 2022

Thom 113

Big Horn Sheep population analysis

Adler Rickords, Rebecca Yox, Olivia Leising, and Camden Sesna 2:30-2:45p

Faculty Sponsor: Jennifer Freund

The goal of this project was to run a population viability analysis of Big Horn Sheep in Nebraska to inform conservation planning. In order to accurately simulate the population, the program Vortex was used. Vortex is a computer program that simulates deterministic forces and genetics on wildlife populations. Vortex was used to look at the main threats to the total population which include disease, fire, drought, predation, harvest limits, lamb survival rate, as well as the ratio of males to females. Utilizing Vortex showed that the population in Nebraska is most greatly affected by predation, fire, disease, and drought.

Phascolarctos Cinereus: An Analysis of the Vitality of the Koalas

Brynna Bruxellas, Tara Ferrel, Olivia Buschow, and Jayzen Armstrong 2:45-3:00p

Faculty Sponsor: Jennifer Freund

Koalas are an endemic species that is considered vulnerable according to the IUCN Redlist. It only lives in certain parts of Australia and has faced some serious threats. Without human conservation, we could see this incredibly unique and valuable species go extinct. We used VORTEX to conduct a population viability analysis. VORTEX is an advanced software that predicts when/if a species will go extinct based on much data like the survival rates, fecundity rates, stochasticity rates, abundance rates, dispersal rates, and carrying capacity. The findings better our understanding of koalas, their ecosystem, and how we can conserve them.

Analyzing GPAC Men's Soccer Players from 2021-2022

Daniel Campbell 3:00-3:15p

Faculty Sponsor: Joel Helmer

Soccer is the world's most renowned sport, so that brings people from across the world to the U.S. for opportunities of playing and education. This project was completed by retrieving each schools' respective rosters and then using Excel and ArcGISOnline to record and map students' hometowns and denote what school they attend. This project identified all Great Plains Athletic Conference (GPAC) players from the 2021-2022 season and maps their hometown. The goal for the project was to demonstrate how globally diverse soccer in the Great Plains Athletic Conference is.

Distribution of GPAC Golf Athletes

Jacob Melchor 3:15-3:30p

Faculty Sponsor: Joel Helmer

Using online rosters from all the GPAC golf programs and ArcGIS Online I mapped all the hometowns of current players. Maps include both the women and men's rosters. This project reveals interesting spatial distributions of each GPAC team and where they mainly recruit. Spatial analysis of the distribution shows interesting clusters, outliers, and recruiting patterns by state, as well as internationally.



Oral Session A3

Monday April 25, 2022

Thom 106

GPAC Football Recruiting

Korrell Koehlmoos and Carsen Arline

2:30-2:45p

Faculty Sponsor: Joel Helmer

This project's purpose was to look at the recruiting tendencies of the football teams in the Great Plains Athletic Conference. The Great Plains Athletic Conference is one of the better football conferences of the NAIA. Whether it was from how well the coaches' coach or the great playing of the athletes. We wanted to see how those two came to fortune with recruiting. We based our research off of where the coaches are from originally, past jobs, and where the school is located at to see where they pulled their recruits from. Research shows a lot recruits come from near the school, but some recruits come from coaches' former living areas.

A Geographic Analysis of GPAC Women's Soccer Athletes

Ellie Eason

2:45-3:00p

Faculty Sponsor: Joel Helmer

This project maps the current women's soccer athlete's hometowns in the Great Plains Athletic Conference (GPAC). Maps were created using ArcGIS Online software. This research reveals interesting spatial patterns of each individual GPAC schools recruiting as well as the entire conference. Further analysis was conducted on all-conference players, GPAC tournament wins, and the overall spatial distribution of players.

Prevention of Diabetes in *C. Elegans*

Rose Grothaus and Emily Rasmussen

3:00-3:15p

Faculty Sponsor: Kyle Johnson

Diabetes is an increasingly prevalent disease in America and using natural products to prevent its onset has become an important area of research. The natural compounds yerba mate, Euiyin-tang, and quercetin have been described as having anti-obesity properties and likely work by disrupting the pathology of diabetes. *C. elegans* will be used as a model organism to test whether the compounds can effectively prevent the onset of diabetes. They will be grown in media with these compounds and diabetes will be induced, then their oxygen consumption will be compared with controls.

Simulating Madness

Jayson Klaumann

3:15-3:30p

Faculty Sponsor: Brian Albright

This presentation will be focused around a mathematical model which simulated the 2022 NCAA March Madness Tournament (men's college basketball). Developed using Microsoft Excel, the project predicted which teams in the field of 64 had the highest percentages to reach the championship game. Implemented within the project were various Excel functions including the V-Lookup function, which was based off the compilation of select statistics, including rebounds per game, seed numbers, and others. Other minor additions were made in the attempt to more accurately "simulate the madness."



Oral Session B1

Monday April 25, 2022

Thom 111

Find The “Best-Fitting” Line

Camry Moore

3:40-3:55p

Faculty Sponsor: Brian Albright

When looking at data that is constantly changing, it is interesting to see the trend within the data. This can be done by fitting a line to a graphed set of data to estimate what a value might be at a certain point. I took my running batting average from the 2019 softball season and tried to find a line that “fit” the data the best. This was done by trying multiple different mathematical techniques. When starting this project, I was unsure if there was even going to be a solution at all, especially with a limited set of data like mine.

Genshin Impact Wish Simulation

Bennett Shane

3:55-4:10p

Faculty Sponsor: Brian Albright

Genshin Impact is a game that can be played as a mobile app or on the PlayStation. Within the game there is a lottery system that allows players to spend in-game currency to receive weapons or characters, which are characterized into Three, Four, and Five star rewards. I set out to create an Excel simulation to model this Wish system, using the probabilities and factors provided in game, to find out the expected number of wishes to receive a Five star reward.

Supplementation of B12 back into B12 -deficient *C. elegans*

Decker Mattimoe

4:10-4:25p

Faculty Sponsor: Kyle Johnson

Vitamin B12 is often associated with increased metabolic rates; however, vitamin B12 deficiency disrupts metabolism by slowing it down. *C. elegans* were used due to quick rates to induce and supplement vitamin B12. Using a colorimetric assay, metabolic rates were measured to determine changes in metabolic rates from deficient to supplementation of vitamin B12 in *C. elegans*. Using phenol red as a pH indicator to monitor acid that is produced during metabolism. We predict an increased metabolic rate through supplementation of vitamin B12, while restoring vitamin B12 levels.

The Effect of Altered Glucose Metabolism on Behavior and Regulation of Schizophrenia Risk Genes in *C. elegans*

Kira Heinselmann

4:25-4:40p

Faculty Sponsor: Kyle Johnson

The effect of glucose metabolism on the exacerbation of schizophrenia symptoms has been well documented in humans; a correlation may exist between altered glucose metabolism and the upregulation or expression of schizophrenia genes. *C. elegans* are subjected to high glucose diets to alter glucose metabolism. This is determined by increased weight due to lipid accumulation and a microplate metabolism assay. Upregulation of schizophrenia risk genes is determined through RT-PCR, GFP-tagged proteins, and light absorption. Schizophrenia phenotype is determined by social feeding tendencies.



Oral Session B2

Monday April 25, 2022

Thom 113

Nicotine as a stressor in *C. elegans*

Logan Adam

3:40-3:55p

Faculty Sponsor: Kyle Johnson

The purpose of this study is to observe the effects of two strains of *C. elegans* as they are treated with nicotine. Wild type N2 and TCER-1 will be examined. TCER-1 is crucial to the study because it's knockout gene codes for the normal stress response within *C. elegans*. These mutants will be studied under the stress of nicotine. Responses observed will include average body length and number of individuals which will serve as indicators of development. It is expected that nematodes on nicotine agar will develop more slowly.

TCER-1, Stress Repressor Gene, Affects Egg Laying Upon Encounter of Different Stressors

Kaetlyn Todd

3:55-4:10p

Faculty Sponsor: Kyle Johnson

C. elegans are model organisms for the study of the reproductive system. TCER-1 is a stress repressor gene that when activated suppresses egg laying. In this study, the effects of heavy metals, low oxygen levels, and UV exposure are evaluated to monitor the efficacy of TCER-1. The goal of this study is to determine if TCER-1 is successful in decreasing the amount of egg laying in wild type and *tcer-1* worms while undergoing these stress tests.

Female Hoopers: A Spatial Analysis of Women's Basketball Rosters in the GPAC for the 2021-2022 Year

Brynna Bruxellas

4:10-4:25p

Faculty Sponsor: Joel Helmer

Basketball, now the world's third most popular game, was invented in 1891 to occupy young athletes at a YMCA in the winter by James Naismith. These humble beginnings could not have foreshadowed the frenzy, intense pressure on coaches and players to compete well, and the vigorous recruitment process endured at all levels of play. Recruitment is critical for the success of a team. It is also very spatial. By using ArcGIS, I mapped where the female basketball players from 2021-2022 are from in the NAIA GPAC. I analyzed specific patterns of spatial phenomena that may indicate why a player chose a certain university over another or why a coach recruits who they do.

Mapping Wrestling Recruitment in the GPAC

Nathan Kieser

4:25-4:40p

Faculty Sponsor: Joel Helmer

Recruiting athletes is an important coaching task and critical to a team's success. This project uses ArcGIS Online to map every recruit from each team in the Great Plains Athletic Conference (GPAC) during the 2021-22 season. The goal of these maps is to show interesting patterns and clusters geospatially of where athletes are being recruited and where the best places are to recruit athletes for wrestling.



Oral Session B3

Monday April 25, 2022

Thom 106

Sleep, Stress & Physical Activity Effect on Productivity

Lizbeth Vargas-Tapia

3:40-3:55p

Faculty Sponsor: Sara Brady

Mental and physical health can influence student's productivity in a positive or negative way in a class/work environment. The number of hours of sleep can affect behaviors and emotional regulation (Liu et al., 2021). High stress levels are linked to a decrease in concentration and cognitive functions and an increase in depressive symptoms (Shehata et al., 2020). This study examined four variables of sleep, stress, and physical activity, and productivity in coursework. It was hypothesized that more sleep, a low level of stress, and a high level of physical activity predict higher productivity in Concordia students. Students completed a survey on their sleep quality, levels of perceived stress, and levels of physical activities. Results were measured to find if there is a correlation with productivity in coursework.

Vortex and Capybaras: A Study on Capybara Harvest Rates

Haley Compton and Kathrine Bauer

3:55-4:10p

Faculty Sponsor: Jennifer Freund

This study is a population viability analysis and conservation plan considering the harvest and supplementation rates for the capybara (*Hydrochoerus hydrochaeris*). Collected data used Vortex, a Population Viability Analysis software program for population modeling and manipulation. The produced data allow for the formation of data-driven conservation recommendations to maintain a healthy capybara population.

The Effects of Context on the Understanding of Twitch Emotes

Caleb Gierke

4:10-4:25p

Faculty Sponsor: Sara Brady

Research into the culture of the live streaming website Twitch.tv is still in its early stages. There are a handful of studies, but those studies focus on the emotes as a whole and make brief attempts to look at the meaning of individual emotes. The purpose of this study focused on a few specific Twitch emotes instead of broad collections of all emotes in the hopes of getting a glimpse into how people unfamiliar with Twitch.tv will engage with seeing emotes that make up the chatroom culture of the website. Results and implications of the study will be discussed.

Conserving the Northern Tiger Cat

Abigail Mullen, Logan Adam and Elizabeth Gierke

4:25-4:40p

Faculty Sponsor: Jennifer Freund

There are many poster species for the conservation of animals around the world. Pandas, koalas, polar bears, and red pandas probably all come to mind when talking about threatened species. This project aims to show the importance of why conserving and protecting an endemic species like the oncilla (*Leopardus tigrinus*) is important to not only the area where it is native to, but also internationally.



Oral Session C1

Monday April 25, 2022

Thom 111

Nicotine Influences Behaviors Including Locomotion, Egg-Laying, and Food Intake of *Caenorhabditis elegans*

Nicole Breese

4:50-5:05p

Faculty Sponsor: Kyle Johnson

This study is aimed at investigating the effects of nicotine exposure on *C. elegans*. Nicotinic acetylcholine receptors mediate the synapse between nerve and muscle cells and play a role in neuronal communication. *C. elegans* were exposed to increasing concentrations of nicotine, and egg-laying, locomotion, and food intake were measured. We expect nicotine exposure has suppressive effects on egg-laying and food intake and increases locomotion speeds in wild type *C. elegans*.

APL-1 Over Expression in *Caenorhabditis elegans* and Heavy Metal Exposure on the Development of Dementia and Neurodegenerative Disorders

Avery Stillahn

5:05-5:20p

Faculty Sponsor: Kyle Johnson

Dementia is a neurocognitive disorder that is caused by neural degeneration. Amyloid precursor protein (APP) is a protein in the human genome that, if overexpressed, can lead to the development of dementia. CRISPR/Cas9 will be utilized to instill a modified human APP gene into the genome of *C. elegans* for experimentation. Once genetically modified, the *C. elegans* will be exposed to a heavy metal and subject to behavioral assays to determine its effects on dementia. It is expected that exposure to the heavy metal will increase the effects of dementia.

Spatial Analysis of GPAC Dance Competitors

Abigail Mullen

5:20-5:35p

Faculty Sponsor: Joel Helmer

Where are most of the dance competitors in the GPAC from? For this project I have mapped out using ArcGIS Online the hometown of each dance team member from the GPAC. Using spatial analysis tools, I have been able to find trends in where most of the competitors in the GPAC come from and what correlations there are between location and school choice.

Geography of GPAC volleyball players

Chris Shelton

5:35-5:50p

Faculty Sponsor: Joel Helmer

Women's volleyball is one of the most popular sports in the Midwest. This project maps and explains the Great Plains Athletic Conference (GPAC) volleyball team rosters and where their players reside. This project's ArcGIS Online map includes geographical locations of athletes' hometowns within the United States, as well as, athletes who reside in other countries. This map will overall demonstrate where coaches and GPAC college volleyball programs primarily recruit from and why it makes sense.



Oral Session C2

Monday April 25, 2022

Thom 113

Calculating the Probability of Certain Outcomes in the Game BUNCO!

Lauren Holmlund

4:50-5:05p

Faculty Sponsor: Brian Albright

This project is a mathematical simulation to calculate the probability of winning the game BUNCO between 1, 2, and 4 players.

Compulsions of Ethanol Addiction in *C. elegans* and the Role of Dopaminergic Signaling

Tabitha Ristvedt

5:05-5:20p

Faculty Sponsor: Kyle Johnson

The role of dopamine has not been researched in conjunction with the presence of compulsions, the need to intake a substance despite any negative consequences. Due to previous dopamine implications, dopamine may be necessary for compulsive addictive behaviors. This research examines such behaviors by presenting normal and dopamine deficient ethanol-conditioned *C. elegans* with ethanol surrounded by nonanone, a strong *C. elegans* repellent. Movement of conditioned worms toward nonanone is used to examine the hypothesis that dopamine is necessary for compulsive addictive behavior in *C. elegans*.

GPAC Tennis Examination

Drew D'Ercole

5:20-5:35p

Faculty Sponsor: Joel Helmer

Have you ever wondered where all the athletes in one sport from one conference come from? This presentation will be looking at maps of GPAC tennis players are from and what university they attend.

Monarchical Republicanism and its Imprint on American Government

Nicholas Totenhagen

5:35-5:50p

Faculty Sponsor: Matthew Phillips

Popular and scholarly thought in America commonly misunderstands the political character of the American Revolution to mostly be a revolt against monarchy, which ignores monarchism's crucial role in forming American government. This study seeks to establish the importance of monarchical thought and its enduring effects on early American government by utilizing documents from America's Founders and prominent scholars in the field. This is accomplished by analyzing various plans to create an American monarchy following the American Revolution, along with the implementation of monarchical ideas into the American Constitution.



Oral Session C3

Monday April 25, 2022

Thom 106

Prediction of March Madness Winners Through Simulation

Matthew Kamm

4:50-5:05p

Faculty Sponsor: Brian Albright

By using Microsoft Excel, a simulation of the NCAA Men's Basketball tournament was created to predict winners. The winners were predicted based on historical probabilities for matchups against seeds one through sixteen. All four regions were simulated including the Final Four. The simulation was then compared to the final outcome of the 2021 Tournament. This showed the probability of predicting every game right based on previous historical seeding matchups.

Saving the Southern Sea Otter

Mackenzie Koepke and Gabby Mason

5:05-5:20p

Faculty Sponsor: Jennifer Freund

This project explores the way we can conserve the environment and work to save the Southern Sea Otter population. With research and using Vortex, we are exploring ways that can help save the Southern Sea Otter from extinction by experimenting with numbers and data we are finding from other research and placing them into Vortex. By doing this we may be able to discover conservation strategies and help the population thrive again.

Caribou: Conservation or Extinction

Colten Uitermarkt and Nicholas Engebretson

5:20-5:35p

Faculty Sponsor: Jennifer Freund

Conservation biology is a relatively new topic in which methods for maintaining and growing populations is the top priority. Caribou is an interesting migratory species that is found in different populations all around the tundra. Studies done on Caribou look at their migration from breeding grounds to wintering grounds, population density, fertility, mortality rates, and more. This particular study accounts for a wide array of scenarios with the ultimate goal to find the proper population number, what environmental issues arise with this species, and a conservation plan to maintain healthy numbers of Caribou in North America. This study will be conducted using vortex, a software that was developed by the Conservation Planning Specialist Group, that uses a variety of situations involving winter and summer temperatures, fertility rate, mortality rate, population density, environmental impact, and other random factors and occurrence that could potentially occur to species. This software will aid in developing said conservation plan for the North American populations of Caribou.

Duck-Billed Platypus Conservation Status on King Island

Joel Rathe, Wyatt Loga, Maccoy Menke, and Nathan Auffet

5:35-5:50p

Faculty Sponsor: Jennifer Freund

Worldwide, duck-billed platypus populations are declining. This is no different in King Island in Australia. Through our group project for Conservation Biology (BIO 377), we wanted to find what was causing a decline in the duck-billed platypus population on Kind Island. In our project our group utilized Vortex Software to research and simulate both genetic and environmental factors to simulate what the King Island population of platypuses will likely look like generations from now. Through this we formulated potential solutions to help this population.



Oral Session D1

Monday April 25, 2022

Thom 111

Emerald Ash Borer Spread Simulation

Kathryn Castens

6:00-6:15p

Faculty Sponsor: Brian Albright

The invasive emerald ash borer has devastated the ash tree population in North America in recent years. Its rapid spread rate and the one hundred percent mortality rate of infected trees cause infestations to be fatal. I have created a model for the spread of the emerald ash borer and the effect of one dose of an insecticide on the ash tree population. Users can choose the time frame, the spread rate (within a specified range), and the percentage of the trees that are treated with the insecticide. The model outputs the percent of trees in the population that survive based on the chosen parameters.

The Effects of Glucose on TCER-1 *C. elegans*

Adler Rickords

6:15-6:30p

Faculty Sponsor: Kyle Johnson

The purpose of this study is to look at the effects that glucose in the diet has on TCER-1 strand *C. elegans*' health as a model organism for humans. The TCER-1 strand is different than wild *C. elegans* because they have increased longevity and stress resistance. The different aspects of their health that were looked at in this study were locomotion, reproduction, and growth rate. The tests should indicate that there is a direct correlation between the presence of glucose in a TCER-1 strand *C. elegans*' diet and their locomotion, reproduction, and rate of growth.

Risks to Tropical Island Systems

Cheyenne Smith and Jayzen Armstrong

6:30-6:45p

Faculty Sponsor: Jennifer Freund

There are many risks that damage/degrade tropical island systems. During this study tour to Ecuador and the Galapagos Islands, we observed several risks that show why conservation is so important on tropical islands. Some of these risks that we observed include, overfishing, tourism, coastal erosion, boating/cruise ships, solid waste, chemicals/pollutants, and the conservation of animals. These risks negatively affect the natural environment of the Galapagos, and we are looking at how we can decrease these affects. This is important because we want to preserve the natural beauty of the Galapagos as much as we can. If we are not able to decrease these risks, then the natural environment of the Galapagos may be destroyed beyond repair. This is also important because most of the species on the Galapagos are endemic, and if their environment is not preserved they are at risk of extinction.

A Population Viability Analysis on the Florida Manatees

Ellie Eason, Allee Downing, and Grace Soenksen

6:45-7:00p

Faculty Sponsor: Jennifer Freund

For our project, we conducted a Population Viability Analysis on the Florida Manatees. Through our research, we discovered that the main factors that were lowering the population levels of these mammals were direct human causes such as boat collisions and entanglement within rope lines, pollution from coastal development that kills off seagrass (their main source of food) and hurricanes which causes them to die from cold stress. In our presentation, we explain through graphs what we can change to help protect this vulnerable species from dangerously low population levels.



Oral Session D2

Monday April 25, 2022

Thom 113

Religion in the Dust Bowl

Joshua Marlatt

6:00-6:15p

Faculty Sponsor: John Hink

Faced with uncertainty about their crops, their property, and their very lives, people in the Dust Bowl clung to their faith, both for comfort and as a means to understand the storms which besieged them. Religious groups, especially Pentecostal and Holiness churches, capitalized on the rise of religiosity and saw growth in church membership. Religious publications from the era continually pointed to the dust storms as a sign from God. The religious implications of the Dust Bowl went beyond the storm-afflicted land of the Midwest. As groups of people fled the dust storms, they carried their faith with them to the west. Lacking possessions, many turned to the church to fulfill their need for community and value. Dust Bowl migrants introduced a new "Okie" culture to California, which was heavily centered on religion, altering the religious and social makeup of California.

Geographical distribution of GPAC track and field athletes

Andy Amos

6:15-6:30p

Faculty Sponsor: Joel Helmer

For my research project I mapped all the female track and field athletes in the Great Plains Athletic Conference (GPAC). Using a program known as Arcgis Online athletes were mapped using the location of their hometowns. By mapping these athletes, I was able to analyze the recruiting methods of each GPAC school and identify patterns that occurred such as clusters, pipelines, and outliers. These recruiting methods are greatly affected by the location of the college or university. This research holds value as recruiting methods and geographic distribution of athletes can be used to determine why each team may or may not be experiencing success in the sport of track and field.

Great Plains Athletic Conference Recruits

Hunter Cole

6:30-6:45p

Faculty Sponsor: Joel Helmer

Using the resource ARCGIS, I created a map of all the men's cross country athletes in the Great Plains Athletic Conference. I will be showing the trends of the coaches recruiting by analyzing the data shown on the maps I created.

The Effect of Nicotine on the Locomotion of *C. elegans*

Maccoy Menke

6:45-7:00p

Faculty Sponsor: Kyle Johnson

Nicotine induces a decrease in muscular strength and anaerobic performance, but can be used to enhance concentration, agility, and aerobic performance. Assessing *C. elegans* to see how the organisms responds to nicotine should reveal an effect on its locomotor activity. By incubating nicotine with the agar plates, the effects of nicotine addiction should increase the locomotor activity of the worms. After removing the worms from the nicotine plates, the locomotor activity will greatly decrease.



Oral Session D3

Monday April 25, 2022

Thom 106

Analyzing GPAC Baseball Players Regionally

Cale Mathison and Joey Grabanski

6:00-6:15p

Faculty Sponsor: Joel Helmer

We analyzed the locations of every baseball player in the Great Plains Athletic Conference (GPAC) in 2021-2022. Using ArcGIS Online, each player's hometown was mapped using the associated school logo. Through the maps, our layers have revealed certain recruiting patterns and clusters from the individual schools in the GPAC.

Epidemic Model with Covid-19

Bree Green

6:15-6:30p

Faculty Sponsor: Brian Albright

Using an epidemic model, we can predict the number of susceptible and infected people of Covid-19 depending on transmission coefficients of different vaccines. I looked at Moderna, Pfizer, and the Johnson and Johnson vaccine, as well as those who are unvaccinated. Mostly everything in the model the user can input their own data, so it is very individualized.



Oral Session D4

Monday April 25, 2022

Thom Auditorium

Queue Lines

Benjamin Toenjes

6:00-6:15p

Faculty Sponsor: Brian Albright

This presentation will discuss my project based on Queue Lines. I created a model in Excel to compare and contrast different set-ups for how stores might design their checkout areas. Through the use of varying service and arrival rates, I found that sorting customers by item amounts allows for a more expedited service process. Apart from these results, this model has room for extensions and additional applications.

GPAC Softball Rosters

Kyle Berg

6:15-6:30p

Faculty Sponsor: Joel Helmer

This project is based on the rosters of the softball teams in the Great Plains Athletic Conference and where the players of each team are originally from. The research that has been gathered from each of the schools in the Great Plains Athletic Conference has been mapped using ARCGIS and made into a presentation. This project was created to find patterns of where each school gets their players from. You will find by looking at this map that every school tends to pull many players from out of state and far away from their home. However, there are 3 schools that tend to pull their players only from in state and surrounding states. Those schools include Morningside University, Northwestern University, and University of Saint Mary's. The other schools in the GPAC tend to be pretty even on recruiting out of state and recruiting in state.

Great Plains Athletic Conference Men's Track and Field Analysis

Jarod Reed

6:30-6:45p

Faculty Sponsor: Joel Helmer

Through the use of ArcGIS Online and Microsoft Excel an analysis of the Men's Track and Field athletes from within the Great Plains Athletic Conference (GPAC) during the 2021-2022 season was completed. The purpose of the maps is to provide a visual representation of the recruitment trends of each individual team and the GPAC as a whole. While the analysis explains why each school recruits their athletes from certain regions.

Busyness and its Effects on Quality of Friendships

Annah Heck

6:45-7:00p

Faculty Sponsor: Sara Brady

Past research on college campuses has shown that getting involved in activities around campus can strengthen a student's sense of belonging (Murray, 2010). What this research doesn't look at is if this same busyness causes unwanted effects such as decreases in friendship quality or increased stress or anxiety (Govasli, 2020). Mental health issues, such as depression, self-esteem, and anxiety are large issues on college campuses (Matthew, 1998) The purpose of this study is to compare levels of busyness with the quality of friendships. It is expected that as a person's levels of perceived busyness increase, the quality of their friendships will decrease. There were 79 individuals who responded to the survey via an anonymous link or a QR code. Results, implications, and future directions based upon the hypothesis of this study will be discussed.

