

# Scholarship

# Arts

# Symposium

# 2023



**THIEL**  
COLLEGE



# Symposium Schedule Overview

**8:30 a.m. – 8:45 a.m.**

**Welcome and Opening Remarks**

Dr. Susan Traverso, President

*Bly Hall*

**9:00 a.m. – 12:00 p.m.**

**Morning Session**

Multimedia Presentations, *Pedas Discovery*

Dietrich Honors Institute Thesis Presentations, *Stamm Hall*

Oral Presentations, *Lutheran Heritage Room*

Digital Posters, *Bly Hall & Pedas 125*

**9:30 a.m. – 3:00 p.m.**

**Student Art Show,**

*Weyers-Sampson Gallery HMSC*

**12:00 p.m. – 1:00 p.m.**

**Lunch**

**1:00 p.m. – 1:30 p.m.**

**Keynote Address:**

Jared Johnson, Ph.D., Associate Professor of English

“Launching Scholars: Research and the Tomcat Way”

*Stamm Hall*

**1:30 p.m. – 3:00 p.m.**

**Afternoon Session**

Dietrich Honors Institute Thesis Presentations, *Stamm Hall*

Digital Posters, *Bly Hall & Lutheran Heritage Room*

Oral Presentations, *Pedas 125*

**3:00 p.m. – 4:30 p.m.**

**Library Research and Writing Awards & Closing Reception**

*Stamm Hall*

# MORNING SESSIONS

## ROOM: PEDAS DISCOVERY

### *Multimedia Presentation*

**Moderator: Mary Theresa Hall**

**9:00 – 9:30 a.m.**

Kaitlyn Schmidt (T.A.), Bianca Fenstermacher, Blake Gibson,  
Brooke Griffith, Karigan Hager, Makenna Oswalt  
M.T. Hall, Ph.D., Professor of English

*Developing the Culture of STEAM at Thiel College*

## ROOM: STAMM HALL

### *Dietrich Honors Institute Thesis Presentations*

**Moderator: Sheila Nowinski**

**9:30 a.m. – 9:50 a.m.**

Raquel McDonald  
N. Homa, Ph.D., Associate Professor of Psychology

*Expert Versus Eyewitness: Who Do We Trust When They Conflict?*

**9:50 a.m. – 10:10 a.m.**

Rebekah Ladaika  
J. Kobak, MA, CCC-SLP, Associate Professor of Communications,  
Sciences and Disorders

*What Makes a Children's Television Show Beneficial for Learning and  
Developing Language Skills?*

**10:10 a.m. – 10:30 a.m.**

Shayna Lantz  
M. Morgan, Ph.D., Professor of Philosophy

*The "Culture of Poverty"*

**10:30 a.m. – 10:40 a.m.**

Break

**10:40 a.m. – 11:00 a.m.**

Demir Schroyer

A. Franley, M.Div., Visiting Assistant Professor of Religion

*How Christian Persecution in Ancient Rome Influenced the Symbolism in Revelation*

**11:00 a.m. – 11:20 a.m.**

Christian Kemp

A. Franley, M.Div., Visiting Assistant Professor of Religion

*Parables of the Synoptic Gospels: The Lessons that We Can Learn and Apply to Our Lives Today*

**11:20 a.m. – 11:40 a.m.**

Zoe Heckathorn

A. Reinsel, Ph.D. Professor of Environmental Science and Chemistry

*Soil Reclamation: How Effective Are Sunflowers at Absorbing Heavy Metals?*

**11:40 a.m. – 12:00 p.m.**

Cassandra Bown

A. Reinsel, Ph.D., Professor of Environmental Science and Chemistry

*The Salton Sea: An Environmental Disaster and Public Health Risk*

# ROOM: LUTHERAN HERITAGE ROOM

## *Oral Presentations*

**Moderator: Greg Kingston**

**9:00 a.m. – 9:20 a.m.**

Cassandra Bown  
M. O'Donnell, Ph.D., Assistant Professor of Biology

*The Impacts of Stress on the Placental Functional Zone*

**9:20 a.m. – 9:40 a.m.**

Danielle Sterling  
M. O'Donnell, Ph.D., Assistant Professor of Biology

*The Effects of Stress on Placental Labyrinth Development*

**9:40 a.m. – 10:00 a.m.**

Jenna McCandless  
M. O'Donnell, Ph.D., Assistant Professor of Biology

*The Effect of Stress and L-Citrulline on Placental Development*

**10:00 a.m. – 10:20 a.m.**

Break

**10:20 a.m. – 10:40 a.m.**

Grace Adams  
G. Kingston, Ed.D., CSCS, Assistant Professor of Exercise Science

*Injury Prevention Program Awareness, Knowledge, and Attitudes Among Division III College Athletic Directors*

**10:40 a.m. – 11:00 a.m.**

Hannah Strott  
G. Kingston, Ed.D., CSCS, Assistant Professor of Exercise Science

*Exercise as a Treatment Modality in Occupational Therapy*

**11:00 a.m. – 11:20 a.m.**

Jacob Sirofchuck  
J. Broderick, Ph.D., Assistant Professor of Biology

*Dental Hygiene in Traditional Undergraduate Students at Thiel College*

**11:20 a.m. – 11:40 p.m.**

Malajah Johnson, Brooke Deal, Katherine Phillips  
J. Broderick, Ph.D., Assistant Professor of Biology

*Evaluating our Treatment of Chronic Pain: From macrophage-targeted nano emulsion delivery to understanding the differences sex and race play*

**ROOM: PEDAS 125**

*Digital Poster Presentations*

**Moderators: Michael Balas & Natalie Homa**

**9:00 a.m. – 10:00 a.m.**

Biology Posters

**10:00 a.m. – 10:30 a.m.**

Chemistry Posters

**10:30 a.m. – 10:45 a.m.**

Psychology Posters

**10:45 a.m. – 11:00 a.m.**

Communication Science Disorders Posters

**ROOM: BLY**

*Digital Poster Presentations*

**Moderator: Jared Hanneman**

**9:00 a.m. – 12:00 p.m.**

Evidence Based Medicine and Public Health

## LUNCH BREAK

*Lunch on your own*

**12:00 p.m. – 1:00 p.m.**

## KEYNOTE ADDRESS

*STAMMHALL*

**1:00 p.m. – 1:30 p.m.**

Dr. Jared Johnson, PhD., Associate Professor of English  
*Launching Scholars: Research and the Tomcat Way*

## AFTERNOON SESSIONS

**ROOM: STAMMHALL**

*Dietrich Honors Institute Thesis Presentations*

**Moderator: Tressa Snyder**

**1:30 p.m. – 1:50 p.m.**

Morgan Wood  
N. Lax, Ph.D., Assistant Professor of Neuroscience

*Can Transcutaneous Electrical Nerve Stimulation Be Used to Treat Inflammatory Pain?*

**1:50 p.m. – 2:10 p.m.**

Mya Storll  
M. Balas, Ph.D., Professor of Biology

*Does the Drinking Water on Campus and in Greenville Meet State and Federal Standards Regarding Lead and Copper Content?*

**2:10 p.m. – 2:30 p.m.**

Zakaria Wilson  
E. Torigoe, Ph.D., Associate Professor of Physics

*Dvorak's Setbacks: Barriers to Learning the Dvorak Keyboard*

## **ROOM: PEDAS 125**

### *Oral Presentations*

**Moderator: Nancy Antonino**

**1:30 p.m. – 1:50 p.m.**

Anthony Trobek  
J. Broderick, Ph.D., Assistant Professor of Biology

*Use of Lures in Camera-Trapping PA Wildlife around Thiel College*

**1:50 p.m. – 2:10 p.m.**

Kylee Eaton  
J. Broderick, Ph.D., Assistant Professor of Biology

*Influence of Weather on the Presence of PA Wildlife around Thiel College*

**2:10 p.m. – 2:30 p.m.**

Omahn Dobbins  
J. Broderick, Ph.D., Assistant Professor of Biology

*Optimizing DNA Extractions For Development of Species-Specific Primers in eDNA Experiments*

## **ROOM: LUTHERAN HERITAGE ROOM**

### *Digital Poster Presentations*

**Moderator: Jared Hanneman**

**1:30 p.m. – 3:00 p.m.**

Statistics for the Social Sciences

## **ROOM: BLY**

### *Digital Poster Presentations*

**Moderator: Mary O'Donnell/Neil Lax**

**1:30 p.m. – 2:15 p.m.**

Microbiology Posters

**2:15 p.m. – 3:00 p.m.**

Neuroscience Posters

## **STAMM HALL**

### *Library Research & Writing Awards*

**3:00 p.m. – 4:30 p.m.**

## **STAMM HALL**

### *Closing Reception*

**4:00 p.m. – 4:30 p.m.**

# MULTIMEDIA PRESENTATION

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## MORNING SESSION – PEDAS DISCOVERY

### **Developing the Culture of STEAM at Thiel College**

*Kaitlyn Schmidt (T.A.), Bianca Fenstermacher, Blake Gibson,  
Brooke Griffith, Karigan Hager, Makenna Oswald  
M.T. Hall, Ph.D., Professor of English*

Over the last two years, a group of students in Dr. Hall's Honors 114: Creating Culture course presented the concept of inserting the arts and humanities into the basic STEM principle. The previous STEAM Team members cultivated an inclusive environment for students to creatively express themselves; this newly renovated room is now located on the second floor of the library. This year, the students enrolled in this section of the course continued to renovate, publicize, and preserve the STEAM Room for future Thiel students. Three separate yet cohesive branches of the STEAM Team – fundraising, marketing, and renovations – collaborated to enhance the community of Thiel and Greenville. Students took practical steps to restore the room and improve its condition. Initially, they distributed a survey to all students, seeking interest of possible academic department contributions. Then, they painted ceiling tiles, which represent the unity and distinction among the various academic programs offered at Thiel; raised funds to ensure longevity; and marketed the room to encourage patronage. This room now emblemizes the arts, sciences, and Thiel's mission statement. The principles of STEAM are timeless. The STEAM Team hopes to see you there!

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## DIETRICH HONORS INSTITUTE THESIS PRESENTATIONS

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## MORNING SESSION – STAMM HALL

### **Expert Versus Eyewitness: Who Do We Trust When They Conflict?**

*Raquel McDonald  
N. Homa, Ph.D., Associate Professor of Psychology*

In the courtroom, jurors perform one of the most important roles that allow the criminal justice system to function in the United States. Because of their decision of guilty or not guilty, the jury holds immense power over the future of the defendants that enter court. The abundance of media on crime, such as TV shows and documentaries, has been seen to influence the perception of evidence and testimonies, known as the CSI effect. In order to understand how jurors make their decision, this study aims to determine whether a jury finds the testimony of a forensic expert or eyewitness more credible and how that influences the outcome of the trial. Data was collected on around 130 participants through a survey that provided a vignette of a murder based on a real case and the testimonies of an eyewitness and forensic expert; participants were then asked to rank each testimony's credibility and determine guilt. The cross-sectional sample was gathered by convenience. Results showed that there was no significant difference in perceived credibility between the eyewitness and the forensic expert. Further findings support the CSI effect, where there was a significant correlation between individuals who watched more crime shows or documentaries

and those who thought this media was accurate. This research creates opportunities for deeper analysis into the perception of forensic experts versus eyewitnesses; this is a serious concern in the courtroom as the former are often seen as condescending and the latter are known to be unreliable, both of which could result in poor trial outcomes.

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## **What Makes a Children's Television Show Beneficial for Learning and Developing Language Skills?**

*Rebekah Ladaika*

*J. Kobak, MA, CCC-SLP, Associate Professor of Communications, Sciences and Disorders*

This study examines the current field of children's television shows using the five domains of language to determine the show's effectiveness in improving language development. Language development is an important process that spans many years. It is a crucial part of a child's development because language is how we share our wants, needs, and ideas. According to research, the best way to promote good language skills in children is through parent-child interactions. Technological advances have led to more media consumption by adults and even children. Increased media consumption takes away from parent-child interaction, which can have a negative impact on a child's language development. Using the five domains of language, a good television show would have strong morphology, phonology, syntax, semantics, and pragmatic qualities. Educational television was created to entertain while simultaneously educating on various topics that a child would learn in a classroom. Not only can children's television shows affect grades, but it can also have an effect on language skills. There is a known process to how children develop communication skills. Therefore, it is important that the media children are consuming is aligned with their development process to help promote the best results. Children will continue to watch television for their entertainment; however, caregivers should ensure they are watching the shows that are the best for their development. The goal of this study is to create an information tool that parents and caregivers can use to determine whether a children's television show is beneficial for learning and developing specific language skills.

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## **The "Culture of Poverty"**

*Shayna Lantz*

*M. Morgan, Ph.D., Professor of Philosophy*

The education system is an important institution that shapes students into functioning members of society. School is meant to be a fulfilling experience, but this can be dependent on teachers' attitudes in the classroom. The dominant group, white middle-class children, are typically the ones who receive more encouragement from their teachers. On the other hand, marginalized groups, such as students in poverty, may not experience the same engagement, leaving them to feel excluded and inadequate. This is not intentionally done by educators, as it is often an effect that arises from stereotypes embedded in the concept of the "culture of poverty". This creates biases that unconsciously direct the interactions that teachers have with students who come from impoverished backgrounds. The reason that teachers may accept these stereotypes could be due to a lack of sociological understanding. This ignorance can result in a self-fulfilling prophecy, where students will internalize the way authority figures perceive them and act accordingly. The method for this research will be done through an analysis of primary and secondary sources

to understand the relationship between the culture of poverty and this self-fulfilling prophecy. It will also include examining the core curriculum for education majors to identify whether it contains a sufficient amount of sociology classes that will equip future teachers to provide an equal opportunity to all students from different backgrounds.

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## **How Christian Persecution in Ancient Rome Influenced the Symbolism in Revelation**

*Demir Schroyer*

*A. Franley, M.Div., Visiting Assistant Professor of Religion*

The understanding of the book of Revelation is a major theoretical issue in the theological community. Understanding how Christian persecution in ancient Rome influenced the symbolism in Revelation will help to better understand the book itself. As a result of my research, I have concluded that many important aspects of Revelation have been influenced by Christian persecution happening in first-century Rome. I have found that Babylon represents the Roman empire, specifically the value the empire places on material wealth, and its hostility towards Christians. The beasts in Revelation represent Roman imperial power; the beasts' features symbolically represent Rome. The mark of the beast represents Roman money and how more zealous early Christians, such as John, refused to use Roman money because they refused to participate in a society that persecuted them. The number 666 represents emperor Nero Caesar, an infamous persecutor of the early Christian church. Finally, Jesus' ultimate triumph at the end of Revelation represents a sign of hope, telling readers during the late 1st century that Christianity will prevail over Roman persecution.

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## **Parables of the Synoptic Gospels: The Lessons that We Can Learn and Apply to Our Lives Today**

*Christian Kemp*

*A. Franley, M.Div., Visiting Assistant Professor of Religion*

The first four books of the New Testament are referred to as the gospels. The gospels of Matthew, Mark, and Luke are collectively referred to as the Synoptic Gospels. These books contain a detailed account of the life of Jesus. Jesus often taught his followers using parables, a story that teaches a moral lesson. These lessons greatly differed from the standards of the time and led to clashes between Jesus and the Jewish religious leaders. Although written almost 2,000 years ago, these lessons are still relevant to our lives today. By taking a deeper look at these parables and the historical context behind them, I discovered many universal themes that everyone can relate to. These reoccurring themes help us reflect on who we are and how we treat others. By applying these lessons to our lives, we can seek to live a better life, one filled with a greater amount of respect and understanding for ourselves and others.

## **Soil Reclamation: How Effective Are Sunflowers at Absorbing Heavy Metals?**

*Zoe Heckathorn*

*A. Reinsel, Ph.D. Professor of Environmental Science and Chemistry*

Soil degradation is a global issue that has become increasingly problematic. Soil is a critical component of life and is the backbone of the agricultural industry. When soil becomes unfit for plant growth or land development, it becomes an interdisciplinary crisis that can be costly, time-consuming, and fruitless. As civilization developed, industrialization, urbanization, and the abundant use of fertilizers allowed pollutants to increase and enter the soil in many ways. While there is a range of contaminants that may be found in the soil, the removal of heavy metals is of high priority due to their toxicity, inability to biodegrade, and tendency to accumulate. Techniques of phytoremediation using sunflowers (*Helianthus annuus*) have shown the potential to provide effective heavy metal extraction, without being ecologically aggressive or costly. In this experiment, sunflowers were planted in pre-contaminated soil, grown for five weeks, harvested, and measured. Metal content analysis was conducted on plant matter and soil using X-Ray Fluorescence Spectroscopy (XRF) and Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) to determine how well the plant removed copper, nickel, and zinc from the soil. This research can be used to further the inquiry on the phytoremediation of heavy metals and soil reclamation.

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## **The Salton Sea: An Environmental Disaster and Public Health Risk**

*Cassandra Bown*

*A. Reinsel, Ph.D., Professor of Environmental Science and Chemistry*

Around the world, climate change, droughts, and human actions are increasing the rate at which saline lakes are drying up. The Salton Sea, located between the Imperial and Coachella Valleys in Southern California, is a saline lake whose water levels are maintained primarily by agricultural runoff. As the lake recedes, chemicals that are deposited into the lakebed form particulate matter (PM), which can be picked up by the wind to create dust storms. Exposure to dust near the Salton Sea and in other regions around the world has been associated with an increased risk of hospitalizations, respiratory issues, cardiovascular diseases, and mortality. Near the Salton Sea, little progress has been made to fix these issues, but proposed solutions focus on mitigation efforts to suppress dust emissions, including planting vegetation or importing water. It is hypothesized that by reducing dust emissions, the air quality and people's health conditions will improve. This paper is a review of published literature that examines what is happening to the Salton Sea, how it is related to the health problems that are seen in the Imperial Valley, and what solutions have been proposed to resolve these issues. This analysis hopes to spread awareness of this issue that is affecting people's well-being.

# DIGITAL POSTER PRESENTATIONS

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## MORNING SESSION – BLY

### EVIDENCE-BASED MEDICINE AND PUBLIC HEALTH

#### **Do Adverse Childhood Experiences play a role in the development of Mental Disorders?**

*Natalia Addo*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

With each passing year, a growing number of the U.S. population struggle with some type of mental illness. Mental health disorders account for several of the top causes of disability in our world. In 2019, an estimate of 418 million disability-adjusted life years (DALYs) were attributable to mental disorders. A growing body of research has revealed some of the risk factors that predispose children and adults to mental disorders. Adverse childhood experiences (ACEs) are one of the many risk factors and are closely related to the occurrence and development of many mental disorders. ACEs such as child abuse (emotional, physical, or sexual), child neglect (emotional or physical), and household dysfunction (domestic violence, substance abuse, mental illness, criminal activity, or parental absence) are also connected to a trend of health problems in adulthood such as heart diseases, sexually transmitted infections to name a few. Using the BRFSS dataset, I will show that adults who experienced adverse childhood experiences (exposure) are more likely to develop mental disorders (disease) than those not exposed. This research can help show the relationship between childhood environmental experiences and mental disorders.

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#### **The COVID-19 pandemic: investigation into the effect of a nationwide lockdown on drug use in the United States of America**

*Ryan Anselmino & Ashley Riccardino*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

The COVID-19 pandemic lockdown greatly affected the mental health of United States citizens. This research project analyzes drug use in 2019, 2020, and 2021 to determine if there is any statistically significant correlation between the time periods before, during, and after the COVID-19 federal lockdowns that were implemented beginning in March of 2020. The data sets that are utilized in this research project are from the National Survey on Drug Use and Health (NSDUH). For example, in the year 2019, the percentage of respondents who had confirmed alcohol use at some point was 71.48%. In the year 2020, this number rose to 74.54%, before then dropping to 71.91% in 2021, following the federal lockdowns. Similarly, reported marijuana usage in 2019 was at 44.22% of respondents, which then increased to 45.15% in 2020 before falling to 44.02% in 2021. While collecting data, it was anticipated that there would be similar trends with other drugs of interest, including cocaine, oxycontin, and cigarettes. The increased drug use seen during the challenging times had both short and long-term ramifications, some of which may not be fully understood for several years. For example, in May 2020, there was a 57.7% increase in drug related deaths in comparison to the prior May (2019). This research can be used to suggest where public health resources should be allocated to affect any potentially marginalized groups as it pertains to drug use during the COVID-19 pandemic.

## **Healthcare and socioeconomic status: an investigation to the dependence of one's access to healthcare on their socioeconomic status**

*Kendra Benton*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

Socioeconomic status has long played an important role in society, and it has a big role in one's health care, those who are of a lower status and a lower income may forego medical care. By having inadequate care, the mortality and morbidity of these individuals increase. Healthcare isn't all about medicine, it's about education as well. It is important for individuals to be taught about their own health and how it may affect them later in life or any children they may have. Students hypothesize that low socioeconomic status is associated with a decrease in one's health care leading to higher individual morbidity and mortality. Socioeconomic status may be dependent on variables such as work conditions and region of residence, which may increase the need for medical care and limit the accessibility to that needed healthcare. Students will utilize the General Social Survey (GSS) to obtain additional data and with the use of SPSS they will be able to accept or reject their original hypothesis. It is expected to see some sort of correlation between healthcare and socioeconomic status.

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## **An Evaluation of the Relationship Between a Person's Religious Beliefs and Their Views on Physician Assisted Suicide**

*Casey Buechel*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

Bodily autonomy at the end of life is constantly on the docket of the United States government. Many people argue that because of their religious beliefs, other citizens should not be granted bodily autonomy, and the United States government should regulate and criminalize it. However, in the United States, there is a separation between church and state. So, these arguments should not be based on religious views, but they still are despite this separation. The specific arguments around physician assisted suicide vary greatly. The review article, "Assisted Dying Around the World: A Status Question", highlights most of the arguments that are present throughout the world regarding physician assisted suicide. They specifically highlight two opposing arguments. The argument regarding religious beliefs being the reason against physician assisted suicide is "often based on the principle of sanctity of life" (Mroz et al. 2020), but the argument for physician assisted suicide legalization is that it is "the only option to relieve unbearable suffering and that quality of life takes precedence over quantity of life" (Mroz et al. 2020). Overall, physician assisted suicide is a highly debated topic in the United States and worldwide from many moral, ethical, and legal standpoints. In the United States, there are many arguments formulated against physician assisted suicide that are based on a person's religious preferences that might not accurately reflect the entire populations views. This project will evaluate whether a person's religious views are correlated with their beliefs about physician assisted suicide.

## **Correlation between socioeconomic status and substance abuse**

*Kara M. Davis & Emily Baer*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

There is a correlation between low socioeconomic status and higher use of alcohol and tobacco. This is proven by looking at the dependent variables like how many days per week people drank in the past 12 months would depend on their socioeconomic status, the number of drinks per day depends on their socioeconomic status, etc. Compared to the independent variables which looks at families that receive welfare have lower socioeconomic status which can lead to substance abuse, a person's total income could lead to substance abuse, etc. Therefore, we have found that people from lower socioeconomic backgrounds will have a higher use of alcohol and tobacco.

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## **Insurance and cancer: the link between preventative cancer screening and insurance coverage**

*Sbianne M. Donovan*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

Many variations of cancer affect the world, and traditionally the main stay of treatment is prevention and early diagnosis. Prevention and early diagnosis typically include screening tests used at specifically designated ages and/or situations. These screenings lead to better outcomes for patients who, without these measures, often find themselves with a cancer diagnosis that is beyond treatment. While utilization of these tests is incredibly important, they are often underused due to different socioeconomic barriers, including medical insurance coverage attained by the patient. Barriers to these forms of treatment are essential to identify in the continued effort to provide effective cancer treatment. Students hypothesized that individuals who receive medical insurance coverage complete more comprehensive cancer screening tests than those that do not have medical insurance. Cancer screenings that were investigated were common variants of breast, cervical, prostate, and colorectal cancer. Each dependent screening was individually assessed and compared to independent variables assessing presence of insurance coverage and specific types of coverage used.

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## **The association between age of first-time drug use/misuse and various sociodemographic factors in the United States**

*Mariab Fluke, PA-S, Samantha Houle, PA-S, and Sarah McCann, PA-S*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

This study analyzes whether, or to what extent, various sociodemographic factors (including employment status, race/Hispanicity, gender, education, and total family income) have a role in the age of first-time drug usage/misusage (regarding 18 different drugs including, but not limited to illicit drugs, alcohol, tobacco, and prescription psychotherapeutic agents) amongst individuals aged 12 years and older within the United States. This study explores potential protective factors, such as drug and alcohol education, and engaging in discussion with parents concerning the dangers of tobacco, alcohol, or drugs. Factors that were expected to increase the likelihood of drug use/misuse were also explored, such as being approached by someone selling drugs, the presence of mental health issues/major depressive episodes, drug or alcohol use problems, and involvement in serious fights while at work/school. Students hypothesize expected differences and utilize the 2021 National Survey on Drug Use and Health (NSDUH) as their data set for statistical analyses. Further investigation of the demographic and social characteristics, as well as motivations for drug initiation and misuse, is imperative to drug use prevention and drug treatment outcomes. Enhancing the knowledge and availability of this information can lead to prophylactic management for individuals at an increased risk of drug use, and prevention programs for those struggling with drug misuse/abuse.

## **The Relationship between Depression, Poverty, and Mental Health Service Utilization among the American Population**

*Hailee Foster*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

This study investigates the relationship between depression, poverty, and mental health service utilization among the American population aged 12 and above. Despite the significant impact of mental health on overall well-being, mental health services and treatment are underutilized, particularly among the impoverished population in the United States. This study uses the 2021 National Survey on Drug Use and Health (NSDUH), which is the primary source of statistical information on substance use and mental illness across various subgroups, trends over time, and the need for treatment services in the United States. The study hypothesizes that there is a direct correlation between the lack of utilization of mental health services and the income level of those struggling with mental health issues. The study's dependent variables include government-assisted programs, total family income, poverty level, depression, and mental health service utilization. The findings of the study are expected to be generalizable to the larger target population. Scientific literature used for this study suggests that poverty is a significant social determinant of mental health in the United States, with children and families living in poverty disproportionately affected. Poverty has been directly linked to poor health outcomes and increased risk for mental health disorders. Mental health care service utilization is especially challenging due to the scarcity of available services, and the most common barriers to healthcare access relate to affordability. This study aims to provide insights that may help address the growing medical problem of mental illness among impoverished Americans.

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## **The impact of negative life events on levels of altruism**

*Jessica Kylander*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

Empathy is the ability to understand and share feelings of someone going through a similar experience. Altruism takes empathetic feelings and turns it into selfless concern for another's welfare despite the trauma being experienced. The purpose of the present study is to understand how the experience of negative life events can affect a person's altruism toward others and how this result changes the way they interact with the world and people around them. It is anticipated that the quantity of these traumatic experiences increases the altruistic tendencies toward other suffering persons. We find it necessary to determine the correlation between these topics to understand psychological differences as a result of suffering. Randomized quantitative research analyzes the negative life events of participants and the altruistic capacity to care for the less fortunate. People were more likely to have a negative life event (0.7458) than those without (0.2541) and more people considered themselves to be altruistic (0.4605) compared to those who did not (0.0402). This project outlines the comparison of these two topics and paints a clear relationship between trauma and compassion.

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## **An investigation of the effects of socioeconomic status on mental and physical health.**

*Maggie Nee and Abigail Young*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

There are disparities among individuals of differing socioeconomic status (SES) regarding public health and medicine. There are correlations between lower SES and higher rates of disease and disabilities worldwide. In contrast, wealthier adults are correlated with better access to healthcare, which results in better health

outcomes. This study examines how SES impact mental and physical health by using SPSS. Our hypothesis is lower SES negatively impacts mental and physical health outcomes. Variables that measure SES include the following survey questions: poverty status, income level, vocabulary knowledge, education level, residence, how much cash in stocks, eligibility for bonus at work, how much do people in your job earn, poor service compared to others at stores, and people act as if you are not smart. Variables that measure mental health status include the following survey questions: knowing suicide victims, emotional or mental disability, access to mental healthcare, how many days a week do you feel sad, and how many days a week do you feel anxious or tense. Lastly, variables that measure physical health status include the following questions: pain scale, how physical health affected activities of daily living, fatigue, regular doctor/ clinic, and does your health insurance have restrictions on doctors. The objective of this study is to use the comparison of the statistical analysis results to reveal specific discrepancies of access to basic necessities and how it impacts the public's health. This research can be used to see what interventions are needed to provide services to those in lower SES.

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### **Anabolic steroids: investigation of mental health effects in using adolescents**

*Owen R. Kravetz*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

Athletes, during their adolescence, very often desire to elevate their performance in their respective sports. Since the 1980s, adolescents have self-reported anabolic steroids use at some point in their career. Anabolic steroids can increase lean muscle mass, lower body fat, and increase athletic performance. Many scientific providers have discouraged the use of these substances due to their physiological side effects such as endocrine changes, cardiovascular injury risk, and increased musculoskeletal injuries. However, the mental changes due to anabolic steroid usage are not as well studied. Some initial studies did report students, mainly males, who used anabolic steroids had increased depression, disordered eating, and possible reliance on the substances. Students hypothesize adolescents, especially males in strength-related sports, will be more likely to use anabolic steroids in their lifetime. The initial use of the steroids may show immediate rewards, but they will likely suffer from dependence and serious mental health side effects from use/misuse of the drugs. Data taken from the National Survey on Drug Use and Health (NSDUH) were analyzed across steroid-using adolescents and the side effects, if any, they may have endured while using. This study will be investigating a statistically significant relationship between adolescents' mental health and the use of anabolic steroids. Further evaluation of the role sex has on this relationship will add greater insight to this possible association.

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### **The relationship between cigarette smoking and 16 different types of cancer in the United States**

*Robert O'Connor, MPH*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

Cigarette smoking is a well-known risk factor for the development of cancer. Smoking cigarettes tops the list of modifiable risk factors, accounting for 19% of all cancer cases and nearly 29% of cancer deaths (Mendes 2017). Here, we examine the prevalence of 16 different types of cancer in the United States. We aim to answer whether smoking cigarettes, even once, significantly increases the prevalence of each type of cancer. A group of over 56,000 study participants in the United States helped answer this question. The results of this study hope to prove useful in future policy and medical decision making.

## **Exploring the potential link between sleep deprivation and health conditions**

*Joey Petrolla*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

Sleep is a vital aspect to human health, but it can easily be neglected. Sleep deprivation can naturally lead to decreased functionality during the day, but that is not all. It has also been implicated as an important risk factor for several disease states including ones such as diabetes, coronary heart disease, and pulmonary disease to name a few. Sleep deprivation is often defined as sleeping fewer than seven hours per night. This will be the independent variable. The dependent variables will be the prevalence rates of each of the disease states. This data analysis is expected to demonstrate a positive relationship between individuals who fall short of the seven-hour mark and prevalence rates of the disease states in question.

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## **The Importance of Sleep for Physical and Mental Well-Being**

*Julia Petrucci, Lorela Pengu*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

Sleep quality and quantity are independent risk factors for many physical and mental illnesses. Receiving inadequate sleep each night puts an individual at a higher risk of developing cardiovascular disease, cancer, anxiety, and depression. There are many factors that can contribute to sleep hygiene. These include, but are not limited to, education level, socioeconomic status, number of children in the household, and income level. As future practicing physician assistants, we believe it is our responsibility to inform our patients of all the risk factors of an illness. Education of our patients is a key role of a PA, and by better educating our patients about the importance of sleep, we can help minimize their risk of developing certain diseases. Upon analyzing our data, we believe that receiving an adequate quantity and quality of sleep each night will cause an individual to have a higher computed physical and mental health status. We will analyze the effect of many independent variables, such as “education level” and “own or rent a home”, on one’s sleep quality. We will then study the impact of sleep quality on many dependent variables, such as “how many types of cancer” and “ever diagnosed with coronary artery disease.” Using SPSS software, we will analyze the effects of quality of sleep on an individual’s computed physical and mental health status.

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## **An investigation of the mean incidence of mental health conditions in patients with chronic medical conditions**

*Allison M. Sarbaum*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

Chronic health conditions, such as heart disease, COPD, and cancer, and mental health conditions, such as depression and stress, are both extremely prevalent in society. Advances in medicine allow patients to live longer and have more treatment options, but the emotional toll on patients must also be considered. Patients may commonly feel discouraged, anxious, or sad after receiving a chronic diagnosis and while trying to manage it. Therefore, it is hypothesized that the mean incidence of mental health conditions will be higher in patients with chronic medical conditions compared with the mean incidence of mental health conditions in patients who are healthy. This study was created to investigate whether people who have been diagnosed with a chronic medical condition, the independent variable, have a higher incidence of mental health conditions, the

dependent variable, due to feeling unwell, feeling discouraged, or trying to manage the condition. Using the 2021 Behavioral Risk Factor Surveillance System, various independent and dependent variables are looked at to investigate this relationship to determine whether there is a relationship between chronic health conditions negatively affecting one's mental health.

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## **Esophageal cancer: investigation of increased incidence with excessive alcohol consumption**

*Kierstin N. Schade*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

While often overlooked, esophageal cancer is rarely discoverable at an early/curable stage, most patients showing lymph node involvement at first presentation to their doctor, leaving most treatment options to be palliative only. Esophageal cancer only accounts for 1% of all cancers diagnosed in the United States, once it spreads to nearby lymph nodes and tissue, it carries a 26% 5-year survival rate for these patients. In many cases, patients are left severely affected physically with feeding tubes, chemotherapy, and radiation. It is currently unknown what the major mechanism is to cause esophageal cancer, but it can be inferred that long-term irritation or scarring of the esophageal lining increases this likelihood. Excessive alcohol consumption directly decreases smooth muscle motility of the lower esophageal sphincter, allowing for acidic materials to ascend from the stomach to the esophagus, resulting in tissue damage, scarring long term, and potentially cancer. This bodily response to alcohol intake shows a direct correlation between the independent variable, number of alcoholic beverages, and the dependent variable, esophageal cancer diagnoses. This study was designed to confirm the effect of excessive alcohol consumption on the increased incidence of esophageal cancers within the population.

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## **The association between depression and alcohol abuse in female adults in the United States**

*Hannah M. Schettler & Racquel L. Fera*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology; G.Q. Butcher, Ph.D., Professor of Neuroscience*

This study was to determine whether there is a relationship between depression and alcohol abuse in women in the United States. Mental health is an appropriate topic because it is so prevalent in our society. This relationship is important to better understand because mental health is a significant public health issue that millions of people experience and live with. This study will bring awareness to those who suffer with depression or alcohol abuse and how they ultimately relate to each other. Our variables include those who have had a DUI during a 12-month time period, those who have had withdrawal symptoms from alcohol and also have a history of depression, as well as those who have a mental illness in general at some point in their past. Other variables used were if alcohol affected doing or completing important tasks. A survey showed that more people said yes to continue drinking alcohol even though they have problems with their family. The research question and results can be very useful in the treatment and diagnosis of those with mental illnesses and alcohol abuse. The information analyzed can determine if there is a relationship and how to move forward with future studies.

## **The relationship between socioeconomic status and breast cancer outcomes**

*Kasey E. Solic*

*J.M. Hanneman, Ph. D., Associate Professor of Sociology*

Breast cancer is a devastating diagnosis that far too many women, and men, are given daily. Because breast cancer is such a notorious oncological condition, there is an immense amount of research devoted to not only the pathophysiology, but also the epidemiology and screening measures associated with it. If analyzed appropriately, these data can be immensely impactful for future patients. The purpose of this study is to investigate the relationship between socioeconomic status and the outcome of breast cancer, with hopes of discovering a statistically significant association. This analysis requires the involvement of several other independent variables, including access to appropriate health care (specialized physicians, screening measures, treatment options), insurance coverage, and overall physical and mental health of the individuals, which likely contribute to varying outcomes in the dependent variable of patient outcomes. Such variables will be analyzed using data from the Behavioral Risk Surveillance System, which gathers data regarding health-related risk behaviors and the use of preventative services. It is hypothesized that patients of lower socioeconomic status will have poorer breast cancer outcomes. This is likely due to the fact that low socioeconomic status is associated with less access to adequate insurance coverage, physician availability, educational resources, and treatment options; these deficits will likely lead to poor mental health, which negatively impacts physical health.

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## **The association of Socioeconomic status and the prevalence of adulthood obesity in the United States**

*Taylor A. Taft, Hannah R. Hassinger*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

Adulthood obesity prevalence continues to climb and is a leading risk factor for nearly all chronic and acute medical conditions, like diabetes, heart disease and cancer. It is also the second leading cause of preventable deaths. This study examines the rate of obesity among different levels of socioeconomic status to gain insight on which populations are at the highest risk of obesity in adulthood. This will allow medical professionals, resources, and education to be readily available to the individuals at the greatest risk in efforts to prevent obesity and illness. To examine this relationship, the Behavioral Risk Factor Surveillance System was utilized where the variables examined included obesity as an independent variable and socioeconomic status as a dependent variable amongst many others. Supporting literature and data obtained from this survey suggests that individuals with low SES have an increased prevalence to adulthood obesity. Additionally, this study provides insight to the influence income has on obesity through the examination of other dependent variables such as diet, access to a health care provider, and availability of exercise equipment. Through this study, we can develop and implement care and resources in populations that are lacking.

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## **The negative outcome of marijuana consumption on mental health of its users**

*Bimal Timsina*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

The use of marijuana has been shown to produce negative mental health effects, both in the short- and the long-term. The variables presented are dependent, as well as independent, which aided in analyzing the

effect of marijuana on one's mental health. Users were asked various questions aimed at discerning the state of mental health within the past day, week, or month. The research postulated that the use of marijuana has cognitive effects which also correlate to the effect on overall mental health. Not only that, but the physiological effects could also have a role in mental health effects. From temporary to permanent effects, including psychosis and anxiety disorder, have been observed among marijuana users. Based on analysis of some variables, there do appear to be some effects, such as change in emotions with the use of marijuana. The results do not show strong correlation but do seem to support the research topic. This research aims to, at least, focus on the direction of making association between negative impact of marijuana on mental health of its users. The findings seem to suggest that more secondary data analysis is required to show a greater degree of positive and strong correlation compared to the current data analysis.

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### **Covid-19's profound impact on American citizen mental health**

*Danté Vaniel (PA-S), Joshua Jennerjahn (PA-S)*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

From the onset of the covid-19 pandemic, the livelihoods of American citizens were drastically altered. Individuals and families across the country were now faced with unprecedented situations never seen amongst this generation. The world was shutting down, jobs were being lost, businesses were closing, and the typical way of life as we knew it was coming to an abrupt halt. The cumulative effects of this viral outbreak eventually started to have a deeper impact on citizens. It was no longer a physical struggle, but rather it turned into a mental battle as well. With the overall mental health decline, citizens were tasked with trying to cope with these troubling times. The coping mechanisms used to deal with this unfortunate situation were not adequate enough to properly improve the mental status of citizens affected by the covid-19 outbreak.

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### **Race, socioeconomic status, and the correlation towards developing a smoking habit in today's society**

*Joshua F. Wahl*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology*

Smoking is one of the leading causes of preventable death in the United States which is targeted as a leading subject headlining numerous epidemiological studies. With the plethora of variables that can lead to developing a smoking habit, this article aims strictly towards socioeconomic status and race and their relationship. A hypothesis was developed that being African American and living in a low socioeconomic status increases the risk of developing a smoking habit. The correlation of socioeconomic status and smoking is statistically non-significant when looking between middle class and the working class. When analyzing the lower class and upper class, the ratios drop to 0.09 and 0.035, but mostly due to the lack of "n" in the variables 211 and 83. Looking into the correlation of race and smoking which do in fact have a strong correlation when analyzing between Caucasians and African Americans. Developing the habit for African Americans is less statistically significant than Caucasians with a ratio of .163 versus .715. During the selection stage of the study, a selection bias could have been developed due to the final summation of the variables being drastically different.

# ORAL PRESENTATIONS

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## MORNING SESSION – LUTHERAN HERITAGE ROOM

### **The Impacts of Stress on the Placental Junctional Zone**

*Cassandra Bown*

*M. O'Donnell, Ph.D., Assistant Professor of Biology*

An estimated 7-30% of women suffer from stress-related disorders of pregnancy. When a pregnant woman is stressed, cortisol increases in her bloodstream and is transmitted to the fetus through the placenta. Studying stress-induced changes in human populations can be challenging. As such, animal models, such as the chronic unpredictable (CUS) model, can be used to study the effects on stress on the placenta. The aim of this study was to use a model of CUS to research how it influences the junctional zone (JZ) during pregnancy. Changes to the JZ, a layer found in mice placentas, can affect fetal growth, and alter the distribution of maternal resources. Prior to this study, placental photos from BALB/c control and CUS mice were taken. The area and depth of the JZ were measured using Image J software. There was a significant difference between the control and stress groups for the JZ depth. There was no significant difference between the control and stress groups for the JZ area, although the area for the stress group was, on average, smaller than the control group. Together, this work contributes to our understanding of how stress and stress-related disorders can impact pregnancy and placental development.

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### **The Effects of Stress on Placental Labyrinth Development**

*Danielle Sterling*

*M. O'Donnell, Ph.D., Assistant Professor of Biology*

The purpose of this study was to examine how stress impacts the growth of the placenta using animal models. Stress during pregnancy can lead to many problems with both pre- and postnatal health including development of mood disorders, premature births, and fetuses with reduced heart rate. However, it remains unclear how stress and stress-related disorders impact the development of the placenta. This study focused on characterizing changes to the labyrinth zone of the placenta in an animal model of chronic stress. Image J Software was used to examine placentas from stress-exposed and control female mice. Specifically, measurements of the labyrinth's area and thickness were measured. Results show differences between labyrinth development in control and stress-exposed females. This work contributes to a growing body of literature aimed at understanding how stress impacts the growth of the placenta and contributes to maternal disorders of pregnancy.

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### **The Effect of Stress and L-Citrulline on Placental Development**

*Jenna McCandless*

*M. O'Donnell, Ph.D., Assistant Professor of Biology*

Mental health affects a substantial portion of the general population, serving as the leading cause of disability worldwide, and is therefore commonly studied. What is less commonly studied, is how mental

health affects the pregnant population. Stress is one of the most well-known contributors to mental health disorders like anxiety and depression during pregnancy. However, studying stress and perinatal physiology can be difficult in such a vulnerable population. As such, animal models of stress serve as a valuable tool to better understand how stress can impact pregnancy and perinatal development. The purpose of this study was to use an animal model of stress and anxiety to see if there was an effect on the maternal decidua layer of the placenta. This layer of the placenta plays a critical role in protecting the embryo and providing nutrients from the mother. Preliminary results show that there is a difference in the maternal decidua between the control and experimental group. L-citrulline, a non-essential amino acid, was also used to determine if the nutraceutical could alleviate stress-induced changes in placental size. This research will set a framework for how stress and potential treatments may alter placental development.

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## **Injury Prevention Program Awareness, Knowledge, and Attitudes Among Division III College Athletic Directors**

*Grace Adams*

*G. Kingston, Ed.D., CSCS, Assistant Professor of Exercise Science*

A major concern that many student-athletes face throughout their time playing a collegiate sport includes suffering from an injury. Due to the number of injuries that athletes experience, there has been an increased demand for strength and conditioning coaches and injury prevention programs in athletic departments, ranging from Division I athletic departments all the way down to Division III. A questionnaire had been administered to all eleven Athletic Directors in the Presidents Athletic Conference, which is the conference that Thiel College plays all sports in. The questionnaire consisted of thirteen questions, ranging from multiple choice, fill-in-the-blank, and Likert Scale questions. This research study is significant in helping to understand the importance of strength and conditioning coaches and injury prevention programs, especially for those athletic departments in the lower Divisions.

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## **Exercise as a Treatment Modality in Occupational Therapy**

*Hannah Strott*

*G. Kingston, Ed.D., CSCS, Assistant Professor of Exercise Science*

Occupational therapy is a branch of healthcare that specializes in treating injured or disabled patients through the therapeutic use of everyday activities. The use of physical activity and exercise is a common practice in treatment and intervention. The goal of this research is to investigate the effectiveness of exercise based occupational therapy treatment and the types of demographics and diagnoses that would most benefit from this type of treatment. This study was conducted using scholarly articles and reviews from online databases where each article was selected based on inclusion criteria. Information will be dissected to cultivate a scholarly based conclusion that will be informative on the topic of incorporating exercise into occupational therapy treatment. The results found that exercise could be a beneficial implication in certain occupational therapy interventions based on demographics and diagnoses. This research is significant in discovering new ways to incorporate exercise and physical activity into practice.

## **Dental Hygiene in Traditional Undergraduate Students at Thiel College**

*Jacob Sirofchuck*

*J. Broderick, Ph.D., Assistant Professor of Biology*

Dental hygiene varies greatly among college students. There is a wide variety of processes to have good oral hygiene overall. Methods of keeping good health are brushing teeth, dental floss, mouthwash, and other oral preventatives. Using oral preventatives are essential in keeping good health with the upkeep of dental hygiene being associated with a longer life. Due to changes with their social life and new responsibilities, dental hygiene can deteriorate quickly. College sponsored clinics are effective ways to educate students independent of their unique backgrounds. I conducted a survey in the spring 2023 semester to assess student's dental hygiene habits, how often they went to the dentist, their parent's dental hygiene, and what factors may limit their ability to visit the dentist. Lastly, students were questioned on their interest in potential dental clinics on campus.

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## **Evaluating our Treatment of Chronic Pain: From macrophage-targeted nano emulsion delivery to understanding the differences sex and race play**

*Malajah Johnson, Brook Deal, Katherine Phillips*

*J. Broderick, Ph.D., Assistant Professor of Biology*

Neuroinflammation is a leading cause of pain of Americans. In the Pollock lab, chronic constriction injury (CCI) of the rat sciatic nerve is used to induce neuroinflammation. Neuroinflammatory relief can be achieved with nanotherapeutics, developed by Dr. Jelena Janjic, delivering the NSAID, celecoxib, to macrophages. There was a reduction in the number of macrophages in the injured nerve treated with CXB-NE when compared to CCI (Funded by NSF-REU Site Award 1757555). This summer research experience sparked my curiosity for better understanding the differences in pain research and treatment due to sex and race. In recent studies, male and female mice have shown to process pain differently due to estrogen and testosterone levels. However, when evaluating sex differences in chronic pain, there are sex-biases when conducting preclinical research on chronic pain. Despite the sex-bias changes in chronic pain research, there is still emphasis on male-only studies. The percentage of adults experiencing chronic pain and high-impact chronic pain also varies among several racial groups with African Americans being the most undertreated for chronic pain.

# DIGITAL POSTER PRESENTATIONS

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## MORNING SESSION – PEDAS 125

### **Comparison of Insect Diversity Samples from 2020 to 2022 on the Thiel College Campus**

*Mindy Fleming, Abigail Harbison*

*M. Balas, Ph.D., Professor of Biology*

The prospect of future climate change has increased the need for reliable and repeatable biodiversity data to attempt to measure the influence of climate change. We compared insect biodiversity data collected near Thiel College campus in 2020 to 2022, to determine if there was consistency between the two samples of insect species commonly found in Mercer County. Using four Malaise traps of two different sizes, small and large, we sampled four times throughout the span of the month of July. The samples collected were divided into two major divisions, insects and non-insects; the insects were further divided into four major insect orders and several minor orders. Each trap sample was dried then weighed. We then compared the weights of our samples to the weights of samples taken from the same traps in 2021 using a two-sample t-test. For small trap samples, the 2023 weights were significantly higher than the 2021 weights. For large trap samples, the 2023 weights were significantly lower than the 2021 weights. The different outcomes could be from the ecological differences between the two sample years, a change of location of traps between years, weather differences, different prevalence of predators and prey, or variation in setup of traps.

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### **Evaluation of Water Quality in Pymatuning Lake using both Chemical and Biological Measurements**

*Mya Storll*

*M. Balas, Ph.D., Professor of Biology*

It is common to use a pollution tolerance index (PTI) when evaluating the water quality in a stream or river. A PTI shows how each taxon compares to another when analyzing the quality of water required for that species to survive. Although this index exists for a running body of water, there is no current available index for a standing body of water, such as a lake. This study aimed to compare and contrast the water quality, as well as the season in which various aquatic macroinvertebrates were found within Pymatuning Lake. This lake, as the largest in the state, is 17,088 acres, is located in northwestern Pennsylvania, and even crosses into Ohio. Pymatuning Lake provides a massive habitat for many native species, including ones that are threatened and endangered, for this reason, and many others, it must be protected. Four specific locations were selected for their habitats, proximity to potential pollutants, and ease of access; two of these locations were suspected to be of high quality, and two were suspected to be of lower quality. Each of these locations was sampled four times throughout the summer of 2022 (June-August) in order to encapsulate the widest range of the seasons. At each location, a water sample was taken, as well as a D-net kick sample. These samples were then taken back to the lab at Thiel College and evaluated. Water chemistry results show a noticeable difference between the quality seen throughout the summer, as well as throughout the locations. It is not yet known if these results are seen throughout the macroinvertebrate samples.

## **CdS and CdSe Nanoparticle Synthesis and Application in Photovoltaic Cells**

*Caleb Learn*

*G. Rattan Khalsa, Ph.D., Professor of Chemistry*

Semiconductor nanoparticles demonstrate quantum mechanical properties due to the small size of the individual particles. These particles, known as quantum dots, have properties that can be tuned by controlling their sizes, and in particular they can be produced to absorb visible light. This makes them attractive candidates for harnessing light in photovoltaics. When the sizes of the quantum dots are in the range of a few tens of nanometers, the boundary conditions on the electron and the hole left behind upon excitation lead to quantization of their energy states, and thus we can apply the particle in a box model. Upon absorbing light, an electron is excited to a higher energy state from the valence band to the conduction band; in this way, electricity can be passed through the material. CdS and CdSe nanoparticles were synthesized and analyzed using UV-Vis absorption and emission spectroscopy; for emission, the nanoparticles were excited at 405 nm and 500 nm. To study their potential use in solar cells, the nanoparticles were then bound to 3-mercaptopropionic acid on the surface of titanium dioxide to produce a simple solar cell on conductive glass. As the size of the nanoparticles increased from 1.8 to 4.5 nm, the emission band increased from 391 to 488 nm.

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## **Progress Constructing a Fluorescence Spectrometer Using Affordable Components to Study the Kinetics of an Enzymatic Reaction Catalyzed by Lactate Dehydrogenase**

*Zachary Ausburn, Caleb Learn, Anthony Richards*

*C. Stanisky, Ph.D., Professor of Chemistry*

We report progress constructing a fluorescence spectrometer (or fluorometer) to study the enzymatic conversion of L-lactate and NAD<sup>+</sup> to pyruvate and NADH by lactate dehydrogenase. NADH strongly absorbs ultraviolet (UV) light of wavelength 340 nm and is well-known to fluoresce at 460 nm. The fluorescence of NADH can be used to monitor the progress of the enzyme-catalyzed conversion of lactate to pyruvate. A 365-nm UV light-emitting diode (LED) is used as the light source to excite NADH. (Significant fluorescence is produced by this LED even though the wavelength is 25 nm from the 340 nm maximum absorbance of NADH.) The fluorometer uses LEGO bricks to form the sample compartment, and the fluorescence is detected by a phototransistor perpendicular to the incident light path. This simple apparatus can be used to investigate the kinetics of the enzymatic reaction, and to determine the Michaelis constant and catalytic constant. Additionally, the data can be analyzed to determine whether this bisubstrate enzyme reacts according to a sequential or ping-pong reaction mechanism.

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## **The Impact of Trauma-Knowledge on Resilience Outcomes**

*Paige Long*

*N. Homa, Ph.D., Associate Professor of Psychology*

The purpose of this study was to examine the relationship between trauma-knowledge and resilience outcomes. Specifically, we investigated whether or not trauma-informed caregivers promote better resilience outcomes in children. Data was collected from a sample of parents/guardians raising biological and/or foster children in the state of Pennsylvania. To distinguish between biological and foster children,

caregivers reported in context to their oldest child and/or the child that has been in their care the longest. Using a modified version of the Connor-Davidson Resilience Scale (CD-RISC-25), we measured resilience outcomes in foster and biological children, as reported by caregiver. It was hypothesized that those children with trauma informed caregivers would score higher on the Connor-Davidson Resilience Scale (CD-RISC-25) than those without trauma informed training. Furthermore, using a modified version of the Trauma-Coping Self-Efficacy Scale (CSE-T), we assessed caregiver confidence in helping children cope with trauma. With the accumulation of protective factors in mind, it was hypothesized that foster children who have experienced trauma in their lifetime would score higher on the CD-RISC-25 than biological children; even if their caregivers are trauma informed.

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### **Concussion Awareness Now**

*Lilliana Briscoe, Rebekah Ladaika, Sarah Walker*

*N. Antonino, Ph.D., Lecturer of Communication, Sciences and Disorders*

According to the American Speech-Language-Hearing Association, most people do not realize that even a minor head bump may have major effects. Any hit or jolt to the head may start the cascade of concussion symptoms (fatigue, headache, cognitive changes, mood changes, balance issues, slower word finding). Falls, sports injuries, and automobile accidents may cause concussions. It is estimated that concussions occur every 15 seconds in the US. Sadly, more than half of those with suspected concussions get them diagnosed. We are here today to help spread the word about concussions. Increased awareness has the potential to encourage people to seek proper medical intervention and subsequent treatment. Concussions may happen to anyone, anywhere, at any time.

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## **DIETRICH HONORS INSTITUTE THESIS PRESENTATIONS**

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### **AFTERNOON SESSION – STAMM HALL**

#### **Can Transcutaneous Electrical Nerve Stimulation Be Used to Treat Inflammatory Pain?**

*Morgan Wood*

*N. Lax, Ph.D., Assistant Professor of Neuroscience*

Millions of people around the world struggle with pain caused by inflammation every day, specifically arthritis and joint pain. Typically, medications like opioids are prescribed by a physician to treat this pain in the long-term. However, these types of drugs can be addictive, overused, and may lead to a fatal overdose. Transcutaneous electrical nerve stimulation, also known as TENS, is the nonaddictive therapeutic application of electrical stimulation through the skin, commonly used to treat various issues concerning the muscles. It is unclear if TENS can be used to treat other issues due to a lack of consistency in prior research. This study researches the effectiveness of TENS on inflammatory pain in a controlled experiment using a mouse model. The study also measured the level of electrical stimulation that may be effective for the management of inflammatory pain. The potential applications for this study are to hopefully find a nonpharmaceutical treatment for pain caused by rheumatoid arthritis. Alongside this research, hopefully other treatments could be utilized for this kind of pain.

## **Does the Drinking Water on Campus and in Greenville Meet State and Federal Standards Regarding Lead and Copper Content?**

*Mya Storll*

*M. Balas, Ph.D., Professor of Biology*

The Environmental Protection Agency (EPA) and the Pennsylvania Department of Environmental Protection (PADEP) have set strict requirements for lead and copper content in drinking water. Lead and copper can cause major health issues within the human body if left unchecked and untreated. This paper addresses the specific quantities of lead and copper found in drinking water on campus and in the surrounding town of Greenville. This was accomplished by choosing specific testing sites, evaluating the plumbing materials for potential deposition, and finally conducting the tests on tap water. The tests consisted of taking a water sample and submerging a test strip that would react if lead or copper was present. Tests were conducted in the spaces where students were most likely to have high contacts with potable water, such as the living spaces, student center, and the main academic building. Most of these results ended up being within the appropriate range set by the DEP and EPA. However, a few were above the acceptable amount of 1.4 mg/L of copper. All of the locations tested with no lead content.

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## **Dvorak's Setbacks: Barriers to Learning the Dvorak Keyboard**

*Zakaria Wilson*

*E. Torigoe, Ph.D., Associate Professor of Physics*

The ability to type quickly and accurately is an invaluable skill in the modern era. The dominant keyboard layout is the QWERTY keyboard, so common that many assume it is the only option. There is, however, another layout that many experts praise for its speed and comfort. Developed by psychologist August Dvorak, the Dvorak Simplified Keyboard (DSK) is structured around touch-typing, a technique often only used by more experienced typists. This research aims to discover the specific problems that arise when the average typist attempts to switch to DSK and how those problems might be addressed so that DSK can become more widely adopted. For analysis, participants were recruited to answer some survey questions regarding typing experience and perform 2 typing tests on both QWERTY and DSK. Each DSK test had a training time of 15 minutes in an attempt to teach the basics to improve performance on the test. With the combined quantitative data of speed and accuracy from the typing tests, as well as the qualitative data from how participants responded to the surveys, the current study serves as a foundation for identifying obstacles when switching keyboards so that future research or individuals may attempt to address and overcome them.

# ORAL PRESENTATIONS

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## AFTERNOON SESSION – PEDAS 125

### **Use of Lures in Camera-Trapping PA Wildlife around Thiel College**

*Anthony Trobek*

*J. Broderick, Ph.D., Assistant Professor of Biology*

Camera trapping is used to capture images of wildlife in an environment with as little human interference as possible. The images are captured when a motion sensor detects any movement in the field of view of the camera. While the diversity of species seen is of course climate and habitat dependent, expected wildlife in northwest Pennsylvania based on current and past trends include white-tailed deer, otters, fishers, ospreys, hawks, eagles, badgers, squirrels, and occasionally black bears (Animals in Pennsylvania, 2022). Two cameras were placed in the woods behind the greenhouse as well as two additional in East Acres wooded areas. Cameras were placed four feet off the ground pointed near wooded areas and natural water sources more likely to have animal activity. A lure (Doe Urine) was placed at two of the four cameras to see if it increased animal activity compared to no lure.

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### **Influence of Weather on the Presence of PA Wildlife around Thiel College**

*Kylee Eaton*

*J. Broderick, Ph.D., Assistant Professor of Biology*

Northwestern PA is known for its diversified and unpredictable weather conditions and varies between day and hour sometimes, especially through the months of January to March. In this study, we observed how weather in regard to temperature and precipitation affects the activity level of native species. Through the early spring of this year, we placed a motion sensor camera trap behind the science connector on a tree 4–5 feet off the ground in a moderately wooded area with a water supply. This study attempts to support that northwestern Pennsylvania weather affects animal activity. The cameras were placed on January 25th, 2023, and collected pictures up until the beginning of April. Through examination of the photos collected, the data reveal a presence of both *Odocoileus Virginianus* (white-tail deer) and *Procyon Lotor* (raccoon). In cold and warm climates these species were observed and active, as well as during times of moderate precipitation and not. The indicated information is significant in understanding how climate can or cannot cause a disruption in native species migration patterns and to gain insight in western Pennsylvania animal behavior.

## **Optimizing DNA Extractions For Development of Species-Specific Primers in eDNA Experiments**

*Omahn Dobbins*

*J. Broderick, Ph.D., Assistant Professor of Biology*

Environmental DNA (eDNA) is DNA that is collected from environmental samples including soil, seawater, snow, and rain. What makes eDNA important is that it is a good way to identify and track species normally hidden in a habitat. The long-term project consists of partnering with Moravian University and Dr. Sara McClelland to sample Pennsylvania aquatic environments using eDNA techniques and comparing them to traditional ecological sampling. eDNA is useful for identifying species because the species does not have to be obtained in order for it to be identified which makes it a convenient way to identify species because some species are very difficult to obtain. We received various frog species from Moravian University before optimizing the extraction of their DNA and confirming results via gel electrophoresis and a nanodrop. The next step is to test out previously made species specific primers in a PCR reaction.

# **DIGITAL POSTER PRESENTATIONS**

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## **AFTERNOON SESSION – LUTHERAN HERITAGE ROOM**

### **STATISTICS FOR THE SOCIAL SCIENCES**

#### **Socioeconomic Status and Substance Abuse**

*Jared J. Beers*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology & Criminal Justice Studies*

The current controversy relating to drug arrests involving socioeconomic status has sparked an ongoing debate on whether drug crimes correlate with an individual's social class. This topic can result in multiple different outcomes because depending on an individual's social status, the consequences they might experience can vary based off their social class. For example, drug use in lower social economic communities can lead to homelessness which increases the overall poverty rate within the United States. This topic provides a vast amount of information because precedented studies on this issue have influenced its current situation in today's time. My primary data set used was the GSS 2018 because its most recent information provides the most efficient correlation between social class and drug related crimes. In addition to using data sets from GSS 2018, various literature related to my research were Decades of Disparity: Drug Arrest and Race in the United States, Race, Neighborhood Context, and Drug Enforcement, and The New Jim Crow: Mass Incarceration in the Age of Colorblindness. In lower economic communities, drug crimes occur more frequently than higher economic communities. The sample size of the data set utilizes 1081 individuals, which was acquired by random sampling.

## **Church vs color: a statistical analysis of the relationship between religiosity and racial prejudice**

*Bethany Bonnar and Maxwell Ravenscroft*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology & Criminal Justice Studies*

Abstract: Within the United States, religion is a key pillar of society that affects many different avenues of life. In addition, prejudicial beliefs based on race are a widespread social issue within the country. The relationship between these two variables has been a point of contestation between scholars within the field of Sociology. Regardless of denomination, many religious doctrines focus their key principles on the values of compassion and acceptance. However, extreme religiosity has been depicted as intolerant due to the prevalence of extremist religious groups and individuals. This research attempts to contribute to the ongoing discussion regarding racial prejudice and religiosity by performing secondary data analysis using data provided by the General Social Survey.

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## **Eyewitness testimony: investigation on biases within the criminal justice system**

*Emma S. Galiardi*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology & Criminal Justice Studies*

The usage of Eyewitness testimony during a civil or criminal case in the United States is flawed and riddled with bias. Eyewitness testimony is detrimental to the foundational arguments of a case for the reasons of unreliable sightings, misdirection by police, time of the incident(s), fear, and especially the prevalence of bias. Victims and witnesses are prompted to reenact their experiences and provide the eyewitness testimony but later redact or attempt to edit it over time. Biases from eyewitness testimony can be unconscious or cognitive, regardless of whether it is present within many testimonies. This bias is a key factor in putting innocent citizens in jails serving wrongful sentences. Furthermore, bias negatively affects the Criminal Justice system in means of targeting minorities. Data is obtained from the General Senses Survey (GSS), where it can be easily measured by qualitative data. This brings an investigative approach to studying the biases within the criminal justice system regarding eyewitness testimonies.

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## **The relationship between adult mental health issues among abuse victims and their siblings**

*Nielab K.V. Jones*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology & Criminal Justice Studies*

Nearly 80% of U.S. children grow up with a sibling, and approximately 9 out of every 1,000 children in the United States are identified as abuse victims. Studies have also found that people under 18 who were maltreated were more than twice as likely to develop severe mental ill health issues. However, limited information is available on the sibling's risk of abuse and its effects on their mental health later in life. Therefore, it is crucial to research this information to implement more helpful programs for future victims, and now victims better understand how their childhood trauma affects their adult lives. Using the General Social Survey (GSS) database and other peer-reviewed studies, this paper examines the link between how the number of siblings in a family can induce extensive childhood trauma, such as child abuse, that later affects mental health in adulthood. This paper indicates that more siblings in a household create a greater chance of child abuse, leading to mental health issues later in life. The significance of this research is for abuse victims to help the processes of healing by re-establishing their familial bonds, understanding the origins of their mental health issues, and creating more helpful programs for now and recovering victims.

## **Do sports reduce stress and mental health problems?**

*Bryce K. Knauf*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology & Criminal Justice Studies*

So many students suffer from stress and mental health problems so why not try a sport if you have free time to see if they reduce these issues? This study can help show how people with certain issues can try to be more active to reduce these problems. Many people suffer from depression, stress, loneliness, etc. and sports may be a way to escape from these issues. The aim is to see how helpful sports contribute to reducing mental issues. Drawing from secondary studies that others conducted, these data sets will be put together to create results and see if our hypothesis matches our result. The research hypothesis for this study is (Sports help reduce stress and mental health problems) we hope to accept this hypothesis, in the end, to know that they do have a correlation. But in the end, I do believe that sports and other physical activities will help reduce these issues.

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## **Financial stability and its impact on individual support for social welfare programs**

*Ellis S. Law*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology & Criminal Justice Studies*

The purpose of this study is to determine whether there is a link between increased financial stability and decreased support for programs that aid impoverished families and individuals. Using three distinct variables from the 2018 General Social Survey (ENDSMEET, GOVLAZY, and HELPPoor), this study seeks to establish the ability for one to make ends meet as an independent variable, and attitudes towards government assistance as dependent variables. I hypothesize that respondents who report greater ease of affording everyday expenses will generally be less supportive of welfare programs and hold negative views regarding those who receive government assistance. Conversely, respondents who report less financial stability will be more supportive of welfare programs and hold more positive or neutral views towards those on government assistance. These findings can be useful in determining the root cause of negative outlooks on welfare programs and can assist advocacy groups in tailoring their messaging to gather more support for these programs.

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## **Religion and how it affects views on abortion**

*Sydney Linhart, David Gonzalez, Tyler Roddy*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology & Criminal Justice Studies*

This study was chosen to conduct due to the rise in opinions and views on abortion as the Supreme Court case *Roe v. Wade* was overturned this previous summer. This was a significant event in history as it changed a woman's ability to have access to abortions regardless of the circumstances of their case. IBM SPSS GSS2018 was used to collect several variables for data. These variables encompass a wide range of topics, including gender, age, religion practiced when the individual was young, current religious practices, and different points regarding opinion on abortions. Taking into consideration the data that was seen from these variables, we hypothesize that those who are older in age and stricter in their religious affiliation will have little to no approval of abortions when compared to those who are younger in age and are less stringent with their religion. This conclusion is also based on outside knowledge of traditional views of elders, specifically those with close ties to the church.

## **Faith and duty: an investigation of correlations between religiosity and public confidence in modern administrations**

*Bradley Molnar*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology & Criminal Justice Studies*

Having retained its popularity on the individual level over the past 2000 years despite repeated collapses of government bodies, students hypothesize religion has retained its popularity due to its ability to help individuals cope with decreasing societal stability. To test this hypothesis, variables regarding public confidence in various government and societal institutions, alongside variables regarding public belief in higher powers and ability to commune without churches, will be gathered from the US population using the General Social Survey data sets for comparison using the Chi-square test of independence to test for correlation. Chosen federal and societal confidence ratings will be measured on a 1-3 scale (1 being "Complete confidence" and 3 being "no Confidence"), belief in a higher power on a 1-6 scale (1 being "Don't believe" and 6 being "Absolute Certainty"), and confidence on communion without churches being a 1-5 scale (1 being "Strongly Agree" and 5 being "Strongly Disagree"). Students hypothesize a negative correlation between public confidence in existing institutions versus religion manifesting continuous decreases in average confidence ratings from 1970 to 2018 in institutions such as education (1973: 1.71, 2018: 1.94), congress (1988: 2.04, 2018: 3.60), and organized religion (1973: 1.80, 2018: 2.05) while average responses for belief in a higher power (1988: 5.26, 2018: 4.87) and ability to commune without churches (2008: 2.41, 2018: 2.43) will increase or decrease at a statistically insignificant rate. This research will bring an analytical approach to understanding the relationship between religion, society, and governments.

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## **The ways important women are taught from childhood, and if social class and traditional family households affect that**

*Tumbijika A. Powell*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology & Criminal Justice Studies*

This research topic will focus on the correlation between the upbringing of women, their social status, and their importance. This topic will reveal the impact each variable has on each other and any awareness that can be brought to light. This research is determining the outcomes of women who hurt from traditional families, how important women are taught from childhood and their self-ranking in social position. A huge factor in the traditional home that can hurt a woman is the way they are groomed from a young age and although the way the household is ran and underlying gender roles. That is effective because what is exposed to children at a younger age are things that can become adopted as habits and can impact their adulthood. Social class plays another big part in the upbringing of many individuals because it impacts the child's development as well as their outcome. The achievement gap between children from an economically higher class than those from a lower class further emphasizes the effect and how it can relate to the importance of the adult. Reports from important women explaining their childhood and socioeconomic status is a way I was able to identify how the variables can be impacted by the others listed. I am confident that data from this research will show a correlation between these variables. Information gathered from reports and a few articles have allowed me to find out how each variable is related altogether.

## **Religion and its relation to mental health**

*Camdyn A. Seman*

*J.M. Hanneman, Ph.D., Associate Professor of Sociology & Criminal Justice Studies*

Religiosity is a multidimensional concept that encapsulates a range of attitudes, beliefs, and behaviors. The higher levels of compatibility one shows with religion, the better their mental health is shown to be. Religion brings a sense of structure and a stronger understanding of the self. Religion, as a source of resiliency, is utilized in various types of rehabilitative therapies. Forgiveness is a strong and emotionally blissful benefit of religion, especially for those going through those rehabilitative therapies. Largely, the social aspects of religion give followers a community to fall back on, usually referred to as a “therapeutic community.” Frequent attendance and interaction with other members is a key mechanism in improving mental health. From a sample of 639, those who identify as religious (494) and those who do not (195) show a statistical difference in whether religion helps build friendship. The overarching theme of day-to-day actions being influential and judged by a divine power gives a sense of belonging and importance to a religious member. Religion plays a prominent role in one’s day-to-day routine, thoughts, and interactions.

# **DIGITAL POSTER PRESENTATIONS**

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## **AFTERNOON SESSION – BLY HALL**

### **Finding the Bacteriophage SonicCup**

*Blake Gibson Karigan Hager, Daisy Jenness*

*M. O'Donnell, Ph.D., Assistant Professor of Biology*

Over the last eight weeks, students enrolled in Microbiology 212 participated in the international SEA-PHAGE program to isolate bacteriophages. Soil samples were processed through both an enriched and direct isolation protocol. Enriched samples were studied using the host bacteria *Microbacterium foliorum* to obtain phage plaques. To confirm the presence of phage, spot tests were performed, and the novel bacteriophage SonicCup was isolated. After the spot test, samples were purified by plaque assay. Purified samples were used to create webbed plates for the collection of high-titer lysate at a concentration of  $1.44 \times 10^{10}$  pfu/mL. Finally, with high titer lysate, phage DNA was extracted at a concentration of 108.6 ng/ $\mu$ L which will be analyzed by gel electrophoresis. The isolation of bacteriophages like SonicCup will contribute to the fields understanding of bacterial resistance.

## **SEA-PHAGES Discovery: Direct Isolation of Phage DNA from *Microbacterium foliorum***

*Zoe Heckathorn, Nicolette Graham, Camryn Sankey*

*M. O'Donnell, Ph.D., Assistant Professor of Biology*

SEA-PHAGES is a unique program for undergraduate students that allows for the discovery and analysis of a bacteriophage. Bacteriophages, also known as phages, are viruses that infect and replicate in bacteria. There are an estimated  $10^{31}$  phage particles in the environment with less than 3,000 analyzed (SEA-PHAGES). During the discovery phases of the SEA-PHAGE program, the phage can be found through direct and enriched isolation. The direct isolation technique differs from the enriched isolation technique because it does not allow time for the replication of the virus with the host bacteria, *Microbacterium foliorum*. During direct isolation, the environmental sample is directly incubated with host bacteria following filtration. After direct isolation and successful isolation of a phage, multiple serial dilutions, plaque assays, purifications, and webbed plates were completed. Phage DNA was also extracted for further analysis. The DNA phage was purified to a lysate concentration of  $2.21 \times 10^{10}$  pfu/mL. This concentration was sufficient for DNA extraction. Through this research, students were able to contribute to a national database that could help aid in novel medical treatments or analysis.

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## **The Collection of Bacteriophages at Thiel College through the SEA-PHAGES program**

*Marissa Locondro, Sarah Orr*

*M. O'Donnell, Ph.D., Assistant Professor of Biology*

Dirtybird is a bacteriophage that was discovered from a soil sample collected from Conneaut Lake, PA. A bacteriophage is a virus that infects bacteria and replicates within it in order to kill it. Bacteriophages are important because they can be used to treat resistance diseases with the use of phage therapy. Enriched isolation was performed to obtain our bacteriophage with *Microbacterium foliorum* being used as the host bacteria. A plaque assay was performed on the enriched isolation sample and a spot test was performed on selected plaques. Serial dilutions and plaque assays were conducted to obtain high concentration lysate. The lysate with a concentration of  $3.04 \times 10^{11}$  was used for the DNA extraction. The DNA collected during DNA extraction was then run through a gel electrophoresis analysis. These experiments resulted in a DNA with a concentration of 46.1 ng/ul and a 260/280 purity value of 1.71. This work will add to the growing body of bacteriophages being collected for medical research.

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## **Bad Bertha Bacteriophage: Enriched Isolation**

*Jacey Casper, Jessica Eslinger, Teagan Pierce*

*M. O'Donnell, Ph.D., Assistant Professor of Biology*

Bacteriophages are defined as a type of virus that can destroy bacteria through infecting it and reproducing inside of it. Use of bacteriophages have medical relevance as they can help treat resistant bacterial infections. In this experiment, enriched isolation protocols were performed on a soil sample to isolate a new bacteriophage, Bad Bertha, that may help combat bacterial resistance. Enriched Isolation involved the host bacteria, *Microbacterium foliorum*. Through phage extractions, serial dilutions, and enriched isolations higher concentrations of phage lysate were collected at a concentration of  $1.264 \times 10^8$  pfu/mL and used for DNA extraction. This concentration was established through the process of plaque assay. Novel phages, such as Bad Bertha, will add to the growing collection of bacteriophages used in medical science.

## **Isolation of the Lytic Bacteriophage Fishbowl**

*Bryce Knauf, Hannah Jones, Jenna McCandless*

*M. O'Donnell, Ph.D., Assistant Professor of Biology*

Bacteriophages, or phages, are of interest to scientists because they are tools for understanding fundamental molecular biology. Bacteriophages are viruses that infect a bacterium, and they are the most abundant organism in the biosphere due to their unique features in prokaryotic existence. They are vectors of horizontal gene transfer, drivers of bacterial evolution, and are used as sources of diagnostic and genetic tools as novel therapeutics. The novel phage Fishbowl was discovered through an enriched soil sample processing protocol and spot tests. Lytic properties of the bacteriophage were observed through the morphology of the colonies. After isolation, the phage was purified through several rounds of serial dilutions and plaque assays. Webbed plates were generated to obtain a high titer phage lysate of  $1.1 \times 10^{10}$  pfu/mL, allowing for DNA extraction. Concentration and purity of the DNA were calculated to 56.6 ng/uL and 1.81 260/280. Bacteriophages in molecular biology have become a pivotal point in helping to combat antimicrobial resistance.

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## **Collecting the Novel Bacteriophage JeriBeth at Thiel Campus**

*Kailee Matter, Jenna Murrey, Kylee Surrena*

*M. O'Donnell, Ph.D., Assistant Professor of Biology*

The SEA-Program allows students to find and name their own bacteriophages around Thiel. Bacteriophages are viruses that parasitize a bacterium by infecting and reproducing inside of it. This program allows for student led research projects which contribute to bacteriophage collection at the fraction of the cost and time of an apprentice-based research program. The novel bacteriophage, JeriBeth, was collected by a soil sample from outside the greenhouse at Thiel College. Enriched isolation, serial dilutions, plaque assays and a DNA extraction were performed. Following phage isolation and purification, a phage DNA concentration of 141 ng/uL was obtained. Due to the high concentration, JeriBeth will be sent to the University of Pittsburgh for further research. Collecting phages of high concentrations are very important and can help cure bacterial resistant infections.

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## **DNA Extraction of the Novel Bacteriophage BigBoyz**

*Evan Cessna, Rhiannon Mayer, Isabella Young*

*M. O'Donnell, Ph.D., Assistant Professor of Biology*

The SEA-PHAGES program is an international project hosted by the Howard Hughes Medical Institution and the University of Pittsburgh that discovers bacteriophage for use in the medical world. As part of this program, soil samples were collected, and a phage was isolated through enriched isolation using the bacteria *Microbacterium foliorum*. Through serial dilution and plaque assays, highly concentrated lysate at  $1.36 \times 10^8$  was collected. This lysate generated a very high DNA concentration of 283.3 ng/uL. This phage DNA sample will be sent to the University of Pittsburgh for genome sequencing and further testing to be used to treat bacterial infections that normal antibiotics cannot.

## **Purification of the Bacteriophage BigCat**

*Mitchell Mason, Tumbijika Powell, Jonathan Woge*

*M. O'Donnell, Ph.D., Assistant Professor of Biology*

A soil sample was obtained from Thiel College for bacteriophage purification. Bacteriophages are viruses that reproduce inside the bacteria and kill it. Our bacteriophage identified as lytic through plaque morphology as it left clear plaques on agar plates. Purification of the novel bacteriophage BigCat was completed through enriched isolation with serial dilution. Using aseptic techniques, plaque assays were performed to further purify the phage and to obtain a webbed plate. Webbed plates were used to collect high titer lysate at a concentration of  $1.71 \times 10^{10}$  pfu/mL. High titer lysates were used for DNA extraction and gel electrophoresis. The DNA concentration of BigCat was 75.4 ng/uL. This work helps us identify a novel phage that can infect a bacterium and may possibly help combat bacterial antibiotic resistance.

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## **Annotating Bacteriophages Altheas and Romm at Thiel College**

*Sydney Varga, Elijah Flinchbaugh, Paige Clyde*

*J. Broderick, Ph.D., Assistant Professor of Biology*

The SEA-PHAGES cohort at Thiel College has been a participant in the international SEA-PHAGES program since 2018. This semester, our Genetics course utilized bioinformatic approaches to better understand the phages Altheas and Romm, which were discovered in the Spring of 2022 at Thiel College. GeneMark, Glimmer, and HHPred were used to fully annotate the phages Altheas and Romm, allowing for a better understanding of phage similarities and differences. A comparison shows that Altheas and Romm are both in cluster EG and have many reverse genes in their genomes. In contrast, some notable functions for genes in Altheas are histidine triad nucleotide binding protein, DprA-like ssDNA binding protein, and RuvC-like resolvase. For Romm, notable functions of genes are helix-turn-helix DNA binding domain protein, terminase, and phosphoesterase. The comparison and contrast of these two bacteriophages in the same cluster allow for further research. This research has been important in contributing to the SEA-PHAGES database and to furthering research on the genomic evolution of phages.

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## **Examining the Prevalence of Dopamine Receptor D1 Proteins in Associated Areas**

*Abigail Smagala, Kaya Van Tassel, Charlee May, Gena Miller*

*N. Lax, Ph.D., Assistant Professor of Neuroscience*

As the goal of our project, we aimed to examine proteins found in four different regions of a preserved mouse brain for the purpose of identifying and visualizing those areas. We hypothesized that our chosen areas—including sections of the hippocampus, basal ganglia, amygdala, and the ventral tegmental area of the thalamus—would display the locations of dopamine (D1) neurotransmitter receptor proteins. To achieve this, we used the technique of immunohistochemistry to visualize the targeted antigens in the preserved brain sections mounted on slides via the binding of a staining antibody to the already-bound primary antibody artificially introduced during preparation. Due to issues in the handling of nervous tissue slices and in the staining process, there was no visible staining in our final slides when viewed through a microscope; given this lack of tangible results, conclusions could not be made.

## **GABA-B Staining in Mouse Brain Tissue**

*Jordan Fiorentini, Mckenzie Miller, Madalyn Moore, Sydney Varga*

*N. Lax, Ph.D., Assistant Professor of Neuroscience*

Immunohistochemistry (IHC) staining was used to observe different neurotransmitter receptors in different sections of mouse brain tissue. The receptor our lab group focused on was GABA-B. GABA-B is a metabotropic receptor that is coupled with a G-protein. GABA-B is often found most abundantly in the hippocampus, amygdala, frontal cortex, and the thalamus, so we picked brain tissue that would have those brain structures for the best results. From here, we prepared our brain structures to be stained. After staining our different structures, we put them on slides so we could look at our results through a microscope. No positive staining was observed in the tissue.

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## **Is Transcutaneous Electrical Nerve Stimulation an Effective Way to Treat Inflammatory Pain in Mice?**

*Keara Henry, Morgan Wood*

*N. Lax, Ph.D., Assistant Professor of Neuroscience*

Millions of people around the world struggle with inflammation pain every day. Transcutaneous electrical nerve stimulation, also known as TENS, is the nonaddictive therapeutic application of electrical stimulation through the skin, commonly used to treat various issues dealing with the muscles. It is unclear if TENS can be used to treat other issues due to lack of consistency in prior research. This study aims to research TENS and pain in a way that allows for control groups and specificity about the specific measures of the electrical stimulation while examining its potential for pain management through the use of TENS units and animal models and humans with inflammatory pain. The potential applications for this study are hopefully to find a nonpharmacological treatment for rheumatoid arthritis pain. Using intraplantar injection techniques, an injection of capsaicin was used to replicate inflammation in mice. This was followed by a TENS treatment every day for three days and followed by von Frey mechanical sensitivity tests. The goal of this study was to produce a reduced 50% withdrawal threshold in the mice receiving TENS treatments.

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## **Investigating the Expression of GABA-B Receptors in the Mouse Brain**

*Lillian Sitzer, Mason Wolfe, Tumba Powell, Katabella Byers*

*N. Lax, Ph.D., Assistant Professor of Neuroscience*

In this immunohistochemistry lab, our lab group stained slices of mouse brain in order to visualize the locations of brain regions that contain specific proteins. We hypothesized that four brain regions selected from the Mouse Brain Atlas website (hippocampus, thalamus, basal ganglia, and hypothalamus) would all reveal positive staining. To achieve this, we used preserved and perfused brain tissue that had been “fixed” with formaldehyde and eventually sectioned. IHC staining is dependent on the presence of antibodies. Our selected antibody was GABA-B. We used chromogenic detection to visualize a product. After the staining took place, the slides that contained the brain slices were viewed under a light microscope in order to reveal positive or negative staining. The results of our lab did not match our hypothesis because one brain region, the basal ganglia, had negative staining. We concluded that errors could have occurred, such as damaging the slices.

## **Exploring Brain Regions Using the 5-HT<sub>2C</sub> Neurotransmitter Antibody to Find Populated Serotonin Receptor Areas**

*Randall Miller, Che Fuqua, Bryce Knauf, Paige Clyde*

*N. Lax, Ph.D., Assistant Professor of Neuroscience*

In this study, certain brain regions were cleaned and stained with the 5-HT<sub>2C</sub> neurotransmitter antibody to locate areas that have a high concentration of serotonin receptors. Before beginning tests, the brain regions of interest chosen were the hippocampus (CA1-CA3), thalamus, amygdala (amygdaloid nuclei), and hypothalamus. Once brain slices that matched these regions were selected the sections were prepared, using chromogenic tissue preparation methods, and exposed to the primary antibody (5-HT<sub>2C</sub>). Next, the brain slices were stained with the secondary antibody (horseradish peroxidase) to complete the experiment. The results showed staining in three of the four hypothesized brain regions: the hypothalamus, thalamus, and amygdala. The slices that showed the hippocampus did not appear to stain but were overall too shredded to obtain any definitive data.

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## **Using Immunohistochemistry to Observe Serotonin Receptors in Different Brain Regions**

*Ryan Harcourt, Grace Jones, Connor McInnis, Anna Paul*

*N. Lax, Ph.D., Assistant Professor of Neuroscience*

Immunohistochemistry (IHC) is a diagnostic technique that combines anatomical, immunological, and biochemical techniques to image specific proteins within cells of designated anatomical regions. IHC uses antibodies to selectively bind to a protein of interest. The brain regions stained in this experiment were the hippocampus, cerebral cortex, hypothalamus, and amygdala. Using IHC, if the chemical 5-HT (serotonin) is present in selected brain regions, then the receptors would be visible in those regions because the antibodies used would bind to the serotonin. In preparation for the experiment, a rat's brain was preserved, fixed, and sectioned on a cryostat. Then, over three weeks, slices of brain tissue were prepared and stained with antibodies for chromogenic visualization. The IHC for serotonin receptors was consistent with the hypothesis, and the receptors in the hippocampus, cerebral cortex, hypothalamus, and amygdala were visibly stained.

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## **IHC Testing of the Neurotransmitter Antibody Dopamine Receptor (D<sub>1</sub> Receptor)**

*Zack Welker, Emili Scavitto, Tyler Ammann, Hayden Tucker*

*N. Lax, Ph.D., Assistant Professor of Neuroscience*

This study was created to cut, stain, and visualize the D<sub>1</sub> Receptor proteins in the basal ganglia, thalamus, hippocampus, and amygdala of a mouse's brain using immunohistochemistry (IHC). We hypothesized that there would be staining of all four brain regions listed above after undergoing chromogenic secondary antibody staining, which is a technique used to visualize the localization of a target protein or antigen within a tissue or cell. As a result of this process, the basal ganglia, thalamus, and amygdala showed staining through a black coloration of the soma. In contrast, the hippocampus did not show any staining. Overall, our research was successful as three out of the four brain regions showed staining.

# LIBRARY AWARDS

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## STAMM HALL

### **Professor Evelyn C. Baer Writing Award Recipients:**

- **Ava Kavulla, nominated by Dr. Mary Theresa Hall**  
Honors Composing Contextually  
*A Short Stop at Davos and Narnia: A Literary Response to Setting*
- **Bradley Molnar, nominated by Dr. Sheila Gross**  
Creative Nonfiction  
*The Devourer: Rommel's Perspective of the Africa Campaign*

### **Library Research Award Recipients:**

- **Emma Deitz, nominated by Dr. Mary Theresa Hall**  
Linguistics  
*Learning Language: The Influence of Literature and Linguistics in Children's Speech Therapy*
- **Janelle Mudry, nominated by Dr. Jared Johnson**  
Special Topics: Staging Piracy in Renaissance Drama  
That's Nobody's Business but the Turks...Or Is It?: An Examination of Jacobean Drama as a Tool to Promote English Imperialism

### **"Beyond the Page" Winner:**

- **Madison Yurich, nominated by Dr. Kristel Gallagher**  
Statistics for the Social Sciences  
*The Association Between Number of Languages Spoken and Memory Recall Abilities*

## **Writing Award Nominees**

Colin Schroyer, ENG 220, British Literature II, Dr. Mary Theresa Hall

Ava Kavulla, HONS 126, Composing Contextually, Dr. Mary Theresa Hall

Ava Kavulla, ECE 213, Language Development for Early Childhood, Dr. Nancy Antonino

## **Research Award Nominees**

Haley Weber, PSY 150, General Psychology, Dr. Natalie Homa

Tess Cadman, ENG 212, Creative Nonfiction, Dr. Sheila Gross

Daisy Jenness, HONS 113, Communicating Effectively, Dr. Sheila Gross

Kaitlynne Wolffe, ENG 212, Creative Nonfiction, Dr. Sheila Gross

Bradley Molnar, ENG 212, Creative Nonfiction, Dr. Sheila Gross

Makenna Oswald, HONS 113, Communicating Effectively, Dr. Sheila Gross

Colin Schroyer, HONS 113, Communicating Effectively, Dr. Sheila Gross

Taylor Pearce, ENG 340, Shakespeare, Dr. Jared Johnson

Janelle Mudry, ENG 352, Special Topics, Dr. Jared Johnson

James Cromwell Young, HONS 113, Communicating Effectively Prof. Sean Oros

Devin Rhoads, HONS 113, Communicating Effectively, Prof. Sean Oros

Blake Gibson, HONS 113, Communicating Effectively, Prof. Sean Oros

Nathaniel Turner, HONS 113, Communicating Effectively, Prof. Sean Oros

Josie Gadsby, HONS 113, Communicating Effectively, Dr. Mary Theresa Hall

Roxanne Cianci, ENG 210: British Literature to Romanticism, Dr. Mary Theresa Hall

Alex Henry, ENG 317, Linguistics, Dr. Mary Theresa Hall

Emma Deitz, ENG 317, Linguistics, Dr. Mary Theresa Hall

Cole Sherwin, HONS 113, Communicating Effectively, Dr. Mary Theresa Hall

Roy Wilt, ENG 210, British Literature to Romanticism, Dr. Mary Theresa Hall

## **“Beyond the Page” Nominees**

Paige Long, PSY 215, Statistics for the Social Sciences, Dr. Kristel Gallagher

Madison Yurich, PSY 215, Statistics for the Social Sciences, Dr. Kristel Gallagher

Gena Miller, PSY 215, Statistics for the Social Sciences, Dr. Kristel Gallagher

Erika Cook, PSY 215, Statistics for the Social Sciences, Dr. Kristel Gallagher

Brianne Coatsworth, PSY 215, Statistics for the Social Sciences, Dr. Kristel Gallagher

Madeleine White, HONS 126, Composing Contextually, Dr. Mary Theresa Hall











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