

# Celebration of **SCHOLARSHIP**



**THURSDAY, APRIL 15, 2021**

## **Oral Presentation Program**

**IWU'S ANNUAL UNDERGRADUATE RESEARCH CONFERENCE**  
SPONSORED BY THE JOHN WESLEY HONORS COLLEGE



**INDIANA WESLEYAN UNIVERSITY**

# ORAL PRESENTATION SCHEDULE

Presentations begin every 20 minutes. Login information can be found below.

Bedford		Jones
Zoom Access	<a href="#">Bedford Zoom Click Here</a>	<a href="#">Jones Zoom Click Here</a>
8:40 am	Mark Rettstatt	Emily Bays, Isabel Baker, Kaylee Chapman Kordell Cabe, Morgan Coppel, & Madelyn Crawford
9:00 am	Preston Collyer	Maenetta Green, Meghan Darcy, Kay Fletcher, Heidi Line, Brennan Fortner and Audrey Madl
9:20 am	Zac Faitz	Brianna Rhodes, Madelyn Mester, Sarah Pyle, Hannah Slota, Anna Ross and Kiersten Waltman, Preston Wade, & Hannah Slota
9:40 am	Kendra Webster	Courtney Lehe, Kara Schmidt, Kathryn Wininger, Peyton Denning, Jessie Banter
10:00 am	Megan Bernth	Baillie Killian, David Hulings, Isabel Elliott, Haleigh Snyder, Autumn Rogers, Bryanna Linnehan
10:20 am	Presley Ratliff	Kyla Foley
10:40 am	Jennifer Daniele Conrad	Jacob Crist
11:00 am	Kaylee Daniels	Madelyn Campbell, Isaias Cisneros, Rachel Klitzing, Mark McQuinn, Hope Miller, Mercedes Smith
11:20 am	Hayli Stephens	Megan Crawford, Hannah Hubler, Lily Kintz, Suzanne Ledbetter, Anna Mallery, & Heath Thielen
11:40 am	Natalie Cotherman	Taylor Brown, Emily Couser, Ethan Morrisson, Grace Johnson, Julia Evans, and Alexi Viviano
Lunch Break		
1:00 pm	Riley Daugherty	Alexis VanFleet & Jared Williams
1:20 pm	Haleah Heater	Caleb Davis, Josiah Gardner, Brenden Zeisloft
1:40 pm	Gracia Gormong	Damascus Mickey, Mckenzey Ridge, Melanie Stuck
2:00 pm	Brianne Flanagan	Dayton Groninger, Tonya Riffey, and Emily Heighway
2:20 pm	Hannah Knodel	Jacob Glover, Gino Taylor, and Corbin Jennings
2:40 pm	Nathaniel Richard Miner	Madison Seymour, Ian Hudson, Christopher Maxon
3:00 pm	Zach Graber	Sarah McLimore
3:20 pm	A'ishah May Guinocor Tandoc	Olivia Ennis, Anita Martin, Becca O'Vell, Ragan Skaggs, Desirae Miller, Lillian Koenig
3:40 pm	Cassandra Thompson	
4:00 pm	Elizabeth Faitz	Jessica Binkley, Makayla Standfest
4:20 pm	Abby Conrad	

## Coupling Coupled Oscillators to the Quantum Vacuum Electromagnetic Field

Mark Rettstatt, *Natural Sciences*

A Fabry-Pérot cavity is an apparatus capable of forming a micrometer-sized cavity between two reflective mirrors. IR light, when passed through the space, reflects as it hits the mirrors, temporarily trapping it within the confines of the cavity. Only integer values of the wavelength of light passed through the cavity are allowed to pass through to the other side. These integer values are known as the cavity modes. Molecular modes, likewise, are the vibrations observed during a typical IR experiment. The optical mode of the cavity can be overlaid with the vibrational mode of the molecule resulting in the formation of hybrid light-matter states, known as a polaritons. These states, called the upper and lower polaritons, are spaced above and below the original molecular modes at equal distances that are proportional to the square root of the concentration.

The formation of polaritons and the fundamental physics is well known. By changing the length of the cavity by adjusting the angle of incidence or moving the mirrors, the cavity mode can be tuned to fit theoretically any desired molecular mode, including polaritonic states. Our research attempted to determine the effect of normal vibrational modes on polariton formation, determining that there is a qualitative difference between weakly and strongly coupled oscillators.

## Novel Writing & Illustration Collaborative Project

WRI 465 and ART 463, *Interdisciplinary*

This presentation is collaborative project between the students of WRI 456: Writing the Novel and ART 436: Computer Illustration. Each writing student has been paired with two art students to collaborate on cover or poster illustrations for the novels written during this semester. Each team of students will describe the collaborative process, then the writing student will read a brief excerpt from their novel while each art student shows their illustration. A brief Q & A will follow as time permits.

## Restoration of the Chesapeake Bay

Preston Collyer, *Natural Sciences*

The Chesapeake Bay is the largest estuary in the United States flowing into six different states along the east coast and the second-largest in the world. This dynamic body of water has faced many challenges since colonization. Pollution from both urban and rural areas along with overharvesting of the Eastern Oyster, a keystone species in the bay, has caused the water quality of the bay to drastically decline. Many efforts have been made to restore the Chesapeake Bay, but they have led to little success. My research focused on the implications of poor water quality and its effects on public health. Additionally, I offer what I believe the most efficient options on how to begin restoring the Chesapeake Bay to its original beauty. These methods include resorting to the oyster population through oyster farms and halting oyster harvesting from the bay, only allowing harvesting from manmade oyster reefs intended for consumption. It is just as important

to more properly measure and limit the amount of nitrogen and phosphorous used in fertilizer. Although it is essential for agriculture, it causes over 80% of all of the pollution in the bay, and limiting the amount used would directly aid in restoration.

9.20 AM Bedford

### **Altering Reaction Kinetics with Vibrational Polaritons**

Zac Faitz, *Natural Sciences*

We alter the reaction rate of the cis-stilbene photoisomerization by forming a vibration polariton with the solvent.

9.40 AM Bedford

### **Providing a Good Death: A Quantitative Study of How Hospice Care Education Can Relieve Death Anxiety and Improve Death Competence in BSN Students at IWU**

Kendra Webster, *Nursing*

Studies show many nursing schools and medical schools require extensive clinical hours at the beginning of life yet very little (if any) training at the conclusion of life. This results in medical professionals who feel anxious and unprepared to care for dying patients. This research investigated if a hospice care education course relieved death anxiety and improved death competence for Bachelor of Science in Nursing (BSN) students at Indiana Wesleyan University (IWU). The research consisted of an initial survey, a three-part hospice care training course, and a final survey. Before beginning the hospice care training course, the research participants completed an initial survey to assess their readiness to care for hospice patients. The survey indicated most students agreed with the importance of the nurse's role in the dying process, but the majority indicated they did not yet feel comfortable or confident caring for dying patients. After completing the initial survey, the participants attended the first part of the hospice care training course which consisted of a lecture and PowerPoint presentation that addressed the needs for hospice care education. The second part of the course allowed the students to complete a case study in groups of two to three participants. In the final segment of the hospice training course, the participants engaged in a panel-based discussion with Gilead Ministries (a nonprofit organization that counsels patients and families of patients with chronic illnesses) and Visiting Nurse (a local hospice facility). The results of the final survey show the students felt much more comfortable and confident providing care to dying patients after receiving the hospice education.

### **Behavioral Tendencies Amongst College Majors**

Courtney Lehe, Kara Schmidt, Kathryn Wininger, Peyton Denning, Jessie Banter, *Behavioral Sciences*

"This study focuses on the prevalence of narcissistic tendencies amongst Indiana Wesleyan University students from all academic divisions. This study addresses how understanding narcissism amongst the student population can prove helpful for faculty and students, why being able to recognize narcissistic tendencies is helpful when entering the professional realm, and how historical narcissistic tendencies apply to college students. Results will be able to not only better understand the narcissistic tendencies of college students at Indiana Wesleyan specifically, but will also be able to better identify which majors on average possess students with higher Narcissism Personality Inventory scores. Indiana Wesleyan University has a goal of developing students of character and leadership (Distinctives of Indiana Wesleyan). Narcissism is the excessive interest in oneself and if a student had a large number of narcissistic tendencies, it would be hard for them to reflect-Christ in what they are doing in. Although only 0.5 to 1 percent of the general population are diagnosed with Narcissistic Personality Disorder, narcissism tendencies fall on a continuum (2018). There is a level above NPD which is called narcissistic personality type and these people will lack empathy, look down on others and feel entitled (2018). This research study will be looking at which students may fall into the narcissistic personality type and this will benefit administration, faculty and staff and students.

### **Creating Holistic Pediatric Hospital Environments Using Ulrich's Theory of Supportive Design**

Megan Bernth, *Nursing*

Hospital environments can foster better healing when designed with the patients' well-being in mind. In a pediatric hospital setting, the unique opportunity to create an environment that meets the needs of a wide range of age groups arises. Pediatric hospital rooms not only house the child being treated but must create space for the adult parents and caregivers that are present and intimately involved in the child's recovery. When the stress of both parent and child is reduced during the child's care, better healing occurs. Much research has been done regarding pediatric and adult hospital rooms as separate entities, but little has been done to discover how pediatric hospital rooms can simultaneously address the stress of both parent and child. This project proposes that Ulrich's Theory of Supportive Design—which focuses on the ways hospital environments can contribute to feelings of perceived control, social support, and positive distraction—is a framework that can be used as a tool to create holistic pediatric hospital environments that meet the needs of both pediatric patients and their adult family members.

**Untold Stories: A Generic Qualitative Study on the Members of the Black Student Union at Indiana Wesleyan University**

Baillie Killian, David Hulings, Isabel Elliott, Haleigh Snyder, Autumn Rogers, Bryanna Linnehan,  
*Behavioral Sciences*

The purpose of this presentation is to articulate data that has been collected from active members of the Black Student Union at Indiana Wesleyan University (IWU). There has been research conducted on Black Student Unions (BSU) across the nation, but there has been no formal study or interviews about the BSU at Indiana Wesleyan. Through the qualitative process of conducting interviews, the study uncovered how minority groups perceive campus climate regarding diversity. The data also provides a clear picture about how the BSU has served individuals mentally as well as socially and academically in their collegiate careers.

**Nursing Proficiency for Patients with Autism Spectrum Disorder: A Qualitative Study in Education**

Presley Ratliff, *Nursing*

This research was completed to evaluate the nursing curriculum's efficacy in preparing nurses to provide care for individuals with autism spectrum disorder (ASD). Research conducted by Massachusetts General Hospital has shown that medical professionals are not adequately trained to give adaptive care to individuals with ASD. The study assessed the nursing program in its preparation, with the participants being nursing students in their senior year. After taking a pretest, the participants completed education modules on autism spectrum disorder and the nursing considerations related to their care. After completing the educational modules, they took a posttest consisting of the same questions as the pretest. This evaluates whether an ASD-specific curriculum will prepare nursing students to care for patients with ASD. Nursing students performed better on the test, provided more knowledgeable answers, and demonstrated an improved understanding of autism spectrum disorder after completing the ASD-specific training modules. This research illustrates the lack of education in the nursing curriculum for caring for patients with ASD.

### **More Than A Fairy Tale: The Gendered Experience of Child Abuse in George MacDonald's "The Day Boy and the Night Girl"**

Kyla Foley, *Behavioral Sciences*

Over the course of his life, MacDonald published countless fairy tales, for ages five to one hundred and five, wrestling with social problems, political issues, and questions of faith. Perhaps the most common, and most overlooked, social problem MacDonald addressed in his fairy tales is child abuse. In the "The Day Boy and Night Girl," MacDonald mixes Victorian Era gender roles and child abuse, providing an ample canvas for examining child abuse through the lens of gender. This presentation examines the statement "child abuse is never gender-neutral," drawing on both the perpetrator and victim's genders and societal stereotypes, along with "The Day Boy and the Night Girl."

### **A Comprehensive Approach to the Nursing Care of Patients Affected by Opioid Addiction**

Jennifer Daniele Conrad, *Nursing*

The opioid epidemic has radically impacted medical and nursing care through the rapid introduction of opioids into practice and increased prevalence of opioid addiction in patients. This study will first examine the history and precipitation of the opioid epidemic, then address nursing interventions appropriate for the care of patients affected by the opioid epidemic and subsequent opioid addiction. It will be shown that the comprehensive nursing care of patients affected by opioid addiction must include reducing stigma surrounding addiction, optimizing pain management, reducing opioid prescriptions through patient advocacy, and motivational interviewing due to the attribution of inappropriate pain management techniques, denial of the addictive properties of opioids, overprescribing, and psychosocial and socioeconomic factors for the emergence and persistence of the opioid epidemic.

### **Finding Sobriety: A Qualitative Study with Adults Three or More Years Sober**

Jacob Crist, *Behavioral Sciences*

Many people today are facing substance abuse disorder and have trouble maintaining sobriety. This presentation will reveal findings from a qualitative study that discovered the barriers and what has been most effective in entering sobriety and maintaining sobriety from those who have sustained recovery. The common barriers and effectiveness of certain practices that arise from this study will bring greater

awareness to service providers that are working with the addicted population. The knowledge that is obtained from this study can be utilized to help individuals working with the addicted population to aid addicts in reaching and maintaining sobriety.

11.00 AM Bedford

### **The Effects of a White Savior Complex on Transcultural Nursing Care**

Kaylee Daniels, *Nursing*

How do we effectively engage with people of other cultures? What does it look like to serve humbly? What can we learn from the stranger? These are the questions that I contemplated coming home from Haiti. Ultimately, this research project was created for the purpose of allowing space for my peers and elders to enter into my journey of learning how to challenge my self-righteous humility in a medical, cross-cultural context. In my research, I considered the unhelpful nature of serving with the intention of "saving people from themselves", or believing you are the one with answers. This will be my heart's reflection on what it means to build, and be a part of, the Kingdom of God.

11.00 AM Jones

### **God difference: a quantitative study on the effects of spirituality among college students**

Madelyn Campbell, Isaias Cisneros, Rachel Klitzing, Mark McQuinn, Hope Miller, Mercedes Smith, *Behavioral Sciences*

The purpose of this research is to provide a quantitative analysis of the anxiety levels among college students 18-25 at a secular college campus versus at a Christian college campus. Students who participated were given the State-Trait Anxiety Inventory, which tests for underlying and circumstantial anxiety levels. The study looked at a series of questions from the STAI that would indicate different levels of anxiety present in participants. The results of this study display the varying levels of anxiety felt by college students from these two different educational settings. The information that is found in this study can be utilized by administrators, professors, students, and future research teams to evaluate how they can reform their campuses and provide resources to individuals who are struggling with anxiety on college campuses.

11.20 AM Bedford

### **Towards a Theology of Menstruation**

Hayli Stephens, *Nursing*

A theology of menstruation first explores the current depiction of periods in modern society through a critiquing lens. The spiritual significance of the cyclical, bodily act is illuminated by the dissection of biblical



passages, the recurrent symbolism of blood in the Old and New Testament, and human embodiment's significance. The diversity embedded into the individual menstrual experience is a central focus that fosters a more comprehensive understanding of periods and their relationship with the divine. A more charitable, humanitarian outlook on menstruation will then be suggested as a path forward.

11.20 AM Jones

### **Tied to Family: A Quantitative Study on Parental Divorce and Relationship Satisfaction**

Megan Crawford, Hannah Hubler, Lily Kintz, Suzanne Ledbetter, Anna Mallery, Heath Thielen,  
*Behavioral Sciences*

This quantitative study focuses on the difference between two groups' relationship satisfaction. The two groups include IWU students who have experienced parental divorce and IWU students who have not. The research results are based on demographic data and the Burns Relationship Satisfaction Scale scores that have been gathered through online surveys voluntarily taken by students at the university. This presentation focuses on rates of relationship satisfaction based on one's family childhood experiences in order to further knowledge on relational health in college students.

11.40 AM Bedford

### **Spiritual Education within Nursing**

Natalie Cotherman, *Nursing*

Within the field of nursing, holistic care is claimed to be vitally important. One aspect of nursing that seems to be missing in clinical practice is spiritual care. The research done by others shows how the implementation of spiritual care nursing interventions has made great advancements in the care for the patients. Nursing students also tend to understand spiritual care is vitally important for the overall care of the patients but are not confident in their ability to perform spiritual care. While spiritual care is taught in the Indiana Wesleyan's School of Nursing, there are little opportunities to implement or practice spiritual care in the clinical setting. A group of nursing students were invited to participate in a spiritual care course primarily developed from the book *Spirituality in Nursing: Standing on Holy Ground*, by Elizabeth O'Brien. Prior to taking the course, students took a survey to assess their understanding of spiritual care and they completed the survey again upon completion of the course. The goal was to assess if Indiana Wesleyan's School of Nursing adequately prepares nursing students to provide spiritual care to patients in the clinical setting. Nursing students appeared to be more confident in their ability to provide for patient's spiritual

needs, developed a broader understanding of spirituality, and a greater understanding of what spiritual interventions are after completing the spiritual care course.

11.40 AM Jones

### **Where Does the Help Lean: A Quantitative Study on Empathy Levels and Political Affiliations in Practicing Social Workers**

Taylor Brown, Emily Couser, Ethan Morrisson, Grace Johnson, Julia Evans, Alexi Viviano, *Behavioral Sciences*

Over the course of the semester, we have worked to further review whether liberal or conservative social workers demonstrate higher empathetic levels. All social workers who responded to our study have at least a BSW degree. Through our research, we have also gained a deeper understanding regarding the client, social work relationship. We are so excited to share our findings from the study with all of you!

**LUNCH BREAK 12:00-1:00 PM**

1.00 PM Bedford

### **A New Home?: a Qualitative Study on Belonging Among Hispanic and Latino Immigrants**

Riley Daugherty, *Behavioral Sciences*

1.00 PM Jones

### **The Effect of Childhood Trauma on Pain Tolerance in Collegiate Athletes with Chronic Back Pain: A Cross-Sectional Study**

Alexis VanFleet and Jared Williams, *Health and Human Performance*

**Objective:** To evaluate the effect of adverse childhood experiences on pain tolerance in patients with chronic back pain.

**Background:** Childhood trauma has been correlated with multiple adverse health effects including chronic back pain. However, the perception of pain in people who experience childhood maltreatment has not been widely researched and has incurred mixed results in the few studies conducted concerning this topic. This study not only seeks to better understand the relationship between pain perception and ACEs (adverse childhood experiences), but to also give health care providers more insight into their patients who fall onto this spectrum.

**Methods:** 29 subjects with chronic back pain participated in the study. The adverse childhood trauma questionnaire (ACE-Q) was used to split subjects into the control and experimental group. The control group consisted of 12 subjects with an ACE score of  $\leq 1$ . The experimental group consisted of 17

subjects with an ACE score  $>1$ . The visual analog scale (VAS) was used to assess perception of chronic back pain.

Results: Findings indicate there is no significance difference between the control and experimental groups ( $p = 0.975$ ). A linear regression analysis was established to identify if ACE score can predict VAS score. However, the analysis did not statistically predict pain level ( $F(1,27)=1.056, p=0.313$ ).

Conclusion: Research remains largely inconclusive as to whether ACE's influence the perception of pain. Increasing the population size, broadening the population to include recreational athletes, and including subjects above the ages of 26 may yield better results in future studies.

1.20 PM Bedford

### **Too Attached?: A Phenomenological Study of Foster Parents' Grief**

Haleah Heater, *Behavioral Sciences*

The purpose of this phenomenological qualitative study is to discover the lived experiences of foster parents who are managing and coping with grief/loss when a foster child leaves their home. Foster parents are housing some of the most vulnerable children in America, yet there are few studies currently done to see how grief from the loss of a foster child is affecting the foster parents. Therefore, semi-structured qualitative interviews have been conducted to understand how foster parents are coping and managing grief that they experienced due to fostering. This study focused on an array of circumstances that affects the foster parent's attachment to the child/children with a concentrated focus on their grieving process upon removal of that child. This study provides more understanding of the grief foster parent's experience.

1.20 PM Jones

### **The Efficacy of Anti-Gravity Treadmill on Lower Extremity Injury Rehabilitation**

Caleb Davis, Josiah Gardner, Brenden Zeisloft, *Health and Human Performance*

**PURPOSE:** Distance runners routinely experience lower extremity overuse injuries resulting in weight-bearing dysfunction. Modification of protocol through weight-bearing activities can benefit a patient recovering from injury. Modified workouts can be heavily dependent on training resources available. A healthy 21-year-old female developed chronic lower extremity pain in her left knee and both feet while training for cross country season. The patient was diagnosed with chronic patellar tendon strain in her left knee with left foot plantar fasciitis and a navicular stress fracture as well as sesamoiditis in her right foot.

**METHODS:** The multiple lower extremity diagnoses made running impossible without increased pain and

disability. Anti-gravity treadmill training was considered due to the ability to modify the percentage of body weight impact on lower extremities through usage of this type of equipment. While literature exists on using anti-gravity treadmill for alternate training regimens, evidence of using the LightSpeed Lift (LSL) anti-gravity treadmill for lower extremity rehabilitation is almost non-existent. The patient performed an experimental protocol using the LSL for injury recovery and rehabilitation and determine the intervention effectiveness by measuring perceived pain (PP) changes over time. The patient recorded a subjective pain perception evaluation at the start and end of each protocol session followed by a 6-Minute Walk Test (6-MWT). Weight reduction through LSL was performed 2 days/week for 7 weeks, with up to 60 min of usage per session. The protocol included two major parts; concurrent warmup/mobility assessment and conditioning. RESULTS: After 8 weeks of LSL intervention, PP immediately following the 6-MWT was unchanged. However, the post-session PP decreased significantly over time. CONCLUSIONS: Lower extremity injuries are problematic for running patients due to high frequency of use to the involved joints. This case involving a competitive runner pursued anti-gravity treadmill intervention to alleviate pain and dysfunction resulting from lower extremity injuries. This intervention approach could be utilized to reduce recovery time of injured runners and promote earlier return to activity. Additional benefits could include increased sense of well-being, as well as aerobic capacity maintenance or improvement. ABBREVIATIONS: 6-MWT = 6-Minute Walk Test, LSL = LightSpeed Lift, PP = perceived pain.

1.40 PM Bedford

### **A conductor's tone-print: discovering the inherent timbre of individuals**

Gracia Gormong, *Music*

Studies in the world of choral conducting have shown that every choral conductor sends subconscious, nonverbal messages that are transferred to their singers. Choral conductors can begin to “look like the music” due to their habits of movement (both postural and gestural), which are integral to the way they communicate to their ensemble. Because of the mirror neuron system of the human body, singers will mimic body posture, tone of voice, pronunciation, facial expressions, and even breathing rates of their conductor. By understanding the mirror neuron system and its functions, choral conductors have been able to solve common issues with the alignment, expression, breathing, and tone production of the singer, as well as help prevent those issues, by focusing on the intentionality of their gesture.

And while the intentionality of gesture is vital to the success of a choral conductor, this study aims to explore how not only gesture but the vocal tone (or timbre) of the individual conductor affects their

perception of sound and therefore the timbre of their choir—their “tone-print.” Our hypothesis is that while the exploration of gesture is vital to each conductor’s success in shaping their choir’s sound, the unique tone-print of that conductor will imprint on their choir uniquely as well (even, and especially, subconsciously). While one gesture might work well for a conductor with a bright, forward tone, the same gesture might not work well for an individual with a warm, dark tone. Therefore, though sound from the choir is gesturally based, the tone-print of the individual conductor also plays a critical role in the sound of an ensemble.

1.40 PM Jones

### **Metabolic Observation During Running with and without the Light Speed Lift**

Damascus Mickey, Mckenzey Ridge, Melanie Stuck, *Health and Human Performance*

**PURPOSE:** To investigate the differences in oxygen consumption (VO<sub>2</sub>), predicted maximal oxygen consumption (predVO<sub>2</sub>), respiratory exchange ratio (RER), heart rate (HR), rate of perceived exertion (RPE), and affect valence (AV) with the Light Speed Lift (LSL) to reduce 8-10% of body weight and without the LSL. **METHODS:** Thirty participants volunteered to participate in this study. During one exercise session, participants performed two submaximal tests, one using the LSL for body weight reduction, and one at full weight bearing (FWB). Conditions (LSL or FWB) were randomly counterbalanced. During both conditions, the participant worked to reach 60% of their calculated heart rate reserve. Once they reached this value, the individual remained at the obtained speed for 3 minutes. Measurements for metabolic variables were recorded at this stage using the metabolic cart while the affect valence and rating of perceived exertion was recorded manually. Paired t-tests as well as Wilcoxon Signed Rank tests were run to determine significance. The alpha levels were set at p<0.05. **RESULTS:** VO<sub>2</sub>, RER, and HR were not significant. PredVO<sub>2</sub> (LSL=41.1783, FWB=38.3280) as well as RPE (LSL =10.07, FWB=11.25) and AV (LSL=2.63, FWB=1.90) were statistically significant. **CONCLUSION:** Based on the findings, the utilization of the LSL brings greater enjoyment. Therefore, the LSL could be a tool that increases subject adherence. Further research is needed to develop an understanding of how the LSL affects predicted VO<sub>2</sub> max. A different equation to find predVO<sub>2</sub> can be found and used that takes time into account instead of speed.

2.00 PM Bedford

### **Interdisciplinary Curriculum Mapping with a Focus on Music Integration in the Middle School Classroom**

Brianne Flanagan, *Teacher Education*

This research highlights the benefits of an interdisciplinary approach to instruction with a concentration on music integration in the middle school classroom. Interdisciplinary instruction is a current hot topic in education that has yet to become common practice. Lack of common practice is widely due to educators' perceived notions that there is not enough time to teach one subject substantially, let alone several. Lack of interdisciplinary curriculum mapping is also a deterrent. Thus, interdisciplinary instruction is often encouraged but entirely discretionary. To many educators, interdisciplinary instruction, while great in theory, requires time they do not have to give. This research posits that interdisciplinary instruction is something an effective educator is already doing; they just have to be aware of how they are doing it.

2.00 PM Jones

### **Mild Traumatic Brain Injury Secondary to Atypical (Asymptomatic) Hydrocephalus: Return to Play Considerations and Management**

Dayton Groninger, Tonya Riffey, Emily Heighway, *Health and Human Performance*

This case study covers a 15 year-old diagnosed hydrocephalus patient who appears with no distinctive symptoms and requires no athletic or academic restrictions. Hydrocephalus is medically defined as having enlarged ventricles in the brain caused by an excess amount of cerebrospinal fluid (CSF) build-up. Most hydrocephalus cases present with diminished fine motor skill function as well as some kind of cognitive impairment due to the CSF pressure on the brain. The uniqueness of this case is that the brain scan of this teenage patient presents with swollen ventricles, but he experiences no cognitive or motor-functioning impairment typically seen in a patient with his diagnosis. Furthermore, this boy makes all A's in school, and is a three-sport athlete who plays soccer, basketball, and track for his high school sports teams. He currently has no sport-related restrictions or symptom management. This situation is very rare, and a case like this is not extensively covered in literature. Most diagnosed hydrocephalus cases are treated with a shunt placement surgery, but his neurologist at Riley Children's Hospital in Indianapolis did not think it pertinent to advance with surgery due to his asymptomatic condition. The purpose of our research is to fundamentally assess this patient's cognitive and motor-skill functioning to prove that this young patient can continue without sport and academic restrictions. We anticipate that the results of our testing will be within normal ranges, considering the patient currently presents with no complaints of physical or mental regression. The research and analysis of this case may benefit future doctors and athletes should another individual present with asymptomatic hydrocephalus.

## **Faith and Capital Punishment: Why Do Christians Support the Death Penalty?**

Hannah Knodel, *Social Sciences*

Most Christian denominations in the United States have denominational statements denouncing the use of the death penalty. However, poll data shows that the majority of Christians support the death penalty. In this presentation, we will show that the difference between theological statements and practical belief comes from the broader element of racialization in American culture.

## **Glenohumeral Joint Dislocation in a Female Fencer Diagnosed with Ehlers-Danlos Syndrome**

Jacob Glover, Gino Taylor, Corbin Jennings, *Health and Human Performance*

Background: Competitive Fencing is a group of three related combat sports. Competitive fencers experience a myriad of contact injuries due to the nature of the sport. Specific congenital conditions may influence susceptibility of certain orthopedic injuries. While fencing has been identified as a safe sport through extensive research studies, the officials, sport rules, and protective equipment may not be enough to foster a safe competition environment for participants with congenital conditions. Patient: A healthy 13-year-old female experienced an acute right shoulder glenohumeral joint dislocation on her dominant side during a fencing match. The patient was previously diagnosed Ehlers-Danlos Syndrome (EDS), a congenital connective tissue disorder. EDS is characterized by articular (joint) hypermobility, skin extensibility, and tissue fragility. EDS can be divided into six different classifications. This patient falls into the hypermobility category of EDS. Differential Diagnosis: Joint Hypermobility Syndrome, Marfan syndrome, Osteogenesis imperfecta, Classical EDS. Treatment: Glenohumeral joint (GH) dislocations require immediate reduction by qualified medical personnel. Upon reduction, the GH joint must be immobilized and radiographs are imperative to identify bony lesions that may have resulted from the dislocation and/or reduction. Immobilization is critical to joint healing as the compromised strength of the GH joint must be re-established through the scarring process and allowed to return to normal joint function by decreasing inflammation. Immobilization (6-8 weeks) will be followed by a rotator cuff (RTC) rehabilitation program. This program is designed to strengthen the shoulder girdle musculature to ensure functional joint kinematics. Outcomes: After 12 weeks of GHJ rehabilitation, the patient was able to resume progressive reintroduction of fencing activities. The patient was asymptomatic with full fencing activities 6 months post injury. Conclusions: The shoulder joint (glenohumeral joint) is one of the most common areas for a dislocation. Shoulder and other joint dislocations are more common for individuals that have EDS.

Continual dislocation of any joint can lead to arthritic changes and cause permanent damage. Congenital syndromes present unique challenges for competitors, coaches, health care professionals, and officials of contact sports. Awareness of athlete health conditions and their potential impact on participation is of paramount importance to ensure safe competition. Implementation of specific clearance rules and guidelines could promote safer competition. There is a lack of information concerning safety protocols for athletes participating with EDS. Clinical Applications: It is suggested that increased safety precautions for athletes involved in contact sports diagnosed with congenital syndromes could promote a decrease in musculoskeletal injuries. The sport of fencing has the potential to create unique circumstances that could lead to injury.

2.40 PM Bedford

### **Do Lawyers Affect Incarceration Rates? A Study into the Relationship Between Incarceration Rates and the Number of Lawyers**

Nathaniel Richard Miner, *Social Sciences*

A study into the relationship between lawyers per capita with both overall incarceration rates and black incarceration rates. Controlling for popular variables such as poverty, crime rate, unemployment rate, and other variables.

2.40 PM Jones

### **Comparing muscular activation through EMG during full-weight bearing versus reduced-weight bearing treadmill running.**

Madison Seymour, Ian Hudson, Christopher Maxon, *Health and Human Performance*

**PURPOSE:** The LightSpeed Lift is a positive pressure treadmill system that allows for the reduction of body weight while running on a treadmill. In this study, we are looking at the difference in muscle activation in relation to maintaining full body weight and reduced body weight in order to determine the effects of force on the body. These results can be applied to individuals involved in rehabilitation regarding the lower body or as a means of active recovery and injury prevention for athletes. **METHOD:** The true experimental study will include a controlled condition and a treatment condition with the subject strapped into the harness for both settings in order to maintain consistency. The controlled condition will include their full body weight and the treatment condition will be a reduction of 20% to 30% of their body weight, running for approximately 3 minutes for each condition setting. The results will be analyzed utilizing SPSS



and t-tests to determine the average muscle activation for both condition settings. **RESULTS:** Results showed that the gluteus maximus and the rectus femoris were statistically significant in reducing the average of muscle contractions (in volts) over 6 steps, while the gastrocnemius and the biceps femoris were not statistically significant. The results also showed that in comparing the means of all four muscle groups, all but the biceps femoris decreased in the average of muscle contraction (in volts).

3.00 PM Bedford

### **Housing Affordability and Education Outcomes in Indiana School Districts**

Zach Graber, *Social Sciences*

3.00 PM Jones

### **The Cultural Competency of IWU Undergraduate Students Pursuing Graduate Study in Health Professions**

Sarah McLimore, *Health and Human Performance*

3.20 PM Bedford

### **The Spanish-American War and the Philippine-American War: Western influences on Filipino identity and Pentecostalism's role in reclaiming Filipino identity**

A'ishah May Guinocor Tandoc, *Theology and Ministry*

3.20 PM Jones

### **Sporting Good Mental Health: A Quantitative Study**

Olivia Ennis, Anita Martin, Becca O'Vell, Ragan Skaggs, Desirae Miller, Lillian Koenig, *Social Sciences*

Studies done by the American Psychological Association have found that anxiety is one of the top concerns among college students at 41.6 percent, followed by depression at 36.4 percent, and relationship problems at 35.8 percent (College students' mental health, 2013). An increase in the number of college students who are battling some form of mental health is growing every year. The purpose of this study is to look at the comparison of mental health in collegiate athletes vs non-collegiate athletes. The two main groups that will be looked at include a number of diverse athletes and non-athletes at Indiana Wesleyan University.

In spite of the many years of data indicating these problems among college athletes, students still face difficulty getting the help they need. Student athletes have much on their plates, including demanding schedules, performance inside and outside of a sport, balancing social life, getting inadequate sleep, and figuring out when to do schoolwork; all of these factors lead to a higher risk of mental health issues. Student athletes typically feel like they have no time for help, or fear they might be perceived as “weak” if they seek help, and many do not have the appropriate counseling available for them (Kroshus, 2017). There is also a stigma that goes with getting professional help that oftentimes gets in the way of the motivation to seek assistance. An article by Bird (2018), reported on research indicating that athletes face more of that public stigma than non-athletes. Among athletes, fear of admitting weakness has played a big role in finding the right help. With such an admission, many athletes believe that they will experience rejection by their fellow teammates. Public stigma in this context is defined as discrimination or negative stereotype about people who seek help (Bird, 2018). Due to the stigma, student athletes also seek help from unqualified people, such as friends and family. Treatment is important when seeking counsel and many athletes do not feel safe getting professional counsel, leading to more problems over time (Bird, 2018).

3.40 PM Bedford

### **Exploring Theology in Fantasy Literature**

Cassandra Thompson, *Theology and Ministry*

This presentation will discuss the Christian roots of the literary fantasy genre and why fantasy is such a great tool for exploring and discussing theological realities. I will also discuss my own fantasy novel I have written, and how I incorporated and utilized theological truths to shape the story.

4.00 PM Bedford

### **Optimization of Steered Molecular Dynamics to Determine Binding Affinity for SHP2 *in silico***

Elizabeth Faitz, *Mathematics and CIS*

In order to find optimal inhibitors of SHP-2, small organic molecules are optimized and simulated through SMD with carefully chosen specifications. Performing statistical analysis with the generated data provides an estimation of binding energy.

## Geranylgeraniol, Not Phosphonoformic Acid, Partially Rescues Human Gingival Fibroblasts From Zoledronate-Induced Death

Jessica Binkley, *Natural Sciences*

The drug zoledronate (ZOL) is used for treatment of bone resorptive diseases including cancer metastasis to bone. ZOL is linked to medication-related osteonecrosis of the jaw (MRONJ), which is known to cause hard and soft tissue lesions in the maxillofacial region. Potential rescue agents for managing ZOL-associated side effects include geranylgeraniol (GGOH), sodium citrate, and phosphonoformic acid (PFA). GGOH is a known mevalonate pathway intermediate that circumvents ZOL-induced inhibition of this pathway. In osteoclasts and macrophages, bisphosphonate uptake is enhanced by calcium ions. Use of citrate, the major calcium chelator in saliva, could potentially limit ZOL uptake. PFA, a topical anti-viral, is thought to inhibit the SLC20/34 families of sodium-dependent phosphate transporters, thereby preventing bisphosphonate entry. This study measured human gingival fibroblast (HGF) viability in the presence of ZOL and varying amounts of either GGOH, citrate, or PFA in order to evaluate relative rescue from ZOL-induced viability loss. Viability was measured by an MTT assay. Viability dose-response curves for each compound were determined at 48 and 72 hours of treatment in order to optimize the doses tested for rescue. 50 mM ZOL-induced viability loss was partially but significantly rescued by both 10 and 30 mM GGOH but not by the optimized doses of PFA (0.5 mM) nor citrate (2 or 3 mM). To investigate the failure of PFA to rescue, we analyzed gene expression of the SLC20 transporter family genes in HGFs via quantitative real time RT-PCR. The SLC20A1 gene was moderately expressed, albeit significantly less than the positive control. The SLC20A2 gene was minimally expressed. The data suggests that alternative mechanisms of ZOL entry into HGFs must exist. This work was partially funded by a Senior Research grant from the Indiana Academy of Science and a University Scholar Award from Indiana Wesleyan University.

## Optimization of a Viability Rescue Assay in Human Oral Keratinocytes

Abigail Conrad, *Natural Sciences*

Zoledronate (ZOL) is used to treat bone resorptive diseases such as osteoporosis and cancer metastases to bone. ZOL is associated with medication-related osteonecrosis of the jaw (MRONJ), a condition known

to cause bone destruction and maxillofacial region lesions. Geranylgeraniol (GGOH) is a potential rescue agent that provides an alternate route in the mevalonate pathway when the pathway is inhibited by ZOL. This study measured the viability of normal human oral keratinocytes (NHOKs) when exposed to ZOL and when GGOH was added under varying conditions to rescue the ZOL-induced viability loss. Viability was measured by an MTT assay in which viable cells convert water-soluble (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) into an insoluble, formazan product. Quantitation was performed by measuring absorbance of the product at 570 nm (630 nm reference) after 72 hours of treatment incubation. NHOKs grown on uncoated 96-well plates showed significantly higher corrected absorbance values ( $p < 0.035$ ) than NHOKs grown on poly-L-lysine-coated plates; consequently, successive experiments were performed on uncoated plates. We tested rescue of NHOKs when 10 microM GGOH was added 15 minutes prior to ZOL, 24 hours prior to ZOL, or simultaneously with ZOL. In the 15 minute-prior variation, 25 and 50 microM ZOL significantly decreased viability but GGOH did not rescue. The 24 hour-prior and the simultaneous addition variations displayed significant ZOL-induced viability loss at 10, 25, and 50 microM. Only when ZOL and GGOH were added simultaneously did significant rescue occur. These results inform successive NHOK experimentation on the relative efficacy of rescue agents to rescue from ZOL-induced viability loss. This work was partially funded by an Indiana Academy of Science senior research grant.

4.20 PM Jones

### **Dynasore, A Dynamin Inhibitor, Prevents Zoledronate-Induced Human Gingival Fibroblast Death**

Makayla Standfest, *Natural Sciences*

Medication-related osteonecrosis of the jaw (MRONJ) is a condition known to cause bone destruction and lesions of the maxillofacial region. Associated with the onset of MRONJ, zoledronate (ZOL) is a drug used for treatment of bone resorptive diseases such as osteoporosis and cancer metastasis to bone. ZOL inhibits the mevalonate pathway, and geranylgeraniol (GGOH) is a known pathway intermediate shown to partially rescue human gingival fibroblasts (HGFs) in vitro. However, there is evidence that GGOH may be tumorigenic and hence alternatives are needed. Phosphonoformic acid (PFA) is a potential alternative that theoretically could inhibit ZOL uptake via inhibition of soluble carrier (SLC) sodium-dependent phosphate transporters. Another compound of interest theoretically is a dynamin inhibitor, Dynasore, that could limit endocytosis and ZOL uptake. This study used quantitative real time RT-PCR to first measure the expression of SLC transporter genes in HGFs and found that the SLC34 family is not significantly expressed, explaining earlier work in the laboratory that revealed failure of PFA to rescue HGFs from ZOL-

induced viability loss. Next, we investigated the ability of Dynasore to prevent ZOL-induced death as well as the effect of GGOH and Dynasore in combination over 72 hours of treatment. Initially, dose-response curves were determined for each of ZOL, GGOH, and Dynasore to define the optimal doses for testing. Pre-treatment with either 10 or 30  $\mu$ M Dynasore 15 minutes prior to ZOL addition completely prevented 50  $\mu$ M ZOL-induced viability loss in HGFs. Combination doses of GGOH and Dynasore provided no additional benefit. The data suggests that Dynasore merits further study for use as an oral topical agent in the prevention of MRONJ. This work was partially funded by a Senior Research grant from the Indiana Academy of Science and a University Scholar Award from Indiana Wesleyan University.