SYMPOSIUM

NINETEENTH ANNUAL UNION UNIVERSITY SCHOLARSHIP SYMPOSIUM

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TUESDAY, APRIL 19, 2022

AFTERNOON CONCURRENT SESSIONS

Poster Presentations (P)

Carl Grant Events Center	Student Presenters
12:30-2:00 p.m.	Chloe Thomas (ART) Ella Wheeler (ART) Ashley Perkins (ART) Brianna Correia (CHE) Cece Morton (CHE) Evan Holt (CHE) Nathan Golden and Noah Simpson (EGR) David Ebrahim (EGR) Cooper Champine (EGR) Nathan Golden (EGR) Noah Simpson (EGR) Nate Barnard, Tim Boccarossa, and Adam Sills (EGR) Vishal Karmacharya and Nathanael Madison (EGR) Philip Becker and Paige Bizzell (EGR) Jasmine Gonzales, Chad Hinton, and Tiffani Tran (NUR) Lauren Larsen, Kellie McGiffin, and Scott Venable (NUR) Katherine Barnes, Samantha Irvin, and Zehra Jaffer (NUR) Jennifer Dahle, Ashley Pratt, and Garrett Rhodes (NUR) Matthew Johnson, Gleyndon Kern, and Jennifer Kern (NUR) Contesta Corey, Candace Hubbert, and Jodine James (NUR) Kayla Lambert, Ross Palmer, and Dana Sanders (NUR) Shairah Hortelano, Natashia Melton, and Molly Mills (NUR) Charles Banks III, Albert Scott Jr., and Erica Wooten (NUR) Rebecca Davis, Codie Moszczynski, and Curtis Sutera (NUR) Joshua Lawson, Joshua Morse, and Justin Woods (NUR) Amanda Cox, Sam Seaton, and Amanda Terwilliger (NUR) Roman Comer and Oktay Mustafayev (NUR) LaQuitta “Shai” Wilkins (NUR) Juanjeca Barrow (NUR) | Rachel Reeves (NUR) Ross Palmer (NUR) | Jennifer Bunte (NUR) Inga Paige Juchheim (NUR) | Aaron Drees (NUR) Olivia Sognesand (NUR) | Casey White (NUR) Lori Hurlbut (NUR) | Asmait Rezene (NUR) Ashton Joyner (NUR) | Hoa (Henry) Nguyen (NUR) Katherine Faltot (NUR) | David Barrera Jr. (NUR) Mason Matzek and Chuncey Ward (NUR) Shayla Cue (NUR) | Cory Riley (NUR) Tahiem Eady (NUR) | Marcus Williams (NUR) Ashley Nicole Diaz (NUR) | Carey Grace Peebles (NUR) Jesus R. Zambrano-Samaniego (NUR) | Timothy Lovelace (NUR) Jamie Ellerbrook (NUR) | Teresa Johnson (NUR) Daniel Thomas (PHY)

SCHEDULE

Oral Presentations (O)

Dept.	Room	Student Presenters	Time
ART Session Chair: Haelim Allen	PAC D-53	Kendra Duffey Joy Robbins Grayce Lillpop Callie Wright Sara Nevius Sara Beth Zeiser Avery Lopez Callie Wright Laura Rose Gray Sara Nevius	2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m. 3:20 p.m. 3:40 p.m. 4:00 p.m. 4:20 p.m. 4:40 p.m. 5:00 p.m.
BIO Session Chair: Andy Madison	WH 101	Gabi Mirabella Alana Parkey Melissa Aguirre Adna Alihodzic Sydney Zemke Charis Murrey Nicholas Lewis Hannah Juliussen	2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m. 3:20 p.m. 3:40 p.m. 4:00 p.m. 4:20 p.m.
BIO Session Chair: James R. Kerfoot	WH 102	Anders Rider Isaias Leon Carly Bryant Alyssa Hughes Alexis Tinsley Alexis Hightower Noah Reid	2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m. 3:20 p.m. 3:40 p.m. 4:00 p.m.
ENG/SOC Session Chair: Christine Bailey	BAC 44	Benjamin Murray (SOC) Cate Price (ENG) Sydney Schmude (ENG) Hannah Miller (SOC) Eunice Tan (ENG)	2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m. 3:20 p.m.
CSC/MAT Session Chair: G. Jan Wilms	PAC A-7	Caleb Atkins (CSC) Ben Trainor (CSC) Samuel Drotar (CSC) Reid Lydon (CSC) Patrick Music (CSC) Lisa Reed (MAT)	2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m. 3:20 p.m. 3:40 p.m.
EGR Session Chair: Jay Bernheisel	PAC D-3	Roger Baker, Cade Crowder, and Kyle Roach Sydni Caruvana and Caleb Steele Shawn Ross and Trey Tidwell	2:00 p.m. 2:30 p.m. 3:00 p.m.
HIS/MUS/STM Session Chair: Mark Dubis	JEN 325	Nicholas Terra (HIS) Lucas Brogdon (MUS) Gabrielle McClellan (STM) Steven Errico (STM)	2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m.

LAN (ICS/FRE SPA) Session Chair: Karen Martin	Language Lab	Leah Busler (ICS) Jon Hudson (FRE) Bayley Smith (SPA) Elijah Stutz (SPA)	1:20 p.m. 1:40 p.m. 2:00 p.m. 2:20 p.m.
LAN (TESOL/ALNG) Session Chair: Phillip Ryan	Language Lab	Rachel V. Henderson David Raymond Anne Adams Rachel Smith Bayley Smith	2:40 p.m. 3:00 p.m. 3:20 p.m. 3:40 p.m. 4:00 p.m.
NUR Session Chair: Cathy Ammerman	WH 205	Ashley Jones Christina Lumpkin Colton E. Gramse	2:20 p.m. 2:40 p.m. 3:00 p.m.

ART

Color as Candy (O)

Presenter: Kendra Duffey
Faculty Project Advisor: Christopher Nadaskay

No color. Imagine a world without color, yet the forms of objects are still visible. Though there are some cases where people are completely color blind, most people can see color in some way. If you see color in any way, can you imagine life without it? "Color As Candy" celebrates color by comparing it to candy in paintings made in oil and acrylic. Color is an addition to vision, as candy is an extra part of a meal. I'm not saying that color is not nutritious in a visual sense. Color is important, but what if God created sight without color? Seeing hues in the world around us is many times taken for granted. Come celebrate and be reintroduced to colors that are found all around in the "Color as Candy" painting series.

National Parks and National Forests (O)

Presenter: Joy Robbins
Faculty Project Advisor: Christopher Nadaskay

Our National Parks and National Forests protect many wonderful areas of God's creation. These protected areas provide the space needed for individuals to gain valuable experiences in nature and also provide natural "classrooms" and "studios" in which the artist can learn and work. These parks and forests allow the artist or visitors to gain a deep respect for God's creation of nature and the world around us. The National Parks and Forests allow the opportunity for curiosity and wonder for those who visit them. This curiosity and wonder is what I try to capture in my paintings. My watercolor paintings depict several of the various National Parks and National Forests. My paintings come from both an appreciation and desire to visit the National Parks and National Forests and to display the glory and wonder of God's creation.

Television Commercials to Social Media Ads: The Evolution of Advertising (O)

Presenter: Grayce Lillpop
Faculty Project Advisor: Haelim Allen

The evolution of visual advertising throughout history has significantly altered the way we perceive media and purchase goods today. With the invention of the television in 1929, graphic marketing material that consisted of two-dimensional printed advertisements was now made available with sounds, sights, and motion, thus increasing entertainment value and conversion rates exponentially. Early television commercials aimed to make goods readily accessible to those wanting a product, and the same principle has spanned generations into the current digital world. However, modern means of advertising have shifted to cater to this generation's specific consumer behaviors and preferences. To gain a better understanding of this trend is to identify where early television advertising began, acknowledge its purpose, analyze its impact, as well as observe how advertising material is currently being created. This research demonstrates how the manner in which media is encountered today has evolved from exclusively being available within a television screen to being accessible at every fingertip through the power of social media advertising.

Painting on Walls: Modern Public Murals as Art (O)

Presenter: Callie Wright
Faculty Project Advisor: Haelim Allen

Art museums and traditional galleries are considered establishments of high culture and class, full of fine artworks gracing their walls and pedestals. One form of art that lives outside the gallery, however, is the public mural. Murals occupy particular public spaces and are installed directly on the interior and exterior of buildings, rather than canvases or smaller substrates. With a long history in the art world and social movements, today, many large-scale murals become local landmarks. Cities, including Jackson, are promoting this form of public art as an avenue for urban beautification and development. While this public art form may be tangentially related to the fine art world, it has unique potential to engage a different kind of artist, audience, and space. This survey will examine the development of public wall murals in the contemporary art world and discuss the unique purposes, considerations, and community this medium creates.

Revolutionizing the Title Sequence in Cinema (P)

Presenter: Chloe Thomas
Faculty Project Advisor: Haelim Allen

This research delves into the history of the film title sequence and discusses how designers and filmmakers like Saul Bass and Maurice Binder revolutionized the cinematic world with motion graphics. Title sequences were once motionless cards that solely showcased the production company's trademark, yet through time have presently become intricate and meaningful additions that, as Bass has stated, "prime the underlying core of the film's story." It was not until Bass and Binder began their successful careers in the film industry that cinema saw a shift in title sequences into more of what is seen today with moving parts, invigorating music and details that give clues to the plot. Prior to their work in the late 1950s, title sequences had not progressed significantly in over twenty years. Bass and Binder's styles, techniques, and film direction have resulted in some of the most recognizable sequences and scenes to date, such as the famed gun-barrel sequence for the James Bond film, *Dr. No.* Both designers saw an opportunity for innovation in the industry and were able to use their imaginations, alongside motion graphics, to change the course of titles in cinematic films.

Ansel Adams: The Father of Dodge and Burn (P)

Presenter: Ella Wheeler
Faculty Project Advisor: Haelim Allen

Ansel Adams, a pioneer in black and white photography, grew up socially isolated from others in his youth. He spent most of his youth documenting nature and landscapes through the lens of his Kodak camera. Over the years, he developed and refined methods of controlling lighting and contrast in his printed photos. He began with his ten tonal zone system of exposure and development, then developed straight photography in which the final image had no alteration from the moment it was taken to the final print. Finally, Adams created one of his most influential methods to date: the dodge and burn method of photo processing. Through his manipulation of light exposure during the development process, he was able to create his visions of his artwork. This was a major milestone in the realm of photo editing, which is still used today in the dark room and has now been digitized in contemporary photography. One of the most common features in Photoshop, is the Dodge and Burn tool. Due to Ansel Adams' discoveries and innovations, photographers worldwide have much more creative freedom in the editing process, revealing their artistic visions of the world.

Wabi Sabi: Philosophical Design (P)

Presenter: Ashley Perkins
Faculty Project Advisor: Haelim Allen

Wabi Sabi is a Japanese philosophy which embraces the beauty of imperfection. With roots in ceramics, Buddhism, and Taoism practices, it values simplicity, humility, and nature. According to Axel Vervoordt, a notable interior designer, ceramicist, and fine artist, Wabi Sabi finds elegance, perpetuity, and honor in otherwise humble and minimal materials. Using water, wood, metal, and natural light as his palette to create a harmonious living space, Vervoordt's interior designs are the physical manifestations of what he believes Wabi Sabi to be. He asserts that his personal definition of Wabi Sabi is the beauty in objects that are pure, natural, humble, and reserved. He also suggests it is timeless and creates a heightened physical and spiritual awareness in a viewer. Discerning what Wabi Sabi exactly is and whether or not it should be implemented in interior design is an arduous task; by analyzing Vervoordt's designs, an informed decision on this philosophical design can be made.

ART

Jenny Saville Incarnate (O)

Presenter: Sara Nevius
Faculty Project Advisor: Haelim Allen

Jenny Saville is a contemporary British painter who studied at the Glasgow School of Art from 1988 to 1992. She earned her recognition in the exhibition Young British Artists III at London's Saatchi Gallery in 1994. This research explores Jenny Saville's figurative paintings in which she addresses cultural beauty standards of women. Her works, *Plan* and *Propped*, react and challenge these standards by depicting tones with a colorful palette, manipulating scale and proportion, along with atypical perspectives of the figure. The pieces articulate flesh through color and brushwork and challenge the historical artistic traditions of the female figure. Saville questions western beauty standards as they may endorse unattainable body ideals through diet culture and plastic surgery. Saville's *Plan* addresses these existing standards by including surgical markings and exaggerating the scale of the figure. In *Propped*, Saville confronts these ideal standards through amplifying the figure, in addition to painting the words of feminist philosopher Luce Irigaray. In addition, Saville manipulates paint in such a way to portray the figure beyond the traditional canon of figurative work while maintaining aesthetic considerations. Saville's two works counter traditions of female representations as Saville represents both the model and the artist.

Ipseity (O)

Presenter: Sara Nevius
Faculty Project Advisor: Christopher Nadaskay

This presentation explores a body of drawings and paintings titled *Ipseity* meaning individual identity. Tension and division have infiltrated many aspects of society between religious groups, political affiliations, racial groups, and gender orientations. As a response to this division, the works in *Ipseity* explore the individual's identity and cultivate a relationship between the viewer and the subject to learn, find beauty and human connection in the diversity of perspectives. Specifically, the paintings *Gwyn* and *Gwyn II* explore the subject's identity of womanhood and femininity through color, composition, and positioning. In addition, the paintings of this body of work are produced using the Zorn palette, also known as the "limited palette" comprised of four basic colors: white, black, vermillion, and yellow ochre.

The Evolution of The Wedding Invitation (O)

Presenter: Avery Lopez
Faculty Project Advisor: Haelim Allen

This research aims to examine and explain the evolution and processes which brought about the wedding invitation. Before Gutenberg's printing press was invented in 1447, the wedding invitation began as a verbal exclamation by the town crier. Over time, the wedding invitation has developed into a commercialized phenomenon. This portion of wedding planning has created an aspect of societal expectation for couples. The immense diversity is displayed in the: formatting, styles, content, and embellishments of the invitation itself. The invitation's extravagance is seen as an exhibit of the affluence of a bride's family.

Faces of Jackson: Portraiture as a Dignifying Act (O)

Presenter: Callie Wright
Faculty Project Advisor: Christopher Nadaskay

The Christian faith and the social work profession both speak to a specific understanding of human dignity and the calls to see, serve, and love one's neighbors. This body of work seeks to use visual art as a unique medium for communicating these ideas. This series of portraits shows local neighbors in Jackson – those who have recently been experiencing homelessness in our community. The works use the tradition of portraiture to encourage the subjects to see the beauty in themselves and encourages the viewer to see them as a neighbor. For the artist, creating these portraits becomes a meditation on the subjects as Image-bearers, giving these neighbors the time and attention that dignity merits. Displaying their likenesses through works of visual art affirms that the subjects have lives and stories, and as Image bearers, they are worth seeing.

Art Therapy for Hospitalized Children (O)

Presenter: Laura Rose Gray
Faculty Project Advisor: Haelim Allen

This essay will explore how art therapy can help hospitalized children process their emotions and gain a sense of control. Young children have trouble expressing their suffering in words. They show us how they feel through their behavior. Art therapy for children in a hospital setting can give them a space where they can feel more comfortable while in the hospital and a chance to process through their emotions about being there. The duration of the child's stay in the hospital and purpose for the stay require the therapist to use individualized techniques with each patient. Art therapy comes equipped with numerous opportunities to help children through the medium that is used during therapy and the way it is used. During this process a therapist can identify the struggles that a child is having. Ultimately, the therapist can help the hospitalized children start to verbalize and process through those emotions.

American Raku (O)

Presenter: Sara Beth Zeiser
Faculty Project Advisor: Haelim Allen

Raku is a ceramic firing technique that was founded in the 16th century Japan. It was created as a part of a traditional Japanese aesthetic and became very popular in the late 1500s and has not lost its popularity since. Its history intertwines with the Japanese tea ceremony and wabi sabi aesthetic. A British ceramicist, Bernard Leach, visited Japan in 1908 and stumbled upon raku accidently. He was infatuated with raku and brought it back to Britain which created a raku revolution in the west. Artists picked up the technique quickly; Paul Soldner, an American ceramicist, brought raku to the United States in the early 1950s. As raku's popularity grew among American artists, its historical roots, that tied into the ancient Japanese aesthetic, were lost and only certain ceramic technique remained. In the United States, artists picked up the technique quickly and were captivated by the beautiful surface texture it created. It is a low-firing technique that causes the clay to have a unique surface texture that is different from other firing techniques. Raku is a technique that pulls the pottery out of the kiln at its hottest point and the cold shock from the atmosphere causes the pottery to cool extremely quickly, which causes the beautiful surface. This research is an overview of the journey of raku from ancient Japan to modern America, along with people who contributed to spreading the technique around the world. ■

BIOLOGY

Effect of *Pseudomonas* Supernatant on Biofilm Formation and Gene Expression of *Staphylococcus epidermidis* (O)

Presenter: Gabi Mirabella
Faculty Project Advisor: Esther Choi

Staphylococcus epidermidis is an opportunistic pathogen and an important cause of nosocomial infections by forming biofilms in medical devices. Biofilms impair penetration of antibiotics and evade immune surveillance. Our lab has observed that *Pseudomonas fluorescens* supernatant disrupted *S. epidermidis* biofilms due to competition between bacteria. Polysaccharide intercellular adhesin is the main component of the *S. epidermidis* biofilm matrix and is synthesized by the products of *icaADBC* genes. Quantitative RT-PCR was performed to observe differences in biofilm-related gene expression. All *icaADBC* gene expression was significantly downregulated in supernatant-treated *S. epidermidis* compared to controls. These results indicate that polysaccharides are the component of *S. epidermidis* targeted by inhibitors in *Pseudomonas* supernatant. The inhibitory effect of the *P. fluorescens* supernatant has potential to be used for destabilizing and removing *S. epidermidis* biofilms from medical devices when combined with antibiotics.

Differentiating Clades of Cricket Assassin Wasps (O)

Presenter: Charis Murrey
Faculty Project Advisor: Jeremy Blaschke

Two genetically distinct clades of cricket-assassin wasps (*Rhopalosoma*) occur as sympatric cryptic species in eastern North America. To investigate potential morphological traits that can reliably distinguish clades, specimens were collected from Cypress Grove Nature Park, Jackson, TN from July to September 2020 using malaise traps. Specimens were preserved in 95% ethanol and genetically barcoded to identify clades. Pictures were taken of the hindwings of ten specimens including both males and females (six total from Clade 1, four total from Clade 2). Nine length measurements and seven vein angle measurements were calculated and analyzed with ImageJ. The length of the Rs and M-Cu vein and three angles showed significant statistical differences. These morphological differences should be confirmed with additional specimens, but preliminarily analyses indicate that this may be a reliable way to differentiate the cryptic species of cricket-assassin wasps.

Chemical and Physical Factors Contributing to *Staphylococcus epidermidis* Biofilm Formation (O)

Presenter: Alana Parkey
Faculty Project Advisor: Esther Choi

Nosocomial infections are often caused by the microorganism *Staphylococcus epidermidis*. Typically, *S. epidermidis* is a part of normal skin microbiota causing no harm, but environmental factors can cause it to become pathogenic. The major mode of pathogenicity is what is known as biofilm. My research focused on analyzing how chemical and physical factors contribute to *S. epidermidis* biofilm formation. The factors tested included temperature, surface types, and competitive bacteria supernatant. Serial dilutions were performed for *S. epidermidis*, allowing the biofilm to grow in the appropriate conditions; the biofilm was then stained and quantified. When comparing *S. epidermidis* biofilm growth between 2 temperatures as well as plastic and silicon surfaces, no significant differences were observed. When comparing competitive bacteria supernatant, *P. fluorescens* and *B. subtilis* supernatant significantly inhibited biofilm formation. These observations provide a new perspective to destabilize *S. epidermidis* biofilm accumulated on medical devices.

Biofilm Inhibitory Effects of Bacterial Supernatant on *Pseudomonas fluorescens* and *Candida albicans* (O)

Presenter: Melissa Aguirre
Faculty Project Advisor: Esther Choi

Biofilms are an accumulation of bacteria enclosed in an extracellular matrix. By forming communities, microorganisms exhibit antibiotic resistance and evade immune surveillance. The supernatant of one bacterial species may inhibit biofilm growth of another species, due to competition and sensing mechanisms. Previously, our lab has shown growth and biofilm formation of *Staphylococcus epidermidis* were inhibited by *Pseudomonas fluorescens* culture supernatant. This research examined inhibitory effects of various bacterial culture supernatants on different types of microorganisms. *Candida albicans* was not inhibited by *P. fluorescens* supernatant. *P. fluorescens* bacterial growth and biofilm formation was also not affected by *S. epidermidis* culture supernatant. These results indicate that *P. fluorescens*, a Gram-negative bacteria, produces inhibitors specifically targeting Gram-positive bacteria such as *S. epidermidis*.

BIOLOGY

Thrombin Involvement in Tissue Remodeling and Chemotaxis of 3T3-L1 Fibroblasts (O)

Presenter: Anders Rider
Faculty Project Advisor: Marc Lockett

When injured, blood coagulation factors aid in the clotting response. Research was conducted to test if a factor, thrombin, leads to wound healing. It was hypothesized that thrombin and protease-activated receptors would contribute to fibroblast function after an injury. This was determined by chemotaxis assays, cell counts and collagen deposition using 3T3-L1 fibroblast cell lines. Cell counts were performed on 3T3-L1 cells with and without the presence of thrombin and an inhibitor. A Transwell assay was used to determine chemotaxis ability. To assess collagen deposition, an ELISA was performed. Cell plates with higher concentrations of thrombin contained larger numbers of cells than cell plates without thrombin. It was determined cells in the presence of thrombin were more mobile than cells without thrombin. The cells incubated with thrombin produced collagen, however the results of the collagen assay were inconclusive. This study could prove beneficial in fibrosis research.

Extraction of Degraded Genomes from Cricket Assassin Wasps (Rhopalosomatidae) Using Non-Destructive Enzymatic Techniques (O)

Presenter: Nicholas Lewis
Faculty Project Advisor: Jeremy Blaschke

Rhopalosomatidae are a taxonomically understudied group of cricket-assassin wasps. Specimens are rarely collected and consequently, no family-level molecular phylogeny has been completed. For rhopalosomatid samples stored in ethanol for >10 years, typical DNA extraction methods that keep the valuable specimens intact are unsuccessful at consistently extracting high-quality genomic DNA. To address this difficulty and create the first family-level phylogeny for Rhopalosomatidae, a new non-destructive enzymatic technique was applied to sixteen rhopalosomatids of >10 years storage age whose DNA failed to amplify using normal extraction methods. Seven specimens, representing all four genera of Rhopalosomatidae, were successfully amplified (43.75%), three genes were sequenced (*COI*, *EF1-α*, *POL*), and a phylogeny was assembled using the concatenated data from all three genes. Our results indicate that non-destructive enzymatic techniques are effective at extracting amplifiable DNA from degraded genomes and can be used as an additional tool to solve persistent difficulties related to understudied taxa.

Novel Specific Primer Design for *Alligator mississippiensis* in Preparation of Environmental DNA (eDNA) Survey Research (O)

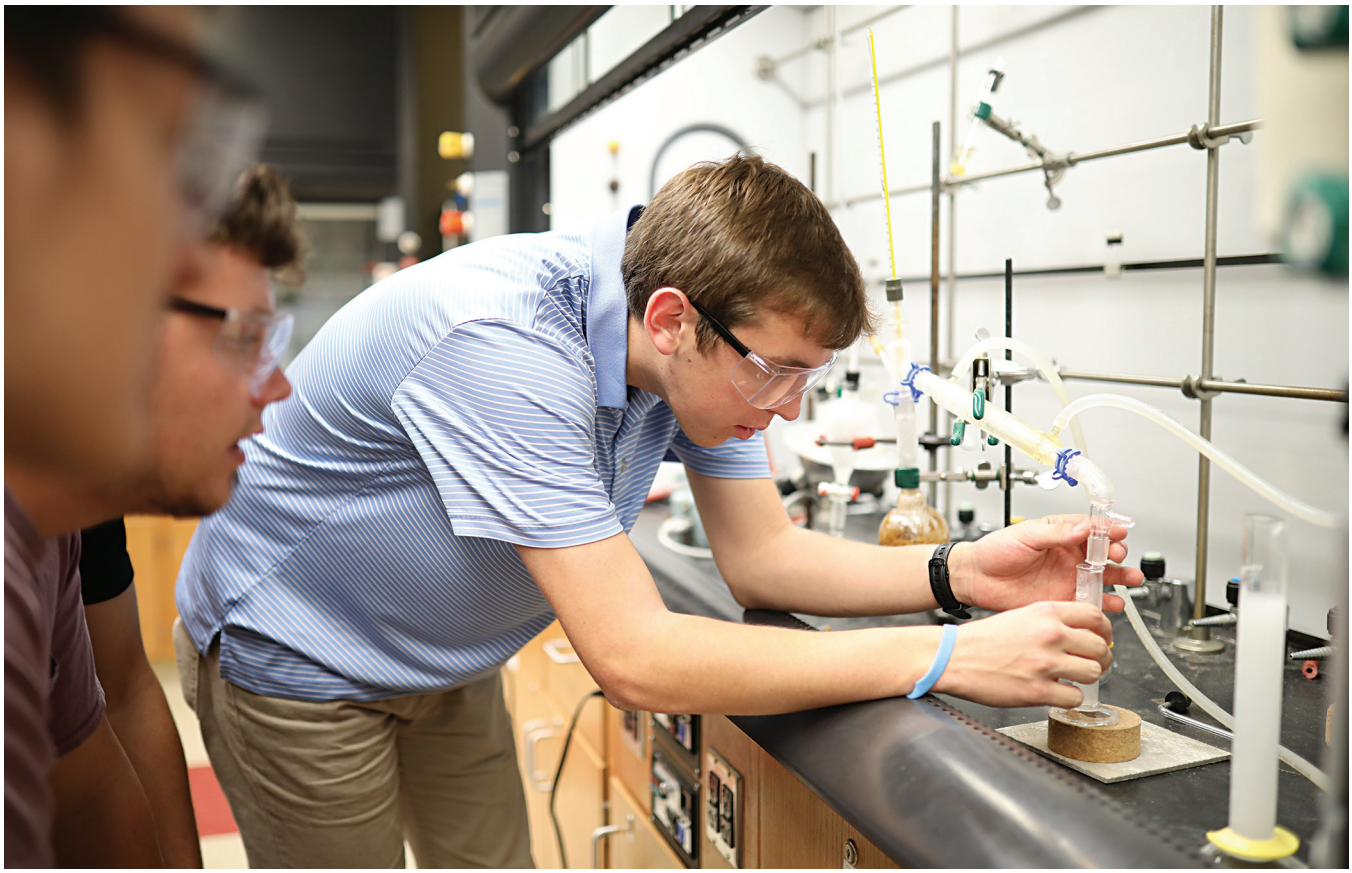
Presenter: Sydney Zemke
Faculty Project Advisors: Micah Fern and William Thierfelder

In recent years there has been an increase in the number of sightings of *Alligator mississippiensis* in West Tennessee. Environmental DNA surveying is a newer management tool that can be used to identify which waters have *A. mississippiensis* in them. A common problem with previous eDNA research is using a poor primer that produces false positives for genetically similar species. This research evaluated and tested six primers for *A. mississippiensis*, using polymerase chain reaction to test the primers' specificity with isolated DNA from *A. mississippiensis* specimens and an outgroup that included representatives from five different caiman species to measure specificity and false positive rates. Assessment of the correct annealing temperatures and refinement of the PCR procedure was also conducted. Gel electrophoresis was used to see if the primers were effective. Results are still pending, but there is one primer that could be used under the right annealing temperature in PCR.

Analysis of the Effects of Glucose on HuC Protein Expression in Zebrafish (O)

Presenter: Carly Bryant
Faculty Project Advisors: Faith Zamamiri-Davis and Hannah Henson

Diabetes Mellitus is a glucose intolerance identified by abnormal blood glucose levels due to defects involving insulin. Pregnant women that develop gestational diabetes are not only at risk for developing Type II diabetes but also for having a miscarriage, stillbirth, or premature birth. Infants born to mothers with gestational diabetes are often diagnosed with hyperglycemia, although long-term effects of hyperglycemia are unknown. To investigate the effects of hyperglycemia on brain and neuron development, we used zebrafish (*Danio rerio*) embryos subjected to a 4% glucose solution to observe changes in HuC expression levels. HuC is a protein in the nervous system used as a marker for neuron development. After using reverse transcription quantitative real-time polymerase chain reaction, results indicated that glucose has an inhibitory effect on HuC protein expression during embryonic development, which could be a potential model for the effects of gestational diabetes.



Effect of Herbicide Exposure on Zebrafish Skull Morphometrics (O)

Presenter: Alyssa Hughes
Faculty Project Advisors: James R. Kerfoot and Hannah Henson

Glyphosate (Roundup) production has increased drastically over time and is the most widely used herbicide in the United States. Studies have shown a link between glyphosate and autism spectrum disorders due to the increasing prevalence of both. With autistic individuals, there tends to be brain enlargement which causes skull structures to expand. Using zebrafish (*Danio rerio*) as a vertebrate developmental model, the objective of this study was to investigate the effects of glyphosate on cranial development. The experimental group was exposed to glyphosate and the control group to normal conditions with each group containing approximately 150 embryos. Once reaching the larval stage, they were cleared and stained to measure 8 cranial elements with a compound microscope. A Multivariate Analysis of Variance revealed significant differences in cranial elements between treated and untreated individuals. The data suggests that glyphosate exposure causes an increase in cranial development and size.

Effects of Exposure to 17a-Ethinylestradiol on Developing Zebrafish Behavior, Morphology, and the Brain Transcriptome (O)

Presenter: Alexis Tinsley
Faculty Project Advisor: Faith Zamamiri-Davis

17a-Ethinylestradiol (EE_2) is a form of synthetic estrogen, commonly found in oral forms of birth control. Studies have shown that this endocrine-disrupting chemical is linked to harmful changes in aquatic life development. Because there is a noteworthy similarity between hormone receptor systems in humans and zebrafish, it raises the question: could this synthetic hormone be negatively affecting humans? Zebrafish (*Danio rerio*) embryos were exposed to high levels of EE2 for 5 days while their development was monitored alongside the control group. Following exposure, the embryos were harvested, and RNA quantified. *VtgI*, and *esr2* (genes found to be changed with endocrine disruption) were assessed via RT-qPCR and compared with *elfa*, a housekeeping gene. Developmental differences were observed but there was no significant difference in *vtgI* or *esr2* gene expression. Future studies will explore adjusting exposure time and minimizing the variability of our housekeeping gene.

BIOLOGY

Diversity and Seasonal Abundance of Ichneumonid Parasitoids at Cypress Grove Nature Park (O)

Presenter: Hannah Juliussen
Faculty Project Advisor: Jeremy Blaschke

Ichneumonidae are extremely diverse and ecologically important parasitoid wasps. Due to tri-trophic interactions between parasitoid, host, and host plant, a high diversity of ichneumonids in an ecosystem can indicate a healthy diversity of host species and host plants. The abundance and diversity of ichneumonid wasps were surveyed at Cypress Grove Nature Park in Jackson, TN from 5 August-7 October 2020 using a Gressit-style Malaise Trap. Specimens were collected every ~48.75 hours, stored in 95% ethanol, and sorted to morphospecies. The number of new species over time was plotted to create a species accumulation curve. Four hundred and sixty-two specimens representing 133 morphospecies were identified. Common genera included the lepidopteran parasitoids *Enicospilus*, and *Baryceros*. This incredible diversity indicates Cypress Grove is a diverse and healthy ecosystem, and the species accumulation curve suggests there are far more species of Ichneumonidae still awaiting discovery.

Analyzing Relative Condition of Local Fish Populations and Determining Differences in Samples Affected by Varying Degrees of Parasitism (O)

Presenter: Noah Reid
Faculty Project Advisor: James R. Kerfoot

West Tennessee hosts a variety of baitfish commonly affected by parasitism. In a previous study documenting the prevalence of *Eustrongylides spp.* parasitism in populations of *Gambusia affinis* in three west Tennessee sites, fish parasitism was found in varying frequencies between sites. It is thought that parasitism can affect the physiological condition of fish populations. The goal of this study was to investigate the link between physiological condition and prevalence of parasites at sites. Fish preserved from a previous study were weighed and measured from lip to caudal fin to calculate the species-specific physiological condition. The fish specimens were grouped based on prevalence of infection at each site as high, moderate, and low. A series of Sheirer-Ray-Hare and Kruskal-Wallis analyses indicated a significant difference in condition between Western Mosquitofish (*Gambusia affinis*) and other collected species and a significant difference between sites. In areas with moderate parasitism, condition was nearest to 1.0.

Examining the Effects of Synthetic Estrogen on HPT Gene Expression in a Zebrafish Model (O)

Presenter: Alexis Hightower
Faculty Project Advisor: Faith Zamamiri-Davis

Endocrine disruptors are chemicals that interfere with hormonal systems and found within many products, including detergents, plastics, and pesticides. 17-ethinylestradiol (E2) is a synthetic estrogen, an endocrine disruptor, and a potent environmental toxin with high resistance to degradation by wastewater treatments. E2 has the potential to impact the secretion of thyroid hormones from the hypothalamic-pituitary-thyroid (HPT) axis, which plays a significant role in development of fetal nervous systems, and thyroid neoplasms, hypothyroidism, or cardiovascular disease in adults. To observe how E2 alters the mechanism of the HPT axis, zebrafish (*Danio rerio*) were exposed to varying E2 concentrations, harvested, and analyzed by RT-qPCR to measure expression of HPT genes, *dio3*, *trh*, and *tshβ*. E2 did not lead to differences in gene expression when compared to non-treated controls. Future research will utilize higher levels of E2 and perform ELISA to evaluate the production of thyroid hormone, T4 in our samples.

Plasmin Involvement on 3T3-L1 Fibroblast Replication (O)

Presenter: Isaias Leon
Faculty Project Advisor: Marc Lockett

This research is being conducted to examine the relationship between wound healing and degradation of clotting. It was hypothesized that plasmin would increase cell 3T3-L1 fibroblast replication and protease-activated receptor-1 (PAR-1) would inhibit replication. This was determined with 3T3-L1 fibroblasts, derived from mouse fibroblast cells, and varying concentrations of plasmin, cell counts, and PAR-1 antagonist. Cell count was performed on 3T3-L1 fibroblast cell plates with and without the presence of an inhibitor. An ELISA was performed on the plasmin buffer to ensure it was viable. Using an analysis of variance (ANOVA) we were able to find a statistical difference in 3T3-L1 cell plates with plasmin compared to that of cell plates either without plasmin or with inhibitors and plasmin. This research could prove beneficial to plasmin research.

Tracking Production of Secondary Metabolites in Wormwood (*Artemisia absinthium*) after Introducing Bacterial Extracts (O)

Presenter: Adna Alihodzic
Faculty Project Advisors: Mark Bolyard and Jimmy H. Davis

Southern wormwood (*Artemisia abrotanum*) is one of the largest and most widely distributed plants from the family of Asteraceae. This species is widely recognized due to its distinctive aroma, herbaceous flavor, but most importantly, human health benefits. Wormwood volatile oils, such as borneol, camphene, camphor, 1,8-cineole, and limonene, represent the basis of application of these benefits to humans. This research explores the production of the secondary metabolites in Southern wormwood by extracting and comparing the essential oils from specimens grown in the greenhouse, a control group, compared with the wormwood regenerated from tissue culture. In vitro cultures were also tested with heat treated Gram + or Gram – bacterial extracts. Analysis of the essential oils was performed by gas chromatography/mass-spectrometry (GC/MS). The results are still pending, but a significant difference between the control and the regenerated plant is expected to be seen. ■

CHEMISTRY

The Role of Arginine 353 on PRMT1 Activity and Dimerization (P)

Presenter: Brianna Correia
Faculty Project Advisor: Betsy Caceres

Arginine methylation, a post-translational modification, is performed by protein arginine methyltransferases (PRMTs), and is observed in a wide variety of cell types from prokaryotes to eukaryotes. With recent and rapid advancements in epigenetic research, the importance of arginine methylation has been highlighted in various processes throughout the body. Notably, it has a strong correlation to signal transduction, transcriptional activation, repression, as well as many important diseases such as lung, breast, and colon cancer as well as various heart diseases. Through former research conducted, it was found that in PRMT molecules, specifically PRMT1, aspartate 37 (D37) was forming a salt bridge with arginine 353 (R35), and that this is what allowed this molecule to be both activated and regulated. From these findings, the following hypothesis was proposed: is the disruption of the R353-D37 bond causing low activity in the R353K mutant? In order to determine this, studies were performed on wild-type (WT) PRMT1, as well as the R353KD37E variant. These constructs were both expressed and purified for the first time at Union University and had results identical to that of PRMT1 molecules.

Quantification of Pollutants from Concentrated Animal Feeding Operations in the West Tennessee Area (P)

Presenter: Cece Morton
Faculty Project Advisor: Sally Henrie and Conitra C. Morton

Recently, the effects of environmental pollution on air and water quality as well as on human health have been studied regarding the emergence of concentrated animal feeding operations (CAFOs). These operations have historically had significant negative environmental effects, often been due to insufficient building standards and waste disposal. Recently, there have been plans to install a number of these operations in the local area. As such, the primary objective of this research was to develop a procedure for measuring pollutants and to obtain preliminary quantitative data for longitudinal testing. An organized manner for the collection of this data was sufficiently developed, and quantitative measurements of relevant pollutants were obtained near both operational CAFOs and at planned sites. The obtained measurements did not indicate any hazards regarding predetermined standards; however, future measurements will need to be completed to evaluate a change in environmental conditions that can be attributed to these operations.

Greening the Synthesis of a Chiral Sorbent Using a Microwave (P)

Presenter: Evan Holt
Faculty Project Advisor: Sally Henrie

Chiral column chromatography is an efficient method used to provide enantiomerically pure mixtures. This technique is frequently used to provide enantiomerically pure medicines. Previously, a chiral adsorbent was developed that utilized a dendritic precursor attached to silica gel with vancomycin termini as the chiral selector. The product showed promise as a chiral selector however, this method required using a poisoned Raney Nickel catalyst and produced an inadequate branch length for the vancomycin to effectively attach to the termini. In subsequent research, the synthesis of the tri-branched dendritic precursor was developed without the use of a Raney Nickel catalyst and provided longer branches. In this research, a greener, more efficient method for synthesizing the dendritic precursor was developed by incorporating microwave synthesis. This resulted in the chiral adsorbent being synthesized in less time, requiring fewer steps, and using less energy and less hazardous solvents. ■

COMPUTER SCIENCE

Creating a VR Kitchen (O)

Presenter: Caleb Atkins
Faculty Project Advisor: G. Jan Wilms

Virtual Reality (VR) is one the quickest growing digital mediums in the world. A medium that was once used almost exclusively for video games, VR is now used in architecture, filmmaking, medical research, and a multitude of other fields. With Meta Platforms preparing to launch its Metaverse, there has never been a time in which a basic understanding of Virtual Reality, its functions, and its potential, has been more useful in the daily lives of individuals across all professions. This project intends to give Union University EDGE students an educational, appealing Virtual Reality environment that serves not only as a comfortable introduction to the concept of VR, but also as an exercise pertinent to their coursework. The environment in question is a virtual kitchen with activities modeled after the EDGE program's cooking courses. Within this environment, EDGE students can practice following a recipe, locating ingredients and tools, using said tools, etc.

ED76: The Educational Compressor VST (O)

Presenter: Ben Trainor
Faculty Project Advisor: G. Jan Wilms

One of the most powerful mixing tools available to an audio engineer is the compressor. Across the many analog and digital variations, the concept remains the same: make loud sounds quieter and quiet sounds louder. Each accomplishes these simple goals in various ways with different controls, circuits, and code, and each colors the sound of a track in unique ways. One of the most iconic compressors is the Universal Audio 1176 Compressor/Limiter which developers have cloned many times over. However, the goal of this project is not primarily to create a free UA 1176 knockoff. Rather, it is to create an educational compressor VST to aid Union's commercial music students in early audio production courses. The goal is to reconstruct the original layout to track the stages of an audio signal through a compressor, as well as implement concise tooltips and a rich menu to provide users with easily accessible instruction outside of class time.

Machine Guided Investing (O)

Presenter: Samuel Drotar
Faculty Project Advisor: G. Jan Wilms

This project analyzes financial ratios of stocks in a given portfolio as well as any stock contained in the S&P 500. It compares some of the financial ratios of the stocks to industry averages to help determine the health of a stock. It also uses machine learning to analyze stocks in the S&P 500. It compares the recent performance of the stock against historical periods where the stock preformed similarly to predict the future price. This is all accomplished as a python program hosted on Microsoft Azure and locally interacted with through a desktop interface. The purpose of the program is to help a human investor make sound investment decisions.

Creating Drawings Automatically for ERMCO Engineering through AutoCAD (O)

Presenter: Reid Lydon
Faculty Project Advisor: G. Jan Wilms

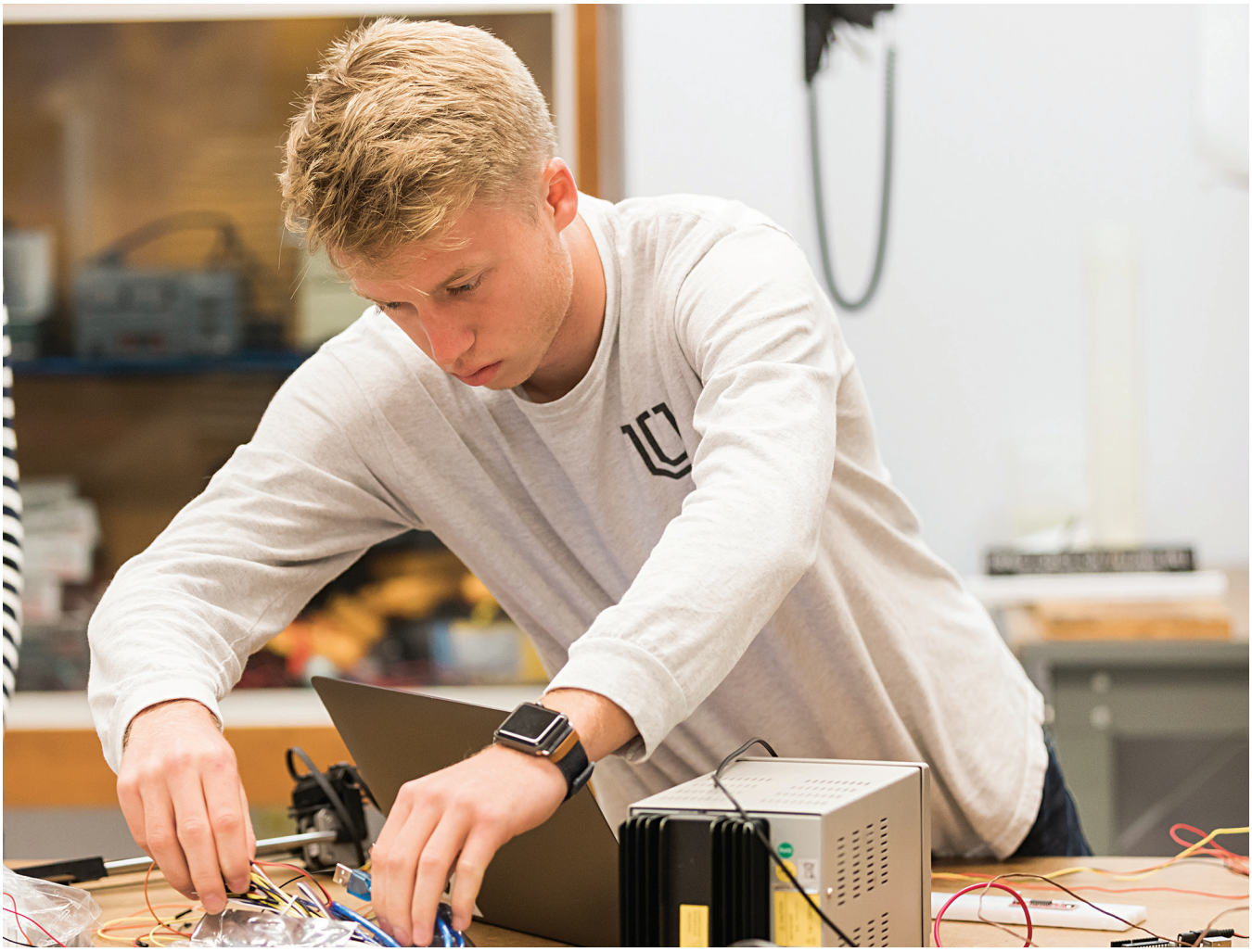
ERMCO's Design Engineering Department desires for their Padmount transformer enclosure design files to be created automatically by utilizing a script within AutoCAD. The current process of drawing them by hand in AutoCAD can cause inconsistencies due to human error. My VBA program will eliminate variations in tank wrappers, door wrappers, sills, and door ends entirely, which vastly improves the drafting efficiency and productivity within the engineering department.

Sabermetrics in Heatmaps (O)

Presenter: Patrick Music
Faculty Project Advisor: G. Jan Wilms

This project is designed to help track the statistic of high school baseball players with a visual representation of a hitter's heat map. A heat map takes data from each pitch and tracks how well the individual player is hitting in that situation. It will allow for the coaches of Jackson Christian School to make informed decisions on which players will best perform in any given circumstance. The program has been constructed using the language R. R is a statistical analysis language with ability to create graphics. ■

ENGINEERING



Exploring LiDAR navigation for Use in Quadruped Robots (P)

Presenters: Nathan Golden and Noah Simpson
Faculty Project Advisor: Georg Pingen

For this project, we developed a 3D printed dog that can navigate the environment it is in. It will be demonstrated at our symposium table. It involves LiDAR, which uses light to determine how far an object is away from the sensor with incredible accuracy. Quadruped robots are also advancing quickly. Their legs allow them to climb stairs, stabilize themselves, flip themselves over, climb over objects, etc. Combining these two technologies is a great way to understand how they both work. Our project was to make a robotic dog that incorporates both LiDAR and quadruped movement. We 3D printed a skeleton of our robot that we would fill with electrical components. We used two microcontrollers as the brains of our robot. They control the legs and interface the LiDAR with the robot. Using the LiDAR, the dog will be able to walk into a room and completely map it out.

Maximizing the Dart Gun's Range - A Design of Experiment (P)

Presenter: Cooper Champine
Faculty Project Advisor: Don Van

Nearly every child that grew up in the last two decades has played with Nerf guns. Even today Nerf guns manage to stay fully stocked in stores. I discovered as a child that blowing darts through half inch PVC pipes was more effective than using the guns provided. The scope of this experiment is to maximize the distance flown; this can be done by changing many different identifiable variables such as angle, pressure of the chamber, dart type, inside or outside, and barrel length. To minimize the variability and improve consistency, I will be using a preexisting PVC air cannon. To better utilize the Design of Experiment (DOE) method, a half fractional factorial design is being planned which results in 16 test runs rather than 32.

Maximizing Thrust of a Drone (P)

Presenter: Nathan Golden
Faculty Project Advisor: Don Van

Drones are being used everywhere nowadays. Drones fly using thrust. Thrust can be created by spinning a propeller blade. To maximize the thrust four factors were identified: motor orientation, number of blades on the propeller, voltage of the motor, and angle of twist in the blades. A 3D printed test stand, that uses a scale to determine the thrust of the motors, was used. Four unique blades were 3D printed with different angles of twist and number of blades. Using half factorial design, eight tests with different combinations of variables were created. To analyze my results, a normal probability plot and a Pareto chart were created to determine which factors changed the thrust output the most.

Maximizing Bike Speed (P)

Presenter: Noah Simpson
Faculty Project Advisor: Don Van

Bicycles are a great tool for used for many different reasons. One reason is mountain biking. Five identifiable factors were tested to see which would affect the bikes speed. These five factors are tire size, weight, gears, heat, and distance travelled. In this experiment, sixteen tests were run to examine the factors that affect the bike's speed. These tests then showed how to maximize the overall speed of a mountain bike. After the testing portion of this experiment, Normal probability and Pareto plots were used to analyze the data. These plots visually show how, and which factors affect the maximization of a mountain bike's speed.

Using High-Pass Filters to Control a Car Engine (P)

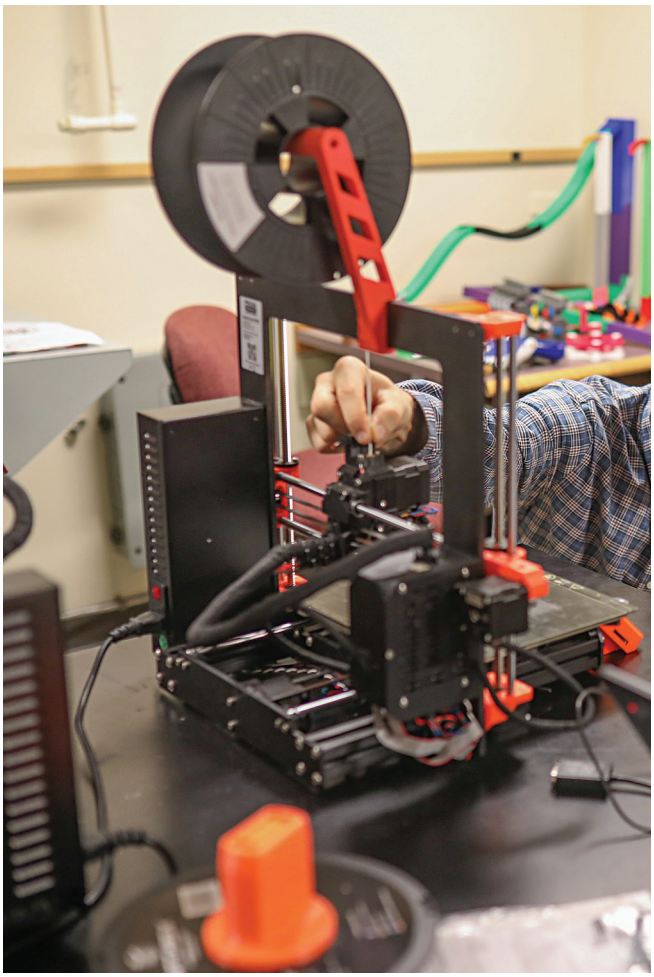
Presenters: Nate Barnard, Tim Boccarossa, and Adam Sills
Faculty Project Advisor: Jeannette Russ

This project will investigate the applications of high-pass and low-pass frequency filters used in conjunction with operational amplifiers. For this project, we will construct high-pass, low-pass and band pass filters both in hardware and through software simulations. After building the filters in software and hardware, we will use our filters to simulate operation of a car motor based on traffic light signals. For example, when the simulated traffic light is green, our system will pass along a voltage that will rev an electric motor. When the simulated traffic light is red or yellow, the filters will pass along a signal telling the motor to stop or slow down.

The Low-Pass Filter and the Process of Sound Refinement (P)

Presenter: Vishal Karmacharya and Nathanael Madison
Faculty Project Advisor: Jeannette Russ

This research project is an exercise of using low-pass filters to solve problems as relating to sound. Low-pass filters have been used for decades when it comes to the electronic display of sound. It filters out higher frequencies but allows lower frequencies to pass through. Thus, a typical application is a speaker which has a lower range of pitches (for example: subwoofers). In a passive filter, this works by having an arrangement of capacitors and either inductors or resistors and an operational amplifier. Generally, an active low-pass filter is used for the purposes of sound as it refines changing frequencies better than a passive filter. In the present, low-pass and high-pass filters are ever less present because of the ever-increasing prominence of digital methods. Even so, this project will use a passive filter for the purposes of proving a concept rather than actual production. In this, a mixed frequency input is fed through the filter and then refined based on the arrangement of the filter itself.



ENGINEERING

Low Pass Filter used as a "Bass Boost" (P)

Presenters: Philip Becker and Paige Bizzell
Faculty Project Advisor: Jeannette Russ

Our project involves the design of a low pass filter implemented in CircuitLab simulation software and on a prototype board. We demonstrate how the filter can be used in audio amplifiers or speaker systems. An active low pass filter can be used to reduce high frequency noise and or a staticky/hiss type of distorting sound/noise. This works by directing lower frequency bass signals to larger bass speakers. The active low pass filter when applied to audio applications is often referred to as a "Bass Boost" filter.

Understanding the Effects of Temperature and Humidity on High-Voltage Generators (O)

Presenters: Roger Baker, Cade Crowder, and Kyle Roach
Faculty Project Advisors: Jay Bernheisel and Georg Pingen

High-Voltage generators are commonly used in industry as a solution to high-output backup or portable power. These generators require the usage of special dielectric materials in order to withstand the harsh conditions to which these machines are subjected. Our team, in conjunction with *Nidec Corporation* in Lexington, TN, measured and quantified the effects of humidity and temperature on the insulating, or dielectric, materials used in the manufacturing of these generators. In order to measure these effects, we designed a sensor to collect and log information about the insulators and its environment. We also built a test chamber for controlling the temperature and humidity to which the insulators were subjected. This data will be used to help *Nidec Corporation* continuously improve their production process.

Applying the DOE method to Kicking a Soccer Ball (P)

Presenter: David Ebrahim
Faculty Project Advisor: Don Van

To kick a soccer ball more accurately, an experiment is planned by applying the DOE method in kicking a soccer ball by including different factors that could affect the accuracy of the kick. Factors like the orientation of the ball, steps taken before kicking, shoe type, ground type, target distance, different foot spots, and kick type are part of this experiment. A 16th fractional design is implemented with 8 runs to conduct. The goal is to minimize the distance between each ball kicked and the preset target. The data is gathered using Excel; analysis graphs show how each factor affects the distance between each ball kicked and the preset target.

Microgrids: An Interactive Model (O)

Presenters: Sydni Caruvana and Caleb Steele
Faculty Project Advisors: Jay Bernheisel and Georg Pingen

This presentation seeks to demonstrate and explain the operation and composition of a microgrid at a fundamental level with the aid of an interactive microgrid model. A microgrid is a power network in which a community or isolated system can operate in tandem with or independent of a larger power grid. The presentation will discuss the various components of a microgrid and will include methods of power generation, transmission, control, as well as end uses (power drains). The discussion will also cover the many benefits and detriments of the generation methods in microgrids implemented in various locations and contexts. All information will be delivered at a level understandable by the general public and will convey limited technical details.

Automated Measuring of Airflow Across Variable Sized Heat Exchangers (O)

Presenters: Shawn Ross and Trey Tidwell
Faculty Project Advisor: Georg Pingen

Heat exchangers are used all around us from air conditioners, to heavy machinery, and even for hospital generators. In order to determine how effective a heat exchanger is, it is important to gather as much information as possible. This could include things like measuring the inlet and outlet fluid temperature, as well as the rate that the air moves across the face of the heat exchanger. Measuring that airflow by hand can be difficult and oftentimes unreliable, a way to automate measuring airflow is needed while also being able to adjust to multiple sized heat exchangers. By using aluminum extrusions and stepper motors, the frame can be easily swapped between sizes to allow for any size heat exchanger to be measured. Making a measurement device that can be easily changed between sizes and accurately record key points of data is the goal of this project. ■

ENGLISH

Red Cotton (O)

Presenter: Sydney Schmude
Faculty Project Advisor: Christine Bailey

Inspired by Shakespeare's *King Lear*, the short story "Red Cotton" by Sydney Schmude follows sixteen-year-old Carla as she cares for her abusive father in his final days. Carla must grapple with the same question posed in the opening scene of *King Lear*: Do children owe their parents love? With the aftermath of World War I and the Great Depression looming over their Tennessee farm, Carla struggles to extend grace in a world of devastation and loss. In "Red Cotton," Schmude taps into the psychological realism of Joyce Carol Oates and Virginia Woolf and explores the theme of female rage presented in Audre Lorde's poetry. The story will be incorporated into Schmude's senior thesis project, a collection of three short stories examining the experiences of women during the Great Depression

Ready or Not, Here I Come (O)

Presenter: Eunice Tan
Faculty Project Advisor: Christine Bailey

Loosely based on her family's story in a painful, dark streak of Malaysia's history, Eunice Tan's short story "Ready or Not, Here I Come" invites listeners to enter an immersive experience of Malaysia's May 13 racial riots through the eyes of Hoi Seon, an active eight-year-old Chinese boy who loves playing hide-and-seek. When Tan's father was a little Chinese boy in Malaysia, he grew up in one of the most multiculturally beautiful, yet racially tense environments in Asia. On May 13 in 1969, Malaysia's racial riots erupted when the Malays started attacking the Chinese due to political and racial conflict, and the Chinese retaliated. As hundreds were slain and blood was spilled at schools and homes, Tan's grandfather saved her one-year-old father by hiding him in a sewage drain and telling him that no matter what, he could not leave—not until he came back for him. This fictional re-imagining of a real monumental event is the tale of a father who is willing to do anything to protect his innocent son from the horrors all around him—even if it means they have to play a game in the middle of the darkest riot in Malaysia's history.

The Texture of Silence: Learning Communal Suffering in Chaim Potok's Fiction (O)

Presenter: Cate Price
Faculty Project Advisor: Jay Beavers

The Chosen and its sequel *The Promise* by Chaim Potok are about two Jewish American boys living in Brooklyn during the World War II era and following. This paper will explore the theme of suffering throughout the two novels, arguing that the main characters learn how to share in the suffering of others. They learn to suffer both with the Jewish people after the events of the Holocaust, but also with individuals within their particular communities. This paper will pay particular attention to how silence shapes the souls of the characters, teaching them to relate to the world in a different way in order to maintain relationships with God or other people. ■

HISTORY

The 1775 Bermuda Gunpowder Plot: An Analysis of its Historical and Cultural Significance (O)

Presenter: Nicholas Terra
Faculty Project Advisor: Keith Bates

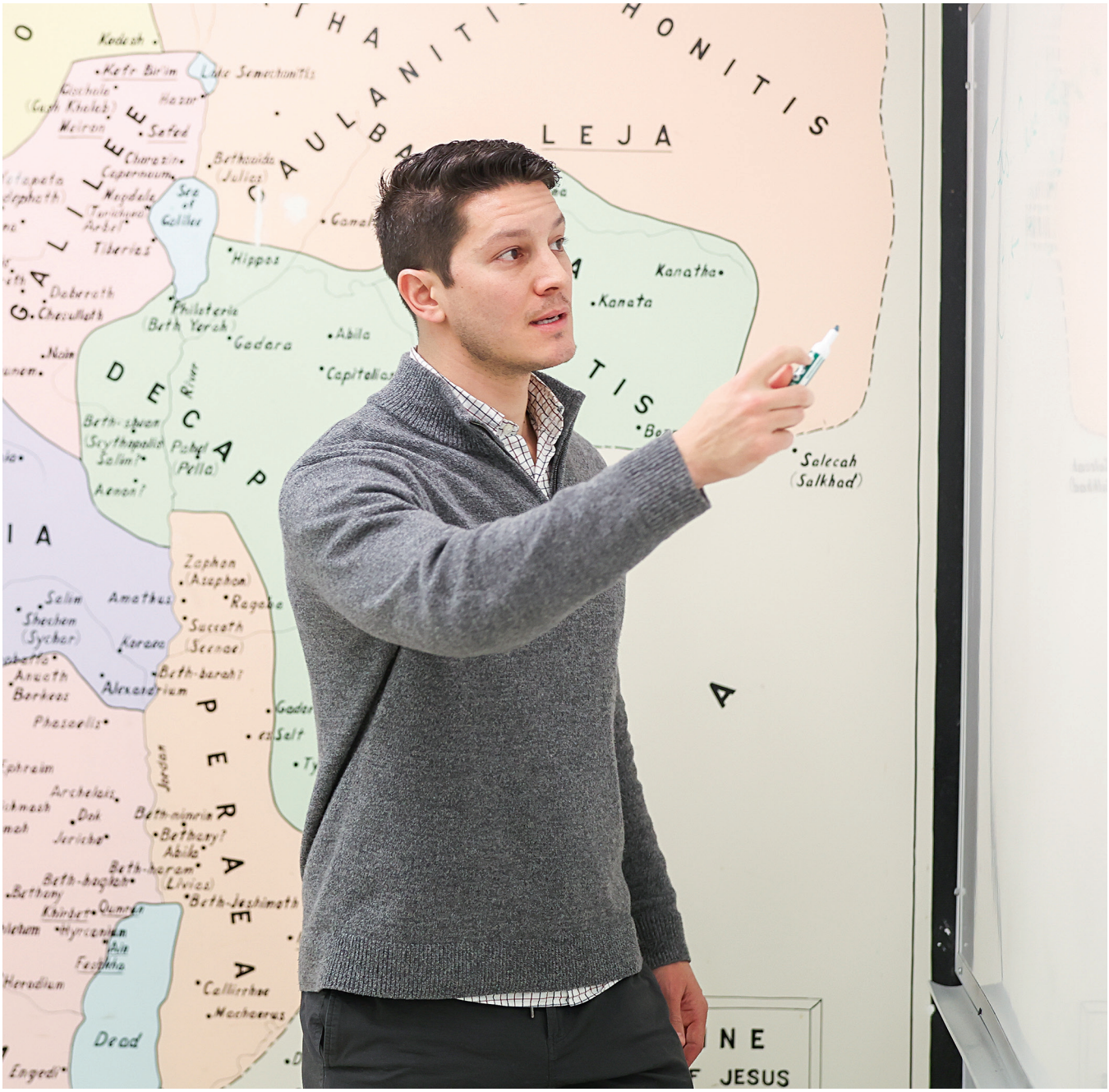
When one thinks of the American Revolutionary War, rarely does the island of Bermuda come to mind. For the citizens of Bermuda, on the other hand, the Revolution is a historical claim to fame. In August 1775, a small band of Bermudians, in an agreement with the American rebels, stole the island's main gunpowder stock in return for desperately needed supplies. Known as the 1775 Gunpowder Plot, the present retelling of the event has led to a prevalent myth being fostered in Bermudian culture: The United States of America was saved by the Bermudian gunpowder. This paper explores the promulgation of this myth through Bermudian sources, provides a comprehensive analysis of the myth's historicity, and assesses the cultural significance of the myth in Bermuda. ■

INTERCULTURAL STUDIES

Shame & Sexism: An Analysis of Purity Culture, Violence Against Women, and Self-Worth (O)

Presenter: Leah Busler
Faculty Project Advisor: Jean Marie Walls

According to the Rape, Abuse and Incest National Network, one out of every six American women has been the victim of an attempted or completed rape in her lifetime. The issues of sexual violence, victim-blaming, and the rape myths that support them are inherently complex and manifest differently within different cultural contexts. Rape myth is a term coined by Martha R. Burt in the 1980s to describe prejudicial, stereotyped, or false beliefs about rape, rape victims, and rapists that serve to create a climate hostile to rape victims. This research project is an examination of how purity culture messages disseminated by evangelical institutions influence rape myth acceptance and the psychological impact this has on young women. Further, this study also addresses ways in which purity culture teachings and literature on rape myths impact feelings of responsibility and power over one's actions and the impact of those actions on others. ■



LANGUAGE

El Machismo: Una tradición que necesita ser revisada (O)

Presenter: Elijah Stutz
Faculty Project Advisor: Karen Martin

Today, the people of Latin America experience severe emotional and physical effects from negative gender stereotypes, known as Machismo and Marianismo. These clichés have been embedded into Latin American culture for centuries, being passed down from generation to generation. This essay serves to address and explain differing intergenerational views in an effort to shed light on why physical and emotional abuse continues to affect these communities. Current research has failed to make connections between Machismo and Marianismo and the rise in domestic violence in Latin America as well as the explanation for its existence. I have found that the family model in these communities is the prime explanation for the prolonging of these ideals. Additionally, I have found that the unhealthy aspects of these stereotypes have encouraged and validated domestic violence in Latin America.

LOOK BACK: How the History of Deaf Culture in the U.S. Effects Deaf Education Today (O)

Presenter: Rachel V. Henderson
Faculty Project Advisor: Phillip Ryan

Deaf students in the U.S. today are experiencing a wide variety of education styles that span different modalities, languages, and educational methodologies. These inconsistencies represent ideological battles in how Americans view Deafness, disability, national identity and language use, all of which culminate in these educational current divides. Those who are the most empowered to decide how d/Deaf children will be taught – namely, hearing people who serve as teachers, parents, and policy makers – are often unaware of the histories of these competing views. Because of this, hearing people often make decisions for d/Deaf children without awareness of how those decisions both impact and are impacted by Deaf culture and history. Thus, goal of this work is to present historical, cultural, and educational information about Deaf Education and its effects on Deaf people and their culture to teachers and parents who may make decisions for d/Deaf students.

Understanding and Addressing Mental Health in the Classroom (O)

Presenter: Bayley Smith
Faculty Project Advisor: Phillip Ryan

Mental health and wellness issues do not typically receive adequate attention in today's education system, especially in English as a Second Language classrooms. Even though a large number of K-12 students suffer from a wide range of mental health challenges, teachers in the classroom all too often overlook these problems. Students in ESL classrooms, and in all subjects, can suffer from mental health problems. Whether suffering from anxiety, depression, high stress, or any other mental condition, students' performance and engagement in the classroom can suffer. These conditions need to be more fully acknowledged and addressed by classroom teachers. There are measures that can improve the wellbeing of students and aid teachers in their lessons. By addressing these mental health issues, and by understanding tactics that teachers can implement to help their students, the classroom environment can improve the chance for success for teachers and students.

Evidence-based Practice and the Role of Speech-Language Pathologists: Addressing Literacy Issues for Diverse Student Populations (O)

Presenter: Anne Adams
Faculty Project Advisor: Phillip Ryan

Speech-language pathologists (SLPs) have a mandate from ASHA (the accrediting body of American SLPs) to provide literacy services that are effective and relevant for culturally and linguistically diverse clients. Diverse students make up a growing proportion of American schools, yet the large majority of SLPs are white, monolingual English speakers who are ill-prepared to serve these students. Research on the role of SLPs in supporting diverse children's literacy has been growing over the past decade, yet effective assessments and interventions for these children are not yet widely established. This presentation explores the challenges SLPs face when implementing evidence-based practice in literacy intervention for diverse students in American preschool and elementary schools, hoping to identify the training methods and clinical strategies that will equip SLPs to fill this growing need.

Studying Linguistics in Signed Languages (O)

Presenter: Rachel Smith
Faculty Project Advisor: Phillip Ryan

Linguistic study of signed languages has been neglected because of the historical stigma that assumed that signed languages were not equivalent to spoken languages in structural complexity. Because of this, linguistic theories are based off spoken languages. This paper will analyze the structural linguistics of ASL (American Sign Language) by studying word order, classifiers, sign parameters, and the constraints and benefits of visual representation. I will apply the linguistic theories of syntax, morphology, and phonology to ASL. I will also include a sociolinguistic evaluation as it applies to the spoken and manual language discourse, as well as compile and explain the structural linguistics of signed languages to help ASL users better understand the language. I will argue that signed languages should be studied alongside spoken languages in linguistics.

Revitalization Efforts for Native American Languages (O)

Presenter: David Raymond
Faculty Project Advisor: Phillip Ryan

This research seeks to examine Native American language revitalization efforts. The paper will provide a historical background of language loss and revitalization as well as examples of contemporary responses to revitalization. Specifically, it will examine a range of historical influencing factors that have caused such a dramatic decline in native American languages, including frontier expansion, various language institutions, and early conflict with European colonists. This paper will also provide a distinction between the idea of language revitalization and revival, both are important but not interchangeable. The contemporary response will examine issues such as internal and external forces surrounding native American communities that serve as driving factors for revitalization, who instigated the language revitalization efforts, and how both the U.S. government and NGOs (Non-Governmental Organizations) have been supporting language revitalization.

Women's Societal Roles and the Continued Struggle for Equality in Latin America (O)

Presenter: Bayley Smith
Faculty Project Advisor: Karen Martin

Prior to the nineteenth century, the traditional role of women in South America was confined to a matronly, housewife position. Being involved in society outside of the home, or having a meaningful career, or receiving an education was largely unavailable. However, beginning in the late 1800s, that began to change as women took a larger role beyond the home. Despite these advances and considerable progress, women in South America still experience numerous difficulties and discriminatory practices. The progress made in the past was substantial, but women are far from equal to their male counterparts in areas of employment, the recognition of achievements, and in other areas of society in Latin America. By understanding the progress made, as well as the issues that women still face in the modern, Hispanic world, we can better address the continued inequalities.

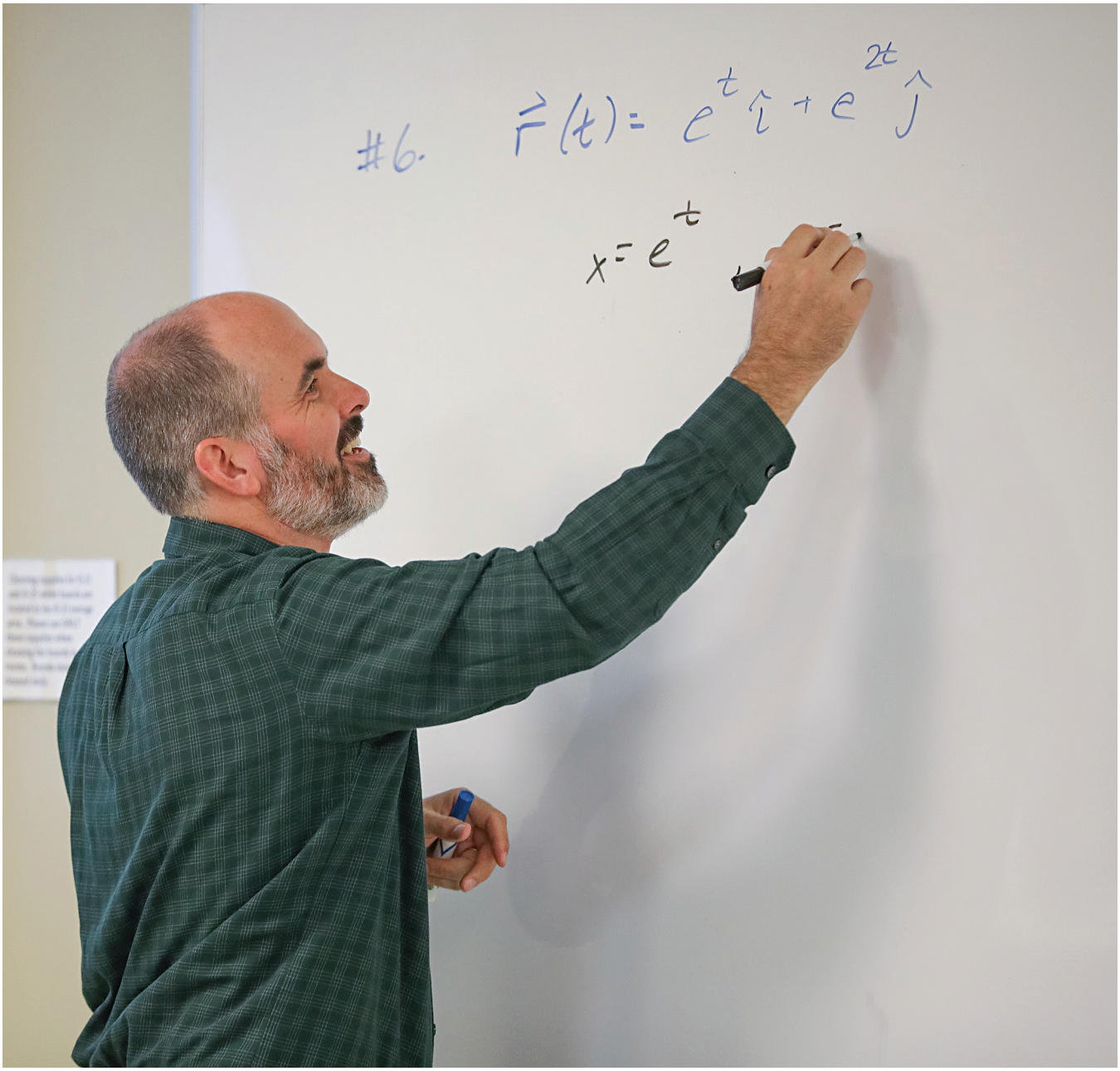
Une lutte acharnée: la développement parallèle de l'état français et ses cultures de langues minoritaire (O)

("A Tug of War: The Parallel Development of the French State and Its Minority Language Cultures")

Presenter: Jon Hudson
Faculty Project Advisor: Jean Marie Walls

Modern France has had a heavy concentration on centralizing its internal structure, causing regional cultures to lose influence over the course of centuries. Nations like Brittany and Occitan fight to maintain connections with their identities through art and religion, while the nations of Catalonia and Basque span the Pyrenean border which muddies their cohesion. These entities have long suffered a cultural tug of war with French nationalism, while also exchanging customs and touchstones in their interaction with French clerical and educational institutions. How have these stateless nations maintained their individuality in light of a powerful and centralized France? As the topic of nationalism becomes increasingly prevalent in contemporary political discourse, answering these questions will provide some insight on how nations left behind by concepts of Westphalian sovereignty persist on the fringes of modern states. ■

MATHEMATICS



That's Impossible! An Exploration of Three Famous Greek Constructions (O)

Presenter: Lisa Reed
Faculty Project Advisor: Matt Lunsford

The three famous ancient Greek construction problems involve using only a straightedge and compass to double the cube, trisect an angle, and square the circle. Attempts at these constructions captivated geometers for centuries. It was not until the nineteenth century that Wantzel proved the impossibility of doubling the cube and trisecting an angle and Lindemann completed the proof of the impossibility of squaring the circle. While the problems seem geometric in nature, proving the impossibility of these constructions requires abstract algebra. This talk will introduce the idea of constructible numbers, i.e., lengths that can be constructed using only a compass and straightedge and will introduce two important theorems concerning constructible numbers. In addition, a proof of the transcendence of pi will be outlined. Using these concepts from abstract algebra and fact that pi is a transcendental number, proofs of the three impossibilities will be presented. ■

The Abyss and the Canyon: An Analytical Comparison Messiaen's of "Abîme des oiseaux" and "Appel Interstellaire (O)

Presenter: Lucas Brogdon
Faculty Project Advisor: Cody Curtis

Two of the most important works from renowned French composer Olivier Messiaen hold a surprising connection. *Quatuor pour la fin du temps* and *Des Canyons aux étoiles* were written under starkly different circumstances nearly three decades apart, yet each contains one movement for solo aerophone that possesses strong parallels to the other. This paper will examine these two movements — "Abîme des oiseaux" for clarinet from *Quatuor* and "Appel interstellaire" for horn from *Des Canyons* — and highlight specific commonalities which suggest that Messiaen had "Abîme" in mind when writing "Appel." A brief background for both works will be provided, followed by a general analysis of each movement. Finally broader connections will be drawn to Messiaen's life and compositional language. ■

NURSING [GRADUATE]

Comparison of International Health Care Systems: China (P)

Presenters: Jasmine Gonzales, Chad Hinton, and Tiffani Tran
Faculty Project Advisor: Shari Wherry

China is the world's most populous country, with a population of 1.4 billion (The World Bank, 2021). In the 1950s, China established a near universal health care system (Wang, 2020). In 2009, the Chinese government proposed a comprehensive reform of its health care system with the goal of universal health care coverage that would be safe and effective and include affordable basic health care services by 2020 (Wang, 2020). The WHO (2000) ranked the performance of China's health care system at 144 out of 191 countries. Despite the various changes made to improve the system, a deficit in health care coverage still exists between China and other socially developed countries. This presentation will compare and contrast the health care systems in the United States and China. Comparisons will include identification of the payer system, financing and supply, reimbursement, production, provider choice, challenges, the WHO ranking, and the gross domestic product spent on health care.

Comparison of International Health Care Systems: United Kingdom (P)

Presenters: Lauren Larsen, Kellie McGiffin, and Scott Venable
Faculty Project Advisor: Shari Wherry

The United Kingdom (UK) is an island nation located in northwest Europe. England, Scotland, Wales, and Northern Ireland make up the United Kingdom with 62,262,00 people (EOHSP, 2019). In contrast to the United States (US), the UK offers public healthcare to all permanent residents, funded through the National Health Service within each country (Tikkanen et al., 2020). According to Girvan et al. (2020), the UK healthcare system is modeled after the Beveridge model, designed by a socialist in the 20th century. All insurance claims go through one government payer instead of individual insurance companies. Only 10.5% of England's population are enrolled in private insurance to supplement the public health insurance (Girvan, 2020). In this review of the UK's international healthcare system, the following areas will be explored: the payment system, funding, compensation, manufacturing, choice in provider, strains, ranking, and gross expenditure.

Comparison of International Health Care Systems: Mexico (P)

Presenters: Katherine Barnes, Samantha Irvin, and Zehra Jaffer
Faculty Project Advisor: Shari Wherry

The Mexican healthcare system serves the population through various payers based on socioeconomic and employment status (Block, 2020). The payer system is comprised of private insurers, public health insurers, and the Institute of Health and Wellbeing, formerly Seguro Popular, that covers the uninsured who comprise 45% of the population (Block et al., 2020). Private health insurance covers 7.8% of the Mexican population (Block et al., 2020). The Mexican federal government finances the public healthcare portion offered in Mexico (Block et al., 2020). Despite the availability of coverage, all is not equal in access or services (Block et al., 2020; Bautista-Gonzalez et al., 2020). This poster will examine the Mexican healthcare system in areas of the payer system, financing, reimbursement, production, provider choice, challenges, the world ranking, and gross domestic product spent on healthcare (Henderson, 2018).

Comparison of International Health Care Systems: Australia (P)

Presenters: Jennifer Dahle, Ashley Pratt, and Garrett Rhodes
Faculty Project Advisor: Shari Wherry

The Australian healthcare system is considered one of the best in the world. It is a socialized system composed of a comprehensive collection of healthcare benefits and government-sponsored care. Because of this, Australia ranks high in immunization status, pediatric care, and hygienic practices (WHO, 2022). However, recently, this system has been scrutinized due to challenges in adapting to modernized care modalities and financially driven data points (Dixit & Sambasivan, 2018). This poster examines the intricacies of the Australian healthcare system based on a series of metrics, rankings (such as WHO), financials (GDP, payer/supplier costs and reimbursement.), personal benefits (including provider choice and availability), and other challenges the system faces in comparison with the United States' medical system.

Comparison of International Health Care Systems: Israel (P)

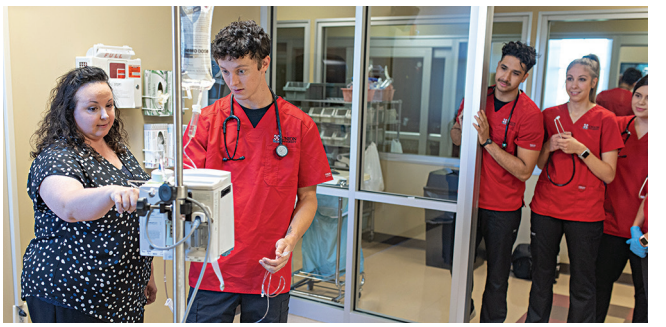
Presenters: Matthew Johnson, Gleyndon Kern, and Jennifer Kern
Faculty Project Advisor: Shari Wherry

The health system within Israel is sophisticated and rewarding for citizens, focusing on preventive medicine and healthy lifestyles (Privacy Shield Framework, n.d.). According to Tandon et al. (n.d.), Israel ranks 28th among 191 countries in overall health efficiency. Israel includes universal coverage, in which every citizen is cared for under the principles of justice, equality, and mutual support based on the 1995 National Health Insurance Law (Internations, 2022; Tikkanen et al., 2020). Although Israel has attractive health care options, Israel is lacking compared to other Western countries, as only 7.5% of gross domestic product (GDP) is spent on health care (Privacy Shield Framework, n.d.). The purpose of this poster presentation is to discuss the health care system within Israel and to identify further the payer system, financing/supply, reimbursement, production, provider choice, challenges, World Ranking (WHO), and gross domestic product spent on health care.

Comparison of International Health Care Systems: India (P)

Presenters: Contesta Corey, Candace Hubbert, and Jodine James
Faculty Project Advisor: Shari Wherry

This poster presentation discusses the economic and political factors affecting healthcare in India. The World Health Organization (WHO) country office created a Country Cooperation Strategy (CCS) to improve health (World Health Organization, n.d.). Implementing the Pradhan Mantri-Jan Arogya Yojana (PM-JAY) has also ensured healthcare coverage for millions of people (Bali & Ramesh, 2021). According to Kasthuri (2018), there are 20 health care employees for every 10,000 individuals in India on average. Kasthuri (2018) mentions five "A" concepts to categorize India's health care challenges: awareness, access, absence, affordability, and accountability. India has a unique healthcare delivery system due to differences in public and private care and resources offered in rural versus urban regions (Rout et al., 2019). This presentation discusses the areas of India's payer system, financing/supply, reimbursement, production, provider choice, challenges, world ranking (WHO), and gross domestic product spent on healthcare.



Comparison of International Health Care System: Russia's Healthcare System (P)

Presenters: Kayla Lambert, Ross Palmer, and Dana Sanders
Faculty Project Advisor: Shari Wherry

All citizens of Russia have guaranteed access to healthcare, as stated in their constitution. Russian healthcare is both private and government-run and is regulated through the Federal Mandatory insurance fund (FOM) and the Compulsory Health Insurance system (CHI) (WHO, 2018; Ivanov & Suvorov, 2021). Therefore, it is both for-profit and not-for-profit. Russian citizens have access to physicians and physician specialists, yet no midlevel providers exist to fill in the gaps. The WHO ranks the performance of Russia's healthcare system at 130 out of 191 participating countries (Tandon et al., n.d.). Despite attempts at upgrading healthcare delivery technologies, and efforts to lower mortality, there are identified challenges, discrepancies, and inequalities to its citizens. Some of these are represented in the affordability of medications, medical procedures, and access (Ivanov & Suvorov, 2021).

Comparison of International Health Care Systems: Spain (P)

Presenters: Shairah Hortelano, Natashia Melton, and Molly Mills
Faculty Project Advisor: Shari Wherry

This presentation aims to provide an overview of how Spain's healthcare system functions compared to the United States. Unlike the United States, Spain has a public healthcare system, mainly financed by taxes resulting in free or low cost covering 99.7% of the Spanish population with 0.3% utilizing private care (Estevez, 2020). Like America, Spain also provides coverage to dependents under age 26, with private insurance including stipulations based on comorbidities and the monthly private insurance averaging roughly the same (InterNations, 2022). Despite being predominantly government-funded for medical care, Spain has one of the top 20 healthcare systems in the world (Zaino, 2022). In general, healthcare is complex with the same common goal, but not all healthcare systems are equivalent across the globe.

NURSING [GRADUATE]

Comparison of International Health Care Systems: Germany (P)

Presenters: Charles Banks, III, Albert Scott Jr., and Erica Wooten
Faculty Project Advisor: Shari Wherry

Germany was the first country to establish a social health insurance system (Blümel et al., 2020). It comprises statutory and substitutive private health insurance, which grants de facto universal health coverage (Blümel et al., 2020). Even disabled, homeless, and unemployed individuals are covered through social assistance (Rajfur & Hys, 2018). Germany's expenditure of its Gross Domestic Product on healthcare is 11.7% higher than all other European countries (Germany: Country health profile 2021, 2021). These costs demonstrate a developing demand to improve productivity and patient appreciation (Busse et al., 2017). Under the circumstances, Germany's healthcare system is not cost-effective. This presentation compares Germany's healthcare system to that of the United States. Evaluation elements will incorporate payer system, financing and supply, reimbursement, production, provider choice, challenges, world ranking (WHO), and healthcare expenditures.

Comparison of International Health Care Systems: Canada (P)

Presenters: Rebecca Davis, Codie Moszczynski, and Curtis Sutera
Faculty Project Advisor: Shari Wherry

Canadian citizens live healthy lives owing to the high quality of their country's healthcare system. Canada has universal and publicly subsidized healthcare administered to the people based on the need for care over the ability to pay. Canada has 13 provincial and territorial healthcare insurance plans that allow all residents access to care with no out-of-pocket expenses. The individual governments of each respective province and territory are responsible for managing, organizing, and delivering healthcare while the Canadian government provides funds for these programs (Government of Canada, n.d.). In addition, there are regulatory fees and services charges imposed (Henderson, 2018). However, Canada is plagued by long wait times, care delays, and a lack of evidence-based healthcare practices in some provinces (Dhalla & Tepper, 2018). This study investigates the Canadian healthcare payer system, financing approaches, supply and demand, and overall challenges compared to the United States.

Comparison of International Health Care Systems: Healthcare in Egypt (P)

Presenters: Joshua Lawson, Joshua Morse, and Justin Woods
Faculty Project Advisor: Shari Wherry

According to Fasseeh et al., (2022) Egypt is a country filled with around 102 million people in the year of 2020. The Egyptian government spends roughly 5% of their country's gross domestic product (GDP). Ireland (2021) indicates that Egypt's healthcare system is ranked 121 in the world. Education of medical professionals have two routes the University's or the Ministry of Health's. There are multiple educational institutions that have led to 30% of 17-24 year-olds to attend medical school (Abdelaziz et al., 2018). This poster takes a closer look at the healthcare delivery, provisions, financing, access, measures, and outcomes of the Egyptian healthcare system. The analysis will then compare the Egyptian healthcare systems with the current healthcare system in the United States.

Comparison of International Health Care Systems: Finland (P)

Presenters: Amanda Cox, Sam Seaton, and Amanda Terwilliger
Faculty Project Advisor: Shari Wherry

The healthcare system in Finland is a complex market that provides care to every citizen in the country (Peltola & Tiirinki, 2020). Global Health Security Index (2021) explains that Finland's healthcare system is currently ranked third in the world when compared to other countries' supply, demand, spending, and outcomes. While Finland provides medical services to all citizens, the country faces higher healthcare spending than other areas. Finland also lacks the ability to provide timely care to poverty-stricken patients (Organization for Economic Co-Operation and Development [OECD], 2017). The purpose of this presentation is to compare and discuss the different components that exist within Finland's healthcare system, including the payer system, financing/supply, production, reimbursement, provider choice, world ranking, challenges, and gross domestic product spent on healthcare.

Anatomical Evaluation of the Extent of Spread in a Single Shot Versus Two Shot Erector Spinae Plane Block: A Cadaveric Study (P)

Presenters: Roman Comer and Oktay Mustafayev
Faculty Project Advisor: Andrew Rice

Nerve blocks can provide analgesia and surgical anesthesia from injuries and painful procedures. An erector spinae plane (ESP) block is emerging as a novel approach to providing analgesia to the torso for various surgical procedures. Clinicians have adapted varying techniques to perform the ESP block, with the two most common being single injection versus dual injections. This study was conducted to determine which technique provides the greatest local anesthetic dermatomal spread. An ultrasound-guided ESP block was performed on a formalin-fixed human cadaver and a single 30 ml injection of 0.02% methylene blue was compared to dual 15 ml injections. The subsequent cadaveric dissections showed that both injection techniques were comparable in their spread. The visual results suggested that both the single-injection technique and the dual-injection technique provided similar dermatomal coverage. Thus, the dual-injection technique offers very little, if any, benefit when performing the ESP block in the thoracic region.

Improving Student Registered Nurse Anesthetist Clinical Experience by Utilizing Emotional Intelligence Skills (P)

Presenter: LaQuitta "Shai" Wilkins
Faculty Project Advisor: Andrew Rice

The responsibilities of nurse anesthetist students involve successful completion of clinical sector during graduate school. Training under various preceptors evokes different personalities and emotions. Emotional intelligence may be connected to the ability to process, react, and manage one's emotions adequately. The nurse anesthetist students' ability to understand and manage their emotions can improve one's clinical experience with different preceptors. This quality improvement study observed the influence of emotional intelligence on student nurse anesthetists' clinical experience and performance. First- and second-years nurse anesthetist students (n=25) completed Schutte's Emotional Intelligence scale. After completion of the scale, students reviewed a pre-recorded Emotional Intelligence seminar that included information such as: self-awareness, self- management, social-awareness, relationship management, and social skills. The results revealed how vital emotional intelligence is for student registered nurse anesthetists during their clinical participation.

NURSING [GRADUATE]

The Diabetes Population and the Use of Continuous Glucose Monitors in the Perioperative Setting: An Educational Tool to Increase Awareness (P)

Presenter: Juanjeca Barrow
Faculty Project Advisor: Jordan Palmer

This study examines anesthesia providers' knowledge of their facility's perioperative glucose monitoring protocol, determines their level of compliance with the established monitoring criteria, evaluates providers' awareness of continuous glucose monitoring (CGM) devices, and educates SRNAs, AAs, CRNAs, and MDAs on the convenience of maintaining optimal glucose levels with the use of CGMs. An intervention was performed commencing with a survey in which participants were queried about topics related to perioperative glucose management. Subsequently, subjects were presented with information to enhance their knowledge of CGMs followed by a post-presentation survey for completion. The researcher evaluated pre- and post-intervention survey results. Findings demonstrated that following the presentation, providers would be more likely to follow glucose monitoring protocol if their facility implemented CGM devices into practice. It is well documented that maintaining tight glycemic control perioperatively is associated with decreased mortality and morbidity, shorter hospital stays, lesser hospital expenses, and improved patient outcomes.

The Cost Efficiency of Sugammadex for the Use of Neuromuscular Blockade Reversal: A Quality Improvement Project (P)

Presenter: Rachel Reeves
Faculty Project Advisor: Jordan Palmer

Sugammadex, a neuromuscular blockade (NMB) reversal used for steroidal non-depolarizing muscle relaxants, is more than half the price of its counterpart, the neostigmine and robinul combination. Although there have been numerous studies to prove sugammadex's superiority in NMB reversal over neostigmine and robinul, providers are often still discouraged from its use due to the exponential price difference. With the ability to provide such quick, adequate reversal, sugammadex has also been shown to drastically reduce operating room (OR) time, resulting in overall health care costs savings. The purpose of this quality improvement project is to demonstrate facility cost savings and provide evidence-based research supporting sugammadex use in a single facility.

Sphenopalatine Ganglion Block: An Alternative to Epidural Blood Patch Abstract (P)

Presenter: Inga Paige Juchheim
Faculty Project Advisor: Tracy Walker

Sphenopalatine ganglion blocks are among the newer considerations, to combat the pain, from post-dural puncture headache. Epidural blood patches are the current treatment that is recommended. However, sphenopalatine ganglion blocks could be a less invasive and more effective option. The purpose, of this project, was to implement a quality improvement tool on the benefits of sphenopalatine ganglion block over the use of epidural blood patches after the occurrence of a post-dural puncture headache. The project used a quality improvement tool to educate anesthesia providers on the benefits of sphenopalatine ganglion block over epidural blood patches on the obstetric population.

A Comparison of Two Injection Techniques (lateral vs. medial to psoas tendon) in Pericapsular Neve Group (PENG) Blocks: A Cadaveric Dye Study (P)

Presenter: Ross Palmer
Faculty Project Advisor: Andrew Rice

Hip arthroplasty presents several challenges in the perioperative setting. The need for an effective solution to pain control with minimal side effects has plagued providers for some time. Conventional peripheral nerve blocks such as femoral and fascia iliaca provide adequate pain control but block motor function to the quadriceps (Short et al., 2018). Early ambulation has been linked to a decrease in morbidity, mortality, and length of stay in this patient population; however, conventional nerve blocks make same-day ambulation virtually impossible (Sheehan et al., 2020). Recently the pericapsular nerve group block (PENG) has gained traction due to its ability to adequately control postoperative pain and maintain quadriceps functionality (Allard et al., 2021). However, little to no evidence exists on the best injection technique in relation to the psoas tendon for a PENG block. This study aims to shed light on the differences, if any, to a medial psoas tendon injection as compared to a lateral psoas tendon injection in a PENG block. A comparative dye study analysis was performed using a formalin-fixed cadaver. Two PENG injections were performed, one per side, using diluted methylene blue. One side was injected medially to the psoas tendon and the other lateral. Each side was later dissected and compared for dye spread.

An Evidence-Based Education Project to Increase the Use of Multimodal Opioid-Free and Opioid-Sparing Anesthesia for Thoracic Surgery by Anesthesia Providers (P)

Presenter: Jennifer Bunte
Faculty Project Advisor: Jordan Palmer

Patients undergoing thoracic surgery can suffer from severe postoperative pain leading to chronic post-thoracotomy pain syndrome. Historically, narcotics have been the

primary treatment modality, but narcotic use can lead to respiratory, cardiac, and gastrointestinal complications. The current opioid crisis further complicates patient care and contributes to the importance of practicing opioid-sparing anesthesia (OSA) and opioid-free anesthesia (OFA). Anesthesia providers need to be proficient and confident in practicing OSA and OFA to yield the best patient outcomes. This evidence-based education project aimed to identify and translate current evidence-based research into clinical practice for Certified Registered Nurse Anesthetists (CRNA) by improving knowledge and confidence. After a thorough review of existing literature, an education project was implemented, including a pretest, educational module, and post-test. This project proved effective, with 100% of participants indicating knowledge and confidence was gained.

A Proposed Safety Protocol for Magnesium as an Adjuvant for Intrathecal Therapy (P)

Presenter: Aaron Drees
Faculty Project Advisor: Jordan Palmer

This project examines available literature regarding use of intrathecal magnesium (ITM) for patient analgesia, with emphasis on the dose of magnesium related to cardiac effects observed in participants of the literature review. Adjuvant ITM may increase safety, block duration, and patient satisfaction. Evaluation of literature led to the proposition of an ITM nomogram. Education was created to update providers on the ITM benefits. The education included pretesting that revealed a lack of knowledge and familiarity among providers regarding ITM use. The education tool and proposed nomogram were used to improve understanding regarding benefits and dosing, with differences between pretest and post-test data demonstrating statistical significance for improved clinician understanding and familiarity. The relevant data and interpretation are provided. The standardized, evidence-based format is herein proposed for implementation in surgical facilities.

The Use of Dexmedetomidine in Cardiovascular Procedures (P)

Presenter: Olivia Sognesand
Faculty Project Advisor: TaMara Carter

The purpose of this project is to provide education to anesthesia providers on the benefits of incorporating dexmedetomidine (Precedex) into their anesthesia care while caring for cardiovascular patients. Multiple articles noted that dexmedetomidine offered cardioprotection, provided intraoperative and postoperative hemodynamic stability, decrease postoperative opioid use, cardiac enzyme stability, and reduced recovery time when used in cardiovascular procedures. Following data collection, a presentation was provided to SRNAs and CRNAs to educate them on alpha2 agonism, dexmedetomidine specifically, and how dexmedetomidine provides multiple benefits when incorporated in cardiovascular procedures. The pretest identified that anesthesia providers may lack knowledge and appreciation for how dexmedetomidine may be a beneficial adjunct to anesthesia care. However, the posttests concluded that, when educated on dexmedetomidine and alpha2 agonists, anesthesia providers were more apt to use dexmedetomidine in their practice, particularly in cardiovascular procedures.

Medically Prescribed Cannabis with Opioids vs Opioids in Chronic Pain Management (P)

Presenter: Casey White
Faculty Project Advisor: Andrew Rice

The opioid crisis across the United States has impacted millions of Americans. Millions of individuals suffer from chronic pain, and opioid medications are generally a go-to drug for pain relief. While opioids provide pain relief, they also have potential for serious negative complications. The purpose of this project was to implement an educational tool to help reduce the number of opioids being prescribed by using medically prescribed cannabis while also maintaining adequate pain relief. When medical cannabis is prescribed to this population, the expected outcome to be measured is a decrease in the number of opioids that are taken while maintaining adequate pain relief. By educating that medical cannabis can be used as an adjunct with or eliminate the need for opioids in patients that experience chronic pain, anesthesia providers will be more likely to prescribe medical cannabis for patients that experience chronic pain; thus, decreasing opioid prescriptions and complications.

Multimodal Approach to Antiemetic Therapy for General Anesthesia in the Adult Patient Population: A Quality Improvement Project (P)

Presenter: Lori Hurlbut
Faculty Project Advisor: Andrew Rice

Postoperative nausea and vomiting (PONV) are some of the most common adverse events that affect 30% of patients with minimal risk and 80% for those at highest risk. Prophylactic interventions have been studied in clinical trials to aid the reduction in PONV. This study aims to compare medications with antiemetic properties and their benefit for postoperative patients. This research identifies a need for further education on PONV treatment plans as well as the number of medications needed for the treatment of high-risk patients. The goal is to promote the use of targeted multimodal antiemetic therapy to improve patient outcomes by decreasing post-operative nausea and vomiting.

NURSING [GRADUATE]

Enhanced Recovery After Total Hip Arthroplasty or Total Knee Arthroplasty Surgery (P)

Presenter: Asmait Rezene
Faculty Project Advisor: TaMara Carter

Enhanced Recovery After Surgery (ERAS) program in total hip arthroplasty (THA) or total knee arthroplasty (TKA) is known to improve health outcomes. However, the lack of continuous education of staff about current evidence on ERAS protocol has been identified as a barrier to the implementation of ERAS. Current evidence regarding ERAS protocol for TKA and THA surgeries was used to develop educational material and educate CRNAs and SRNAs. Then participants completed a pre-and post-education survey to assess their knowledge, readiness, and level comfort to implement the current ERAS protocol. A total of 19 participants attended an education program and completed a pre- and post-test survey. Sixteen percent of participants rated their knowledge about current ERAS protocol as poor. Participant's knowledge regarding the protocol on the application of tourniquet was very low. Future ERAS education should provide more emphasis on aspects of the protocol where there is a gap in knowledge.

An Educational Intervention Describing Ketamine's Use as a Treatment for Depression (P)

Presenter: Ashton Joyner
Faculty Project Advisor: TaMara Carter

Depression has a high prevalence in the United States and other countries. Globally, depression affects over 200 million individuals. Traditional treatments may not be effective for individuals, especially those with treatment-resistant depression (TRD). Recent studies have shown that ketamine has been effective in reducing suicidal thoughts and improving depressive symptoms in patients diagnosed with Major Depressive Disorder (MDD) and TRD. This research project consisted of an educational presentation and an evaluation of learning. This project disseminated evidence-based research to current and future Certified Registered Nurse Anesthetists (CRNAs) regarding ketamine's use in treating depression. As evidenced by the survey results, the presentation was effective in increasing participants' knowledge about ketamine's use for treating depression. The secondary goal of influencing a change in personal practice was met as well as most participants stated they would consider using ketamine on patients at risk for postoperative depression.

Decreasing Fall Risk with the Use of Adductor Canal Blockade (ACB) in Patients Undergoing Elective Total Knee Arthroplasty (TKA) (P)

Presenter: Hoa (Henry) Nguyen
Faculty Project Advisor: Jordan Palmer

Total knee arthroplasty (TKA) is a common surgery in the elderly. Patients who undergo TKA experience severe postoperative pain and have an elevated risk for falls. Femoral nerve blocks (FNB) have been the standard approach for TKA analgesics. Falling after TKA surgery is a major complication related to FNB. The adductor canal block (ACB) reduces the risk of falls in TKA. ACB has been successfully used for early postoperative pain control without diminishing quadriceps muscle strength. Thus, preventing further postoperative complications such as inadequate pain management and quadriceps muscle weakness reduces fall risk and promotes early ambulation. This project aims to disseminate information about the benefits of ACB with an evidence-based practice update. A pre-survey was used to establish CRNAs' baseline knowledge of ACB, such as anatomy, local anesthetic medications, and benefits. A post-survey was delivered after the intervention of an educational tool to verify the efficiency and expand the knowledge on applying ACB in the TKA procedure for CRNAs. Education on the benefits of the ACB helps CRNAs enhance their understanding and use in TKA patient care.

Effects of Dexmedetomidine on Emergence Delirium in Pediatrics (P)

Presenter: Katherine Faltot
Faculty Project Advisor: TaMara Carter

Emergence delirium (ED) is a state of cognitive impairment during the emergence of general anesthesia that develops into agitation and confusion. ED is caused by multiple factors including, preoperative anxiety, pain, and type of anesthetic. There is a higher incidence of ED in the pediatric population. ED can cause self-injury, prolonged recovery times, and increases in medical costs. Dexmedetomidine is an alpha-2 adrenoreceptor agonist with anxiolytic, analgesic, and respiratory preserving properties that safely prevents delirium. This project disseminated the evidence on the effectiveness of intravenous Dexmedetomidine. It identified knowledge gaps in current practice, & increased knowledge about pediatric ED. Anesthesia providers were surveyed with a pre-test to identify the current knowledge about ED. Many providers did not know the dosing, nor did they have a protocol that could guide them through treating ED. More education is required. Implementing ED guiding tool helped filling this knowledge gap.

Evaluation of Anesthetic Management of Down Syndrome Patients undergoing General Surgery (P)

Presenter: David Barrera Jr.
Faculty Project Advisor: Andrew Rice

Down syndrome (DS) is the most common inherited chromosome abnormality that requires corrective surgery under anesthesia. In addition, patients with Down syndrome

have an increased risk of complications with surgery and anesthesia due to having multiple health issues. With more Down syndrome patients living longer thus undergoing more procedures involving anesthesia than before, current providers need to understand this genetic condition and what complications can arise. Some complications that can arise with this health condition can range from pulmonary complications, congenital heart defects, and cervical instability, to name a few. This project aimed to determine how an educational tool improves knowledge on how to manage patients with Down syndrome undergoing general anesthesia. There was limited data on effectively managing patients with Down syndrome, specifically those undergoing general anesthesia and the complications that can arise. The project examined all the currently published data on handling patients with Down syndrome. That data was synthesized to develop an educational tool to help anesthesia providers better manage patients with Down syndrome and reduce complications. Additionally, this project assessed the satisfaction and ease of using this tool. Anesthesia providers underwent a pre-examination to determine their current knowledge and understanding of these patients, followed by an educational tool assessing their prior knowledge of patients with Down syndrome health conditions.

Comparing the 4-in-1 Block to the Adductor Canal Plus IPACK Block, a Cadaver Dye Study (P)

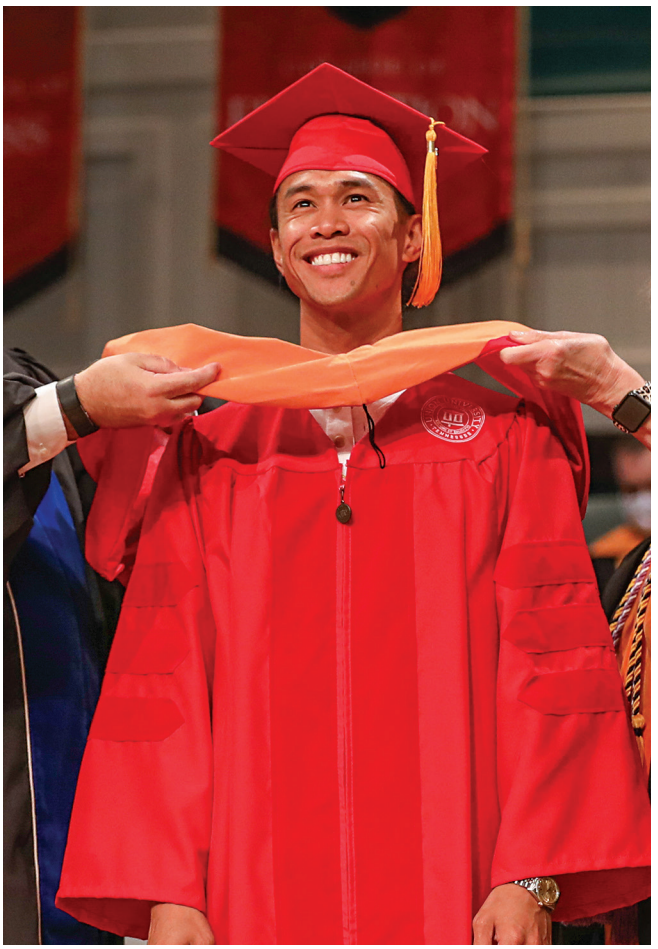
Presenters: Mason Matzek and Chuncey Ward
Faculty Project Advisors: Andrew Rice and Robert Wamble

Total knee arthroscopies (TKAs) are some of most performed orthopedic procedures to date. The use of peripheral nerve blocks to control post-op pain effectively provide analgesia while sparing motor weakness. This allows patients to ambulate and complete range-of-motion exercises earlier, which leads to speedier recoveries and increased patient satisfaction. The two-stick combination block consisting of the Adductor Canal Block (ADC) and Infiltration between Popliteal Artery and Capsule of the Knee (IPACK) block has proven to be effective for motor-sparing post-op analgesia in knee surgery patients for years. However, the novel 4-in-1 Block may provide equally effective nerve coverage with only one needle stick. Our study aims to evaluate and assess nerve coverage of the 4-in-1 Block to the more utilized ADC + IPACK Block combination. Nerve coverage of the blocks will be compared by observing the spread of methylene blue injectate on a formalin-fixed cadaver with ultrasound guidance.

Anesthesia Machine Use in the Intensive Care Unit: A Review of Functional Utilization for Long Term Ventilator Management (P)

Presenter: Shayla Cue
Faculty Project Advisor: Jordan Palmer

Anesthesia workstations are essential pieces of equipment for short-term delivery of anesthetic gases and respiratory support during surgical procedures. However, anesthesia machines can extend their utilization beyond the operating room if a shortage of traditional ventilators arise. This project developed an educational tool that outlined the variations of anesthesia workstations in comparison to ICU ventilators for long term support. A literature review using scholarly databases and best practice resources guided the development of a presentation outlining considerations for the off-label use of anesthesia machines. A pretest was given before a PowerPoint presentation was distributed to practicing anesthesia providers of the East Memphis Anesthesia Services group headquartered in Memphis, TN followed by a posttest questionnaire to evaluate learner knowledge. The average pretest score of 57% increased to a posttest score of 83% indicating increased knowledge after the presentation.



NURSING [GRADUATE]

Infiltration of Bupivacaine, Ketamine, and Ketorolac for Military Trauma Victims (P)

Presenter: Cory Riley
Faculty Project Advisor: Jordan Palmer

This research project is an evidence-based practice update aimed to educate and implicate Bupivacaine, Ketamine, and Ketorolac (BKK) infiltration in current military standard operation procedures. This project identifies the lack of education amongst military providers on the use of BKK and provides an evidence-based update. The military is still an opioid heavy organization in field traumas. The utilization of opioids has the potential for hemodynamic compromise when practicing in an austere environment. Surveys show combat medics and front-line providers do not have any current knowledge of BKK and its potential benefits. BKK administration could provide superior analgesia while increasing the safety margin for American soldiers injured in the line of duty. This implementation can be easily achieved with cost efficient medications that are already utilized individually on the formulary.

Magnesium Sulfate for Postoperative Pain Management (P)

Presenter: Tahiem Eady
Faculty Project Advisor: Tracy Walker

Magnesium sulfate ($MgSO_4$) has been utilized for decades to treat preeclampsia, arrhythmias, electrolyte replacement, and constipation. However, through continuous research, magnesium sulfate has shown its analgesic properties, and the results have been positive. In the United States, we face an opioid epidemic, and we must develop alternative ways to manage patients' pain. The purpose of this educational research project was to determine magnesium sulfate's effectiveness in treating pain through an integrative research review of literature. After the review of literature, I informed student registered nurse anesthetists (SRNAs) through educational intervention to improve their knowledge base and they completed pre-and post-test. This research study proved that magnesium sulfate is effective in treating postoperative pain and reduced the number of opioids being utilized. The results showed that SRNAs would use magnesium sulfate in practice and 100% of the SRNAs selected that they had an increase in knowledge.

A Comparison of Neostigmine Versus Sugammadex: Which Reversal Has the Least Postoperative Complications (P)

Presenter: Marcus Williams
Faculty Project Advisor: TaMara Carter

Recurarization is a complication that can occur following surgery when general anesthesia is used with a neuromuscular blocking (NMB) agent. Recurarization occurs when an NMB agent has been ineffectively reversed. Recurarization can cause the patient to have postoperative pulmonary, cardiovascular, and many other complications. To ensure that surgery patients who received a neuromuscular blockade reversal (NMBR) agent have an optimal recovery, it is imperative to select the reversal agent that is less likely to cause postoperative complications. Results of a study conducted with 7 participants displayed that 85.7% preferred the use of Sugammadex and 28.5% favored the use of Neostigmine.

Promoting Parturient Health for CRNAs in the Operating Room (P)

Presenter: Ashley Nicole Diaz
Faculty Project Advisor: Andrew Rice

In the surgical setting, there is much confusion regarding safe practices for parturients working in the operating room (OR). Most providers base their decisions on either fear or misinformation. Incidental exposures go under-recognized and unnecessary precautions are taken. This health promotion project clarifies what evidence-based research is available regarding teratogenic exposures in the OR. Evidence proves teratogenicity when pregnant providers are exposed to waste anesthesia gases, antineoplastics, and radiation. Occupational risks due to long hours and labor are underappreciated, as well. Conversely, unnecessary precaution is often exercised around polymethyl-methacrylate. Evidence-based findings were implemented by educating OR Board Runners on teratogenic exposures in hope of improving future assignments for parturient Certified Registered Nurse Anesthetists. A survey was completed by each participating Board Runner before and after receiving an educational brochure. Whether there is a change in the board runners' decisions after being properly educated was measured and evaluated.

A Comparison of Abdominal Regional Block Techniques to Optimize Pain Management (P)

Presenter: Carey Grace Peebles
Faculty Project Advisor: Tracy Walker

Patients undergoing various abdominal surgeries are subject to visceral and somatic intra and post-operative pain. With the advancement of nerve blocks for analgesia, the transversus abdominis plane (TAP) block has been used with success due to optimal visualization of the pertinent structures by ultrasound. However, the erector spinae (ESP) block has been shown to provide effective pain management for patients undergoing abdominal surgery. This study aims to compare and describe the efficacy, safety, and provider competency of the TAP block and ESP block methods in patients undergoing abdominal surgical procedures. Outcome measures included the adequacy of pain control, length of analgesia provided, the need for opioids for breakthrough

pain, adverse events, and perceived ease of block placement associated with each block.

Reduction of PONV in Female Patients Utilizing Acupressure: An Evidenced Based Practice Update (P)

Presenter: Jesus R. Zambrano-Samaniego
Faculty Project Advisor: Andrew Rice

This project disseminated information about acupressure as non-pharmacological agent in the treatment postoperative nausea and vomiting (PONV). For decades pharmacological interventions have been the treatment of choice for PONV. However, pharmacological interventions for PONV are not always one hundred percent effective, and these often benefit from non-pharmacological adjuvants. PONV leads to anxiety, unpleasant postoperative recovery, and even unexpected hospitalizations if not treated adequately. The goal of this project was to create an educational tool via audio presentation to increase awareness about the benefit of acupressure when used in combination with pharmacological treatments in the treatment of PONV. Additionally, this project examined the efficacy a well-developed educational tool had in diminishing the misconceptions and increasing knowledge about acupressure in the treatment of PONV.

Implementing a Scleroderma Teaching Tool that Addresses a Knowledge Gap within Nurse Anesthetists in West Tennessee (P)

Presenter: Timothy Lovelace
Faculty Project Advisor: Tracy Walker

The purpose of this project was to elucidate the benefits of implementing a scleroderma teaching tool that addresses a knowledge gap within nurse anesthetists in west Tennessee. Scleroderma, which is also known as systemic sclerosis, is a rare dysfunction of the body's immune system characterized by overproduction and accumulation of collagen. The hallmark symptoms are products of cutaneous and visceral fibrosis. This commonly triggers multiple organ dysfunction. This project used a convenience sample of nurse anesthetists working in the west Tennessee area. A pretest was used to assess knowledge. This was followed by the implementation of a teaching tool and a posttest to assess the effectiveness of that tool. Primary outcomes were calculated as a percentage change from baseline knowledge in the period immediately after the presentation. Providing quantitative data acknowledging the existence of a knowledge gap in scleroderma teaching is an important step in improving practice.

Evaluation of the Effect of a Linear Communication Model on Teamwork Attitudes: A Quality Improvement Project (P)

Presenter: Jamie Ellerbrook
Faculty Project Advisor: Amy Williams

Ineffective communication between leaders and staff may affect patient care and leave healthcare workers feeling intimidated and disconnected. Communication barriers in healthcare have a negative impact on workplace culture and individual attitudes toward teamwork, which leads to detrimental effects on team dynamics, productivity, stress levels, and overall job satisfaction. The purpose of this quality improvement project was to determine if use of a linear communication model using peer group meetings as the change intervention would contribute to improved staff attitudes toward teamwork within two pediatric primary care clinics. This project utilized a pretest/posttest design and measured Teamwork attitudes before and after intervention using the TeamSTEPPS Teamwork Attitude Questionnaire which assesses five categories: team structure, leadership, situation monitoring, mutual support, and communication. Data showed no significant increases after intervention in any category except mutual support, which was unchanged from the pretest. There were no statistical differences identified in pretest/posttest scores.

Middle-School Age Adolescent Response to Peers Who Talk About or Display Self-harm Behaviors (P)

Presenter: Teresa Johnson
Faculty Project Advisor: Patsy Crihfield

Suicidal and intentional self-harm (ISH) behaviors are becoming more prevalent in middle schoolers. This age group of children is more likely to discuss these thoughts with their peers rather than adults. However, 12 to 14-year-olds are ill-equipped to handle such serious and potentially life-threatening revelations. The body of knowledge regarding how middle schoolers respond to friends involved in or discussing ISH behaviors is shockingly small. This quasi-experimental study investigated the prevalence of middle schoolers who have experienced peer discussion or participation in ISH behaviors, their understanding of the phenomenon, and their responses to these situations. Using an educational approach accompanied with a pre-test and post-test, this study revealed that 78% of participants had friends who had talked about or demonstrated ISH behaviors, and only 22% (2 students) of them would involve an adult when faced with this situation. This study also showed that a brief education intervention was effective at improving the participants' knowledge of and appropriate responses to the issue. More research is desperately needed into the prevalence of this phenomenon. Furthermore, age-appropriate conversations, education, and support for the students experiencing these scenarios is paramount.

NURSING [GRADUATE]

Improving Practice Through the Introduction of a Mental Health Resource Tool: A Quality Improvement Project (O)

Presenter: Ashley Jones
Faculty Project Advisor: Cathy Ammerman

Mental illness is prevalent among the United States population with a significant decrease in the number of patients who receive adequate treatment. There is a lack of knowledge regarding community resources for mental health referrals. The aim of this quality improvement study was to create and pilot a mental health resource tool (MHRT) following the Plan-Do-Study-Act (PDSA) rapid cycle. After the eight-week study, the results showed there was a 76% utilization of the MHRT with a decision to adopt the tool in the clinic, as well as offer to share this tool with sister clinics in the same geographical area.

The Weight of the World's Pandemics on Her Shoulders: The Effects of COVID-19 and Racial Inequality on the African American Female (O)

Presenter: Christina Lumpkin
Faculty Project Advisor: Shari Wherry

The year 2020 will forever be remembered for the unexpected phenomenon that occurred. A deadly virus emerged, causing not only a pandemic but pandemonium worldwide. Thousands of lives were lost, businesses closed, and many Americans lost jobs. Record numbers of people applied for unemployment and gun violence was on the rise. The effects of everything listed above were felt in the black community and especially by the African American female. COVID-19, also known as coronavirus, brought the world to a complete halt. Its emergence visually magnified some of the long-standing shortcomings in healthcare and society that are often overlooked (Sandoiu, 2020). As a result of COVID-19 and racial inequality, the African American female succumbed to depression, anxiety, and substance use and/or abuse; further making her life a ticking time bomb. However, there is hope that this can start to turn around with some timely interventions, education, and community consciousness.

A Quality Improvement Project to Assess the Gap in a Rural Primary Practice Clinic: Identifying and Holding Therapeutic Communication in Post-Abortion Trauma (O)

Presenter: Colton E. Gramse
Faculty Project Advisor: Cullen Williams

Introduction: The impact of post-abortion psychological trauma often is unrecognized by providers in clinical practice. This project's primary aim was to increase provider recognition of potential post-abortion trauma by 25% within eight weeks by applying QI principles and implementing an assessment tool. *Methods:* The QI project took place in a rural clinic located in southeast Missouri involving four Advanced Practice Registered Nurses (APRNs). The change intervention included: 1) development of the tool for assessment; 2) pre-test to develop baseline knowledge data of the providers; 3) provider education intervention of current evidence and stakeholder input; 4) implementation of the tool; 5) post-test analysis, and 6) evaluation of practice change using the new tool. *Results:* Staff using the new tool increased by 39% at the end of the eight-week PDSA cycle. The clinic administration adapted the use of the tool for both providers and patients with reevaluation in six months for effectiveness in evidence-based practice. *Conclusion:* The assessment tool demonstrated increased provider recognition of potential post abortion trauma with improved patient safety and quality outcomes. ■

PHYSICS

The Simplicity of Quantum Randomness (P)

Presenter: Daniel Thomas
Faculty Project Advisor: Fonsie Guilaran

Random number generators are readily available online for extremely cheap, but do they produce truly random numbers? The purpose of this research was to explore randomness and ways to test for it, to build the simplest quantum random number generator (QRnG) given the resources at hand, and prove its intrinsic randomness using a logical and mathematical analysis. The components of the experiment were radioactive compounds [Ba – 133, Co – 60, Ra – 226], Geiger Tube, and a ST – 360 Radiation Counter. By collecting one batch of decay counts as a result of gamma ray detection from each of the radioactive compounds, respectively, the average of the decay values was used to assemble a logic gate. This logic gate was constructed such that when the decay count was greater than the average, a value of 1 was given, below the average, 0. This yielded a binary sequence that, according to the principles of nuclear and quantum physics, should be perfectly random. Using the defined process, three separate strands of sixty perfectly random binary values were attained. Using a mathematical analysis, the data from the aforementioned system was tested to see if it was truly random. ■

SOCIOLOGY AND FAMILY STUDIES

Sex Education and Personhood (O)

Presenter: Hannah Miller
Faculty Project Advisor: Matt Henderson

Sexual activity is a highly moralized issue in the United States, and the two main styles of sex education, abstinence and comprehensive, are hotly debated across both religious and partisan lines. There are a number of studies that review the effectiveness of both programs and find different results, but most support the ineffectiveness of abstinence programs and the effectiveness of comprehensive programs. I interviewed ten people from different schooling backgrounds and asked them questions about how their sex education experiences impacted their understandings of both sex and personhood. I found that those raised in Conservative Christian homes were unsatisfied with the little amount of conversation surrounding sexual issued in the home, and that most turned to the internet and pornography to supplement their unanswered questions. Those who experienced abstinence-centered programs also carry a lot of guilt and shame surrounding their self-worth and sexual activity. Finally, I found that most sex education programs communicated the utilitarian nature of sex and a woman's responsibility to prevent unwanted pregnancies and handle the consequences of a teen pregnancy if it occurs. The way sex education was given to my interview respondents demonstrated a communication of negative self-value, unequally weighted responsibility, and forced values that should be reformed in both families and schools.

The Relationship between Socioeconomic Status and Health Care Disruptions due to COVID-19 (O)

Presenter: Benjamin Murray
Faculty Project Advisor: Matt Henderson

Link and Phelan's theory of fundamental causes establishes that socioeconomic status is powerfully predictive of health outcomes. Material resources are able to influence these outcomes through a variety of mechanisms that are replicated in different forms over time. While this theory is well established under normal conditions, the COVID pandemic is a unique set of circumstances that has been uniquely devastating, which may change the relationship between resources and outcomes. Using data from the National Health Interview Survey, we researched the relationship of education and family income, markers of socioeconomic status, to the likelihood that an individual experiences healthcare delays or did not receive healthcare because of the COVID-19 pandemic. We found that higher levels of education are significantly associated with a higher chance of experiencing delays and not receiving care, but family income was only significantly associated with a higher chance of not receiving care due to the pandemic. ■

THEOLOGY AND MISSIONS

Lessons From the Church in Syria (O)

Presenter: Gabrielle McClellan
Faculty Project Advisor: Jacob Shatzer

After reading Rod Dreher's *Benedict Option* and *Live Not By Lies*, I was convinced that there are better models for the American church to look to during this age and government defined by moral therapeutic deism. Dreher looks to communities who have survived severe communist regimes, but I believe that looking at the history of Christianity throughout the world provides a more realistic and hopeful guide. More specifically, I am looking at the church in Syria in the 3rd century and its current state. This paper explores the similarities between the American church and the Syrian church and what we can learn from the Syrian church which survived everything from jihad to dhimmitude.

The Epic of Gog and Magog: An Exegetical and Historical Study of John's Use of Ezekiel 38–39 in Revelation 19–20 (O)

Presenter: Steven Errico
Faculty Project Advisor: Mark Dubis

The biblical story of Gog and Magog has fascinated and perplexed readers for thousands of years. Their story appears first in Ezekiel 38–39 and then in Revelation 19–20, and many extrabiblical writers also make reference to them. However, for such prominent characters in the history of Jewish and Christian thought, surprisingly little is known about their identity. Gog and Magog are simultaneously well documented and yet also mysterious. This paper argues that Haman the Agagite, the right-hand man of King Ahasuerus in the book of Esther, acts as a typological fulfillment of the Gog oracle in Ezekiel 38–39 and prefigures the ultimate fulfillment of the prophecy in Revelation 19–20. Consequently, the story of Haman contributes to the background of Revelation, but what John describes is not merely a return of the national enemies of Israel but indeed the final battle between good and evil. The result is that the Gog and Magog story powerfully depicts the final victory of the Messiah over all enemies that make war on his people. ■

RESEARCH GRANT RECIPIENTS *Fall 2021*

Undergraduate

Micah Fern and Sydney Zemke: "Designing a Novel Primer for the American Alligator (*Alligator mississippiensis*) to Enable an eDNA Method of Species Tracking in West Tennessee"

Esther Choi and Bethany Wells: "Anti-Biofilm Activity of *Pseudomonas fluorescens* Supernatant on *Staphylococcus epidermidis* Biofilm"

Jeremy Blaschke/Nicholas Lewis: "Extractions of Degraded Genomes from Cricket Assassin Wasps (*Rhopalosomatidae*) using Non-Destructive Enzymatic Techniques"

Faith Zamamiri-Davis and Alexis Hightower: "Analyzing the Hypothalamic-Pituitary-Thyroid Axis in Zebrafish Embryos Exposed to a 17α-Ethinylestradiol (E2)"

William Thierfelder and Amanda Gilbert: "Using Mice as a Model to Study the Effects of a Ketogenic Diet on Psoriasis-like Skin Inflammation"

Mark Bolyard and Adna Alihodzic: "Tracking Production of Secondary Metabolites in Wormwood (*Artemisia abrotanum*) after Introducing Bacterial Extracts and Comparing Different Types of Growth Media"

Sally Henrie and Conitra Morton: "Quantification of Pollutants Near Concentrated Animal Feeding Operations in the West Tennessee Area"

Georg Pingen, Nathan Golden, and Noah Simpson: "Researching LIDAR and PIR Sensors to Apply to Robotics"

Graduate

William Thierfelder and Tara Tuck: "Optimizing DNA Transfection into Eukaryotic Cells"

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