SYMPOSIUM

SIXTEENTH ANNUAL UNION UNIVERSITY SCHOLARSHIP SYMPOSIUM

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TUESDAY, APRIL 23, 2019
Afternoon Concurrent Sessions

Poster Presentations (P)

Dept.	Room	Student Presenters	Time
Poster Displays	Grant Events Center	Haley Barnette (CHE-pg.13) | Colin Coleman (CHE-pg.13) Kaitlyn E. James (CHE-pg.13) Davina Norris, Kyle Roach, and Dakota Stedman (EGR-pg.16) Emory Craft, Regan Oliver, and Dakota Stedman (EGR-pg.16) Adam Lynn, Benjamin Marsch, and Davina Norris (EGR, pg.16) Ainsley Duncan, Adam Lynn, and Stuart Milam (EGR-pg.16) Gabriel Garneau, Matthew Owen, and Addison Turner (EGR-pg.16) Mark Carbonell and Andrew Dougan (EGR-pg.16) Thomas Foster and Kaylee Owen (EGR-pg.18) | Gavin Hamann and Ethan Morris (EGR-pg.18) Michael Drury, Ben Marsch, and Ben Nyguyen (EGR-pg.18) Jared Lavelle and Grant Wise (EGR-pg.18) Palmer Bell, Gavin Hamman, and Davis Johnson (EGR-pg.18) Emory Craft and Reagan Oliver (EGR-pg.19) Addison Dunn and Jacob Lovelace (NUR-pg.26) | Braxton Hobbs and Kianna Kyles (NUR-pg.26) Macy Morrison and Alexandra Nanney (NUR-pg.26) Vincent Cagungun, Amber Craven, and Samantha Walker (NUR-pg.27) David Anderson, Tyler Cox, and Wade Lomax (NUR-pg.27) Kayla Goins, Michael Hackett, and Kevin Stahl (NUR-pg.27) Brian Bourgard, Nerlie Pierre, and Ashley Riesberg (NUR-pg.28) Yolande Alexandre, Emily Poppelreiter, and David Rodrigues (NUR-pg.28) Marida Pace-Newbern, Delecia Parker, and Greta Robinette (NUR-pg.29) Thomas Goins, Alicia Hickman, and Erica Walker (NUR-pg.29) Lindsay Brewer, Holly Hardy, and Heather Middleton (NUR-pg.29) Jennifer Delk, Holly Jones, and Suzanne Steward (NUR-pg.30) Brad Creekmore, Michelle Edacheril, and Clesheree Stepter (NUR-pg.30) Philip Ervin, Nilap Patel, and LaQuasha Rosson (NUR-pg.30) Richard Christian, Stewart Jeter, and Haley McCoy (NUR-pg.31) Brianna Moultrie, Jessica Raebel, and Ashlea Sledge (NUR-pg.31) Chinoyerem Oji, Beunica McDowell, and Malasy Vichathep (NUR-pg.31) Qianwen C. Williamson (NUR-pg.31) | Natalya Malenko (NUR-pg.31) Shana Mosley (NUR-pg.32) | Nicole Russell (NUR-pg.32) | Caleb Wagler (NUR-Pg.32) Cassie Clark and Jamia Moore (NUR-pg.32) | BethAnn Jones (NUR-pg.32) Indya R. Daniels (NUR-pg.33) | Dorothy E. Hiatt (NUR-pg.33) | Catherine Aslin (NUR-pg.34) Paula L. Buckner (NUR-pg.34) | Bradley Steg (NUR-pg.35) | Adam Bland (NUR-pg.35) Wendy Greene (NUR-pg.35) | Meggy Hayes and Racheal Howard (NUR-pg.36) Jennifer Estes (NUR-pg.35) | Tyler Thompson (NUR-pg.36) | Dane Mitchell (NUR-pg.36) Ashley McTyre and Hannah Shaw (NUR-pg.37) | Nahada "Juan" Gudger (NUR-pg.38) Jeremiah Cole (NUR-pg.37) | Nicole Rivera (NUR-pg.38) | Jack Harold Fields III (NUR-pg.38) Justin Harrison (NUR-pg.38) | Alaina Little (NUR-pg.38) | Maizee Kelley (NUR-pg.39) Jason Bolt (NUR-pg.39) | Kathryn Berry (NUR-pg.39) | Benjamin Stephens (NUR-pg.40) Mary Anderson, Bethannee Horn, Taylor Mathis, Kate Norville, and Jeffrey Snow (PHRM-pg.42) Victoria Downs and Ngoc Nguyen (PHRM-pg.42) | Victoria Downs (PHRM-pg.42) Natalie Mausey (PHRM-pg.42) | Jenna Summerlin and Drew Wells (PHRM-pg.42) Brittany Caroll and Mariah Smith (PHRM-pg.43) | James A. Clary (PHRM-pg.43) Christian Brown (PHY-pg.44) | Alexandra Bodnar (PHY-pg.44) Sarah McLeod (SW-pg.45) | Callie Wright and Sarah McLeod (SW-pg.45)	12:30–2:00 p.m.

SCHEDULE

Oral Presentations (O)

Dept.	Room	Student Presenters	Time
ART Session Chair: Chris Nadaskay	PAC D-53	Eli Creasy (pg.4) Jennifer Hatch (pg.4) Abby Wolfzorn (pg.4) Eli Creasy (pg.4) Mikaela Allen (pg.5) Madison Borden, (pg.5) Maria Stewart (pg.5) Haeun Shim (pg.5)	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: Andy Madison	WH 101	Deryn St. James (pg.8) Jacob Lemon (pg.7) Lance Miller (pg.10) Hannah C. Shea (pg.11) Holly Gilbert (pg.11) *Break* Kaelyn Moore (pg.11) Nick Underwood (pg.11) Argus Floyd (pg.8) Josh Mays (pg.10) Rachel Hickle (pg.6)	1:40 p.m. 2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m. *3:20 p.m.* 3:30 p.m. 3:50 p.m. 4:10 p.m. 4:30p.m. 4:50 p.m.
BIO Session Chair: Marc Lockett	WH 102	Amanda Ebert (pg.6) Lauren Alldredge (pg.6) Meagan Clark (pg.6) Madison Studstill (pg.8) Lauren Thornburg (pg.7) *Break* Christian Sidebottom (pg.10) Maddie Dotson (pg.8) Daniel Bile (pg.11) Thomas Lunsford (pg.8) Braxton Rider (pg. 9) Haley Hathcock (pg. 9)	1:40 p.m. 2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m. *3:20 p.m.* 3:30 p.m. 3:50 p.m. 4:10 p.m. 4:30 p.m. 4:50 p.m. 5:10 p.m.
BUS/EDU/ ENG/ICS Session Chair: Colene Trent	BAC 44	Spencer McCloy (BUS-pg.12) Ian Maupin (BUS-pg.12) Spencer McCloy (ENG-pg.20) Shea McCollough (ENG-pg.20) Steve Meyer (GR-EDU-pg.15) Austin Maddox (ICS-pg.21)	2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m. 3:20 p.m. 3:40 p.m.
CSC Session Chair: Haifei Li	PAC D-54	Ben Dubis (pg.14) Mathew Mathis (pg.14) Lane Crouch (pg.14) Ashley Raines (pg.14) Joel White (pg.14)	2:00 p.m. 2:25 p.m. 2:50 p.m. 3:15 p.m. 3:40 p.m.
EGR Session Chair: Randal Schwindt	PAC D-3	Mark Carbonell and Matthew Owen (pg.18) Angel McQuiston, Daniel Porter, and Conner Wilson (pg.19) Thomas Foster, Gabriel Garneau, and Kaylee Owen (pg.18) Gavin Hamann, Davis Johnson, and Addison Turner (pg.19) Gabriel Garneau (pg.19)	2:00 p.m. 2:30 p.m. 3:00 p.m. 3:30 p.m. 4:00 p.m.
ENG Session Chair: Gavin Richardson	THEATRE	Kayla Binkley, Rebecca Duttweiler, Brandon Harper, Ariel Holzheimer, Shea McCullough, Avery Rist, and Brittany Staggs (pg.20)	2:00 p.m.
HIS/STM Session Chair: Brad Green	JEN 325	Lauren Butler (HIS-pg.21) Luke Sower (HIS-pg.21) Madde Ely (STM-pg.47) Briley Ray (STM-pg.46) Jacob Collins (STM-pg.47) Brandon Harper (STM-pg.46)	2:00 pm. 2:20 p.m. 2:40 p.m. 3:00 p.m. 3:20 p.m. 3:40 p.m.
LAN (SPA/FRE) Session Chair: Karen Martin	LANGUAGE LAB	Korey Adams (pg.22) Hannah Fryling (pg.22) Brooklyn Cheyenne Staten (pg.23) Korey Adams (pg.23)	9:25 a.m. 9:45 a.m. 10:05 p.m. 10:25 a.m.
LAN (TESOL/ALNG) Session Chair: Philip Ryan	LANGUAGE LAB	Lydia Davidson (pg.23) Erin Copeland (pg.24) Brittany Staggs (pg.24) Kayla Binkley (pg.24) Rebekah Pendergrast (pg.24) *Break* Lyndsey Welch (pg.24) Jeff Walker (pg.24) Brandon Harper (pg.25) Steven Cutliff (pg.25) Jonathan Hall (pg. 25)	12:15 p.m. 12:35 p.m. 12:55 p.m. 1:15 p.m. 1:35 p.m. *1:55 p.m.* 2:05 p.m. 2:25 p.m. 2:45 p.m. 3:05 p.m. 3:25 p.m.
NUR Session Chair: Cathy Ammerman	WH 205	Braxton Hobbs and Kianna Kyles (UG-pg.26) Macy Morrison and Alexandra Nanney (UG-Pg.26) Anna H. Gallion (GR-pg.40) Jessica L. Phillips (GR-pg.40) Ginnifer Hutcheson and Marianne Kirk (GR-pg.40)	2:20 p.m. 2:40 p.m. 3:00 p.m. 3:20 p.m. 3:40 p.m.

ART

The Precious Ones (O)

Presenter: Eli Creasy
Faculty Advisor: Chris Nadaskay

The artist's internal and external processes for the painting series, "The Precious Ones" will be explored. The driving inspiration for this series is the division amongst people. Racial lines are divided despite the efforts for reconciliation. As a response, four portraits of individuals of different races were painted. The goal of these paintings is to provoke the audience to view all people as equal image bearers of God. Content will be discussed, as well as the technical processes taken to create the series.

The Scream (O)

Presenter: Jennifer Hatch
Faculty Advisor: Haelim Allen

Since its creation in 1893, Edvard Munch's *The Scream* has become known throughout the modern world for the strong emotional and psychological feelings that it conveys. But to say merely that *The Scream* is a picture of human angst is an over simplification. The public's perception of *The Scream* has changed over time. Discussions and interpretations have centered around the environment, madness and mental states, extreme emotions, and connections between the internal and external. This paper will look into Munch's life, the thoughts he expressed in his writings, the body of his work, and the history surrounding his painting – all essential for a rich understanding of *The Scream*.

I Am Outside (O)

Presenter: Abby Wolfzorn
Faculty Advisor: Chris Nadaskay

This presentation will focus on the importance of artwork of marginalized peoples. It includes, but is not limited to, children, the mentally or physically handicapped, trauma victims, the uneducated, and outsider artists. The presenter will include pieces of her own personal story, how she became compelled to make her own work, and why she is drawn to such works. Often rejected as real artists, this presenter's heart lies in validating and making known the work of these marginalized peoples and showing that they may experience the world in a way that we should try to understand, particularly as believers.

Vincent van Gogh's Spiritual Expression (O)

Presenter: Eli Creasy
Faculty Advisor: Haelim Allen

This research presentation regards the Post-Impressionist painter, Vincent van Gogh, and how spirituality played a role throughout his life and in his work. Van Gogh manifests his personal vision and spirituality in all of his paintings through his unique technique and style. This presentation will address van Gogh's personal history, especially his life revolving around his religious affiliation and fascination, in addition to the effects of spirituality on his paintings. Central to this discussion will be van Gogh's brushwork, color usage, and content which will be explored through his work especially *Starry Night* of 1889.

Symbolism in Gustave Moreau's *Salome Dancing Before Herod*: Salome as a "Femme Fatale" and Sorceress (O)

Presenter: Maria Stewart
Faculty Advisor: Haelim Allen

This paper examines the unique portrayal of the Biblical character Salome by Gustave Moreau in his two paintings *Salome Dancing Before Herod* and *The Apparition*. Moreau displayed both paintings at the Salon in Paris in 1876, the second of which garnered attention for its non-traditional portrayal of John the Baptist's martyrdom. In *The Apparition*, the severed head of John the Baptist miraculously floats above the spectators instead of being presented to Salome on a plate. Within the paintings Moreau includes visual references that relate Salome to a "femme fatale" woman and a sorceress. These visual cues and their meanings are found in Gustave Moreau's source materials, writings, and his other supernatural paintings, which suggest that he provided further insight to the supernatural aspects of his rendition of Salome through symbolism.

Preserving Painting Techniques of the Past: A Painting Study of William-Adolphe Bouguereau's Work (O)

Presenter: Madison Borden
Faculty Advisor: Chris Nadaskay

Romanticism, an art movement countering the Age of Enlightenment, emphasized the importance of feeling and emotion while challenging the enlightenment idea of logic and reason. In painting, this idea brought forth a freeing renewal to painters, allowing them to express interest in the natural world through representations of religion, stories, mythological themes and landscape. Fashioned from Neoclassicism, the brushwork in the Romantic Era was carefully imagined and delicately detailed. Bold, meaningful strokes created illuminating skies in landscapes, while precise lines outlined the shapes of glowing figures in portraits. William-Adolphe Bouguereau, a French academic painter, greatly exemplifies these characteristics mastered during this renowned artistic movement. In fueling my astounding fascination for the Romanticism painting techniques, I longed to attempt the process of these great masters in order to gain an insight on the time and difficulty involved in making a masterpiece. I chose to study Bouguereau and his techniques due to his mesmerizing figure paintings, which embodied oil painted flesh seemingly nothing less of reality. Desiring to grasp even a small understanding of his processes and use of color, I recreated a cropped piece of his work, *The Palm Leaf*, in hopes to capture only an essence of what he learned in a lifetime. Among current day artists, the number of painters tackling the grueling work of classical masters during presidential painting eras are dwindling. The techniques of the great Romantic painters must not be forgotten. By revitalizing such painting styles, I dedicated myself to honor the path set before us by the masters.

Mary Cassatt: An Exploration into the Portrayal of Women and Maternity (O)

Presenter: Mikaela Allen
Faculty Advisor: Haelim Allen

This presentation examines the works of Impressionist painter, Mary Cassatt, and seeks to explore the underlying reasons for her portrayal of maternity and women in their daily lives. Cassatt lived during a time in which it was typical for women to be depicted as objects of the male gaze and/or assets to men. In contrast to such notions, Cassatt sought to show the dignity of femininity, domesticity, and maternal instincts of women. This presentation will address both Cassatt's personal history and the context during and around the Industrial Revolution. While many of Cassatt's works are used to explore her theme of maternity, specific examples include: *The Child's Bath* (1893), *Reading* (1880), and *Mother and Child* (1880).

Heart, Mind, and Soul (O)

Presenter: Haeun Shim
Faculty Advisor: Chris Nadaskay

This presentation will cover the background and history of abstract expressionism and how it has influenced my style of work from that era. I will share a few of the artists that have inspired and influenced my work, along with where I might still disagree with their theories that juxtapose my world views and philosophy. I want to communicate different kinds of emotions to the viewer through my work; emotions that can be expressed and felt by looking at the gesture of brush work and the choices of colors that are applied to the canvas. Why I choose this life as an artist, and the passion I have to communicate to the viewer the beauty that can be seen through simple things that are purely from space, form, line, texture, and color, will be discussed. ■

BIOLOGY

Variation of Salt Tolerance between Agronomic *Phaseolus Vulgaris* and Invasive *Microstegium Vimineum* (O)

Presenter: Rachel Hickle
Faculty Advisor: Michael Schiebout

Plant health is subjective to abiotic factors that influence crop quality and yield which in turn influences human health and prosperity. Though human involvement has benefitted many crop species, global trade and travel have been detrimental to many native communities. Non-native species can naturalize and some become invasive when they grow unchecked in an ecosystem. Research has indicated the major reasons an invasive plant will spread include its ability to rapidly reproduce and a lack of predators in non-native environments. In addition, increased stress tolerance is likely a factor in their vitality and hardiness contributing to their success. In this experiment, we subjected a C3 crop species *Phaseolus vulgaris* and a C4 invasive species *Microstegium vimineum* to varying salt concentrations to determine how salinity stress affects the growth rate of plants with differing physiological characteristics and photosynthetic pathways. Preliminary results indicate that the invasive had greater tolerance to increased salinity.

Determining the Effects of Glucose on the Blood-Cerebrospinal Fluid Barrier in Zebrafish (O)

Presenter: Amanda Ebert
Faculty Advisor: Hannah Henson

Diabetes mellitus, a disease where the body cannot effectively process glucose, is prevalent in the United States. Hyperglycemic conditions, due to elevated blood glucose may cause brain barrier permeability to increase, which can cause damage to the brain. Changes in cognitive ability and other neurological issues experienced by diabetic patients have been suggested to emerge from a disruption of the brain barrier. Additionally, a better understanding of barrier properties could aid in improving drug administration directly to the brain to treat numerous neurological disorders. In this project, zebrafish (*Danio rerio*) were used as a model organism to specifically evaluate the effects of glucose on the blood-cerebrospinal fluid barrier at the choroid plexus. Zebrafish were injected with glucose, followed by a fluorescent tracer, which was used to detect any disruptions of brain barrier integrity. The results are pending.

Glucose Uptake by Zebrafish Embryos (O)

Presenter: Lauren Alldredge
Faculty Advisor: Hannah Henson

There are many substances the body needs to survive and function properly. However, these substances operate within an optimal range. When substances fall below or exceed their optimal range, problems arise. Glucose, for example, is a substance obtained in the diet that is used to produce energy. Too much glucose in the blood stream is characteristic of diabetes, a common metabolic disorder which can cause many

complications in the body. In addition, infants of mothers diagnosed with diabetes prior to becoming pregnant may experience developmental defects. Zebrafish (*Danio rerio*) are excellent model organisms for observing the effects that various substances have on embryonic development. In this study, a microinjection system was used to inject the yolk sacs of zebrafish embryos with different glucose concentrations. After exposure, a glucose assay was performed to determine if the amount of glucose uptake by zebrafish embryos increased as glucose concentration increased. Results are pending.

Investigating the Effects of Pseudomonas Fluorescens on Intestinal Barrier Integrity (O)

Presenter: Meagan Clark
Faculty Advisor: Hannah Henson

Intestinal diseases, such as Crohn's disease, are debilitating conditions resulting in a degradation of the intestinal barrier. Individuals with intestinal diseases tend to have elevated levels of antibodies against many bacterial proteins, such as those found in *Pseudomonas fluorescens*. *Danio rerio* (zebrafish) were used as a model organism to investigate the effects of *P. fluorescens* on intestinal barrier integrity, specifically its effects on the tight junction protein Claudin-15. We predicted that exposing zebrafish to *P. fluorescens* would cause a downregulation in Claudin-15 expression thereby resulting in a leaky intestine. After ingesting the bacterium, zebrafish were collected, and changes in Claudin-15 expression were detected using qPCR. Changes in Claudin-15 expression due to *P. fluorescens* exposure would suggest that it does have an impact on the intestinal barrier. The results of these studies may prove to be helpful in better understanding the pathologies related to numerous intestinal diseases. Results are pending.

The Effect of Vitamin C on SH-SY5Y Neuroblastoma Cells (O)

Presenter: Lauren Thornburg
Faculty Advisor: Lunawati Bennett

Neuroblastoma is a rare cancer that develops in the neuroblasts (immature nerve tissue) of the adrenal gland, neck, chest or spinal cord. This cancer causes about 700 new cases in children each year and accounts for 7 to 10% of childhood cancers in the United States, although it is rarely present in adolescent or adults. Treatment of neuroblastoma includes surgery and chemotherapy, but relapse is as high as 50-60% even with aggressive treatment. The main objective of this study was to determine if vitamin C at pharmacological concentrations has an effect on this type of cancer using SH-SY5Y neuroblastoma as the model. To measure the concentrations of vitamin C needed to kill about 20% to 80% of the cells, 2 assays, MTT and sulforhodamine were employed. Sulforhodamine assay was chosen since this procedure gave more reliable and consistent data. The IC50 of the vitamin C was at about 2.5 mM. Further studies were conducted using two dosages of vitamin C at 2.5 mM and 0.625 mM. This study shows at high doses vitamin C has possible chemotherapeutic effect against neuroblastoma.

Examining the Antibiotic Effects of Hemolymph from Immune Challenged Squash Bugs *(Anasa tristis)* (O)

Presenter: Jacob J. Lemon
Faculty Advisor: Jeremy Blaschke

Insects represent a promising source for novel antimicrobial peptides for combatting the growing epidemic of antibiotic resistant bacteria. The antibiotic properties of squash bug *(Anasa tristis)* hemolymph were tested against *Escherichia coli* in a growth inhibition assay. *Anasa tristis* groups were either immunized with a mixture containing *E. coli* and *Staphylococcus epidermidis* or un-immunized. Hemolymph from both groups was extracted and tested against *E. coli* growth in a microplate assay. Post-assay, bacterial colony counts were measured via a spread-plate technique. Growth curves and colony counts revealed *E. coli* grew more in the presence of immunized hemolymph than the positive control. Growth curves between immunized and un-immunized hemolymph were not significantly different but were significantly different for colonies counted. Overall, neither assay revealed any significant antibiotic activity in *A. tristis* hemolymph. Instead, the hemolymph increased *E. coli* growth, possibly due to the pH or total nutritional value of the insect hemolymph.

BIOLOGY

Scent Presentation Type Effect on Bobcat *(Lynx Rufus)* Presence Assessments (O)

Presenter: Argus Floyd
Faculty Advisor: Andy Madison

Mesopredator populations have been on the rise for years and their populations have begun to play a more important role in ecosystems across North America. As population dynamics change, it is important for researchers to assess mesopredator population numbers, but bobcats *(Lynx rufus)* have proven difficult to study due to their cryptic nature. Bobcat scent lures were presented in a standard trap set, and wooden sent eggs and then monitored with cameras. All wildlife visitations were recorded and analyzed to see if there was a difference due to presentation method. This data was compared to similar studies by other Union University students, which has shown scents presented on wooden scent eggs have been largely ineffective. The trials in this study showed the standard trap set to be more effective at attracting bobcats than the wooden scent eggs.

Modification of Episomal Green Fluorescent Protein in E. Coli Using CRISPR (O)

Presenter: Thomas Lunsford
Faculty Advisor: William Thierfelder

The Green Fluorescent protein (GFP), originating from the jellyfish *Aequorea victoria*, is utilized for fluorescent tagging of molecules for identification or indication of successful modification in molecules. Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) and CRISPR associated protein 9 (Cas9) form the newly discovered CRISPR/Cas9 genome editing system. CRISPR/Cas9 induces genome modifications such as point mutations, insertions, or deletions. Using a CRISPR/Cas9 system composed of donor DNA, Cas9, and guide RNA (gRNA), a point mutation of tyrosine to phenylalanine at position 66 (Y66H) causing GFP to luminesce blue instead of its standard green was performed. This experiment provides future professors and students with teaching and learning potential of CRISPR/Cas9 modifications for disease modeling, observation of structural alterations, or other precise genome editing techniques. Results of successful GFP modification are to be determined.

Isolation of Hemostatic Proteins from the Latex of *Euphorbia pulcherimma* (O)

Presenter: Maddie Dotson
Faculty Advisor: Marc Lockett

The poinsettia *(Euphorbia pulcherrima)* yields various proteins and enzymes as well as other compounds, such as protease inhibitors, alkaloids, and glycosides in its latex. These proteins can potentially be used medicinally to affect the cardiovascular system, especially the blood coagulation process. In this project, we collect, purify, and test the latex isolated from *E. pulcherrima*, to discover an anticoagulant protein that could be used as a supplement in the human blood clotting mechanism. Collection methods from *E. pulcherrima* consisted of removing bracts to expose the underlying latex. Methods for purification included dialysis, centrifuging, and ion-exchange chromatography. Multiple biochemical testing techniques were used to identify the function of the protein components of the extracted latex, including gel electrophoresis, and protein activity assays with thrombin and casein. Results are still pending.

Effects of *Candida albicans* Infection on JEG-3 Mammalian Placental Cells (O)

Presenter: Madison Studstill
Faculty Advisor: Esther Choi

Candida albicans populations have become problematic in Neonatal Intensive Care Units (NICU) in the United States. These infections pose a risk to prenatal development and pregnant mothers, and are usually contracted by catheter insertions or unsterilized instruments. C.*albicans* affects humans predominantly as a biofilm, organized cell communities attached to surfaces. It is important to understand biofilm formation for C.*albicans*, so that effective interventions can prevent its infection. A biological system will be set up to observe the best conditions to grow biofilm on a JEG-3 placental cell line. A qRT-PCR will be run to observe RNA molecular changes of the JEG-3 cells. The aim of this study is to observe the optimal conditions for C.*albicans* infections on JEG-3 placental cells to prevent transmission of these diseases in hospitals. *Candida* biofilm shows optimal growth at 37° C in RPMI media, and further results are being obtained for the qRT-PCR comparison.

The Inducible Immune Response of the Tobacco Hornworm (*Manduca sexta*) Inhibits the Growth of *Escherichia coli* (O)

Presenter: Deryn St. James
Faculty Advisor: Jeremy Blaschke

The tobacco hornworm (*Manduca sexta*) is a model organism for human immune systems and a potential source of novel antibiotics. To test the hypothesis that hemolymph from infected *Manduca sexta* caterpillars could inhibit gram-negative bacteria growth, fifth instar larvae were infected with *Pseudomonas fluorescens*, *Escherichia coli*, and *Serratia marcescens*. Twenty-four hours post infection, the hemolymph was extracted and pooled. A 15-hour growth assay was performed in a microplate reader to test how the growth of *Escherichia coli* responded to the presence of uninfected and infected hemolymph. Phosphate-buffered saline and ampicillin were used as the positive and negative controls respectively. Colony counts via streak plates were prepared post-assay to provide a quantitative estimate of bacterial growth. Infected hemolymph successfully inhibited Escherichia coli growth compared to uninfected hemolymph and positive controls ($P<0.0001$), showing that *Manduca sexta* caterpillars produce antimicrobial peptides in response to bacterial infection that may serve as valuable novel antibiotics.

Regulation of Deiodinase-2 in NFKB-Deficient Cells (O)

Presenter: Braxton Rider
Faculty Advisor: William Thierfelder

A variety of hormones, including T3 and T4, are produced by the thyroid gland and are essential for normal metabolic regulation, along with proper growth and development. T3 and T4 act on target tissue to produce a response by increasing metabolism and body temperature. Nearly half of all T4 is converted to T3 with the help of type II iodothyronine deiodinase (DIO2). The objective of my research is to measure DIO2 transcription levels and to use Clusters of Regularly Interspaced Short Palindromic Repeats (CRISPR) technology to delete Nuclear Factor kappa-light-chain-enhancer of activated B cells (NF-κB) in RAW cells to determine how it regulates DIO2 expression levels and ultimately T_3 and T_4 hormone levels. We have yet to demonstrate the effectiveness of using CRISPR in such a way due to normal DIO2 amounts still being present in cells when analyzed using reverse transcriptase quantitative polymerase chain reaction (RT-qPCR).

Regulation of Iodothyronine Deiodinase-3 Expression in a Breast Cancer Cell Line (O)

Presenter: Haley Hathcock
Faculty Advisor: William Thierfelder

An estimated 20 million Americans—60% of which are unaware—have some type of thyroid disease. Thyroid hormone (TH) is crucial to homeostatic balance in the body—balance that, if disrupted, can result in thyroid health-related concerns. The deiodinase enzymes ensure that TH is properly regulated, and iodothyronine deiodinase-3 (DIO3), specifically, is necessary for TH inactivation. Our research sought to determine the effects of transforming growth factor beta 1 (TGF-β), a cytokine shown to be a transcription factor in DIO3-expressing tissues, and phorbol 12-myristate 13-acetate (PMA), an activator of protein kinase C, as possible DIO3 regulators in MCF-7, a breast cancer cell line. To do this, we treated MCF-7 cells with TGF-β and PMA and observed the effect on DIO3 production via reverse transcription quantitative polymerase chain reaction (RT-qPCR). Results are pending.

BIOLOGY

Creating a Novel Tool for Identifying Blood Anticoagulants by Modification of the GFP Protein to Include Thrombin and FXa Recognition Sites (O)

Presenter: Christian Sidebottom
Faculty Advisor: Mark Bolyard

Many anticoagulants target either factor Xa or thrombin, 2 coagulation factors necessary for the coagulation cascade. This project focused on inserting factor Xa and thrombin recognition sites into the pGLO plasmid in the green fluorescent protein (GFP) gene using mutagenic polymerase chain reaction (PCR). Primers were designed to insert the recognition sites at several sites, focusing between amino acids 172 and 173. The modified plasmid was transformed into *Escherichia coli* cells, checked for GFP production in colonies, tested against a diagnostic PCR, and sent for third-party sequencing. The sequence returned with inconclusive results, perhaps indicating mixed results from the mutagenic PCR. A diagnostic PCR showed no distinction between the modified and wildtype pGLO. This project did not definitively succeed in inserting the recognition sites into the DNA structure. Future endeavors should focus on using mutagenic PCR codon-by-codon due to the possibility that sequences were only partially inserted in this project.

An Observation of *Sapajus cay* Behavior in Pinus Taeda Tree Stand (O)

Presenter: Josh Mays
Faculty Advisor: Michael Schiebout

The hooded capuchin monkey *(Sapajus cay)* is known to live in the shrinking Atlantic Forest of Paraguay, but had not been known to live in or utilize non-native loblolly pine *(Pinus taeda)* stands. In this study, hooded capuchins were documented for the first time traveling in a loblolly pine forest, sleeping in the branches, and feeding on the pine cones. All behaviors were recorded, and traveling and feeding heights were analyzed to better understand their social structure. Using a transect and camera traps, a species list was compiled of all birds and mammals utilizing the pine stand. This study documents how species utilize loblolly pine stands in Paraguay. Alternate habitats such as these will be required for species' preservation as deforestation of the Atlantic Forest continues.

DNA Barcoding of *Rhopalosoma nearcticum* (Hymenoptera: Rhopalosomatidae) Reveals a New Host Record and Evidence of Cryptic Species (O)

Presenter: Lance A. Miller
Faculty Advisor: Jeremy Blaschke

Rhopalosomatidae is an unusual wasp family whose larvae develop as ectoparasitoids of crickets. In the Nearctic region, *Rhopalosoma nearcticum* is the only recognized species and the only known hosts for this species are the crickets *Hapithus agitator* and *Orocharis saltator*. Here we report a new host species: *Anaxipha exigua* and reconstruct the first molecular phylogeny of *Rhopalosoma* using the barcoding gene COI. Nine specimens were collected from Cypress Grove Nature Park, Jackson, TN, and their DNA was extracted, amplified, and sequenced. Using these sequences combined with 6 reference sequences from GenBank and BOLD, phylogenies were constructed using neighbor joining and maximum likelihood. Two genetically distinct clades of *Rhopalosoma* were recovered with robust support (bs=100, 96). Intraspecific distances were low (.002, .006), while distance between the two clades was high (.148), indicating the presence of at least two species of *Rhopalosoma* in North America: *R. nearcticum* and one which is currently undescribed.

The Effects of Temperature on Feeding in the Mayan cichlid *(Cichlasoma urophthalmus)* (O)

Presenter: Holly Gilbert
Faculty Advisor: James Kerfoot

Mayan cichlids *(Cichlasoma urophthalmus)*, which are native to tropical South America, are invasive to southern Florida and have been documented as far north as Tampa. Invasive species are recognized as one of the main threats to biodiversity. Ecophysiological studies on invasive fish illustrate how environmental variables, such as temperature, effect stress, thus aiding managers by providing insight to their potential geographic spread. This study looked at the effects of temperature on feeding in Mayan cichlids. Fish acclimated at 20°, 28°, or 36° C, representing Florida's high and low temperatures, and were filmed during feeding. Kinematic variables, such as max gape velocity, initial and post jaw displacement, and head rotation were analyzed. These data may be helpful to determine the possible extent of invasion. Preliminary results indicate that this species feeds more effectively in warm waters. This indicates that there might be limit to their northernly spread.

The Effects on Behavior Determined by Anatomy and Vision among Ages of Domestic Horses (O)

Presenter: Kaelyn Moore
Faculty Advisor: Andy Madison

Vision and age play important roles in horse behavior. This research used 3 objects to urge a behavioral response based on a positive, negative, and neutral stimulus. The reaction of each horse (15 total), specifically with which eye it looked at each object and the observation of a fear factor, and the measurements of the length and width of the horse's head, were recorded and compared among 3 age groups (5 horses in each). It was hypothesized that when comparing behavior based on the objects, the horses will significantly express more interest in the positive stimulus, using their right eye, over the negative stimulus, using their left eye. Among age groups, the hypothesis was the younger horses will have a significantly greater fear factor than the middle-aged and older horses. A preliminary analysis of the data shows trends of supporting these hypotheses. This research could aid in future horse training.

Changes in Thyroid Deoidinase Estrogen Induced Imflammation in Breast Cancer (O)

Presenter: Daniel Bile
Faculty Advisor: William Thierfelder

Iodothyronine deiodinases are essential in the activation and deactivation of thyroid hormones. The extent to which we understand how deiodinase works has not been fully realized yet, but progress has been made. A multi-layered experiment will be conducted to try to understand the role of inflammation, thyroid hormones, deiodinase and estrogen. Cancer is associated with inflammation, estrogen and thyroid hormone are both essential for growth of breast cancer cells, but their regulatory relationship is still not understood. Both will be added to MCF-7 breast cancer cells, then treated with anti or pro inflammatory cytokines to try to stimulate deiodinase expression. Results are currently pending.

Immune Efficiency of *Manduca sexta* in Regard to the Gram Positive Bacteria Staphylococcus Epidermidis (O)

Presenter: Hannah C. Shea
Faculty Advisor: Jeremy Blaschke

The immune system of tobacco hornworms *(Manduca sexta)* can serve as a model of the mammalian immune response and a potential source of novel antibiotics. Forty-five tobacco hornworms were reared, and 13 were chosen randomly for inoculation with gram negative bacteria, while 12 received no injection and served as the control. After 24 hours, hemolymph was extracted from both groups. A microplate assay was then performed to determine whether immune challenged individuals displayed a better capacity to inhibit growth of *Stapholococcus epidermidis* compared to control individuals. Previous research suggests that antimicrobial peptides from insects are better at inhibiting gram negative bacterial growth than gram positive bacterial growth. Our results do not support this research as the immunized hemolymph did inhibit the growth of the gram positive bacteria *S. epiderimids*. This necessitates further studies directly comparing inhibition of gram positive and gram negative bacteria.

Effects of Urbanization and Habitat Fragmentation on Bird Species Diversity in Jackson, Tennessee (O)

Presenter: Nick Underwood
Faculty Advisor: Andy Madison

Urbanization can lead to habitat fragmentation, threatening biodiversity of most taxonomic groups, including birds and mammals. Better understanding of how habitat fragmentation affects these taxonomic groups will contribute to improved conservation efforts. As urbanization moves towards the urban core, habitat patches become more fragmented. During this study, 3 levels of urbanization were observed around Jackson, Tennessee: rural, suburban, and urban. The objective of this study was to determine how habitat fragmentation affected bird species richness and abundance. A total of 108 bird counts were conducted between mid-September and early November of 2018. We observed a total of 48 species and no significant difference in species richness or abundance was detected among the 3 levels. Possible reasons for these results include the timing of the bird surveys or the amount of fragmentation in the rural level. ■

BUSINESS

Institutions and Chaebol Formation and Reform in South Korea (O)

Presenter: Ian Maupin
Faculty Advisor: Colene Trent

This paper examines the history and development of South Korea since the 1960s, focusing on the formation and reform efforts of the *chaebol*. These massive corporations dominate the South Korean economy and are involved in every sector of their economy. Their unique size, corporate structure, and relationship to the Korean government makes the chaebol a special and fascinating study. Using the framework of institutionalism, the question is explored as to why and how the chaebol developed as they did and what impact they might have on the future of South Korea.

Richard Thaler's Behavioral Economics (O)

Presenter: Spencer McCloy
Faculty Advisor: Christopher Manner

Behavioral Economics, the latest trend in the field of economics, is a theory that challenges the classical assumption that men are rational beings who maximize their utility by acting rationally. The paper (a) examines the influences that helped Thaler develop behavioral economics, (b) explains the theory itself, (c) describes how behavioral economics interacts with the history of economic thought, (d) highlights some impacts of the movement, and (e) expounds on some possible critiques. Ultimately, it is concluded that, although the movement might move the science to the opposite extreme (i.e., it focuses too much on integrating psychology and not enough on mathematization), it acts as a necessary corrective measure that returns economics to the consideration of consumer's psychology. ■

CHEMISTRY

Electrochemical Oxidation of Sodium Glucoheptonate to Its Dicarboxylic Acid Salt (P)

Presenter: Haley Barnette
Faculty Advisor: Michael Hayes

The aldaric acid of sodium glucoheptonate offers the potential to be a superior renewable building block chemical as compared to glucaric acid. Electrochemical oxidation may be an attractive "green" route to this compound. The reaction occurred to an extent such that it has the potential to be an efficient method if the pH and temperature fluctuations are reduced. From C-13 NMR spectra of the reaction product, we concluded that the aldaric acid was present and that side reactions were minimal.

Developing a Nylon 6-6/Poly(lactic acid) Polymer Experiment (P)

Presenter: Colin Coleman
Faculty Advisor: Sally Henrie

The importance of green principles and sustainable polymers is highlighted in a new experiment developed for undergraduate organic laboratories where polylactic acid is formed in a two-step process. L-Lactic acid is naturally and synthetically produced and plays a role in several biochemical processes. The reflux reaction of L-lactic acid and a zeolite catalyst in isobutyl acetate results in a viscous solution of the L-lactide form. Subsequent removal of the catalyst purification, followed by ring opening polymerization reflux in isobutyl acetate and further purification produces the polymer product, polylactic acid. Characterization of the product is done using 1H-NMR and IR spectrum. Degradation is observed and compared to synthesized nylon 6-6 through DSC and TGA. This experiment introduces students to structures and fundamental concepts of polymer chemistry and exemplifies modern advances in sustainable materials.

Use of An Inexpensive Surface Plasmon Resonance Instrument to Determine the Binding of α-Lactalbumin to Fragmented Antibodies (P)

Presenter: Kaitlyn E. James
Faculty Advisor: David Wing

The purpose of this research was to develop a laboratory procedure using an inexpensive surface plasmon resonance instrument for undergraduate use that investigates the binding of antigens and antibodies, specifically α-Lactalbumin and anti-α-Lactalbumin. In order for antigen-antibody interactions to be studied by SPR, antibodies must first be attached to a gold-coated glass slide. 2-Mercaptoethylamine (MEA) was used to break the disulfide bonds of the antibodies so they could be attached to the gold-plated slide by exposed thiols on the Fc tail of the molecule. The fragmented antibodies stuck to the gold surface of the slide and produced a consistent change in the SPR angle. As the antigen solution was slowly pumped through the sample cell and over the antibodies, a further change in SPR angle was expected. However, the observed change was inconsistent. In some trials the SPR angle increased while in others it decreased. Our instrument was not programmed to generate a graph of the response as a function of time—called a sensorgram. Thus, there was no way to determine whether or not the α-Lactalbumin bound to the antibodies, and an analysis of the antigen-binding properties could not be completed. The inexpensive SPR instrument could be used by undergraduates to gain familiarity with the SPR technique, but did not prove to be as useful as hoped for purposes of studying antigen-antibody dynamics. ■

COMPUTER SCIENCE

AWS Textract (O)
Presenter: Ben Dubis
Faculty Advisor: Haifei Li

Learning how to manipulate AWS's Textract software, a superior OCR software, in order to develop and create a program that will recognize numbers on a receipt and inform the user when they have exceeded their amount will be covered. There is a learning curve that comes with software like Textract, that is on the cutting edge, and does not have a developed community of support. The struggles of this learning curve and the work process will be discussed, along with a demo presentation.

The Lexington Inn Ordering Application (O)
Presenter: Joel White
Faculty Advisor: Haifei Li

Students who have classes over meal times do not have enough time to wait in a line to order food and eat. The purpose of the project is to create a web application for ordering food at the Lexington Inn. The application extends the existing website to incorporate a form that allows students to order food from the posted menu and choose the time at which they would like it to be ready. The application shows students the pickup expiration time. All orders will be prepaid in "Buster bucks" to enforce food pick up within this window.

Follow Me: A New Method for Navigating Campus (O)
Presenter: Ashley Raines
Faculty Advisor: Haifei Li

For new students, visitors, and even current students, Union University's Jackson campus can be confusing. Union does its best to make directions clear, but there are some rooms that don't follow a clear plan. These rooms exist in every building. Union Station is the place where staff members can help guide and direct, but there is only one on the entire campus. This web-application seeks to help reduce traffic at Union Station and provide a more universal guide to navigate the campus. This web-application will use Wi-Fi triangulation and positioning to guide, direct, and follow the user wherever he or she goes. A web-based interface provides a more widely utilized method to access this service.

Restructuring the Computer Network at "The Church at Sugar Creek" (O)
Presenter: Matthew Mathis
Faculty Advisor: Haifei Li

User experiences for the computer network at the Church at Sugar Creek is not optimal. Right now, every device is on one LAN and every Wi-Fi access point (AP) has a different name. AP should be constructed so that someone can go around the church and stay connected to the Wi-Fi without having to reconnect to other APs. Different VLANs will be created so that there are different 'zones' for different areas in the church (ie. Office, CLC, preschool, and media/streaming). Setting up these VLANs will still allow devices to connect to each other, while allowing for more diversity and security.

Cyber Recycling Inventory Management (O)
Presenter: Lane Crouch
Faculty Advisor: Haifei Li

A personal computer is an essential tool to academic success. The Cyber Recycling project at Union University's Enactus chapter seeks to provide computers to students, faculty, and staff free of charge, as well as small local businesses. An inventory management system is very helpful for this kind of project, so that it is easy to see what Cyber Recycling has and does not have at a glance. However, no system like this currently exists. My goal is to create a cloud-based web application for this purpose that future project leaders can use and maintain easily, so that any delays in the distribution of computers due to insufficient inventory may be avoided as much as possible. ■

EDUCATION [GRADUATE]

The Effect of Scheduling on Student Academic Growth (O)
Presenter: Steve Meyer
Faculty Advisor: Ben Phillips

Humans are subject to the complexity of an internal clock and the corresponding effect on cognitive function, mood, and performance. The cyclic periods of lethargy and increased activity are components of a biological phenomenon known as circadian rhythm. There are differences in individual chronotypes as to the exact timing of the cycles. These differences may in turn affect the ability of individuals to perform at the peak of their own cognitive ability at a prescribed time of day. The purpose of the study was to determine if differences existed in high school students' academic growth based on when a course was taken. The sample included 2,875 end-of course examination scores from 8 core subject areas that utilized state mandated criterion-referenced end-of-course exams. Prediction scale scores from the Tennessee Value-Added Assessment System (TVAAS) academic database were measured against the actual scale score a student produced. A two-way ANOVA was run on the differences of these two scores to answer the following questions: (a) Is there a significant difference in TVAAS growth scores based on the time of day (period) the course is taken? (b) Is there a significant difference for TVAAS growth scores based on the semester the course is taken? And (c) Is there any significant interaction that occurs between the time of day and the semester that the courses were taken? This study did find statistically significant differences in student academic growth pertaining to both the time of day and the semester that specific coursework was taken. Implications of the study are discussed. ■

ENGINEERING

Energy Saving Lighting for the PAC (P)

Presenters: Davina Norris, Kyle Roach, and Dakota Stedman
Faculty Advisor: Jeannette Russ

This project involves the construction of an audio amplifier with the LM386 Low Voltage Audio Power Amplifier chip. A protoboard will be used to solder a circuit that includes capacitors, resistors, a voltage source, a potentiometer, a speaker, and an audio input. We hope to use this project to demonstrate the usefulness of a potentiometer in particular, but also how connecting standard circuit components together can produce an interesting and useful project. We will implement the circuit in PSpice, a circuit simulation software to confirm an accurate design, but also to show the different voltage and current values associated with our design. Our plan is to connect the circuit to a phone playing music to demonstrate how the value of the potentiometer affects the audio output.

A Pressing Matter: Crushing Objects with Hydraulics (P)

Presenters: Emory Craft, Regan Oliver, and Dakota Stedman
Faculty Advisor: Georg Pingen

This project will demonstrate the applications of hydraulics and Pascal's Law which states, "In a fluid at rest in a closed container, a pressure change in one part is transmitted without loss to every portion of the fluid and to the walls of the container." In other words, a very heavy object can be placed on top of a large piston, and a light object on a small piston, and the system will be at equilibrium. With this information in hand, we decided to demonstrate this principle using a hydraulic press. With one small piston feeding a fluid into four large pistons, we can create a force strong enough to crush a can, and we hardly have to try! In addition to our poster, we will have a working prototype to show how it works.

Working Model of a Jet Engine Using 3-D Printed Parts and Compressed Air (P)

Presenters: Adam Lynn, Benjamin Marsch, and Davina Norris
Faculty Advisor: Georg Pingen

For this project, our team attempted to assemble a model of a jet engine. The purpose of this model is to clearly demonstrate how a thermodynamic gas turbine cycle functions. The model is primarily made with 3D-printed parts and manufactured bearings. For safety reasons, and to ensure a realistic build, we replaced the combustion process with a compressed air input. For observational purposes, the model casing is also built with a half-cylinder of clear piping. Our project poster will describe and explain the functions of each component of the model and how those components contribute to the overall thermodynamic cycle. The particular cycle demonstrated in this project is known as a Brayton cycle.

Steel-fully Colorful (P)

Presenters: Ainsley Duncan, Adam Lynn, and Stuart Milam
Faculty Advisor: Jay Bernheisel

Looking to improve your coloring skills? Under different thermal conditions, certain metals develop different colors which depend on its temperature. We plan to investigate the effects of exposing metals to various temperatures along with changing the time that these metals are heated. Using a heat treatment oven, we seek to produce different hues using various types of iron-based materials. This study of the heat-dependent coloring simulates the tempering process, in which the colors are used to determine the temperature. The tempering process is used to decrease the brittleness of the material. This affects many common tools, from knives to screws, which are often colored for decoration. Specifically, we will attempt to recreate this ornamental coloring in screws and other small metal objects.

Survey of Potential Sources of Renewable Energy for Union University: Solar Energy (P)

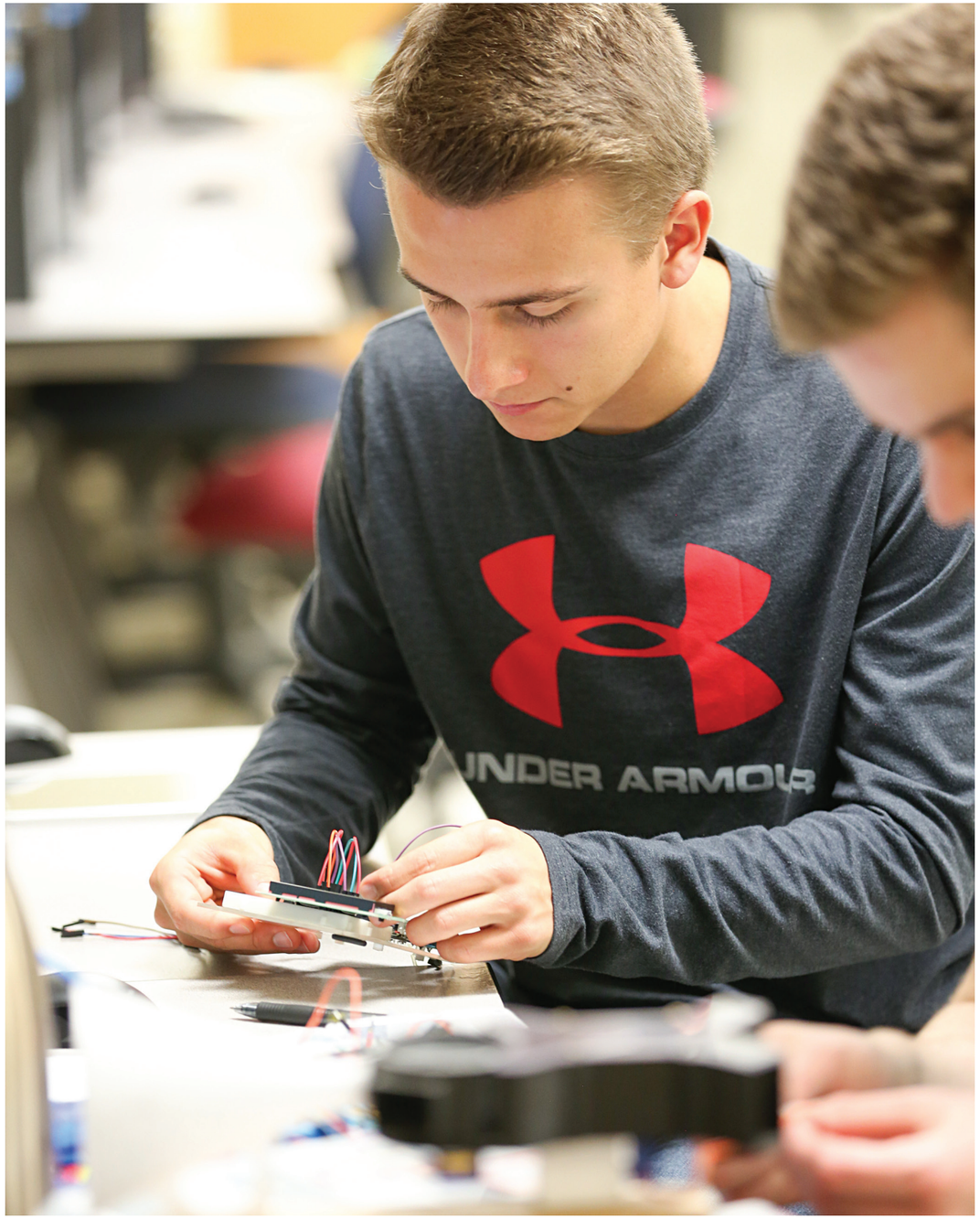
Presenters: Gabriel Garneau, Matthew Owen, and Addison Turner
Faculty Advisor: Don Van

Over time, using renewable energy will become more and more important to sustainable infrastructure and ethical responsibility. Currently, Union University uses only as much renewable energy as our energy providers choose to sell us. This project will look at how Union could make an intentional decision to use renewable energy for its day to day operations. Since energy infrastructure is very costly, we discussed how some of the potential hurdles might be tackled, and the payback period. We will present how renewable energy in the form of solar panels can be introduced to Union University considering both the cost of implementation and other restraining factors, and the potential benefits from both an environmental and economic aspect. We will also consider effects of the Green New Deal as we look into renewable energy options.

Smith Chart Research Project (P)

Presenters: Mark Carbonell and Andrew Dougan
Faculty Advisor: Randal Schwindt

This project explores the various applications of the Smith Chart. The Smith Chart is a graphical tool used for solving mathematical equations without solving tedious calculations. More specifically it allows one to work through a complex electrical, magnetic, and frequency-based problems in a reasonable timeframe. A more specific example would be that it is used in the design of an electrical network that has the load impedance match the input impedance of the line. Our project poster outlines the process of matching impedances and has several examples worked out to show how various types of matching can be solved using the Smith Chart. We also performed research into the theory and mathematical background leading to the creation and operation of the Smith Chart.



ENGINEERING

Impedance Matching Network (P)

Presenters: Thomas Foster and Kaylee Owen
Faculty Advisor: Randal Schwindt

For this project, we created a MATLAB program to calculate characteristics needed for a selected impedance matching network topology. In transmission lines, some of the supplied power can be reflected back toward the source. To minimize this wasted power, an impedance matching network can be added between the source and the load. However, impedance matching characteristics are tedious to calculate by hand. Thus, our user-friendly MATLAB code, streamlines this process.

A Demonstration of Piston Power (P)

Presenters: Gavin Hamann and Ethan Morris
Faculty Advisor: Georg Pingen

This project involved the construction of a functioning gasoline engine model driven by compressed air in order to help students gain a better understanding of the thermodynamic principles of an engine. The project will include two detachable engines. The first engine will be a complete and functioning engine with a clear top so as to see the piston mechanism from overhead. The second engine will be a replica driven by the first, but with a cutaway of the engine block to display the pistons more prominently. Both engines will be color coded to help students visualize the engine components more easily. This project also serves as a prototype for a possible engineering summer camp.

Guitar Distortion Pedal (P)

Presenters: Michael Drury, Ben Marsch, and Ben Nyguyen
Faculty Advisor: Jeanette Russ

Our team attempted to build a working electric guitar distortion effects pedal circuit. The purpose of the circuit is to clip the waveforms on audio input from an electric guitar to produce a "distorted" sound output. We clipped these wave forms using a series of LEDs, which we substituted for diodes. We also included a potentiometer to control the intensity of our distortion effect, which can be achieved independent of the total volume of the music. We spliced this pedal circuit into an instrument cable, and our proof-of-concept is playing an actual electric guitar through an amplifier with and without the effect.

Matching Networks: Matlab Code (P)

Presenters: Palmer Bell, Gavin Hamman, and Davis Johnson
Faculty Advisor: Randal Schwindt

The purpose of this project was to create a MATLAB code that allowed the user to select one of 5 matching network topologies, input data, and receive the specific output data. The input data includes characteristic impedance of feedlines, frequencies, load impedance, and relative permittivity.

Rectangular Waveguide (P)

Presenters: Jared Lavelle and Grant Wise
Faculty Advisor: Randal Schwindt

A waveguide is a special form of transmission line consisting of a hollow conductive (typically metal) tube designed for the transportation of electromagnetic waves. Waveguides can be considered one of the earliest types of transmission lines, and understanding their operation is an important part of electromagnetics. They may be thought of as conduits for electromagnetic energy, the waveguide itself acting as nothing more than a "director" of the energy. Our research focuses on a particular waveguide design, the rectangular waveguide. We will examine their theoretical analysis, physical characteristics, and industrial use.

Condenser Unwinder Design Project (O)

Presenters: Mark Carbonell and Matthew Owen
Faculty Advisor: Randal Schwindt

High voltage bushings such as those produced by ABB Inc. in Alamo Tennessee can be 2-22 feet in length and weigh up to 1000 pounds. The primary component of the bushings is the condenser core, containing a copper or aluminum conductor wrapped with alternating layers of insulating and conductive oil-impregnated paper. Occasionally bushing failure will occur during testing or operation and it becomes necessary to unwind the condenser to determine the failure source. The Condenser Unwinder Design Project, undertaken by the project team on behalf of ABB Inc, aimed to design a device to unwind the paper from high-voltage bushing condenser cores. Primary functions of the device include the ability to automatically and safely unwind paper from the cores, provide a means to measure paper distances and lengths, and dispose of waste paper. The team furnished fabrication drawings for the device to ABB Inc. at the conclusion of the project.

Wireless Telemetry for Temperature and Current Measurement (O)

Presenters: Thomas Foster, Gabriel Garneau, and Kaylee Owen
Faculty Advisors: Georg Pingen and Randal Schwindt

For this project, our team worked with Nidec, an alternator designing and manufacturing company, to design a wireless telemetry system that transmits data from an alternator's rotor to an external receiver. Specifically, the designed system needs to transmit temperature measurements from the rotor windings and current readings from the exciter while the alternator is in operation, meaning that the rotor is spinning at approximately 1800 rpm and a hardwire connection is impossible. Most of Nidec's alternators are four pole machines, so the design will need to transmit four temperature measurements (one for each rotor pole's windings) and one current measurement since the exciter provides a single current to all four windings.

Audio Amplifier (P)

Presenters: Emory Craft and Reagan Oliver
Faculty Advisor: Jeannette Russ

This project involves the construction of an audio amplifier with the LM386 Low Voltage Audio Power Amplifier chip. A protoboard will be used to solder a circuit that includes capacitors, resistors, a voltage source, a potentiometer, a speaker, and an audio input. We hope to use this project to demonstrate the usefulness of a potentiometer in particular, but also how connecting standard circuit components together can produce an interesting and useful project. We will implement the circuit in PSpice, a circuit simulation software to confirm an accurate design, but also to show the different voltage and current values associated with our design. Our plan is to connect the circuit to a phone playing music to demonstrate how the value of the potentiometer affects the audio output.

Wireless Tracking for Manufacturing Efficiency (O)

Presenters: Gavin Hamann, Davis Johnson, and Addison Turner
Faculty Advisors: Georg Pingen and Randy Schwindt

For this project, our team set out to help the Lexington branch of Nidec, Leroy-Somer more closely track the work put into each of their products. Currently, Nidec is manufacturing industrial scale alternators and needs a reliable way to track each project as it moves through the process flow. Our team researched several wireless tracking options and is recommending two primary options as the most effective solutions. The first solution is high-frequency RFID tracking using part order documents as a carrier for the RFID tag. The second option is Bluetooth tracking, again, using part order documents as a carrier for the Bluetooth tags.

Social Mobility Device (O)

Presenters: Angel McQuiston, Daniel Porter, and Conner Wilson
Faculty Advisors: Randal Schwindt and Georg Pingen

A device was developed for a young child with physical and mental disabilities that will allow for more freedom and enjoyment of the outdoors while being fully supported. The device can act as a swing that provides support for the child's neck and head and can act as a cart the child can sit inside and ride. The support in the device is crucial because it enables the child to participate in recreational activities that would otherwise be impossible because of the physical disability.

Effect of Microfluidic Boundary Conditions on Flow Topology Optimization (O)

Presenter: Gabriel Garneau
Faculty Advisor: Georg Pingen

The goal of this research is to provide engineering designers with insights regarding the importance of including microscopic effects in the design process. The recent review article on "Topology Optimization for Microfluidics" by Chen highlights the increased importance of design optimization techniques for micro-scale applications, however, most topology optimization frameworks applied to micro-scale applications consider only macroscopic flow solvers. Building on the initial work by Negrete, we have developed a flow optimization framework that models microscopic/rarefied effects such as velocity slip, creep, and temperature jump using the Navier-Stokes equations and will show its application to the optimal design of a Knudsen Pump. ■

ENGLISH

Okyō, the Unexpected Symbol of Japan: Reinterpreting Higuchi Ichiyō's "Separate Ways" (O)

Presenter: Spencer McCloy
Faculty Advisor: Jay Beavers

Although "Separate Ways" is subject to various interpretations, this paper focuses on a new interpretation that parses the role of the kimono and its related aphorism in Higuchi Ichiyō's work. In this interpretive lens, Okyō acts as a symbol for the modernizing Japan during the Meiji period, and Kichizō serves as a metaphor for the Japanese tradition. The symbolism stems from the vital yet subtle aphorism laced throughout the work, which fall gracefully into place using this new understanding of the short story. The research concludes that Ichiyō utilizes her story as a parable for the modernizing Japan in order to warn her against discarding tradition she once held dear in favor of industrialization molded after the West.

A Vernacular Poetics: Language and Subversion in the Works of Dante Alighieri (O)

Presenter: Shea McCollough
Faculty Advisor: Gavin Richardson

This essay examines Dante's use of the vernacular Italian language in his poetry, both the Vita Nuova and the Divina Commedia, specifically analyzing the dynamics of power wrapped up in his affinity for the Italian tongue. To what extent is Dante transgressing and subverting his contemporary power structures by composing in the vernacular Italian at the expense of ecclesiastical Latin? This essay explores this question by considering Dante's own treatise on the Italian language, *De Vulgari Eloquenita,* as well as by investigating the political, social, and religious ramifications of Dante's voice as an exiled Florentine.

A Reader's Theater Presentation of the Medieval Creation/Adam & Eve (ENG 450) (O)

Presenters: Kayla Binkley, Rebecca Duttweiler, Brandon Harper, Ariel Holzheimer, Shea McCollough, Avery Rist, and Brittany Staggs
Faculty Advisor: Gavin Richardson

This will be a "reader's theater" presentation of *CREATION / ADAM & EVE* from the Chester cycle, ca. 1400-50. Students will read the play in Middle English from prompt copy. The star of the show is the language, but students will do some light performing. The play begins with God describing the creation of the world. But soon, a fallen Lucifer plots against humankind, resulting in Adam and Eve's mutual recriminations. Four sword-bearing angels come to enforce the consequences of our First Parents' actions. Running time is approximately 25 minutes. ■

HISTORY

History of 20th Century American Dance (O)

Presenter: Lauren Butler
Faculty Advisor: David Thomas

Dance is a conversation and throughout history, this dialogue took on different meanings and was a language all its own, sometimes extending beyond the music and becoming a way for dancers and choreographers to deal with the events around them. In a time where the American past, present, and future seemed to be pulling in conflicting directions, dancing became a way in which people of the 20th century reconciled the quickly changing world and seemingly hopeless situations to craft their world: a world where economic, racial, and social problems were overcome if only in the moment. This paper focuses on American dance in the early 20th century including performance and social dances. It highlights the African American roots of these dances and explores some of the evolution between the beginning of the century and World War II.

Christian Shamanism: Ivan Veniaminov and the Adoption of Orthodoxy as the Indigenous Faith of Russian Alaska (O)

Presenter: Luke Sower
Faculty Advisor: Stephen Carls

For a century and a half before its sale to the United States, the Alaskan coast was home to a few thousand Russian fur traders. Like much of the non-Western world, European presence had a significant impact on the indigenous communities of the subcontinent. While disease and forced labor damaged or destroyed many native communities, the Orthodox Christian faith brought by the Russians became a cornerstone of indigenous life in the regions of Alaska formerly occupied by the fur traders. The compassion and tolerance of the Russian clergy, particularly Ivan Veniaminov, and the pre-existing compatibility of Orthodoxy and indigenous Shamanism both contributed to the high rate at which indigenous Alaskan communities peacefully adopted Russian Orthodoxy and began to identify it as a crucial aspect of their native culture and identity. ■

INTERCULTURAL STUDIES

African-American Males in Traditionally White Fraternities at a Predominately White Christian University (O)

Presenter: Austin Maddox
Faculty Advisor: Phillip Ryan

Greek organizations at predominantly white institutions (PWIs) are mostly made up of white students, and Union University is no exception. While much research has been done on African-American membership in predominately white fraternities, there is far less qualitative research about African American students' experiences with Greek life on a predominantly white Christian campus. This integrative intercultural research utilizes qualitative and interdisciplinary research to better understand the experiences of African-American membership in a Greek organization at a small Christian University in the southeastern United States, including implications on faith and identity. In this presentation, A statistical overview of Greek life at this particular university, along with a framework for understanding the complex relationship between race and identity in predominately white institutions is provided. African American students' perceptions and experiences in a white fraternity are then explored, including the voices of white fraternity members. I conclude with an intercultural analysis of the findings. ■

LANGUAGE

Un análisis de la generación Nini (An analysis of the *Nini* Generation) (O)

Presenter: Korey Adams
Faculty Advisor: Karen Martin

The contemporary economy of Spain is characterized by high levels of unemployment oscillating between the tourist-driven on-seasons of summer and winter and the tourist-lacking offseasons of Spring and fall. Across the board, young adults in Spain suffer disproportionately from this unemployment. Additionally, despite the relatively low-cost of university in Europe, college attendance is also on the decline. This has created a stigma against this "Generación Nini" that neither attends institutes of high education nor works enough to sustain themselves without parental aid. In this paper, I explore causes for this phenomenon including unchecked corruption, rising immigration, stringent governmental policies, and the European union are the principal causes.

El tremendismo y la crítica: Dos perspectivas de la Guerra Civil *española/Tremendismo* and the Critic: Two Perspectives of the Spanish Civil War (O)

Presenter: Hannah Fryling
Faculty Advisor: Karen Martin

The Spanish Civil War, fought from 1936-1939, was a precursor to World War II and is the bloodiest conflict in Spanish history. This project will explore the damaging effects of the Spanish Civil War on the Spanish people, the loss of childhood innocence and the stifling of the voices of protest. Tremendismo is a literary movement that this presentation explores that is rooted in Spain and brings to light the bleak consequences of the war. The differences between the writings of Spanish author Ana María Matute and Peruvian author and political critic César Vallejo will be explored in order to discover the ways that gender and nationality affect their perceptions of the war.

Métodos de enseñanza para estudiantes con dificultad de aprendizaje específica a lengua extranjera (Methods for Teaching Students with Specific Learning Disability in Foreign Language) (O)

Presenter: Brooklynn Cheyenne Staten
Faculty Advisors: Julie Glosson and Karen Martin

The capabilities considered essential for foreign language learning are phonetic coding ability, grammatical sensibility, memory capabilities, and inductive language learning abilities. Historically, students with deficits in these areas resulting in a Specific Learning Disability in Foreign Language have been excluded from foreign language requirements. In this paper, I propose that the least restrictive environment for a student with a specific learning disability in foreign language is not exclusion from the foreign language classroom, but inclusion in the foreign language classroom with the appropriate accommodations and supports. This paper discusses a review of the literature regarding these strategies, as well as their application within my own case study.

Le nationalisme français versus une identité européenne (French Nationalism versus a European Identity) (O)

Presenter: Korey Adams
Faculty Advisor: Jean Marie Walls

At his inaugural ceremony French President Emmanuel Macron, instead of playing the French national anthem, played the anthem of the European Union. This event highlights the rising tension and complex nature of the relationship between French nationalism and ties to the European Union. France undeniably has strong ties to the European Union due to its fundamental role in its conception; however, French national identity in many ways remains firm. Over the years, the EU has implemented laws and enacted policy, bypassing the French government and focusing on regional development, thereby fostering support of EU policies and projects. In this paper, I propose that this conflicting loyalty of nationalism and supranationalism has created a power struggle in which where each party is fighting for the allegiance of the French citizenry. I will explore specific policies of the EU and the motives and impacts of their existence in relation to national French policies.

Language Immersion: A Brief History, Learner Identity, and Systemic Challenges (O)

Presenter: Lydia Davidson
Faculty Advisor: Phillip Ryan

The phenomenon of language immersion schooling has been a developing trend in the United States since the 1960's. This presentation will provide a foundation for language immersion schooling by presenting a brief history, a summary of the varying modules, and a linguistic framework. Next, the effects of language immersion on various aspects of the learner's identity, with particular focus on the cognitive benefits, will be explored. Finally, this presentation will suggest some systemic challenges which need to be overcome in order for language immersion schooling to reach its potential.

LANGUAGE

The Effects of Metacognitive Strategy Instruction on English Literacy Rates (O)

Presenter: Erin Copeland
Faculty Advisor: Phillip Ryan

Views on the teaching of literacy have varied greatly over the years, moving from a prescriptive system to a more individualized approach that utilizes the teaching of metacognitive skills in the language learning process. Classrooms which emphasize the use of metacognitive skills encourage students to examine their thought processes and learning styles on a deeper level in order to tailor lessons and assignments that best accommodates the needs of the learner. This presentation explores the development of metacognitive teaching strategies and how they are implemented in the classroom, including how the teaching of these strategies affects literacy rates within the ESL community.

An Ethical Imperative for the Language Development of those on the Spectrum (O)

Presenter: Brittany Staggs
Faculty Advisor: Phillip Ryan

Language development often presents more challenges for autistic students than typically developing students; however, it is essential that educators, through thoughtful considerations and accommodations, help their autistic students to achieve their highest linguistic potentials. In this presentation, I first explore the autistic identity and recent scientific inquiries in understanding the cause of this condition. Next, I describe the journey from first language acquisition to second language acquisition to the development of literacy among autistic students. I then offer several methods of intervention for both educators and parents that have proven to ease this process along with stories from families living them out in real time. This network of support has the potential to liberate these individuals by giving them the power to speak out and to challenge the culture of silence that so often surrounds mentally disabled communities.

How Language Affects Identity: Additional Language Acquisition, Accents, and Dialects (O)

Presenter: Kayla Binkley
Faculty Advisor: Phillip Ryan

This research analyzes and presents the findings of specific positive and negative effects of language on self-reported identity and social identity. Based on a review of existing literature as well as these issues exemplified in an original case study, this research pinpoints instances of language use that affect the identity of the speaker, such as acquisition of additional languages, use of various accents, and use of dialects. The most notable example among these is an original case study analyzing the effects of the acquisition of English on a native Brazilian Portuguese speaker. This case study explains how he views himself after becoming proficient in English, and how his Portuguese-speaking peers view him because of his proficiency.

Effects of Spanish-English Bilingualism on Identity (O)

Presenter: Rebekah Pendergrast
Faculty Advisor: Phillip Ryan

Language identity in the United States is highly complex among Spanish-English bilinguals due to the high value placed on English and the necessity of English for academic success. This project will explore the effects of bilingualism on identity among Spanish-English bilinguals in the United States, as well as factors that influence language choice such as language perceptions and language status, environment, family, and medium of communication. The research will also look at the implications of all of these things in the classroom and how teachers can help to preserve and encourage their students' first languages, as well as how they can improve the perceptions of English and Spanish in relation to each other.

Context-dependent Language and Identity Negotiation for Adults (O)

Presenter: Lyndsey Welch
Faculty Advisor: Phillip Ryan

As a volunteer teacher for an adult English as a Second Language (ESL) class, I recognize that my students' backgrounds (first language, country of origin, etc.) and present life circumstances affect the way in which they see themselves—not only as English language learners but also as humans. Therefore, I am interested in how identity affects language learning and vice versa. I will mention key theories that serve as reference points on understanding ways in which identities may evolve. Then, I will explore a few common language-learning contexts and the results they have on shaping adult learners. Along with modern research, I will integrate my own case-study findings and classroom observations. By recognizing students as "whole learners," my hope is to positively engage with and better support English language learners in the future.

Ethical Implications for Church/Missions-Based English as a Second Language (O)

Presenter: Jeff Walker
Faculty Advisors: Phillip Ryan and Karen Martin

This project combines my own case study of a missions-based English as a Second Language (ESL) classroom and external research concerning the ethics of ESL and missions. With the continued growth of ESL as a mission platform, this project has implications for if/how churches and mission agencies can use ESL in practice. Factors are discussed such as the use of the Bible or other religious texts in the classroom, identity impact of ESL and missions on both Christian and non-Christian students, teacher training (or lack of training), and the extent of conflict of interest when ESL education is used as a platform for Christian missions.

On the Re-Visualization of the Word and the Development of Visual Literacy in the Academy (O)

Presenter: Brandon Harper
Faculty Advisor: Phillip Ryan

The proliferation of digital media in our cultural moment has raised a multitude of critical concerns regarding how emergent communicative platforms affect language and literacy, especially in academic practice. With image-based platforms of social media and film growing in pedagogical prominence, what role ought they play in formal scholarship, especially in writing? This research investigates some of the ways in which increasing digitization has made necessary the development of a common visual literacy, the ability to make meaning through and from visual media. Further, this analysis strives to show that this advancement toward image-based language is a natural progression in what linguists categorize as language evolution; namely, the visualization of language coherently follows the historical-linguistic procession from phonemic orality to graphemic writing. Lastly, this treatise explores some of the practical benefits and ethical considerations involving the elevation of visual literacy's value in education.

The English-Only Movement and its Effects on Hispanic and African Americans (O)

Presenter: Steven Cutliff
Faculty Advisor: Karen Martin

In this paper I look at the varied forms of discrimination that are brought against Chicanos and African Americans under the guise of furthering the English only movement. Included in this discussion are concerns about the erosion of identity in the realms of politics, vocation, and education. I explore the validity of the English-Only Movement and its claims that a shift away from bilingual education is more effective, beneficial, and humanizing than existing or proposed bilingual programs. I also point out clear patterns of the English-Only Movement resulting in the placement of minority speakers at an unfair disadvantage and, through reductive stereotyping, negatively influencing public opinion to cultivate a cultural climate in which the majority speakers are reluctant to relinquish their power.

Considerations Regarding Vernacular Speech in the French Language Classroom (O)

Presenter: Jonathan Hall
Faculty Advisor: Phillip Ryan

This research focuses on vernacular speech with the Français Langue Étrangère (French as a Foreign Language) classroom. While traditional language classrooms may focus extensively on formal syntax and lexicon of the target language, learners often find themselves unable to communicate during "normal interactions" in their target language due to a paucity of vernacular knowledge. Strategies to rectify these current pedagogical failings were studied by examining both sociolinguistic considerations and pedagogical solutions. Engaging with vernacular speech is necessarily laden with ethical issues. Vernacular speech proceeds from distinct language communities and teaching the practices of these communities carries a political and a linguistic consequence. Ultimately, it is demonstrated that vernacular speech both can and should hold a central role in the Français Langue Étrangère classroom. However, it remains beneficial for language educators to stay abreast of salient sociocultural issues, especially accent affectation, slang appropriation and global French languages. ■

NURSING [UNDERGRADUATE]

Effects of Smoking on the Mother and the Fetus (P)

Presenters: Addison Dunn and Jacob Lovelace
Faculty Advisor: Sheilla Foster

This poster presentation will focus on research that was reviewed relating to mothers who smoke while pregnant. Although a majority of people know that smoking is not healthy, they still do it. We wanted to dig deeper into what smoking does to the body, as well as what it does to the baby. We also read a scientist's research on ways that nurses could be more effective in helping mothers quit while pregnant. Anything to help produce a healthier life for the mother and the child was the main goal of this research.

Maternal Mortality and Morbidity (O) (P)

Presenters: Braxton Hobbs and Kianna Kyles
Faculty Advisor: Sheilla Foster

There are a lot of unknowns related to maternal mortality and morbidity that have caught nurses' attention. The unknowns have generated doubt and concern as well as an increased awareness to the problems that exists. According to the World Health Organization, maternal death is defined as death of a mother during pregnancy or within a period of 42 days after birth. This definition is without regard to duration or location as long as it is related to pregnancy; this does not include accidental or incidental complications during delivery. About 700 U.S. women die annually in pregnancy and delivery, and the incidence of unreported maternal deaths make this number even higher. Throughout the research process, we discovered that maternal demise stems from a variety of physiological and environmental factors. The literature review also illuminates specific information related to the nursing process that nurses should use to bring cognizance to this subject and its abstruseness. In our presentation and poster, we will discuss the results of a literature review related to maternal mortality and morbidity.

Effects of Poverty on Childbearing Women (O) (P)

Presenters: Macy Morrison and Alexandra Nanney
Faculty Advisor: Sheilla Foster

Exposure to poverty imposes adverse pregnancy outcomes for childbearing women. These include low birth weight fetuses, poor maternal and fetal nutrition, and decreased follow-up care. Adverse outcomes result from, but are not limited to, homelessness, exposure to substance abuse, lack of prenatal care, and restricted supportive resources. As health care providers, it is important to combat the issue of poverty and its effects on childbearing women in order to decrease the adverse pregnancy outcomes. Effective methods used include: establishing professional client relationships built on trust, promoting and supporting community programs for women's health, encouraging the cessation of substance abuse, educating teenagers about pregnancy, connecting women with financial resource, promoting earlier prenatal care including nutritional education, and identifying positive support structures. By implementing these tools, positive outcomes on pregnancy for impoverished women should increase. ■

NURSING [GRADUATE]

Comparison of International Health Care Systems: India (P)

Presenters: Vincent Cagungun, Amber Craven, and Samantha Walker
Faculty Advisor: Shari Wherry

Many Americans can agree that the healthcare system has much to improve. However, in comparison to other countries, the American healthcare system fairs well globally. For example, according to Singh (2016), there are roughly 600 million people in India with very little healthcare or none at all. Access to healthcare in India is similar to that of the rural areas of America. Comparatively speaking, the American and Indian healthcare systems share similar difficulties but have many contrasting differences. Recent reports of healthcare reforms have concluded that India's current system is not sustainable for its population due to their vital shortage of healthcare professionals (Singh, 2016). Attempting to create a better healthcare system, India has made strides towards healthcare reform. India's government has introduced a new healthcare policy which focuses on holistic care that will be universally affordable, accessible and reduce out-of-pocket expenses (Singh, 2016).

Comparison of International Health Care Systems: Egypt (P)

Presenters: David Anderson, Tyler Cox, and Wade Lomax
Faculty Advisor: Shari Wherry

Egyptian healthcare, like other healthcare systems around the world, contains unique challenges. In December 2018, a new universal health coverage law was approved in Egypt that promises to provide healthcare coverage to Egypt's citizens, primarily the 30% who currently cannot afford coverage (Devi, 2018, p. 194). Terrorist attacks pose a unique burden on Egypt's political scheme, thus creating controversy in the healthcare system. Geographical barriers, specifically urban versus rural locations, affect access to health services in unique ways as well. Rural families seem to bypass health facilities and seek pharmacies for health-related needs, while urban families tend to overburden outpatient clinics in public hospitals (Galal & Al-Gamal, 2014, p. 148). The purpose of this presentation is to compare the healthcare system of Egypt with other developed countries across the globe. This presentation will also describe the demographic, geographical, and cultural effects related to the delivery of healthcare in Egypt.

Comparison of International Health Care Systems: Canada (P)

Presenters: Kayla Goins, Michael Hackett, and Kevin Stahl
Faculty Advisor: Shari Wherry

Canada has a rich history of universal healthcare, currently called Medicare, dating back to 1947. This healthcare system was further standardized with the Canada Health Act of 1984

(Martin, 2018). Medicare is administered through decentralized insurance plans, which are subsidized by the government and free to all Canadian citizens at the point of care. However, this healthcare system has become a large portion of the gross domestic product (Valle, 2016). Long wait times contribute to rising costs, dissatisfaction among the public, and inefficiency in the delivery of care. Because of this, the Supreme Court of Canada has made decisions that have since authorized expanded care with private insurance (Pomey, Hudon, Schendel, Martin, & Forest, 2016). Areas of evaluation for this presentation include payer system, financing/supply, reimbursement, production, provider choice, challenges, world ranking (WHO), and gross domestic product spent on healthcare.

NURSING [GRADUATE]

Comparison of International Health Care Systems: Australia (P)

Presenters: Brian Bougard, Nerlie Pierre, and Ashley Riesberg
Faculty Advisor: Shari Wherry

According to the Organization for Economic Co-operation and Development (OECD), Australia has one of the top-ranked healthcare systems around the world. Australia is considered a developed country with a universal healthcare system that follows the international standards for quality and performance measurement. Australia's healthcare system is a multifaceted organization that is comprised of both private and public sectors (Dixit & Sambasivan, 2018). For the purpose of this presentation, we will examine the healthcare infrastructure within the Commonwealth of Australia. In particular, the following components will be addressed: the type of payer system, funding/supply, reimbursement, production, provider choice, challenges, world health organization (WHO) ranking, and gross domestic product (GDP) spent on healthcare in Australia.

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

Presenters: Yolande Alexandre, Emily Poppelreiter, and David Rodrigues
Faculty Advisor: Shari Wherry

The Doctor of Nursing Practice (DNP) Health Policy and Economics class will examine the economic and political factors affecting the health care of different nations. Our group will compare the United Kingdom's healthcare to other countries. The National Health Service (NHS) is the unified name for each of the four public health services in the United Kingdom. The NHS is composed of the National Health Service in England, the NHS Scotland, the NHS Wales, and the Northern Ireland Health & Social Care (Li et al., 2019). Our DNP class will present posters for Australia, Canada, China, Costa Rica, Egypt, Finland, Germany, India, Israel, Mexico, Norway, Russia, and Spain. Areas of comparison include payer system, financing/supply, reimbursement, production, provider choice, challenges, world ranking (WHO), and proportion of gross domestic product (GDP) spent on healthcare.

Comparison of International Health Care Systems: Finland (P)

Presenters: Marida Pace-Newbern, Delecia Parker, and Greta Robinette
Faculty Advisor: Shari Wherry

Finland has been considered a leader in providing public and primary healthcare since 1972 (Saltman & Teperi, 2016). The Finnish healthcare system originally emerged as a compulsory healthcare program, which was funded by tax payor dollars, but has now become a decentralized publicly run system that has continued to grow and evolve. Today the healthcare system is funded by municipal, social, employer tax sources, privately purchased insurances, and out of pocket payments by patients. According to a study published in The Lancet, Finland's healthcare system continues to be one of the best in the world and continues to demonstrate improvement (GBD, 2018). Information presented in this presentation examines Finland's healthcare payer system, financing and supply, reimbursement, challenges, choices, world ranking, and percentage of growth domestic product spent on healthcare.

Comparison of International Health Care Systems: Spain (P)

Presenters: Thomas Goins, Alicia Hickman, and Erica Walker
Faculty Advisor: Shari Wherry

Funded by taxes and the private sector, the Spanish National Health System (SNS) will be examined. The SNS embraces universality, free access, equity, and fairness in financing and covers 99.1% of the population. Total health financing encompasses 71% of public sources. The private sector of insurance provides voluntary health insurance to individuals and an alternative network for 80% of civil servants insured within the Mutualism of Civil Servants (MF). Spain has the highest life expectancy in the European Union (EU), but because of the rapid ageing population there is an increase in chronic disease and long-standing disability which poses challenges. The health policy changes that were made in 2012 and the effects it had on the country will be examined along with technology and pharmaceutical expenditures.

Comparison of International Health Care Systems: Mexico (P)

Presenters: Lindsay Brewer, Holly Hardy, and Heather Middleton
Faculty Advisor: Shari Wherry

During the class of Health Policy and Economics, economic and political factors affecting health care in Mexico as compared to the United States have been examined. Mexico's public healthcare system is known as *Instituto Mexicano de Seguro Social* (IMSS). This service is funded by a combination of the Federal government, employer payroll taxes and employee payroll taxes

(Mexperience, 2018). The total expenditure of the country on health per capita is $1,122, and the total expenditure on health as a percentage of gross domestic product is 6.3 (WHO, 2014). This presentation will explore Mexico's health care system including payer system, financing/supply, reimbursement, production, provider choice, challenges, world ranking (WHO), and gross domestic product spend on healthcare.

NURSING [GRADUATE]

The Healthcare System of the Russian Federation (P)

Presenters: Jennifer Delk, Holly Jones, and Suzanne Stewart
Faculty Advisor: Shari Wherry

The Russian Federation is the world's largest nation by land area and ranked 9th in population (Worldometers, n.d.). The World Health Organization ranks Russia's healthcare system 130th out of 191 countries (World Health Organization [WHO], 2014). The citizens of Russia have a choice between compulsory insurance, provided by the government, or privately purchased medical insurance (International Student Insurance, 2019). Russia transitioned to a state funded healthcare system for its' inhabitants in 1996 marking monumental change in their healthcare system (Expatica, n.d.). A review of Russia's healthcare system evaluates the impact of both private and public insurance on the quality of healthcare delivery. This poster presentation will examine the economic and political factors affecting health care in Russia while evaluating both strengths and weaknesses of Russia's universal healthcare system.

Exploration of International Health Care Systems: Germany (P)

Presenters: Brad Creekmore, Michelle Edacheril, and Clesheree Stepter
Faculty Advisor: Shari Wherry

The demand for healthcare services is steadily increasing worldwide, resulting in many industrialized countries, such as Germany, to require mandatory health insurance for its citizens as a means to reduce the financial burden of health care on their nation (Busse & Blumel, 2014; Herwartz & Schley, 2018). Since the establishment of health insurance in 1883, Germany's insured population has grown from 10 percent to almost 100 percent, due to the mandate for statutory health insurance and their five branches of social insurance (Institute for Quality and Efficiency in Health Care [IQWiG], 2018). Germany has had a universal health care system since 2009 in which citizens receive coverage through either government outlets or private health insurance (Kifmann, 2017). This presentation will explore the German health care system and evaluate the characteristics of their payor system, financing/supply, reimbursement, production, provider choice, challenges, world ranking, and gross domestic product spent on health care.

Comparison of International Health Care Systems: China (P)

Presenter: Philip Ervin, Nilap Patel, and LaQuasha Rosson
Faculty Advisor: Shari Wherry

All Chinese citizens receive publicly provided and government financed healthcare. Substantial progress has been made in refining the healthcare system and health conditions in the Chinese population over the last 2 decades (Wang, Rao, Wu, & Liu, 2013). A survey of the population showed that the majority of citizens reported gratification with China's healthcare system, but nearly 25% were dissatisfied with hospital environment, wait times to see physicians, and distrust in medical professionals (Duckett, Hunt, Munro, & Sutton, 2016). The purpose for this presentation is to outline the benefits, challenges, finances, provider choice, and production of a country that is ranked 144th of 191 countries by the World Health Organization (2000).

Comparison of International Health Care Systems: Costa Rica (P)

Presenters: Richard Christian, Stewart Jeter, and Haley McCoy
Faculty Advisor: Shari Wherry

Despite significantly higher income and healthcare spending the United States mortality rate is over 18% higher than the mortality rate of Costa Rice (Rosero-Bixby & Dow, 2015). The purpose of this poster is to examine the economic and political factors that impact healthcare in Costa Rica. This information will be used to compare the current healthcare system in Costa Rica to that of the United States and other countries. The following areas will be examined: payer system, financing and supply, reimbursement, provider choice, challenges, World Health Organization (WHO) ranking, and gross domestic product spent on healthcare.

Comparison of International Health Care Systems: Israel (P)

Presenters: Brianna Moultrie, Jessica Raebel, and Ashlea Sledge
Faculty Advisor: Shari Wherry

Each country in the world is tasked with developing a healthcare delivery system to meet the needs of their specific populations. This allows for differences in healthcare delivery to develop between different countries. All countries have the opportunity to learn from each other to better their own healthcare delivery systems. The purpose of this poster is to present the State of Israel's healthcare delivery system. With the State of Israel's rich history and diverse ethnic groups that have impacted the development of their healthcare delivery system, there is much to discuss. Topics will include payer system, financing/supply, reimbursement, production, provider choice, challenges, World Healthcare Organization (WHO) world ranking, and gross domestic product spent on healthcare.

Norwegian Healthcare System (P)

Presenters: Chinoyerem Oji, Beunica McDowell, and Malasy Vichathep
Faculty Advisors: Cathy Ammerman and Shari Wherry

The origin of the Norwegian healthcare system is based upon three principles: decentralization, free choice provider, and universal access (Kasper el at., 2017). All public hospitals are governed by the Regional Health Authority (RHA), which is overseen by the Ministry of Health (Ringard, Saunes & Sagan, 2016). Residents are responsible for treatment cost until they reach an annual limit; the subsequent cost is free (International Health Care Systems Profiles, 2018). However, pregnant women and children (under the age of 16) are exempt from the annual limit and have access to free health care (International Health Care Systems Profiles, 2018). This poster will emphasize the governmental and economic changes within Norway's current healthcare system. Data will be provided regarding the following areas: financing/supply, reimbursement, and payer system; provider choice, production, and challenges; and gross domestic product spent on healthcare and World Health Organization's ranking.

Effects of Auditory and Visual Cues on Anesthesia Providers' Reaction Time to Oxygen Desaturation During Tracheal Intubation (P)

Presenter: Qianwen C. Williamson
Faculty Advisor: Brian Foster

Continuous monitoring of oxygenation via clinical observation and pulse oximetry is a standard for nurse anesthesia practice and anesthesia professionals must make critical decisions affecting patients' safety based on audiovisual cues from the pulse oximeter in an environment often filled with competing sensory information. Research has demonstrated that there is need for improving anesthesia professionals' perception of oxygen saturation. This study aims to investigate the effects of audiovisual cues on anesthetists' response time to oxygen desaturation during tracheal intubation. In a simulated operating room environment, ten student registered nurse anesthetists participated in three experiments, whose results indicated that response time to desaturation could be shortened by modified visual cues and that oxygen saturation was overestimated when only auditory cues were available. Further research should be conducted to explore methods to enhance the effectiveness of oximetry audiovisual cues and oximetry tone perception, which can ultimately improve patient safety.

Effects of Intra-articular Injections of Ketamine on Knee Joint Pain and Arthritis of the Knee: A Systematic Review of Outcomes (P)

Presenter: Natalya Malenko
Faculty Advisor: Brian Foster

Background: Recent studies have discovered the presence of the NMDA receptor at peripheral sites. Ketamine has been shown to produce analgesia and reduce inflammation by its action on multiple receptors, including NMDAr. Objectives: To examine current evidence and assess the outcomes of intra-articular injections of ketamine on knee joint pain and arthritis of the knee. Results: The overall results indicate that ketamine, alone or as an adjuvant, may be efficacious at reducing knee joint pain and arthritis following intra-articular injection of the drug into the knee joint. Conclusions: The review indicates that further studies should be performed to determine the precise effect and mechanism of action of intra-articular ketamine on pain and arthritis of the knee before a change in clinical practice takes place. While further studies are being performed, clinical practice should focus on optimizing patient comfort, minimizing pain and inflammation of the knee joint.

NURSING [GRADUATE]

Analysis of Laryngeal Mask Airway Bulb Inflation, Assessment, and Management Techniques Among Student Registered Nurse Anesthetists (P)

Presenter: Shana Mosley
Faculty Advisor: Melissa Lefave

Laryngeal Mask Airways (LMAs) have been approved since the 1990s as a means to secure a patients' airway while allowing the anesthesia provider to be hands-free. Since the development, adverse complications have occurred due to overinflation of the cuff. The purpose of this study was to assess the ability of senior student registered nurse anesthetists (SRNAs) to inflate an LMA cuff to recommended pressures. Through a pretest/posttest design, this research evaluated the cognitive deficits of seventeen participants and whether the educational intervention improved their ability to inflate the LMA cuff to recommended levels through the use of a manometer. The results concluded that even though there was a cognitive defect among SRNAs related to cuff pressures, almost all the SRNAs were inflating the cuff below recommended levels both pre and post-test. The results concluded the intervention was unsuccessful.

Transom Grant Application: Healing Trust (P)

Presenter: Nicole Russell
Faculty Advisor: Denise Thornton-Orr

The Transom Grant is one of the few grants given to non-profit organizations that are funded by Healing Trust. This grant is given to organizations that have programs with clear goals, timelines, and measurable health outcomes. Through the assistance from the Transom Grant, there will be exhibited health outcomes on the participants in those programs.

Intraoperative Esmolol as an Adjunct for Perioperative Pain Reduction (P)

Presenter: Caleb Wagler
Faculty Advisor: Melissa Lefave

Postoperative pain contributes significantly to increased healthcare costs, prolonged hospital stays, and patient morbidity. Opioid analgesics, traditionally used to treat pain, have substantial dose related adverse effects that include respiratory depression, gastrointestinal symptoms, urinary retention, nausea, vomiting, and opioid-induced hyperalgesia. In an effort to reduce opioid-related adverse effects and postoperative pain, esmolol, an ultrashort acting, cardioselective beta-1 adrenoreceptor antagonist has been researched as an opioid-sparring adjunct in studies utilizing a multimodal analgesic technique. The purpose of this review is to give anesthesia providers evidence-based information on the effectiveness of esmolol in decreasing postoperative pain and opioid consumption in patients undergoing general anesthesia. All 10 reviewed studies claimed a statistically significant reduction in intraoperative and postoperative opioid consumption in patients that received esmolol compared to the control groups. Furthermore, esmolol should be considered as an opioid-sparing adjunct in patients undergoing general anesthesia that are void of contraindications.

Potential Complications Associated with Regional Anesthesia through Tattooed Skin: A Systematic Review and Experimental Study (P)

Presenter: Cassie Clark and Jamia Moore
Faculty Advisor: Brian Foster

In today's culture, an increasing number of patients are presenting with placement of tattoo ink upon various epidermal locations. The tattoo pigments contain a multitude of allergenic substances: Cadmium sulfide for yellow dye, iron oxide for brown dye, cobalt aluminate for blue dye, mercury sulfide for red dye, chromium oxide for green dye, magnesium for purple dye, and carbon for black dye. Tattoo ink ingredients are not regulated. The lack of awareness of potential risks associated with the introduction of tattoo pigments due to the anesthetic needle penetrating the skin, and transferring this ink into deeper levels of tissues and spaces has allowed for ambiguity amongst anesthesia providers as to whether a regional anesthetic approach is appropriate or should be avoided at these sites. Therefore, further research is warranted as patients with tattoos receiving regional anesthesia could be at risk for unknown complications.

The Use of Fresh Frozen Plasma as the Primary Treatment of ACE Inhibitor-Induced Angioedema and Prevention of Emergent Intubations: An Integrated Research Review (P)

Presenter: BethAnn Jones
Faculty Advisor: Melissa Lefave

Objectives. Examine research and assess outcomes of Fresh Frozen Plasma (FFP) on ACE-inhibitor induced angioedema, specifically in preventing emergent intubations. Background. Recent study has revealed more patients experiencing ACE-inhibitor induced angioedema following medication regimen for hypertension, heart disease, heart failure, kidney disease, and diabetic nephropathy. FFP is being evaluated as a life-saving treatment option. Design. Integrative research review (IRR). Methods. Databases included: ScienceDirect, CINAHL, Ovid MEDLINE, and PubMed. Inclusion criteria: publication within the last fifteen years (2003-2018), population studied will be patients presenting with ACE-inhibitor induced angioedema requiring treatment specifically with FFP, and the study must discuss outcomes following intervention. Results. Results indicate that FFP may positively affect outcomes for those experiencing ACE-inhibitor induced angioedema by breaking down bradykinin. Symptom resolution seen between 2-4 hours after receiving 1-4 units FFP. Conclusions. While FFP is beneficial in treating and preventing the progression of ACE-inhibitor induced angioedema, more study is needed. Relevance to clinical practice. Clinical practice should focus on proper differential diagnoses, supportive therapies, and airway management for those experiencing angioedema while study continues, and an algorithm developed.

The Role of Healthcare Administrators in Developing Cultural Competency Among Healthcare Staff for Patients During End-of-Life Care: An Integrative Review of Literature (P)

Presenter: Indya R. Daniels
Faculty Advisor: Nan Henderson

Long-term care facilities (nursing homes) have become the location of many patients until the time of death. Both patients and healthcare providers come from diverse cultural and ethnic backgrounds; therefore, different perspectives are brought into the care environment. Differences between patients and providers affect the quality of interpersonal end-of-life (EOL) communication. Healthcare administrators play a vital role in developing staff training programs that facilitate culturally competent conversations during EOL care. The Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) statement was used as a method to promote transparency of the review process and integrate the results of the studies. The literature review supported a need for (1) healthcare administrators to develop training programs that focus on cultural competence and EOL care conversations for staff in long-term care facilities, and (2) further primary research which deliberately connects EOL care conversations and cultural competence.

Using the Revised Nursing Work Index (NWI-R) to Identify Opportunities for Improvement in High-Turnover Nursing Units (P)

Presenter: Dorothy E. Hiatt
Faculty Advisor: Cynthia Powers

Nurse retention leads to increased patient satisfaction and safety (Africa, 2017). Heavy workloads, lack of support, co-worker relationships, etc. contribute to turnover (Côté, 2016). The Revised Nursing Work Index (NWI-R) measures perceptions of these factors, i.e. practice environment (Aiken & Patrician, 2000). In 2016, the average rate of bedside nurse turnover was 14.6% (NSI, 2017). From February 2017 to 2018, the turnover rate for two units studied, Unit A and B, was 15% and 43.3%, respectively. In the survey, the turnover intention scale (TIS-6), was combined with the NWI-R to assess intent to stay. The purpose of this study was to establish if the NWI-R can be used to identify opportunities for improvement in nurse satisfaction and retention. NWI-R answers were analyzed to determine if the survey provided insight into perceived practice environment deficiencies. TIS-6 results were used to conclude if correlations exist between intent to stay and NWI-R results.

NURSING [GRADUATE]

Evidence-Based Proposed Clinical Preceptor Guidelines for Nurse Practitioners (P)

Presenter: Catherine Aslin
Faculty Advisor: Patsy Crihfield

Literature discusses that the nurse practitioner preceptor clinical model is a proven method to prepare nurse practitioner students as capable health care providers. However, the traditional preceptor clinical model places burdens on the preceptors, including time constraints and difficulty maintaining clinical production. Because most preceptors are not trained as educators, preceptor guidelines provide better understanding of the specific goals and curricula of specific nurse practitioner programs. They also ensure that student educational outcomes are met, while preserving efficiency and productivity for busy nurse practitioner preceptors. The purpose of these proposed preceptor clinical guidelines is to provide clear understanding of Union's core values and mission, as well as the College of Nursing and Health Sciences' outcomes and goals. The guidelines also provide resources and support for practicing nurse practitioners, in order to maintain clinical production and prevent preceptor burnout.

Comparison of Readmission Rates Before and After the Implementation of a Stroke Services Transitional Care Coordinator (P)

Presenter: Paula L. Buckner
Faculty Advisor: Cynthia Powers

Hospital readmissions following a stroke are frequent and carry a significant cost burden to patients, families, and the organization. In an effort to reduce early hospital readmissions, Vanderbilt University Medical Center implemented a transitional care coordinator (TCC) to provide careful coordinated follow up care for stroke patients after hospital discharge. The aim of this study is to compare all cause thirty-day readmission rates of adult patients with a primary diagnosis of stroke before and after the implementation of a stroke services TCC. All adult patients admitted with a primary diagnosis of stroke; ischemic, hemorrhagic, and TIA; and readmitted within the first thirty days following hospital discharge between January-June of 2015, 2016, 2017, and 2018 were analyzed. Readmission data from 2015 -2016, prior to the implementation of the TCC was compared to readmission data, after the TCC was implemented (2017 – 2018). Hospital readmissions were reduced after implementing a TCC.

The Evaluation of Neuraxial Clonidine and its Efficacy in Decreasing Postoperative Pain and/or Narcotic Usage: An Integrative Research Review (IRR) (P)

Presenter: Bradley Steg
Faculty Advisor: Melissa Lefave

The opioid crisis has become one of the most detrimental healthcare concerns, and over the past few years the incidence of abuse has reached an all-time high. Anesthesia providers play a significant role in resolving this healthcare catastrophe. The use of narcotics is one of the most traditional anesthetic techniques to provide adequate analgesia for surgical patients; however, this may be catalyzing the progression of the opioid crisis. In attempt to overcome the consequences of opioid addiction, anesthetists have recently turned to various other pharmacologic classes to ensure pain is treated more suitably. Recent evidence has shown that the alpha-2 agonist, clonidine, has significant analgesic properties, therefore it has become a popular topic throughout anesthesia research. More specifically, the neuraxial use of clonidine has been evaluated for its effectiveness in decreasing postoperative pain and/ or narcotic usage. In this review, current literature will be analyzed to determine whether or not neuraxial clonidine provides anesthetists with a pharmacologic alternative to narcotics and a subsequent solution to the opioid crisis.

Consideration of Outcomes on Cancer Patients after Perioperative Opioid Administration (P)

Presenter: Wendy Greene
Faculty Advisor: Molly Wright

Objectives. To examine evidence and assess the impact of perioperative opioid administration on the proliferation of cancer cells. Background. Recently, articles have been published that show a correlation between cancer proliferation and opioid administration in the perioperative cancer patient. Design. Consideration of outcomes review. Methods. Searched databases: Ovid MEDLINE, PubMed, ScienceDirect, and CINHAL. Inclusion criteria: Articles published in the last eighteen years (2000-2018), and patients with a cancer diagnosis that received opioids perioperatively. Results. The use of opioids perioperatively may promote angiogenesis, tumor cell proliferation, and metastasis in cancer patients. Conclusion. Intraoperative care can influence long-term outcomes. Although RCT's are ongoing, it remains too early to make recommendations for analgesic methods on cancer patients. Implication of Findings. Medications are used without knowing their effect on cancer cells. While the role of opioids in cancer development is unclear, a knowledge base of potential side effects could play a role in decreasing metastasis.

The Effectiveness of Aprepitant Versus Ondansetron in Preventing Postoperative Nausea and Vomiting in Adult Patients Undergoing Noncardiac Surgery (P)

Presenter: Adam Bland
Faculty Advisor: Molly Wright

Postoperative Nausea and Vomiting (PONV) is a common occurrence after patients receive general anesthesia, leading to delayed discharge from the post-anesthesia care unit (PACU). Additionally, PONV can increase total length of stay, increase medical costs, and reduce patient satisfaction. Antiemetic therapy has received widespread research coverage identifying patient and procedural risk factors. The purpose of this DNP project was to examine current research regarding the effectiveness of aprepitant compared to ondansetron in preventing PONV. Results consistently showed that ondansetron and aprepitant were similar in providing a complete response, while aprepitant had greater efficacy in preventing vomiting, severity of nausea, and delaying the time to first vomiting episode. Aprepitant continues to be expensive, restricting its use in the preoperative setting. Results and opinions differ on which dose of aprepitant should be utilized to prevent PONV. Future research is warranted in the use of aprepitant as a mainstay in the antiemetic therapy regimen.

The Use of Ondansetron to Attenuate the Bezold-Jarisch Reflex in Surgical Patients: A Research Review (P)

Presenter: Jennifer Estes
Faculty Advisor: Molly Wright

Objectives: To assess for evidence on the use of ondansetron, a serotonin antagonist, to attenuate hypotensive bradycardic episodes (HBEs) due to the Bezold-Jarisch reflex in patients undergoing surgical procedures. Background: Recent studies have shown that the use of serotonin antagonists, specifically ondansetron, are useful in reducing the incidence of HBEs during surgical procedures. Design: A research review. Methods: Searched databases included CINAHL, Medline, Science Direct, and Academic One File. Articles were searched between February 3, 2018 and March 22, 2018. A total of 11 randomized controlled trials (RCTs) were chosen for this research review. Results: The results indicate that the use of serotonin antagonists, such as ondansetron, may be beneficial in attenuating HBEs that are the result of activation of the Bezold-Jarisch reflex during surgical procedures. Conclusions: Although there is evidence that use of ondansetron can help attenuate HBEs during surgical procedures, further research is warranted on the specific drug dosing needs. Relevance to Clinical Practice: By developing further research on this topic, anesthesia providers could potentially eliminate the negative organ effects of HBEs due to the Bezold-Jarisch reflex during surgical procedures.

NURSING [GRADUATE]

Consideration of Optimal Neostigmine Dosage Guided by Objective TOF Monitoring (P)

Presenters: Meggy Hayes and Racheal Howard
Faculty Advisor: Molly Wright

The use of non-depolarizing neuromuscular blockade agents is a common practice among anesthesia providers. However, there remains minimal use of effective train-of-four monitoring to determine adequate recovery as well as a lack of clear guidelines for the dosage administration of the commonly used reversal medication, Neostigmine. Rocuronium is a non-depolarizing neuromuscular blocking agent that is known to have unstable duration when re-dosed; therefore, the dose of neostigmine should be guided by an objective train-of-four twitch device. Subjective monitoring for adequate neuromuscular recovery continues to be a common method of practice despite the availability and effectiveness of objective train-of-four monitoring tools. This review compiles recent research and literature to provide a more comprehensive overview of the optimal dose of neostigmine as a reversal of Rocuronium using objective train-of-four monitoring.

Effects of Anesthesia on Arteriovenous Fistula Maturation: An Integrated Research Review of Outcomes of End-Stage Renal Disease Patients Following Regional Anesthesia for Arteriovenous Fistula Creation (P)

Presenter: Tyler Thompson
Faculty Advisor: Molly Wright

Objective To analyze current research and literature and assess the effects of regional anesthesia (RA) on arteriovenous fistula (AVF) maturation compared to other types of anesthesia, such as local anesthesia (LA) and general anesthesia (GA), for end-stage renal disease (ESRD) patients requiring an AVF for dialysis. Background: After surgical creation, the vein destined to become a successful arteriovenous (AV) fistula undergoes a remodeling process that is referred to as maturation. Although somewhat variable, these changes occur relatively rapidly, resulting in a fistula that can be repetitively used and that can provide adequate dialysis treatments. Recent studies have shown that RA may be more likely to increase AVF maturation in ESRD patients requiring an AVF for dialysis. Design: This study is an integrative research review (IRR). Methods: Searched databases included: UpToDate, PubMed, and Google Scholar. Search terms utilized were regional anesthesia and AVF maturation. Databases were searched between January 2015 and March 2018. Search terms were limited, as many were not full-text articles but only abstracts. Anesthesia textbooks were also utilized including: Barash, and Guyton. Results: The results of this IRR indicate that RA is most beneficial for AVF maturation for ESRD patients requiring dialysis. This is due mainly to the vasodilatory effects of RA. LA has some positive effects, but not as significant as with RA. GA should be avoided at all cost. Conclusions: More research in needed to make a conclusion regarding change in clinical practice to improve AVF maturation.

Effects of Anesthesia on Arteriovenous Fistula Maturation (P)

Presenter: Dane Mitchell
Faculty Advisor: Molly Wright

The purpose of this project is to examine current evidence and assess the outcomes of end stage renal disease patients following local anesthesia for arteriovenous fistula creation. Recent research shows that primary failure of these arteriovenous fistula grafts is a frequent issue in regard to graft maturation. This issue increases morbidity and mortality of this patient population. This project consisted of an integrated research review. Searched databases included CINAHL, Pubmed/Medline and google scholar. Inclusion criteria were publication within the last ten years (2008-2018) with population being any adult patient with an end stage renal disease diagnosis who was undergoing AVF creation with local anesthesia; and outcomes following anesthetic care including maturation and failure. Results. The results indicate that regional anesthesia is more beneficial for AVF graft maturation in end stage renal patients. Regional anesthesia may promote positive outcomes due to the vasodilatory effects produced with regional blockade and the decreased sympathetic response to surgical stimuli. Conclusions. This project revealed that recent research promotes the use of regional anesthesia over local anesthesia alone, for AVF graft creation, in end stage renal patients. Relevance to clinical practice. Clinical practice should focus on the best anesthetic plan for the patient and aid in the outcome of surgery.

Examining Nurse Practitioners' Perceptions and Comfort Levels When Caring for Adult Pediatric Osteosarcoma and Acute Lymphoblastic Leukemia Cancer Survivors in the Primary Care Setting (P)

Presenters: Ashley McTyre and Hannah Shaw
Faculty Advisor: Laurie Bagwell

A growing population of childhood cancer survivors has placed a new demand on healthcare providers to provide appropriate follow up care during the survivor's adulthood. The literature recognizes the appropriate follow up guidelines for childhood cancer survivors as well as the lack of knowledge regarding the guidelines in the healthcare profession. This study focuses on identifying and describing nurse practitioners' perceptions and comfort level in caring for adults who were pediatric acute lymphoblastic leukemia and osteosarcoma cancer survivors. A survey was distributed via email to eligible participants (N=75) for the purpose of evaluating their perceptions and comfort level when caring for these patients. Descriptive statistics and chi-square testing was utilized for interpreting the survey outcomes. Knowledge and perceptions/comfort level were specifically examined within the survey. The results of this study revealed a significant lack of knowledge among nurse practitioners in caring for adult survivors of childhood cancer.

Non-Invasive and Non-Pharmacological Prevention and Treatment of Acute Vasovagal Syncope (P)

Presenter: Jeremiah Cole
Faculty Advisor: Brian Foster

Objectives: To examine current research evidence and assess outcomes of adult patients managed with non-invasive and non-pharmacological interventions for the acute prevention or treatment of stress-induced vasovagal syncope, and to develop an evidenced-based tool to be used by clinicians based on that evidence. Design: The study design research was an integrative research review. Methods: Databases including PubMed, CINAHL, and ScienceDirect were searched for peer-reviewed studies that addressed acute non-invasive and non-pharmacological interventions to prevent or treat syncopal episodes in adults diagnosed with vasovagal syncope. Results: The results of this review demonstrate that physical counterpressure maneuvers, such as leg crossing and hand grip, are effective in raising systolic blood pressure and avoiding impending episodes of vasovagal syncope. Conclusions: Due to their efficacy and significantly low risk, physical counterpressure maneuvers such as leg crossing with muscle tensing and handgrip should be a first-line defense against avoiding or treating episodes of vasovagal syncope.

NURSING [GRADUATE]

The Effectiveness of Preemptive IV Benadryl Treatment in the Prevention of Acute Lung Injury in Patients Receiving Massive Blood Transfusions: An Integrated Research Review (P)

Presenter: Nahada Juan Gudger
Faculty Advisor: Melissa Lefave

A task as simple as administering blood products is not without its inherent risks. This research project examines the use of pre-treatment with intravenous Benadryl prior to administering blood products in efforts to prevent acute lung injury. The research explains the benefits of using an antihistamine such as Benadryl as a premedication, however also explains the inconsistency of its use from provider to provider. Healthcare providers who have never witnessed an adverse reaction to blood administration may not understand the need to premedicate, while those that have would much rather avoid the potential adverse insult. The purpose of this research is to increase awareness of Benadryl's benefit to aid its inclusion into practice.

Goal-Directed Intraoperative Fluid Therapy: Clinical Considerations and Approach to Therapy for Open Abdominal Procedures (P)

Presenter: Nicole Rivera
Faculty Advisor: Molly Wright

Fluid therapy influences hemodynamics and physiological parameters intraoperatively and is primarily managed by the anesthesia provider. A review of the literature illustrates wide variability of the approach to fluid management between different procedures as well as by providers. The lack of standard definitions and standard practices within even a single institution or by a single provider make assessment of the many approaches to goal-directed fluid therapy difficult to assess. The purpose of this project is to evaluate the current approaches to goal-directed intraoperative fluid therapy management and assess the impact of fluid therapy management on the outcome of the procedure.

The Significance of Propofol Metabolism in the Lungs and Potential Anesthetic Implications: An Integrated Research Review (P)

Presenter: Jack Harold Fields III
Faculty Advisor: Melissa Lefave

Propofol is a commonly used drug in anesthesia practice as well as other medical applications. For the purposes of this integrated research review (IRR), the anesthetic implications are explored. Extrahepatic metabolism of propofol is often overlooked in literature. Specifically, the anesthetic implications concerning propofol metabolism, uptake, or elimination via the lungs could render significant consideration of its use dependent on the presentation of the patient. Patients with alterations in lung parenchyma or circulation include but are not limited to patients undergoing cardiopulmonary bypass, and patients with conditions such as ARDS, tuberculosis, cancer, lung transplants, and lobectomies. The duration, half-life, and potency of propofol as well as its potential deleterious effects could possibly be enhanced in these populations, which would prove a significant finding for those in the anesthesia community. It was discovered over the course of the integrative review that the extrahepatic route of propofol accounts for some, but not most its elimination. Of the 7 articles compared in this IRR, it was found that evidence of propofol elimination/metabolism by the lungs is still not strong. Evidence points most strongly to the kidneys as the second most significant mode of elimination compared to the liver. No recommendations on current anesthetic practice can be made based off the results.

Intravenous Acetaminophen Use in Decreasing Postoperative Opioid Consumption: An Integrative Research Review (P)

Presenter: Justin Harrison
Faculty Advisor: Melissa Lefave

A mainstay treatment for surgery-related pain is opioid therapy. Although an effective form of pain management, these substances carry their own risks to the postoperative patient. Acetaminophen, a very common nonsteroidal anti-inflammatory drug (NSAID), is widely used for both its analgesic and antipyretic effects. As an anesthetic adjunct, does IV acetaminophen reduce postoperative opioid consumption? This integrative review examined a total of ten articles on adults undergoing general anesthesia with postoperative rescue analgesia provided via opioid administration. Overall, this review suggested that IV acetaminophen effectively reduces cumulative postoperative opioid consumption when used at any time during the perioperative period. When used preemptively, total acetaminophen dosage requirements were decreased. In an area warranting further research, acetaminophen efficacy in reducing total postoperative opioid consumption after orthopedic surgeries did not reach statistical significance.

No Filter: Is There Glass Shard Contamination in Medications Stored in Glass Ampules?: A Laboratory Study (P)

Presenter: Alaina Little
Faculty Advisor: Brian Foster

According to Stein (2006), two percent of parenteral medications in the United States are packaged in glass ampules. Due to the potential for glass shard contamination, filter needles are recommended for medical withdrawal (Stein, 2006). However, there is little evidence that this contamination actually occurs. The purpose of this laboratory study is to provide such evidence. 18 one-millimeter samples were collected from medications stored in glass ampules with a resultant 13 samples showing positive contamination when observed under a microscope. Due to these results, the researcher suggests following standard guidelines to include the use of a filter needle for medication withdrawal and vigilant inspection of solutions prior to administration.

Would an Educational Video about CRNAs Inform the Public on the Profession? (P)

Presenter: Jason Bolt
Faculty Advisor: Brian Foster

Through the format of a video, the topic of what is a CRNA is discussed and shown to inform the general public on this healthcare professionals role. The video consists of the history of nurse anesthesia, the modern day practice of anesthesia by CRNAs in the hospital setting and labor and delivery settings, and lastly the legislative and advocacy roles CRNAs work in. By showing a quick and easily understandable video to the general public we can yield mass market understanding and education on the profession and how CRNAs interact with the general public every day. A survey was used after the video to determine if the video was successful in education and informing the public on the role of a CRNA. This data was compiled to draw conclusions on the effectiveness of the video and what the general public thinks about CRNAs and their practice in America.

Evaluation of the European Society of Cardiology and European Society of Anaesthesiology Preanesthesia Assessment Guideline (P)

Presenter: Kathryn Berry
Faculty Advisor: Brian Foster

During the preoperative period it is imperative that the anesthesia provider become familiar with the current and past medical problems of the surgical patient. A thorough preoperative assessment allows the anesthesia provider to identify problems that may affect anesthesia care, fully assess pre-existing disease(s), and develop a personalized anesthesia plan based off findings. When providing anesthesia to patients without full knowledge of their health status, there is greater risk for morbidity and mortality associated with anesthesia. Currently, only two guidelines can be found for cardiovascular preanesthetic assessments. Of the two, the European College of Cardiology and European Society of Anaesthesiology Guidelines on Non-Cardiac Surgery: Cardiovascular Assessment and Management (2014) provides more thorough information. These guidelines were developed by surgeons and anesthesiologists of another country but may still be applicable to anesthesia providers internationally. The purpose of this study was to determine the quality of the presented guideline and to assess usefulness of implementation for these various disciplines. The results of this study revealed high quality guidelines that were recommended for implementation by all participants.

Development of a Perioperative Checklist for Anesthesia Providers to Aid in the Prevention of Medical Errors Caused by Inattentional Blindness (P)

Presenter: Maizee Kelley
Faculty Advisor: Brian Foster

Inattentional blindness (IB) is an important, but often overlooked, factor in adverse patient outcomes across the perioperative spectrum. IB is defined as the failure to note events or actions that are in plain view, especially when that event is unexpected. This becomes problematic for anesthesia providers who require a high level of observation to provide safe and effective care to patients. Few interventions have been proposed on how to counteract the occurrence of IB. Results indicate that IB in anesthesia can cause adverse patient outcomes. An evidence-based perioperative checklist for anesthesia providers was developed based on an analysis of the research conducted. IB is a prevalent phenomenon in the healthcare field that is not easily eradicated. Although the review revealed that more study is needed to fully understand inattentional blindness, means to reduce IB can be implemented into clinical practice. A perioperative checklist is proposed to be a useful tool.

NURSING [GRADUATE]

An Integrated Research Review of the Advantages and Disadvantages of Xenon Gas use in General Anesthesia (P)

Presenter: Benjamin Stephens
Faculty Advisor: Melissa Lefave

The purpose of this project is to determine the advantages and disadvantages of Xenon used as an anesthetic gas. Xenon gas possesses the necessary components desired in an anesthetic agent while maintaining a low cardiovascular and neurogenic effect. Xenon is a simple, stable, inert gas that has little to no metabolism resulting in a safe anesthetic agent. This project was an integrative research review. The chosen articles compared xenon to other anesthetic protocols and agents, with several indicating that xenon has a lower incidence of post-operative nausea and vomiting and post-operative delirium. The issues noted included cost of use, due to xenon's rarity, and the high dose or minimal alveolar concentration value. The conclusion being that while Xenon gas has the potential to be a useful anesthetic choice, the cost of use appears to be out of reach for the main-stream American healthcare market.

Adherence to American Diabetic Association Annual Treatment Recommendations of Adult Patients with Type 2 Diabetes Mellitus at a Tennessee Practice: A Randomized Retrospective Chart Review for Quality Improvement (O)

Presenter: Anna H. Gallion
Faculty Advisor: Cathy Ammerman

Purpose: This quality improvement study was conducted to assess adherence in a rural Tennessee practice regarding American Diabetic Association annual treatment recommendations. Methodology: A randomized retrospective chart review of adult patients with diabetes mellitus type II (T2DM) was conducted to examine the clinic's adherence to current standards of care and assess documentation and treatment practices. Recommended screenings, examinations, laboratory tests, immunizations, and diabetes education were assessed. Results: The study identified areas of strength as being 100% blood pressure assessment, 98% A1c assessed at least once, and 82% physical exams. These patients had controlled blood pressures (58%) and A1c (46%) above the national and state reported averages. Areas of improvement were identified including annual foot exams, eye exam referrals, diabetes education, and albuminuria testing. Conclusion: The data gathered through this retrospective chart review provided information to aid the providers in planning the care of adults with T2DM and meeting quality metrics.

Enlightening Emergency Department Nurses through Human Sex Trafficking Education (O)

Presenter: Jessica L. Phillips
Faculty Advisor: Cathy Ammerman

Purpose: Human sex trafficking (HST) is one of the fastest growing public healthcare crisis. Emergency department (ED) nurses are on the frontlines to encountering these victims and necessitate knowledge on how to intervene. Aim: The aim of this study was to determine advancement in ED nurses' knowledge of human sex trafficking (HST) after participating in an educational program. Methodology: A Pre-/Post-test survey was administered to ED Nurses who volunteered to participate in an educational presentation on HST. Results: Statistically significant improvements were seen in Identification (+42.8%, Z= - 2.214, p= .027) and Communication (+28.6%, Z= - 2.251, p= .024). An increase was also observed in Intervention (+2.9%, Z= - 1.732, p= .083) but did not reach the level of statistical significance. Implications: Providing education to enlighten ED nurses, fills their knowledge gap of HST, taking the first steps toward eliminating this public health predicament.

Assessment of the Proficiency of Nurse Practitioners in Mississippi in Identifying Potential Suicide Risks in Geriatric Populations (O)

Presenters: Ginnifer Hutcheson and Marianne Kirk
Faculty Advisors: Patsy Crihfield and Cullen Williams

Approximately 800,000 suicide completions occur each year with rates increasing with age (WHO, 2017). Suicide is a major concern particularly among geriatric males and individuals ages 85 and older (Szanto et al., 2013). Research indicates geriatric individuals may seek help in primary care settings but suicidal behaviors are often undetected and not treated. Neimeyer and Pfeiffer (2001) developed the Suicide Intervention Response Inventory 2 (SIRI 2) to assess the ability of professionals to recognize potential suicidal risks. The purpose of this study is to assess nurse practitioner proficiency in identifying potential suicide risks in geriatric individuals using a shortened version of the SIRI 2. The sample was obtained through the Mississippi Association of Nurse Practitioners (MANP) email list. There was minimal statistical significance in nurse practitioners' abilities to recognize suicidal statements based on specialty certification. Further research is recommended to identify reasons for undetected suicidal behavior in geriatric individuals. ■

PHARMACY [GRADUATE]

Spigelia anthelmia Induced Cell Death in Human Breast Cancer MCF7 Cell Lines via Cell Cycle Inhibition and Inhibition of MEK Kinases and MDR/ABC (P)

Presenter: Natalie Mausey
Faculty Advisor: Lunawati L. Bennett

Spigelia anthelmia (SA) is a plant native to the southern states of North America and is commonly called "pink root". SA is used as a homeopathic remedy for headaches and difficulty breathing in humans. The purpose of this study was to investigate and to understand how SA effects breast cancer using MCF7 cell lines as the model. Western Blots were performed to detect the genes that were up-or-down regulated in the MCF7. HEK 293 kidney cells were used as a control to see the effect of SA on normal cells. SA concentration used in the MCF7 cells was based on prior MTT results. The results of this study suggested that SA effect cell cycle of breast cancer cells by inhibiting cyclin B1 and cyclin D1. It also inhibits MEK 1 and MEK 3 kinases, and MDR/ABC genes. Thus, this study demonstrated effective chemotherapeutic potential of SA in breast cancer management.

Clausena anisate (CA) Induced Cell Death in Human Breast Cancer MCF7 Cell Lines via Cell Cycle Inhibition and Inhibition of MEK Kinases and MDR/ABC (P)

Presenter: Victoria Downs
Faculty Advisor: Lunawati L. Bennett

Breast cancer is the second most common cancer in women and caused approximately 40,000 deaths in 2018. There is a search for natural therapies that are less harmful and invasive to patients than current treatment methods. Clausena anisate (CA) is an evergreen tree found in tropical places of Africa and East Asia, and it has historically been used for its analgesic and aseptic properties. The objective of this study was to determine if CA has effect on breast cancer using MCF7 cell line as a model. Western blot analysis was performed to determine the specific genes that were affected by CA in MCF7. The results showed downregulation of EGFR, Scr proto oncogene, Phos PDK1 and PDL1 genes. Thus this study demonstrated potential therapeutic effect of CA in breast cancer management.

Andexxa: A New Drug Approved for the Reversal of Factor Xa Agents Under Accelerated Approval (P)

Presenters: Victoria Downs and Ngoc Nguyen
Faculty Advisor: Sean King

Andexxa was FDA approved in 2018 for the reversal of factor ten inhibitors, apixaban and rivaroxaban. Prior to release there were no medications indicated for the reversal of these agents. Andexxa is a coagulation factor Xa recombinant, inactivated-zhzo that exerts its procoagulant effect by binding and sequestering the FXa inhibitors. Two prospective, randomized, placebo-control studies were conducted in healthy individuals. Both studies showed that Andexxa groups had a statistically significant reduction in the levels of anti-factor Xa compared to that of the placebo group. Further studies are being conducted to determine the effects of Andexxa in patients with high bleeding risk. Clausena anisate (CA) Induced Cell Death in Human Breast Cancer MCF7 Cell Lines via Cell Cycle Inhibition and Inhibition of MEK Kinases and MDR/ABC (P).

Design and Evaluation of an Interdisciplinary Escape Room-Themed Non-prescription Medications Lab (P)

Presenters: Mary Anderson, Bethannee Horn, Taylor Mathis, Kate Norville, and Jeffrey Snow
Faculty Advisors: Emily Brandl, Ashok Philip, Ashley Pugh, and Chris Stoltz

Objective: To evaluate effectiveness of escape room-themed over-the-counter (OTC) medications lab in reinforcing knowledge and interpersonal skills of P1 students. Methods: Escape room-themed OTC lab sessions were developed to cover: 1) Cough, Cold and Allergy (CCA) and 2) Ophthalmic Disorders. 53 P1 students were divided into 9 randomized teams for each lab. Teams challenged to complete tasks pertaining to the Pharmacists' Patient Care Process within 35 minutes. To measure the impact on learning and interpersonal skills, students completed pre/post assessments and a perceptions survey. Results: Majority of the students strongly agreed CCA lab reinforced information (79.3%), fostered problem-solving skills (69.8%) and improved team dynamics (70%). 84.9% of students felt confident in recommending OTC medications for CCA. A paired sample t-test revealed a statistically significant increase in knowledge ($p = 0.000$). Implications: Students indicated the intentional design of the lab encouraged them to collaborate and learn from each other in a simulated environment.

Evaluation of Pharmacy Student Burnout and Effectiveness of Intervention Strategies (P)

Presenters: Jenna Summerlin and Drew Wells
Faculty Advisors: Kim Jones and Ashok Philip

The purpose of this study was to evaluate impact of stress-reduction strategies in reducing burnout among Union University College of Pharmacy (UUCOP) students. Consenting P1 - P3 students were randomly assigned to control or intervention groups. Stress-reducing activities were offered during the 2018-2019 academic year for the intervention group. The Maslach Burnout Inventory-General Survey for Students (MBI-GS) was used to evaluate student burnout at three points in the academic year. All participants completed a pre-intervention survey, which identified stressors and stress-reducing activities. A post-intervention survey will be administered to assess the perceived usefulness of stress-reducing activities upon study completion. At mid-point, activities provided by UUCOP contributed to stress-reduction in the intervention group. Upon study completion, results will be used to guide UUCOP efforts to promote overall health and wellness of students.

Nuzyra: A Recently Approved Antibiotic (P)

Presenters: Brittany Caroll and Mariah Smith
Faculty Advisor: Sean King

This drug monograph project brings together trial results of the newly approved antibiotic Nuzyra (omadacycline). The Food and Drug Administration (FDA) approved Omadacycline in October of 2018. A drug monograph is useful for summarizing the pharmacology, FDA approved indications, adverse effects, and acquisition costs of the drug in an attempt to incorporate the most important aspects of omadacycline. This drug monograph will aid in the decision making process for hospitals to add the medication to their drug formulary. According to the American College of Clinical Pharmacy, omadacycline has been approved for the treatment of community-acquired bacterial pneumonia and acute bacterial skin infections. Older drugs in the same class as omadacycline have faced issues due to drug-resistance, but omadacycline has proven to be efficacious against these tetracycline-resistant organisms. Omadacycline's broad spectrum of bacterial coverage proves promising for treatment of multi-drug resistant infectious diseases that attempt to threaten the current antibiotic therapies.

Clarity in Reporting Parameter Variance Needed to Improve Use of Published Models for Simulation Applications (P)

Presenter: James A. Clary
Faculty Advisor: Andrew Castleman

Since published PK/PD models are used by others for the purpose of simulations, clarity in reporting will improve the reproducibility of results and allow for accurate re-use of models. Using ω2 parameter estimates that were calculated from the reported %CV values, two simulations were performed from the pharmacokinetic vancomycin model published by Moore et. al1 and the pharmacokinetic paroxetine model published by Feng et. al2. Simulations were performed using the R package mrgsolve.3 Results of the simulations were then used to calculate between-subject variability (%CV) for each run and compare it to the original value. A 13.3-27.8% difference in %CV of the simulated distribution of the VM parameter was observed with the $\%CV=100*\sqrt{(\omega^2)}$ method when the other method was assumed to be used for reporting. Accurate reporting of the variance estimates in parameter tables or the method used to calculate %CV is important. ■

PHYSICS

New Energy Level Structure of the Isotopes Gd-162 and Gd-164 (P)

Presenter: Christian Brown
Faculty Advisor: Geoffrey Poore

Energy levels in the isotopes ^{162,164}Gd were constructed via triple and quadruple coincidence Gamma-ray data from observations of the spontaneous fission of ^{252}Cf. Gamma-rays from fission events of a 62 μCi ^{252}Cf source were measured in the center of the Gamma-ray spectrometer Gammasphere. This produced 5.7x1011 triple or higher events and 1.9x1011 quadruple or higher events occurring within 1 μs of each other. This data set was analyzed to construct new energy level schemes for ^{162,164}Gd. Levels and transitions previously identified in the ground state rotational band have been confirmed. Additionally, several new transitions and levels are observed in both isotopes, including the establishment of a Gamma vibrational band from 2+ to 9+ for the first time, and the addition of a level in the ground state rotational band of ^{162}Gd.

Exploring the Behavior of Spring-mass Systems with the Aid of Computational Modeling (P)

Presenter: Alexandra Bodnar
Faculty Advisor: Fonsie Guilaran

If you've ever released a vertically hanging slinky, you may have noticed it falls in such a way that the top falls to meet the bottom before the slinky as a whole falls to the ground. That is, the bottom will remain fixed until the spring is fully compressed before the entire mass system is pulled to the ground. Hanging springs weighted with masses behave just the same. This experiment consisted of testing two weighted springs, with differing k constants, to see if both would reach the ground at the same time if simultaneously released from a) the same height with respect to the top of the springs and b) the same height with respect to the hanging mass. The goal was to provide a demonstration for faculty to utilize in a class room setting and introduce students to computational physics modeling to gain basic programming skills. ■

SOCIAL WORK

The Influence of Daily Art Making on Anxiety Levels (P)

Presenter: Sarah McLeod
Faculty Advisor: Rhonda Hudson

Anxiety is a severe mental illness that plagues millions of Americans each year (Ducharme, 2018). While two interventions for anxiety disorders are found to produce positive results, access to these interventions is limited and their effects are not proven to extend across all categories of anxiety (McBride, 2015). Because clinical treatment is limited and costly, self-help anxiety treatment methods have been rising in popularity throughout the past several years (Fenger et al. 2016). Early research in art-making as an anxiety intervention method has yielded positive results for immediate anxiety relief, but research regarding long-term effects of daily art-making is not readily available (Sandmire et al. 2012). In this ongoing single-subject research study, thirty minutes of daily art-making is applied to a junior level college student with a history of anxious tendencies. The Clinical Anxiety Scale is used to record weekly anxiety levels over a ten week intervention period. If the results are positive, this study can provide new insight on the long-term effects of art making as a self-help method for chronic anxiety relief.

Procrastination and College Student Workload (P)

Presenters: Callie Wright and Sarah McLeod
Faculty Advisor: Rhonda Hudson

Procrastination is a problematic habit for many people, and is seen immensely in college students (Ferrari, 2001). The academic form of procrastination has consequences including, but not limited to, poor academic performance and stress (Clariana, Gotzens, del Mar Badia, & Cladellas, 2012; Joubert, 2015; Tice & Baumeister, 1997). There are also a variety of known causes for procrastination, though many contributing factors may be unknown (Ferrari, 2001). The authors aim to expand the research base of academic procrastination through a descriptive, survey-driven study of approximately 300 college students. In this ongoing study, the researchers explore to see if any relationship exists between number of class hours taken by these students and their tendency to procrastinate. If a correlation is present, the researchers hope the results will provide new insight for students and their faculty advisors when planning their course loads. ■

THEOLOGY AND MISSIONS

In Search of Mark's Intention: Revisiting the Canonicity of the Longer Ending of Mark's Gospel (O)

Presenter: Brandon Harper
Faculty Advisor: Mark Dubis

Should the so-called Longer Ending (LE) of Mark (16:9–20) be considered as authentically canonical and therefore suitable for pastoral exegesis? The nature of the LE has remained one of the most debated considerations in textual criticism, especially in the last few centuries of scholarship, wherein critics have tended to favor an ending at verse 8. This paper offers an overview of both internal and external evidences as well as a verse-by-verse analysis of the LE's text, with special attention given to how well the LE literarily and thematically coincides with the preceding pericope (16:1–8). I conclude that while Markan authorship of the LE cannot be entirely certain, the text should be considered authentic, and is therefore suitable for authoritative teaching as it offers insight into Christ's resurrection appearances and the life of the early Church.

Annihilation or Transformation?: The Eschaton of 2 Peter 3 (O)

Presenter: Briley Ray
Faculty Advisor: Mark Dubis

Y2K, asteroids, global warming, and the year 2012 all have one thing in common: end-of-the-world prophecies. From conspiracy theorists to contemporary evangelicals, it seems as if the destruction of the world is near. Even more so, the element of fire or the world burning up appears to loom in the background. In fact, those arguing that God will annihilate the earth through fire make biblical arguments, most notably from 2 Peter 3. Peter asserts that the heavenly bodies will melt, and God will usher in a new heavens and a new earth. This paper argues that Peter speaks of a metaphorical conflagration, not a literal one. Several factors indicate this: (1) an exegesis of 2 Peter 3 that accounts for stylistic and grammatical issues, (2) an exegesis of other New Testament texts that speak of creation's *telos*, and (3) an attestation from the patristic fathers.

On Traditional Arguments for the Existence of God (O)

Presenter: Jacob Collins
Faculty Advisor: Brad Green

The claims made by post-Enlightenment Christian apologists are often centered on an elevated view of human reason and an assumption that the essence of God is something that can, at the very least, be understood. Because of this, they often operate under the belief that God must be explained rationally using human logic and Enlightenment belief. This paper will challenge the so-called "traditional proofs of God's existence," such as the cosmological and teleological argument, and suggest that it is through stories we come to know the reality of God's existence. That is, narrative is the primary method through which man's love is shaped for God. The paper concludes with an analysis of what Lewis calls "latent Christianity" as an appropriate apologetic method.

Revisiting Biblical Feminism: A Biblical Theology of Women In Ministry (O)

Presenter: Madde Ely
Faculty Advisor: Brad Green

The feminist movement--a movement surrounded by many polarized connotations--has brought about many changes to the way society views women today. With these changes, the Church has had to ask many questions regarding the nature of manhood and womanhood, as outlined by Scripture, specifically: what is the role of women in ministry? Traditionally, the Church has affirmed the Complementarian position; however, there has been a recent growth of the Egalitarian position within some circles. This research outlines the biblical theology of both the Complementarian and Egalitarian views of women's role in ministry with the aim of illustrating that the issue might not be as black and white as many have understood it to be. In doing so, this examination attempts to analyze the strengths and weaknesses of each argument, illuminating areas where each side can learn from the other, as Christians strive to cultivate a unified, faithful understanding of the issue. ■


THE LOGOS

SYMPOSIUM

SIXTEENTH ANNUAL UNION UNIVERSITY SCHOLARSHIP SYMPOSIUM

RESEARCH GRANT RECIPIENTS *Fall 2018*

Undergraduate

Jeremy Blaschke and Jacob Lemon
"Antibiotic Effects of Hemolymph from Immune Challenged Squash Bugs (*Anasa tristis*) against *Escherichia coli and Staphylococcus epidermidis*"

Mark Bolyard and Christian Sidebottom
"Creating a Novel Tool for Identifying Blood Anitcoagulants by Modification of the GFP Protein to Include Thrombin and FXa Recognition Sites"

Esther Choi and Madison Studstill
"*Saccharomyces cerevisiae* as a Probiotic to Prevent Candidiasis"

Sally Henrie and Colin Coleman
"Developing a Nylon 6-6/Poly(lactic acid) Polymer Experiment"

Hannah Henson and Amanda Ebert
"Determining the Effects of Hyperglycemia on Brain Barrier Integrity Using Fluorescent Tracers"

James Kerfoot and Holly Gilbert
"The Influence of Termperature on Feeding through Ontogeny in Mayan Cichlids (*Cichlasoma urophthalmus*)"

Andy Madison and Nick Underwood
"Effects of Urbanization on Bird Communities in Jackson, Tennessee"

William Thierfelder and Thomas Lunsford
"Thyroid Hormone Regulation During the Inflammatory Response to Bacterial Infection"

Graduate

Esther Choi and Taylor Garrison
"The Effect of Quorum Sensing Molecules in Mixed-Species Biofirm Communities with *Pseudomonas fluorescens and Candida albicans*"

Hannah Henson and Taylor Wardlaw
"Generating a Transgenic Zebrafish Line to Characterize the Role of Clustering in Cander, Neurodegeneration, and the Inflammatory Response"

Kim Jones and Jenna Summerlin
"An Evaluation of Pharmacy Student Burnout and Effectiveness of Intervention Strategies and Coping Mechanisms"

Ashok Philip and Bethannee Horn
"Design and Evaluation of an Interdisciplinary Escape Room-Themed Nonprescription Drugs Lab"

Michael Schiebout and Olivia Olson
"The Effects of Changes in Temperature, Salinity, and pH on the Growth and Productivity of Turtle Grass (*Thalassia testudinum*)"

UNION UNIVERSITY

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