SYMPOSIUM

FOURTEENTH ANNUAL UNION UNIVERSITY SCHOLARSHIP SYMPOSIUM

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TUESDAY, APRIL 25, 2017

Afternoon Concurrent Sessions

Dept.	Room	Student Presenters	Time
Poster Displays	Grant Events Center	Mary Scarlett Greenway (ART) | Natalie Gandy (ART) | Paige Smiley (ART) Ragan Pendley Williamson (ART) | Kayli Sommers (ART) Angela Taylor (CHE) | Dallas Abraham (CHE) | Minh Dong (CHE) Seth Thibado (CHE) | Vernon Stafford III (CHE) | Alexandra Forderhase (CHE) Angelica Shipps (COM) Nyla Gwan, Gavin Hamann, and Addison Turner (EGR) Davis Johnson, Ashton Lund, and Daniel Porter (EGR) Brady Chandler and Cory Johnson (EGR) Carson Brown, Abbey Pfenninger, and Conner Wilson (EGR) Gabriel Garneau, Robert Hampton, and Joshua Johnson (EGR) Angel Claudio, Sam Jeong, and Joshua Shoemaker (EGR) Mark Carbonell, Angel Claudio, and Thomas Foster (EGR) Mark Carbonell, Thomas Foster, Gabriel Garneau, Joshua Johnson, and Kaylee Owen (EGR) Ethan Morris, Kaylee Owen, and Matthew Owen (EGR) Matthew Owen (EGR) | Corbin Anderson and Rachel Brewer (EGR) Nyla Gwan, Robert Chase Hampton, Davis Johnson, Daniel Porter, and Addison Turner (EGR) Abigail Andrews, Kelsey Chance, and Mary Crouse (NUR) | Rachel Tonahill (NUR) Aaron Lewis, Jason Poletti, and Alan Richardson (NUR) | Rebecca Moody (NUR) Amanda Blassl, Brian Brown, Lavonne Clifford, Josh Dragan, and Jonathan Huggins (NUR) Morgan Neil, Amanda Rogers, and Shenell Thompkins (NUR) | Nathaniel Crum (NUR) Kenny Krzyzkowski, Amber Palmer, Hannah Shaw, Deborah C. Sherer, and Kenneth Spart (NUR) Anita Langston, Lori Taylor, and LeAnne Wilhite (NUR) | Scott Awtry (NUR) Anna Brown, Ginnifer Hutcheson, Mollie Kinard, and Bonnie Sweat (NUR) | Jessie Yu (NUR) Paula L. Bucker, Anna H. Gallion, Dorothy E. Hiatt, and Jessica L. Phillips (NUR) LeAnn Grimes, Kara Hoover, Jesus LaGarda, April Swoner, and Jayna Wood (NUR) Arshada Hayes, Nikole Jackson, and Raven Rucker (NUR) | Mitch Frank (NUR) Billie Browning, Christian Lopez, and Tammie Vanstory (NUR) | Mario Johnson (NUR) Adam Bland, Nahada Gudger, Dane Mitchell, Bradley Steg, and Tyler Thompson (NUR) Cassie Clark, Adrianne Dunbar, Alaina Little, Jamia Moore, and Nicole Rivera (NUR) Cheryl Dodson, Paul Walker, and Angela Warren (NUR) | Lucy Oliver (NUR) Hannah Abinteh, Cody Pittman, and Chris Wright (NUR) | Meagan Gallaher (NUR) Pamela Kendrick, LaQuisha McFerrin, Debbie Mitchell, and Kimberly Thompson (NUR) Frankie Carroll, Brooke Garner, James Mooty, Ema Uko-Abasi, and Angela Upchurch (NUR) Bethany Hardison, Angela Harriger, Lisa Hellman, Ann Napier, and Haley Walters (NUR) Jake Chandler, Calvin Hocker, and Grady Johnston (NUR) | Lauren Brown (NUR) Jennifer Estes, BethAnn Jones, Jeannie Kopecky, Natalya Malenko, and Caleb Wagler (NUR) Shayla Alexander, Heidi Flowers, John Gordon, and Rebecca Gray (NUR) | Cory York (NUR) Kevin Lum, Joseph Sudderth, and Paige Williams (NUR) | Susan Strange-McClora (NUR) Wendy Caudle, Jeremiah Cole, Jack Fields, Justin Harrison, and Kathryn Tims (NUR) Suzanna Barnhart, Marianne Kirk, Ashley McTyre, Marlo Smith, and Kristina Smith (NUR) Fhteachia Andrews, Tameka N. Jones, and Marilyn Wilbourn (NUR) Maureen Balmeo, Jason Bolt, Brian Gibbs, Benjamin Stephens, and Qianwen Williamson (NUR) Damani Johnson, Megan Ruszczyk, and Margaret Whitehead (NUR) | Christian Haynes (NUR) Maizee Black, Meggy Hayes, Racheal Howard, and Shana Mosley (NUR)	12:30–2:00 p.m.

SCHEDULE CONTINUED »

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Dan Bermea, Jazmin Santiago, and Meredith Tatarzycki (NUR) | Alexandra Maynard (NUR)
Missy Arwood, Nikki Barrett, and Jehan Ellis (NUR)
Brent Earwood, Stacey Hodges, and Patience Whitten (NUR) | Alex M. Witcher (NUR)
Ana Dragoiescu (NUR) | Andrew J. Donadio (NUR) | Ashley Reecht (NUR)
Bradley Beckstead (NUR) | Brandon Young (NUR) | Catherine Mask (NUR)
Emily Pudlo (NUR) | Juli Johnson (NUR) | Kalyn Thompson (NUR)
Katherine Brown (NUR) | Kellee Etghayi (NUR) | Kip Courtney (NUR)
Thomas Bryan Barnes (NUR) | Ann Kumbani (NUR) | Britley White (NUR)
Tiffany Faulkner-Hines and Fred Reed III (NUR) | Kristen Carper (NUR)
Amanda Couch and Ashton Privitt (NUR)
Erin Allen (PHARM) | Japonica Gilliam (PHARM) | Man-To Lee (PHARM)
Monica Barrett (PHARM) | Yuchen Yank and Man-To Lee (PHARM)
Dominick Jaynes (PHY)
Brooke Bates, Deja Moorer, Stephanie Olford, and Cameron Skonhovd (PSY)

ART/COM/HIS MUS/EGR/PHY Session Chair: Haelim Allen	D-3	Autumn Wegner (ART) Katherine Cheshire (COM) Seth Reid (HIS) Giggi DeCoursey (MUS) Mason Ruby (PHY)	2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m. 3:20 p.m.
BIO Session Chair: Andy Madison	WH 101	Alex Garey Caleb Bernui Lucas Pyron Ben Melton Brandon Conaway *Break* Andrew Hicks Benton Hurt David Taylor Kelsey Hosford	1:40 p.m. 2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m. *3:20 p.m.* 3:40 p.m. 4:00 p.m. 4:20 p.m. 4:40 p.m.
BIO Session Chair: Jeremy Blaschke	WH 102	Erin Noel Jacob Whitney Joey Bakeer Kaitlyn Inman Katherine Caid *Break* Troy Smigielski Emma Bilbrey Marley Skelton Zach Boatwright	1:40 p.m. 2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m. *3:20 p.m.* 3:40 p.m. 4:00 p.m. 4:20 p.m. 4:40 p.m.
BIO Session Chair: J.R. Kerfoot	WH 312	Christopher Gant Spencer Arrowood Hannah Porter Taylor Brook Meadows Austin Yaden *Break* Jasmine Hailey Kierra Joy Lauren Tracy Rachel Walters	1:40 p.m. 2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m. *3:20 p.m.* 3:40 p.m. 4:00 p.m. 4:20 p.m. 4:40 p.m.

BUS	BAC-43	Camila Simas	2:00 p.m.
Session Chair:		Graham Gardner	2:20 p.m.
Colene Trent		Ian Maupin	2:40 p.m.
		Kaitlyn Carney and Heather Dockery	3:00 p.m.
		Kyle Yeoman	3:20 p.m.
CSC/EGR	PAC C-13	Hudson Peden (CSC)	2:00 p.m.
Session Chair:		Jacob Parke (CSC)	2:30 p.m.
G. Jan Wilms		Joshua Stuckey (CSC)	3:00 p.m.
		Lance Dell (CSC)	3:30 p.m.
		Rachel Brewer and Brady Chandler (EGR)	4:00 p.m.
		Zachary Benson, Andrew Ford, and Sam Jeong (EGR)	4:20 p.m.
EDU/ICS/LAN	PAC D-54	Angela Jacks (ICS)	3:00 p.m.
Session Chair:		Kimberly Chavers (ICS)	3:20 p.m.
Phillip Ryan		Sarah Troxel (ICS)	3:40 p.m.
		Jordyn Battistelli (LAN)	4:00 p.m.
		Audrean Bond-Jones (EDU)	4:20 p.m.
ENG	Theatre	Erin Crocker, Emily Johnson, Jessica Vaughn, Joshua Welsch, and Abigail Wills	2:00 p.m.
Session Chair:			
Gavin Richardson			
ENG	PAC D-53	Amanda Vernon	2:20 p.m.
Session Chair:		Beth Adams	2:40 p.m.
Chris Bailey		Ellen Howard	3:00 p.m.
		Abigail Wills	3:20 p.m.
NUR	WH 205	Julie Coleen Stuckey	2:00 p.m.
Session Chair:		Ashley York	2:20 p.m.
Shari Wherry		Elizabeth Fulmer	2:40 p.m.
		Kayla Yates	3:00 p.m.
		Mary Hardin	3:20 p.m.
		Shanytel Weathersby Cook	3:40 p.m.
		Stacey LaBarre-Powell	4:00 p.m.
		Worthy S. Walker	4:20 p.m.
		Amanda Couch and Ashton Privitt	4:40 p.m.
ThM	JEN 325	Audrey Mitchell	2:00 p.m.
Session Chair:		Brian Breedlove	2:20 pm.
James Patterson		Christopher Primeaux	2:40 p.m.
		Jalen Sowell	3:00 p.m.
		Rachel Ewing	3:20 p.m.
		Ryan Pattat	3:40 p.m.
ThM	JEN 212	Becca Robertson	2:00 p.m.
Session Chair:		Brandon Harper	2:20 p.m.
Hal Poe		Hannah Brandt and Cayley Cantwell	2:40 p.m.
		Wesley Chatham	3:00 p.m.
		Zach Wylie	3:20 p.m.
		William L. Watson	3:40 p.m.

ART

Typography on Real Environment that Appears to be Art

Presenter: Songhyun Kim
Faculty Advisor: Steve Halla

This research is about environmental typography that is not written on the computer like original graphic design. We are always surrounded by graphic designs such as the posters, books and packages. Typography is traditionally a rather flat pursuit, however it is one of the foundations of solid graphic design. Three-dimensional typography that actually exists in real environment is a very unique and powerful way to communicate with viewers. Typography that is not written on the computer, but is in a real environment can be presented as painting, sculpture, interior design or art. There are artists and designers who have taken typography and turned it into their own works of art.

The Return of Hand Lettering in a Digital World

Presenter: Mary Scarlett Greenway
Faculty Advisor: Haelim Allen

This project addresses the return of hand-made elements, specifically hand lettering, in the now almost entirely digital world of graphic design. The goal is to show the similarities between the current movement toward the hand-made and the Arts and Crafts Movement of the 1800's. Both of these movements are reactionary against the stark and mass-produced, the Arts and Crafts movement against the Industrial Revolution, and the current movement against the digital world. Despite all technological advances, human beings still long for the hand-made, the personal, and the well-crafted, which the immediacy and mechanical nature of mass production cannot satisfy.

How Blue Transformed Painting

Presenter: Ragan Pendley Williamson
Faculty Advisor: Haelim Allen

The color blue in an artist's palette has been changing since the times of the ancient Greeks, Egyptians, and Romans. Blue began as Egyptian blue, and then azurite emerged, a very expensive pigment; afterwards, there came smalt, pure ultramarine, Prussian blue, synthetic French ultramarine, cobalt, and cerulean blue. These pigments shaped the way artists painted their paintings. For example, when pigments were expensive and difficult to make, artists only used blue in paintings for rich patrons, using layers of pigments to achieve a deep blue that one pigment could not achieve. Then, once these blues became more accessible and cost effective, the Impressionists began to use blue in their paintings much more freely. Blue has had a lasting impact on the history of painting, and its invention and transformation has shaped the ways in which artists use their paints.

The Rise of Folk Pottery in the American Colonies

Presenter: Paige Smiley
Faculty Advisor: Haelim Allen

This research examines the beginning of American Folk Pottery in contrast to the imported European wares during the American colonial period. The rise of machinery in England's pottery production drove many unemployed potters to immigrate to America. These potters pursued their craft in America by either working for or setting up a pottery business. The focus on the utilitarian aspect of American Folk Pottery and demand of products limited decoration and was therefore seen as of lesser value than the more elaborate factory-made European wares. However, today in southern parts of the U.S., a viable means of making pottery places value in the clay bodies, forms, and firing methods traditionally associated with American Folk Pottery.

The Evolution of the Letter

Presenter: Kayli Sommers
Faculty Advisor: Haelim Allen

Letter anatomy has evolved since Gutenberg first cast his lead type in 1440. While the earliest typefaces were originally designed to mimic the handwriting of scribes, it later expanded into the intricate and diverse styles we have today. Fixations on various styles have come and gone, fading into obscurity as the technology surrounding Gutenberg's press continued to advance. Letterforms changed in appearance depending on the purpose of the publication or the preference of the printer. This research charts the changes that occurred from the time of Gutenberg up until modern day and the circumstances that influenced their evolution.

Commonalities Found through the Use of Symbolism in African, Asian and Islamic Cultures

Presenter: Natalie Gandy
Faculty Advisor: Haelim Allen

This research considers the usage of symbolism in the artwork of several different cultures, comparing the similarities of possible meanings in each. The goal of this project is to explore how African, Asian and Islamic cultures incorporate symbolism into their artwork, as well as provide insight into several distinct similarities found in each. Though the artwork found in these cultures, as well as the cultures themselves, are drastically different, various commonalities have been found in regard to their uses of imagery.

Art and Well-Being: Benefits of Art Appreciation in the Art Therapy Session

Presenter: Autumn Wegner
Faculty Advisor: Haelim Allen

When researching the effects of the arts on a person's well-being, psychologists often separate art appreciation and expressive arts therapy in their investigations, even though both aspects of the arts have shown they enrich the lives of participants and clients. Art therapy tends to focus on clients' ability to express themselves and encourages them to explore their emotions while they are exposed to various art mediums. Ideally, this will help clients grow, flourish, and lead a fulfilling life, as research suggests. Research also shows that exposure to the arts, including classes devoted to its appreciation, correlates to an increased emotional quality of life and encourages, depending on the age of the participants, the development of abstract thoughts. This examination of research aims to suggest that encouraging clients to view and engage the arts is a beneficial addition to the exploration of self in art therapy sessions. ■

BIOLOGY

Assessing Nest Predation at Various CRP Lands Using Artificial Nests (A Pilot Study)

Presenter: Lydia Atchley
Faculty Advisor: Andy Madison

Conservation grassland buffer zones bordering agricultural fields may serve to concentrate predators along a narrow corridor. This pilot study compared artificial nest predation and predator species composition between buffer zones (CP33) and larger grassland fields. We observed no significant difference in the average number of artificial nests destroyed or simulated Mayfield nest survival between the CP33 and larger grassland fields. There was a significant difference in the types of predators that visited the fields.

A Vascular Floristic Survey of the Mebane Wetland Restoration Site in Carroll County, TN

Presenter: Luke Little
Faculty Advisor: Michael Schiebout

A plant survey was conducted at the Mebane Wetland Restoration Site in Carroll County, TN. This site serves as a wetland mitigation site for the state of TN and was created to reestablish essential wetland habitat that was destroyed because of land development. The objective of this study was to evaluate plant diversity and wetland status of the species at the site after 2 years of mitigation effort. In addition, species composition of a mitigation area was compared to a reference area. This study documented 82 families, 209 genera, and 346 species including infraspecific taxa from the site. Sixty two percent of the plants documented met the criteria to be considered "hydrophytic". The mitigation area had greater species diversity and more non-native species than in the reference area.

Evaluation of Growth Regulators in *Khaya senegalensis* Regeneration

Presenter: Kevin Luy
Faculty Advisor: Mark Bolyard

The African mahogany (*Khaya senegalensis*) does not reproduce well naturally and is threatened due to logging in its native range. Many native African people rely on this plant as a source of income. Regeneration of *K. senegalensis* will be attempted using plant tissue cultures. To support regeneration, we used the cytokinin thidiazuron (TDZ), and the auxin 2,4-dichlorophenoyacetic acid (2,4-D) along with Phytoblend agar and Murashige & Skoog medium, to provide the nutrients needed for growth. Varying levels of Murashige and Skoog vitamins and 2,4-D were used to determine the optimal environment for callus formation and regeneration. Shoots did not form but the potential for differentiation was present.

Characterizing Species Diversity of Gall-Forming Insects and Gall Structure from Upland and Lowland Populations of Goldenrod (*Solidago*) in West Tennessee

Presenter: Elizabeth Pigg
Faculty Advisors: Andy Madison, Michael Schiebout, Jeremy Blaschke

Gall producing insects infect diverse plant species worldwide. This research focused on insect initiated galls produced in Goldenrod (*Solidago*) species that inhabit the grasslands of West Tennessee. Specifically the research was interested in determining if lowland sites varied from upland sites in gall density, gall size, and the composition of insect species producing them. Goldenrod plants containing galls were collected from agricultural grasslands in both Gibson and Carroll Counties. No significant difference was observed between gall abundances, gall size, or insect species composition of the two major study sites.

Irrigated vs. Non-Irrigated Corn Crop Yield

Presenter: Maclin Williamson
Faculty Advisor: Michael Schiebout

Corn (Zea mays) production is critical to the prosperity of the United States and accounts for 50 billion dollars in revenue per year. In Western TN to increase production the use of expensive irrigation systems have been proposed and in some cases implemented. The purpose of this study is to determine if irrigated fields have enough increased plant growth and ultimately greater seed production than non-irrigated fields to justify the increased cost of irrigation. To address this question, comparison plots were established in irrigated and non-irrigated fields. Plant height and number of leaves for all plants in each plot were collected bi-monthly for three months. In addition, total grain yield data for the fields were collected. Plants from the irrigated plots were significantly taller ($F=1138.97$, $P<.001$) than plants from the non-irrigated plots.

Determining Cryptic Species Diversity in Feather-Footed Flies (*Trichopoda* spp.)

Presenter: Katherine Caid
Faculty Advisor: Jeremy Blaschke

Trichopoda pennipes are parasitoid flies that attack stink bugs of economic importance. Previous inconsistent results in the use of *T. pennipes* as a natural biological control agent may be due to the existence of host specific pheromone strains of *T. pennipes*. Within *T. pennipes*, 2 morphotypes are present, one with golden wings and one with black wings. To discern if there are consistent genetic differences between morphotypes, the MCS gene of 4 *T. pennipes* specimens (2 black and 2 gold) along with 1 *Trichopoda lanipes* as an outgroup were chosen for DNA sequencing. Sequences were combined with a larger data set of 28 sequences, and a phylogenetic tree was reconstructed using maximum likelihood. Gold and black morphotypes were not reconstructed as individual clades, thus indicating no consistent genetic differences between phenotypes. Additionally, the *T. lanipes* clade was nested within the larger clade of *T. pennipes*, implying considerable introgression between species.

Effect of Exercise Mode on Cardiovascular Drift and Maximal Oxygen Uptake during Heat Stress

Presenter: Troy Smigielski
Faculty Advisor: Andy Madison

Exercise mode can impact the magnitude of cardiovascular drift and the decrement in $\dot{V}O_{2max}$ under thermoneutral conditions. It is unknown whether exercise mode impacts these in a hot environment. This study compared the effect of exercise mode on cardiovascular drift, and its subsequent effect on $\dot{V}O_{2max}$, during prolonged exercise in a hot environment (35°C). This was done in a series of 6 trials that used either a stationary bike or a treadmill, each of which measured $\dot{V}O_{2max}$ as well as heart rate and stroke volume to observe cardiovascular drift. Results revealed no significant difference on either measurement between the 2 modes of exercise. This suggests that a hot environment can eliminate the differences in the magnitude of cardiovascular drift and the subsequent decrease in $\dot{V}O_{2max}$ caused by different exercise modes.

Effects of Vitamin C and N-acetyl Cysteine on Human Corneal Epithelial Cell Regeneration

Presenter: Brandon Conaway
Faculty Advisor: Richard Addo and Andy Madison

Corneal wound injuries affect every demographic of the world and result in economic, social, and health complications. Vitamin C and N-acetyl cytosine (NAC) are reagents that have promising characteristics to promote corneal tissue regeneration due to antioxidant properties. Well plates containing human corneal epithelial (HCE) cells were scratched using a pipet to simulate a corneal wound. Cells were divided into 2 plates, one containing vitamin C and the other containing NAC. The cells received treatment of the respective potential regeneration agent every 24 hours for 72 hours and regeneration of cells was recorded by taking microscopic pictures every 8 hours. Both vitamin C and NAC were successful agents in regenerating HCE cells, but there was no significant difference from cells that received the treatment of vitamin C and NAC than those that only received it a single time.

Using DNA Barcoding to Accurately Identify Species of the Parasitoid Fly *Cylindromyia*

Presenter: Erin Noel
Faculty Advisor: Jeremy Blaschke

DNA barcoding is a rapidly advancing technique used to identify and discover new species, especially those difficult to identify morphologically. One such organism is the parasitoid fly *Cylindromyia*, a promising biological control agent for heteropteran pests. To determine the ability of barcoding to identify and distinguish between species of *Cylindromyia*, the nuclear coding gene MCS was extracted, amplified, and sequenced from three specimens of *Cylindromyia*. Collections of parasitoids were made in the Great Smoky Mountains National Park and Jackson, TN. Sequences were compared to a database of known *Cylindromyia* species and a phylogenetic tree was reconstructed using maximum likelihood. MCS was confirmed to accurately differentiate between species of *Cylindromyia* and we successfully obtained species identification for all specimens analyzed. The three sequenced samples were identified as *C. euchenor, C. binotata*, and a possible new species closely related to *C. interrupta*.

The Regenerative Effects of Curcumin and Glutathione on Human Corneal Epithelial Cells

Presenter: Lucas Pyron
Faculty Advisors: Richard Addo and Andy Madison

In the United States, there are around 1 million reported cases of corneal wounds annually, and healing from this injury can be difficult. To investigate a treatment method for accelerating corneal wound healing, Human Corneal Epithelial (HCE) cells were cultured in ultra-growth media and scratched by a 5-mL pipette tip. Experimental groups were then treated with glutathione, a powerful antioxidant, and curcumin, an anti-inflammatory agent. The effects of glutathione and curcumin were observed by microscopically photographing the migration and adhesion of HCE cells treated with glutathione and curcumin following scratch. Differences in HCE cell adhesion and migration between the control group (scratched but not treated) and the experimental group (scratched and treated) were measured to determine the speed and completion of recovery. Results indicated that HCE cells recover faster and survive longer after being treated with a combination of glutathione and curcumin after being scratched.

BIOLOGY

Antibacterial Assays using Secretions of Black Soldier Fly Larvae (*Hermetia illucens*)

Presenter: Jacob Whitney
Faculty Advisor: Jeremy Blaschke

Many insects, including the black soldier fly (*Hermetia illucens*), are known to produce antimicrobial proteins called defensins. In *H. illucens*, these defensins can be induced via immune challenge in larval hemolymph and have potent effects against antibiotic resistant bacteria. To determine if *H. illucens* also possess an innate immune system, secretions from non-immune challenged larvae were tested against *Escherichia coli* and *Staphylococcus epidermidis*. Extractions were obtained via larval incubation in saline buffer at 30°C for 3 hours. Inhibition assays were conducted using spread plates of bacteria on Mueller-Hinton agar and larval secretions applied to sterile paper discs. Plates were incubated for 24 hours and examined for zones of inhibition. Secretions obtained via this procedure did not display inhibition against either of the bacteria used. These negative results may be attributed to a lack of innate immunity, a low concentration of existing antimicrobials, or an ineffective secretion isolation procedure.

Hemostatic Proteins in the Latex of *Nerium Oleander*

Presenter: Rachel Walters
Faculty Advisor: Marc Lockett

Regulation of the coagulation pathway can lead to a better control of blood clotting and wound healing. Latex proteases from plants such as the Jamoch Red Oleander (*Nerium oleander*) have various physiological effects, including stimulating blood coagulation. We hypothesized the *N. oleander* latex would contain proteases that will affect the coagulation pathway. This would be determined based on activity assays. The Jamoch Red Oleander hybrid (*N. oleander*), was obtained and its latex was extracted. This extract was filtered and purified by dialysis and tested to determine the presence of such proteases. A BSA assay and a polyacrimide gel were used to determine the presence of proteins in the latex and an activity assay was used to test for thrombin-like activity. The assays and gel yielded low protein concentration and low activity, and we concluded that better extraction and purification methods need to be determined.

Detection of Antibacterial Properties in Secretions of Blowfly *Lucilia Sericata*

Presenter: Kaitlyn Inman
Faculty Advisor: Jeremy Blaschke

The larval secretions of *Lucilia sericata* are commonly used to treat wounds in maggot therapy due to their effective antimicrobial properties. Our objective was to establish a technique to extract these secretions from larvae of *L. sericata* and create a protocol for future antibiotic assays. Secretions of 3rd instar larvae were extracted at various concentrations and their antibiotic potential was tested against *Staphylococcus epidermidis* and *Escherichia coli*. Several antibiotic assays were conducted, including measuring optical density in broth cultures in a microplate reader, manually using a spectrophotometer, and measuring zones of inhibition in agar plates by using wells, sterile discs, and direct application. No antibacterial activity was measured using any of these techniques against either bacteria examined. This may be due to non-sterile rearing procedures or inefficient extraction of larval secretions. Future research should alter the method of extraction and attempt to rear larvae in a sterile environment.

Assessment of the Impact of Exogenous Hydrocortisone on Deiodinase Expression in a Zebrafish Model

Presenter: Kierra Joy
Faculty Mentor: Faith Zamamiri-Davis

Cortisol is a glucocorticoid produced and released in the adrenal glands on the kidneys of mammals, and interrenal glands of fish (specifically zebrafish, *Danio rerio*). To regulate cortisol levels produced when stress is encountered, these organisms use a similar hypothyroid related axis called the hypothalamic-pituitary-adrenal axis in mammals and hypothalamic-pituitary-interrenal axis in zebrafish. Zebrafish were stressed via hydrocortisone exposure and vortex. RNA was extracted, reverse transcribed to create complementary DNA that was amplified via real-time quantitative polymerase chain reaction using gene specific primers, and visualized on an electrophoresis gel. Cortisol levels were estimated via expression of corticotrophin releasing factor in relation to deiodinase enzyme (*Dio1-Dio3*) levels. From the preliminary results, a possible correlation between cortisol and deiodinase expression has been suggested. This connection lays the foundation for future research with this model pertaining to stress related thyroid disorders.

Effect of Pro-Inflammatory Stimuli on Deiodinase Expression in Adipocyte and Breast Cancer Cell Lines

Presenter: Kelsey Hosford
Faculty Advisor: William Thierfelder

Adipose tissue is a highly active metabolic part of the endocrine system. This tissue can be a target of thyroid hormones, which regulate normal processes in the human body. Metabolic diseases, such as obesity, involve inflammation in affected tissues and include altered thyroid levels, but there is not a clear connection between them. There is evidence of a connection between hormones secreted by adipose tissue and breast cancer. Proinflammatory cytokines are indicated to increase breast cancer progression. The objective of this research was to examine the relationship between thyroid metabolism and inflammation by treating an adipose cell line, 3T3-L1, and a breast cancer cell line, MCF-7, with the proinflammatory cytokine interleukin-6 (IL-6) and measuring changes in deiodinase expression using quantitative polymerase chain reaction (qPCR) to amplify target gene sequences. Results show that there was no significant change in gene expression with IL-6 treatment in either cell line.

Evaluating Deiodinase Enzyme Expression by qPCR in Adipose and Hepatic Tissue in Response to the Pro-Inflammatory Stimulus Leptin

Presenter: David Taylor
Faculty Advisor: William Thierfelder

Obesity and its associated inflammation are important health concerns. The thyroid hormone thyroxine (T4) and its activated form triiodothyronine (T3) are important metabolic regulatory agents whose levels are controlled by deiodinase enzymes. Expression of the deiodinases is known to be regulated in response to inflammation following infection, but their response to obesity-induced inflammation has not been determined. The objective of this study was to examine levels of deiodinase transcripts (DIO1, DIO2, and DIO3) in response to the pro-inflammatory adipokine leptin in two cell lines: 3T3-L1, a murine pre-adipose cell line, and HepG2, a human hepatocyte cell line. Cells were treated with leptin and quantification of RNA for control genes and the deiodinases was performed using qPCR. Our evidence suggests that the deiodinases are not regulated at the transcriptional level in hepatocytes or pre-adipocytes in response to leptin.

Evaluation of Surface Sterilization and Culture of Tissues from *Artemisia* "Powis Castle"

Presenter: Alex Garey
Faculty Advisor: Mark Bolyard

Artemisia "Powis Castle" is a hybrid of *A. absinthium* and *A. arborescens*. Both plants are widely used in the medical field and chemicals produced by them have shown great promise in many pharmacological uses. Chemicals from the hybrid could have the medicinal properties of both species combined. Micropropagation of "Powis Castle" through use of plant tissue culture could provide a sustainable source of these medicinal chemicals. In this study, regeneration of "Powis Castle" was attempted and the long-term survivability of sterile cultures was tested. Different media and pH levels were tested in the hopes of maintaining healthy and sterile cultures. At the conclusion of these two experiments, plant tissue death was observed in all cultures.

The Effects of Stress on PTPN22 Expression in Danio Rerio

Presenter: Jasmine Hailey
Faculty Advisor: Faith Zamamiri-Davis

When the body mistakes its own cells as a foreign invader it attacks itself this is known as an autoimmune disease. PTPN22 plays a role in inflammation and lymphocyte regulation. Mutations in PTPN22 are associated with Hashimoto's and Addison's diseases, autoimmune diseases of the thyroid and adrenal glands respectively. Cortisol production, induced by stress and inflammation, via the hypothalamus-pituitary-adrenal (HPA) axis is also implicated in both diseases. Our goal was to determine a link between stress (cortisol production indicated by corticotrophin releasing factor (CRF) expression) and PTPN22 regulation in zebra fish. We exposed zebra fish to multiple stressors and extracted RNA from the tailfins of both stressed and control fish. A correlation between PTPN22 and CRF production was seen in stressed fish compared to control fish. Future studies should be conducted to determine the correlation between mutated PTPN22 and stress.

BIOLOGY

PEG Fusion Protocol Optimization for the Production of Monoclonal Antibodies

Presenter: Taylor Brooke Meadows
Faculty Advisor: Jennifer Gruenke

Hybridoma fusion is the process of fusing an antibody-producing spleen cell with a myeloma tumor cell. Hybridoma fusion is a vital step in the formation of monoclonal antibodies. Because this tool is so important in medical research, it is important that an efficient protocol is followed to recover a high percentage of viable cells. The objective of this experiment was to test Polyethylene glycol (PEG) fusion of different ratios of splenic B cells to myeloma cells to determine which ratio produces the highest number of viable hybridoma colonies. The tentative results show no significant difference between the five ratios: 40:1, 20:1, 10:1, 1:1, and 0.4:1 splenic cells to myeloma cells. This information can be useful for future immunology research based on large quantities of specific antibodies.

Scaling of Skeletal Elements Associated with the Feeding Ability of *Belonesox belizanus*

Presenter: Christopher Gant
Faculty Advisor: James Kerfoot

Pike Killifish (*Belonesox belizanus*) are native to Central America and were introduced into South Florida in the 1950s for medical research purposes. As juveniles, pike killifish are opportunistic, feeding on macroinvertebrates and fish, whereas adults are piscivorous feeding exclusively on other fish. Existing research has documented slight differences in cranial and jaw morphologies of pike killifish across life-history stages. The objective of this study was to investigate how the jaw morphology changes throughout ontogeny, determining whether changes in jaw morphologies through ontogeny scale isometrically. Jaw-to-head ratios were calculated from cranial and lower/upper jaw measurements of several preserved neonate, juvenile, and adult specimens. Initial results indicated that jaw and cranium lengths have a positive allometric relationship to standard length. These results indicate that as pike killifish grow their jaws and cranium grow proportionally larger, maybe to capture larger, more elusive prey.

Antibiotic Effects of Hemolymph from Parasitized and Immune Challenged Green Stink Bugs (*Chinavia hilaris*)

Presenter: Joey Bakeer
Faculty Advisor: Jeremy Blaschke

Insects often secrete antimicrobial molecules externally when in contact with pathogens and internally when infected by them. These antimicrobial molecules can be co-opted for use in treating human bacterial infections. We investigated the presence of an antimicrobial response in *Chinavia hilaris* (green stink bug) and examined whether that response changes with the presence of an endoparasitoid (*Trichopoda pennipes*). A laboratory population of *C. hilaris* was separated into four treatment groups: challenged with *Escherichia coli* and parasitized with *T. pennipes*, only *E. coli* challenged, only parasitized, and neither challenged nor parasitized. Hemolymph samples from each stink bug group were used in inhibition assays against *E. coli* (Gram-negative) and *Staphylococcus epidermidis* (Gram-positive). Extractions from both immune challenged groups strongly inhibited both strains of bacteria, while non-challenged groups showed no inhibition. The induced antibacterial response was stronger against *S. epidermidis* than *E. coli*, while parasitization reduced its effectiveness against *S. epidermidis*. *Chinavia hilaris* is shown to be a potential source of novel antibiotics with varying effects against different bacteria.

Testing the Effectiveness of Lipoic Acid and Resveratrol in Human Corneal Epithelium Wound Healing and Migration after Scratching *in Vitro*

Presenter: Ben Melton
Faculty Advisor: James Mahan

Potential changes due to chemical addition in cell migration post scratching of human corneal epithelial (HCE) cells *in vitro* were tested. HCE cells were seated on 12-well plates and grown until the surface of the plate was totally covered after ~2 days. Media was removed and a scratch assay performed on each well. The media added contained only media, media with Lipoic acid, or media with Resveratrol. Lipoic acid and Resveratrol are both oxidizing agents. The media was changed after ~3 hours to remove the oxidizing agents. This was done to replicate eye drop application, staying in contact with HCE cells only for a few hours. To monitor the rate at which cells migrated back across the scratch, pictures were taken at 8 hour intervals for 72 hours. It appears that all scratches closed between 8 and 32 hours.

The Effects of Inflammation on Thyroid Hormone Metabolism

Presenter: Andrew Hicks
Faculty Advisor: William Thierfelder

Enzymes, called deiodinases (DIO), manage thyroid hormone regulation within cells. Disease states, like obesity, can result from or cause unhealthy variations in thyroid hormone levels. Obesity is often characterized with local, low-grade, chronic inflammation. This research explored the relationship between thyroid hormone levels in adipose tissue and the obesity-like state of a cell by monitoring type II (DIO2) and type III (DIO3) iodothyronine deiodinase enzyme expression after exposing the cells to inflammatory stimuli, including interleukin-6 (IL-6) and leptin. The procedure included culturing the 3T3-L1 adipose cell line and a GT1-7 hypothalamic cell line and treating both cell lines with these cytokines. RNA was isolated from the cultures and examined using quantitative polymerase chain reaction. In GT1-7 cells, IL-6 did not significantly change DIO2 and DIO3 expression. Our evidence suggests DIO transcription is not regulated at the transcriptional level. The results for DIO2 and DIO3 expression in 3T3-L1 cells are pending.

The Inclusion of the B-Glucorinidase Gene into the Genome of *Artemisia abrotanum*"

Presenter: Zach Boatwright
Faculty Advisor: Michael Schiebout

Creation of transgenic plants is a valuable tool in the field of molecular biology, but has not been attempted by undergraduate research students at Union University. Determining effective methodology would allow future students to gain experience using these techniques and was the main goal of this project. Specifically, this preliminary research sought to insert plasmid DNA with the uidA (GUS) gene, which codes for β-Glucuronidase, into *Artemisia abrotanum* (southern wormwood) leaf cells. Electroporation (using an electric field to open pores in the cell) and application of dimethyl sulfoxide (DMSO) (which increases the penetrability of cell membranes) are currently being tested as possible methods. Once a method is attempted on a specific leaf, it will be grown on basal media and tested for expression of the GUS gene.

Interspecific Interactions between Raccoons and Opossums

Presenter: Austin Yaden
Faculty Advisor: James Huggins

Past studies on interactions between the Virginia opossum (*Didelphis virginiana*) and raccoon (*Procyon lotor*) have found that they do not change their forage time or habits to accommodate one another although they have overlapping habitats, similar diets, and foraging patterns. This leads to the understanding that aggressive interspecific interactions may occur with the presence of a food source; therefore, our hypothesis is that there will be no difference in foraging time. 4 platforms mounted to trees 1.8 meters off the ground were constructed to hold a mixture of grain and sardines and were placed to where trail cameras took videos and pictures when triggered. Despite the hypothesis that there would be no difference in foraging time, camera evidence showed that opossums did not feed at the same time as raccoons and would climb up to the platform well after raccoons had left. This may be to avoid potentially harmful situations.

DNA Barcode Identification of Commercial Teas

Presenter: Marley Skelton
Faculty Advisor: Michael Schiebout

Commercial teas are presented in a mixture of dried plant fragments that are not easily identified. To make identification easier, a process called DNA barcoding can be utilized to provide an effective way for determining if the tea's constituents are properly labeled. This is important to ensure quality and safety for consumers. The objective of this study was to test the contents of three teas using the DNA barcode *rbcL*. Six different plant tissue types were manually separated from the tea bags. DNA was isolated from each and a PCR reaction for *rbcL* was conducted. Two of the reactions were successful and subsequently the products were sent to GENEWIZ Inc. for sequencing. The sequences obtained were run through the BLAST program for identification. One sequence indicated a plant that was expected and labeled for that tea, but the other sequence identified an unlabeled plant from the family Fagaceae.

DNA Barcoding of *Quercus margaretta* Populations to Validate Morphological Identification and Determine Efficacy of Species Resolution in *Quercus* Using *rbcL* and *ITS2*

Presenter: Emma Bilbrey
Faculty Advisor: Michael Schiebout

In 2004, a population of sand post oak (*Quercus margaretta*) was morphologically identified on the Wolf River Wildlife Management Area in Fayette County, TN, marking the first discovery of *Q. margaretta* in the state and a northward extension of the species' range. To determine if genetic data support the identification, DNA barcodes *rbcL* and *ITS2* were isolated and amplified utilizing PCR from tissue samples obtained from this population as well as a Florida population. Isolated genes were sequenced by GENEWIZ, and the sequences were analyzed for quality then compared to 28 other *Quercus* spp. sequences obtained from GenBank. Interspecific discrimination within *Quercus* was not possible with *rbcL* due to lack of variation at that locus. However, phylogenetic analysis of *ITS2* sequence data show a distinct clade of TN and FL *Q. margaretta* sequences supporting the morphological identification of sand post oaks in TN.

DIO2 Expression in Adipose and Muscle Cell Lines during Inflammation

Presenter: Benton Hurt
Faculty Advisor: William Thierfelder

A group of peroxidase enzymes, deiodinases, plays a role in the instigation and inhibition of thyroid hormones and thereby regulates human metabolism. Certain pathologies may affect deiodinase expression in mammalian tissues. Previous research has not extensively explored the connection of inflammation in adipose and muscle tissues with thyroid hormone regulation, and hasn't shown a linkage in deiodinases expression in adipose and muscle tissues under inflammatory conditions. We propose to search for a connection between adipose and muscle tissues under inflamed conditions and thyroid hormone regulation, by examining changes in expression of a deiodinase enzyme, deiodinase 2 (DIO2), at the mRNA level when 3T3-L1 adipocyte, C2C12 myoblast, and primary mouse myoblast cell lines, are exposed to treatments of interleukin-6 (IL-6). If a connection can be made between thyroid hormone regulation and adipose and/or muscle tissue, further research may perhaps discover methods to maintain thyroid hormone regulation.

BIOLOGY

A Novel Fusion Mechanism: Constructing a Stable Myeloma Cell Line that Expresses Influenza Proteins Hemagglutinin and Neuramindiase

Presenter: Lauren Tracy
Faculty Advisor: Jennifer Gruenke

In hopes of facilitating more research on the influenza virus, in this experiment we are were trying to create a reliable procedure to stably transfect mouse myeloma cells with a plasmid from *E. coli* containing eukaryotic expression genes for the influenza proteins hemagglutinin (HA) and neuraminidase (NA). Eukaryotic cells are notoriously hard to stably transfect with plasmids, as they tend to push out the plasmid since it is essentially a molecular parasite that offers little to no benefit for a eukaryotic cell. These 2 proteins, particularly hemagglutinin, are quite sticky, as their function in the influenza virus is to bind to sialic acid receptors. We attempt to use the characteristics of HA and NA to fuse a mouse myeloma cell with a mouse spleen cell and form a hybridoma cell. Due to unforeseen challenges that occurred throughout the experiment, results and conclusion are pending.

Golden Shadow of the Lagoon: Analyzing Growth Dynamics of the Bloom-Causing Alga *Aureoumbra lagunensis*

Presenter: Spencer Arrowood
Faculty Advisor: James Kerfoot

Release of nitrogen and phosphorus stimulates harmful algae blooms (HABs) in the environment. Understanding the nutrient usage of algae has implications for conservation and industry. This study investigated the influence of variable nitrogen nutrient concentration, temperature, and salinity on the growth of *Aureoumbra lagunensis*. This alga has caused HABs in areas of ecological and economic importance in the southeastern United States. Salinity and NH4NO3 concentration were adjusted to imitate environmental variation that the alga might encounter in the field. After the experiment, optical density readings were taken on all cultures. Consistent with previous results, our preliminary data suggest that the algae grows best in higher ammonium and salt environments. However, we are still measuring the influence of temperature on growth.

Assessment of Meta-Topolin and Simultaneous Combination of Multiple Cytokinins on *In vitro* Propagation of *Khaya senegalensis*

Presenter: Caleb Bernui
Faculty Advisor: Mark Bolyard

Deforestation is becoming an increasing problem in many developing countries, where wood is an easy resource to harvest, and tree populations are rapidly decreasing. Because of its many desirable properties, African mahogany (*Khaya senegalensis*) is particularly subject to this deforestation. *In vitro* propagation of African mahogany could be a valuable tool in protecting the species' population. Different concentrations of growth hormones 1-naphthaleneacetic acid (NAA), thidiazuron (TDZ), kinetin, zeatin, and meta-topolin were tested to find the proper conditions for successful African mahogany regeneration from leaf segments. Callus formation was not achieved in cultures using NAA as an auxin and meta-topolin as a cytokinin. Callus formation was successfully induced in tissue cultures using NAA and various combinations and concentrations of TDZ, zeatin, and kinetin. Proper conditions for regeneration of African mahogany were not found, but using a single auxin combined with multiple cytokinins could prove successful with continued research.

Isolation and Purification of Hemostatic Proteins from *Nerium oleander*

Presenter: Hannah Porter
Faculty Advisor: Marc Lockett

Extract from leaves and stems of *Nerium oleander*, a plant in the *Apocynaceae* family known to contain a variety of proteases in its latex, was purified and tested for thrombin-like activity. The process of isolation and purification of proteins from the plant extract was performed. A diffusion method was attempted for a stem extract, while a protein extraction kit was used to make a leaf extract. Proteins from these extracts were purified by centrifugation, dialysis, and ion exchange chromatography. Samples from different stages of purification were tested for protein content by spectrophotometry and SDS-PAGE. Although absorbances were detected by spectrophotometry, no proteins were detected on the gel. Fractions showing relatively high absorbances were tested for thrombin-like activity in a colorimetric assay using a thrombin-specific substrate. No significant activity was detected. These results could be explained by certain technical hurdles that were encountered, such as the time taken between purification steps. ■

BUSINESS ADMINISTRATION

Vehicle Make as a Determinant of Automobile Loan Default

Presenter: Kyle Yeoman
Faculty Advisors: Colene Trent and Andrew Tiger

In the automobile loan market, lenders face the risk of default. Loans are typically provided based primarily upon credit score. Lenders would be better served if they had additional metrics to employ in determining the probability that a buyer will default on a loan. This paper examines whether the make of vehicle purchased by a borrower reveals information about the probability of default. The researchers analyze a dataset of individuals receiving automobile loans from credit unions, employing logistic regression to determine the relationship between vehicle type and the probability of default. The results provide evidence that certain makes had significantly higher default rates. Other factors such as credit score, applicant age, loan term, and age of the vehicle were also significant in predicting default. These results suggest that lenders could offer more competitive rates by considering a borrower's choice of vehicle.

The Impact of Individualism on the External Validation and the Resulting Perceived Credibility in CSR Reporting

Presenter: Camila A. Simas
Faculty Advisor: Dan Slater

With Corporate Social Responsibility (CSR) reporting becoming an integral part of the business model (as it represents a form of commercial accountability to stakeholders), identifying characteristics that may determine the approach and reception of these reports is of value. Culture, specifically individualism, was the primary variable studied to determine its impact on a firm's likelihood to externally validate its reports as well as the perceived credibility of the reports given the culture of the firm. Moreover, the association between external validation and credibility was also examined. For this study, a database consisting of data from over 20,000 firms' CSR reports, retrieved from one of the primary firms that provide standards for CSR reporting, the Global Reporting Initiative (GRI), was used as the sample source. The degree of individualism of the countries present within the database was determined by the metrics established by Geert Hofstede's work. The study determined that individualism had a relationship with the perceived credibility of reports whereas it had no impact on external validation. However, in terms of external validation, it was determined to have a positive relationship to credibility. The findings indicate that aspects of culture influence CSR reports in that reports from firms domiciled in highly individualistic societies are perceived as less credible to stakeholders than the reports of firms from nations that are less individualistic. While there was no direct relationship between individualism and the likelihood to externally validate reports, the relationship between external validation and credibility demonstrates that reports that receive external validation are perceived as more credible than those that were not. These findings demonstrate how aspects of culture can be used to improve the execution, perception, and acceptance of CSR reports.

Growing Felines: Updating Booth on the Economies of the Asian Tigers and Tiger Cub Nations

Presenter: Ian Maupin
Faculty Advisor: Colene Trent

In 1999 Anne Both published an influential paper titled "Initial Conditions and Miraculous Growth: Why is South East Asian Different from Taiwan and South Korea?" In it, she argued that there were fundamental differences between the "Asian Tigers" of North East Asia and the "Tiger Cubs" of South East Asia, and that the economic future of the region was still a question, especially in light of the Asian Financial Crisis of 1997. In this paper, we look at growth rates in the region since 1997 in order to update Booth's original work, as well as consider the effects of government involvement in their economies using the Economic Freedom of the World Index (EFWI).

Technology Transfer and the Necessity of Inclusive Growth for Sustainable Development: Evidence from Nigeria

Presenter: Graham Gardner
Faculty Advisor: Colene Trent

A recent focus of the economic growth and development literature is inclusive growth, which emphasizes equality of opportunity for market participants. This paper discusses the role of technology transfer in fostering inclusive growth. Using evidence from the Organization for Economic Co-Operation and Development (OECD), this paper establishes that inclusive growth is a necessary component of sustainable development. The link between income disparity and economic growth is also investigated referencing information from the United Nations Association - UK (UNA-UK) and the World Economic Forum's Sustainable Development Goals. The impact of technology transfer on income equity is analyzed for the oil palm and rice farming industries in Nigeria. Because technology transfer can be both beneficial and harmful for developing economies, the paper concludes that development policies should consider the effects of technology transfer on all income groups within an economy to avoid further income disparity.

Improving Target's Efficiency at Checkout

Presenters: Kaitlyn Carney and Heather Dockery
Faculty Advisor: Andrew Tiger

This study utilizes the program Simul8 to demonstrate how Target, Inc. could effectively decrease their customers' time waiting in checkout by changing the que where customers wait and using self-checkout machines. Data will be collected from the Target in Jackson, Tennessee and used as the data for the model. An economic analysis will be conducted to see how long it would take for target to pay off their investment in the self-checkout machines. A survey will also be conducted to estimate the popularity of this new system and how it could align with Target's goals. ■

CHEMISTRY

Synthesis of Nonsteroidal Analogs of CAmSA AS ANTI- Clostridium difficile Agents

Presenters: Isaac Donkor and Angela Taylor
Faculty Advisor: Mike Salazar

Clostridium difficile is a spore-forming bacterium that commonly infects hospitalized patients. It was discovered that CAmSA (a bile salt analog) inhibits germination of C. *difficile* spores and prevents the onset of C. *difficile*-associated disease (CDAD). The steroidal nature of CAmSA makes it undesirable due to potential side effects, so compounds were synthesized as novel nonsteroidal C. *difficile* antigerminants. The m-formamidobenzenesulfonic acid group of CAmSA was retained in the nonsteroidal analogs for effective interaction with the putative bile acid binding site on C. *difficile* spores. To synthesize these compounds, basic coupling reactions were used. Most products were isolated by extraction, rotary evaporation, filtration and/or recrystallization. FTIR and NMR were used to confirm product formation. In future experiments, additional nonsteroidal analogs will be synthesized followed by *in vitro* and *in vivo* testing for effectiveness of the compounds in preventing CDAD in a mouse model of C. *difficile* infection.

Potential Green Catalyst for the Bleaching of Cotton

Presenter: Dallas Abraham
Faculty Advisor: Jimmy Davis

Cotton is the most used textile fiber in the world, more than 20 million tons are produced in more than 80 different countries. An important part of the production process is bleaching the cotton, for which Hydrogen Peroxide is most often used. This however is a very time-consuming process that must be done in a harsh environment. The need for a catalyst is apparent, and some compounds have shown to be successful catalysts for the process. This project aimed to synthesize a seven-coordinate complex that would serve as a catalyst without having any negative ecological impact. The synthesized compounds were based on the open-cyclic ligand 2,6-diacetylpyridine bis-benzoic acid hydrazone. The different complexes catalytic potential was tested by adding them to the reaction between H2O¬2 and Morin hydrate while being monitored by UV-Vis spectrophotometry, and measuring any changes in the absorbance.

Analysis of Fish Oil Supplements for Omega-3 Content and Heavy Metal Contamination

Presenter: Vernon Stafford, III
Faculty Advisor: Joshua Williams

The dietary supplement industry is one of the largest in the world. Due to an absence of adequate US federal regulations, some supplements have been found to have poor quality and purity. This research aims to evaluate the validity of the content and purity claims made by five fish oil supplement manufacturers. Fish oil is known to contain the important omega-3 fatty acids DHA and EPA, but also dangerous heavy metals. By a quantitative nuclear magnetic resonance analysis, it was determined that none of the tested brands have DHA levels lower than the advertised amount. It was also determined by ICP-OES analysis that there was no detectible concentration of heavy metal contamination.

Synthesis Optimization and Applications of a Chiral Selector Adsorbent

Presenter: Minh Dong
Faculty Advisor: Sally Henrie

Chiral separation technique has become a major field for research since the demand of singly pure enantiomer medicine has increased significantly in the pharmaceutical industry. Previously this research successfully developed a procedure to synthesize a tri-branched macrocyclic antibiotic termini silica gel to eventually use as the adsorbent for chiral stationary phase flash chromatography. This particular research finalized the procedure with optimization when necessary. Moreover, the modified silica gel was also tested to confirm its ability to perform chiral separations on metoprolol and warfarin using flash chromatography. Upon experimental results, the tri-branched vancomycin termini silica gel has shown some potentials in chiral separation, but further development is needed to obtain better resolution of these substances.

Constructing a Low-cost Raman Spectrophotometer

Presenter: Seth Thibado
Faculty Advisor: Joshua Williams

In the modern chemistry lab, spectroscopy is one of the most popular and powerful instrumental techniques that is used for both qualitative and quantitative analysis of molecular compounds. It can be used to determine the structure of a molecule as well as the types of bonds present in it. The issue that arises with spectroscopy, however, is that in purchasing an instrument capable of performing spectroscopic analysis, the cost can become a huge factor and on a budget, can limit whether or not one can even be purchased. Raman spectroscopy is one such technique that has been growing in popularity, but remains less accessible to those on a tight budget. It has been demonstrated that a fully functioning Raman Spectrophotometer could be built by carefully planning for and purchasing the necessary components. Using custom coding and buying used parts whenever possible, a functioning Raman spectrometer was constructed for a total cost of $3,246.57.

Comparing Self-Assembled Monolayers on Gold Sensor Chips for Surface Plasmon Resonance Analysis

Presenter: Alexandra Forderhase
Faculty Advisor: Joshua Williams

Surface plasmon resonance systems are widely used in many bioanalytical experiments due to their ability to obtain data from biochemical interactions in real-time in a non-invasive manner. To analyze the ligand-analyte interaction, modification of the sensor chip surface is often needed, and self-assembled monolayers are useful in immobilizing the ligand to the sensor chip surface. Although thiols are more commonly used for SAM formation, there is reason to believe that disulfides offer better results. To test this, the results of IgG and anti-IgG on a bare gold surface, a carbon disulfide/protein A SAM, and a 6-mercaptohexanol/protein A SAM-modified sensor chip were compared. The results on the SAM-equipped chips resulted in much larger shifts, with the sensor chip modified with the disulfide being the strongest, leading to the conclusion that the modification of the sensor chip surface is beneficial and that disulfides are better for SAM formation on a gold surface. ■

COMMUNICATION ARTS

A Quantitative Analysis Concerning Race Relations

Presenter: Katherine Cheshire
Faculty Advisor: Webster Drake

The purpose of this research was to both consider and examine the different perspectives of race relations between young adults at a Baptist university and a historically black college. Union University and Lane College were the two colleges I chose to use for this study; altogether, forty-eight students took part in this research. Twenty-seven of these students were African-American, 15 were Caucasian, three were Hispanic-Latino, two were Asian, and one was from another ethnicity listed as "other." Since this study was conducted through a quantitative analysis, students were asked to take a self-administered survey that measured each person's response about racism. The survey itself was divided into three sections: the first section included demographic questions such as gender and ethnicity, while the second and third sections consisted of a Likert Scale and a Semantic Differential Scale, respectively. Though I wish I could have extended this research over a period of several months, I still learned important lessons from those who participated in this study.

Synergy Career and Business Development Program

Presenter: Angelica Shipps
Faculty Advisor: Webster Drake

In third world countries, like Haiti and Kenya, citizens do not have direct access to programs to help get their businesses out of stagnation and change their living situations. I want develop a "pseudo" career and business development program that would allow individuals and potential business leaders to gain knowledge in professionalism in the business world. They may gain experience in marketing themselves to local and federal government and even courts so they can navigate the formal economy through which legal structures are already established. Non-profit organizations and/or charities may implement this process so that they don't just give handouts; they can actually act strategically in a practical manner to help people in these countries get their businesses and dreams off the ground. The second portion of the program would be dedicated to charities and non-government organizations to offer assistance to impoverished companies by building a business-relief relationship with financial and economic industries. Ending world poverty completely isn't the solution; it shouldn't be the ultimate goal. The goal should be to just be to help individuals make success a reality. ■

COMPUTER SCIENCE

Regulating Mahogany Tree Growth with Raspberry Pi and Node.js

Presenter: Hudson Peden
Faculty Advisor: G. Jan Wilms

Union University's Department of Biology has several African Mahogany trees currently contained within their greenhouse. The tree prefers warmer climates. Jackson, not being a year-round warm environment, does not provide suitable living conditions for the trees. Thus, they must remain in the greenhouse where their growth is stunted due to lack of space for the trees' roots to expand. The overall goal of this project is to acclimate the trees to a colder climate so that they may be planted on Union University grounds. This project will attempt to create a system to regulate the temperature of a single African Mahogany. It will require a heating system that is controlled with software that will keep the temperature of the tree within a specified range (50°F to start). The system will then slowly decrease the temperature range over time in an attempt to allow the African Mahogany to adapt to Jackson's climate. I will work with the Biology and Engineering departments to program the system. The software will read the temperature of the tree both above ground and below ground and use that data to regulate the heating system so that the tree does not drop below the specified temperature.

Skive: Attendance Tracker

Presenter: Lance Dell
Faculty Advisor: G. Jan Wilms

Skive is a web app created with Python and Django and hosted by Heroku. It allows professors to easily keep track of their students' absences by keeping the information in a central location. One simply must go to any browser and navigate to skivetracker.herokuapp.com. Once on the site, the user can either create an account or login to a previously created one. Then they can create classes, add students to those classes, and edit the absences of the students. So either before or after class, the professor can log in and increment the absences of any students if need be.

The Communion Social Media App

Presenter: Joshua Stucky
Faculty Advisor: G. Jan Wilms

This project involved assisting in the development of the Communion social media app for Cornerstone Community Church. Communion is an app where church members can share prayer and service requests as well as praises and other announcements. The developer has added the functionality to follow posts and categorize them, as well as to mark prayer request threads as answered. In this presentation, the developer discusses the development and implementation of these new features, as well as the process involved in learning several new languages used in the project such as React, Redux, and GraphQL.

ABET Scores Program

Presenter: Jacob Parke
Faculty Advisor: G. Jan Wilms

I will be working with the Department of Engineering to debug, document, and improve a program created for them previously by an engineering student. This will involve learning Visual Basic and working with Microsoft Access, both of which I have little experience. Bug fixes will include removing an error that came with the current year change and removing unwanted outcomes from the PowerPoint that the program currently creates. New features will include new save and delete options for a database storing students' test scores, as well as a new way to add in data sheets. ■

EDUCATION

Parent Perceptions of Parental Involvement

Presenter: Audrean Bond-Jones
Faculty Advisor: Carla Cushman

This study was conducted to identify differences in parents' self-perceptions of parental involvement based on the parent's age, ethnicity, gender, and education level. This study also set out to determine whether parents' perceptions of parental involvement vary, based on the grade levels of their children. Furthermore, this study aimed to determine the relationship between parents' self-perception of parental involvement and the frequency of their communication with their children's school regarding their children's academic performance. Regarding age, ethnicity, gender, and education levels of participants, the data revealed that ethnicity and education level were statistically significant predictors of parent perception scores. No statistically significant results were found between any of the grade-level groups. The findings did include a statistically significant relationship between parents' self-perception of parental involvement and their self-reported frequency of communicating with the school regarding their children's academic progress. ■

ENGLISH

"Farrer Forest"

Presenter: Abigail Wills
Faculty Advisor: Christine Bailey

This thesis project is a rough draft of the first five chapters of a novel for children. The story is about three brothers who go into the forest and discover that there is an entire kingdom in the woods, which has been there for several decades and is currently at war. I hope for the story to have a fairy-story-like tone, especially since the narrator is the brothers' father. The story begins with the brothers asking their father to "Tell us a story about what we did today" and the following chapters are narrated by the father.

"Land of Darkness"

Presenter: Amanda Vernon
Faculty Advisor: Christine Bailey

What is the nature of belief and how can it be found in a world that embraces the darkness? The author of this fantasy novel uses a culture with values not so different from America's to craft a semi-allegorical tale about a man who wants desperately to believe in the existence of light but cannot. When he is forced to track down a woman possessing strange magic, he ends up confronting his own doubts about the very fabric of the reality he has always known. In a society fragmented into tribes of broken families, this manuscript explores what happens when the individual is placed before all else, following a man who hopes to change the pattern set by his father and his father's father. Above everything, faith and family remain.

The Patriot

Presenter: Ellen Howard
Faculty Advisor: Christine Bailey

Post-Traumatic Stress Disorder (PTSD) is becoming an increasingly common topic in fiction. From Katniss Everdeen in *The Hunger Games* to Dr. John Watson in the BBC's television series Sherlock, there is no shortage of portrayals of PTSD. However, most of these portrayals focus on the effects of the disorder on the sufferer. In "The Patriot," I wanted to explore this issue, not from the soldier's perspective, but from the perspective of his eight year old daughter. My goal is to look at a common topic from a new perspective, therefore in this story, the reader sees PTSD from the perspective of a child who is too young to understand what PTSD means. This piece, set around the Fourth of July, follows Emily as she tries to make sense of the fact that the man who came home from the war is not the same man who left.

Cataloguing and Curating the Roger Uselton Collection of Ancient and Biblical Coins

Presenter: Beth Adams
Faculty Advisor: Gavin Richardson

After removing each coin from its original flip, they were weighed and measured in grams and millimeters, making sure to keep the coins in order. Occasionally, a coin would need to be polished with a wax specially designed for coin cleaning. Next, the obverse (front) and reverse (back) of each coin was photographed, capturing as much detail as possible. Each coin was then placed in a new, clear flip and arranged by type and date in a new case. The hands-on work completed, information about each coin was entered into a document including pictures of each coin, which often meant searching for details to properly identify the coin's origins.

A Reader's Theater Presentation of a Medieval Play English 450: History of the English Language

Presenters: Erin Crocker, Emily Johnson, Gavin Richardson, Jessica Vaughan, Joshua Welsch, Abigail Wills
Faculty Advisor: Gavin Richardson

This will be a "reader's theater" presentation of a medieval mystery play. Students will read the play in Middle English from prompt copy. Mystery plays are not about solving mysteries. Rather, the name derives from an Old French word for "craft" or "guild," *mistere*. Medieval occupational guilds sponsored these plays, which were performed on mobile carts dragged through towns such as York and Chester. For three days, the entire story of the Bible was told through these dramas. In some instances there was a connection between the guild and the subject matter of the sponsored play; for example, the play of Noah's Flood was sponsored by the waterleaders, or those who sold large amounts of water for commercial purposes such as brewing. These cycles of plays were performed from the 14th to 16th centuries. Our class is performing this play with a 14th-century London dialect that would have been recognizable to Chaucer. The star of the show is the language, but students will do some light performance. ■

ENGINEERING

Smith Chart: Graphical Aid for Impedance Matching

Presenters: Corbin Anderson and Rachel Brewer
Faculty Advisor: Randal Schwindt

A Smith Chart is a graphical aid designed to assist in the design of matched circuits and impedance matched transmission lines. The purpose of impedance matching is to transfer all of the power from the input signal to the load. This is accomplished by preventing any signal reflection from the load, making for the best performance of the transmission line or circuit. Smith Charts are used to design matching networks of representative topologies. Existing computer software is also used as an additional resource to verify findings and aid in our understanding. Additionally, how the Smith Chart works and how it was used to obtain our solutions is also explained.

Controlling and Remotely Monitoring a Solar Hot Water Heater in Honduras

Presenters: Rachel Brewer and Brady Chandler
Faculty Advisor: Randal Schwindt

This past spring break, a team of Union engineering students installed a solar hot water heating panel on the roof of a Honduran orphanage. Building on the previous team's project, we took their design of the solar hot water panel and focused on the system-level implementation. Our solar hot water heating system features a controller for regulating the flow of the water though the system. In addition, we also included a Wi-Fi monitoring system that measures both inlet and outlet temperatures, which corresponds to the water entering and exiting the heating panel in Honduras respectively. With the remote monitoring system, we are able to have real-time monitoring of the temperature information from anywhere with Wi-Fi access.

Whatever Floats Your Boat

Presenters: Carson Brown, Abbey Pfenninger, and Conner Wilson
Faculty Advisor: Jay Bernheisel

The effects of the shapes of boat hulls on the speed of toy boats based on a constant power will be studied. The design will include several different hull shapes, a paddle wheel, and a motor compartment. The paddle wheel will be powered by a small motor run by a AA battery. The supplies, excluding the motor and the battery, will be 3D printed using the Union University Engineering Department's 3D printer.

Wind Tunnel Design Feasibility Study

Presenters: Mark Carbonell, Thomas Foster, Gabriel Garneau, Joshua Johnson, and Kaylee Owen
Faculty Advisor: Georg Pingen

Access to an operational and accurate wind tunnel is a valuable and useful resource, and the goal of this project was to explore the feasibility of designing and constructing such a wind tunnel. The team examined different designs and considered the most viable options based on research of both the balance system used within the wind tunnel, as well as the wind tunnel itself. More specifically, certain limiting factors of the design are size, cost, noise, and power consumption. Also important was the department's ability to construct/house the wind tunnel itself. Using thermodynamic principles, and accepted wind tunnel design rules, the team considered if a wind tunnel design exists that adequately facilitates the needs of the engineering department and fits within the available space and budget.

ENGINEERING

Solar Hot Water Heater

Presenters: Nyla Gwan, Chase Hampton, Davis Johnson, Daniel Porter, and Addison Turner
Faculty Advisor: Georg Pingen

For the past two years, Union University's engineering program has sent students to Honduras on Go Trips. The goal was to provide a solar hot water heater in order to save money for the local orphanage. Our team decided to develop an analytical and numerical model to study the effects of different design parameters. The heater model can be used by future teams to improve the solar water heater design. We used a basic thermal resistance network as the foundation of our analytical model. We also implemented a more comprehensive numerical model in COMSOL and will be comparing the results of both models. Use of COMSOL and our analytical model enables the study of different design implementations, hopefully resulting in improved solar water heaters to be installed and constructed by future teams.

Picture Perfect Heat Loss

Presenters: Angel Claudio, Sam Jeong, and Joshua Shoemaker
Faculty Advisor: Jay Bernheisel

Heat transfer occurs in three ways: through conduction, convection, and radiation. Union dormitories are controlled environments in which each resident can control the temperature of the room. The heat transfer between the dorm and the outside environment is compensated by the AC and heating units. Our team will analyze the potential heat transfer between the dormitory and the outside environment using a thermal imaging gun. In our attempt to measure heat transfer between the dormitories and the outside environment, we will go to multiple rooms in four different buildings of the Quads and buildings in Heritage.

On Top of Topology: A MATLAB Program for Impedance Matching

Presenters: Brady Chandler and Cory Johnson
Faculty Advisor: Randal Schwindt

For this project, a program in MATLAB to design impedance matching networks was created. The program can solve each of the five impedance matching topologies that were covered in the EGR 365 – Electromagnetics course lectures. For the program to solve the matching networks, the user is prompted for certain information that is needed, such as load impedance, feed-line characteristic impedance, and frequency. Once the input information is given, the user chooses the matching network topology that they want to use. Based on their selection, the program may need more information to move forward in the solution. Once there is sufficient information for the program, it will solve the matching network to give the user the desired quantities, which can include line length, characteristic impedance, capacitance, and inductance.

Effects of Potentiometers on Blinking LEDs

Presenters: Ethan Morris, Matthew Owen, Kaylee Owen
Faculty Advisor: Jeannette Russ

The EGR 262 class is an introduction and overview of a variety of topics related to building and analyzing simple circuits. The goal of this project is to use a limited number of components to demonstrate topics we have learned in the course, with a specific requirement to use a potentiometer in our design to show the effects of varying circuit resistance. A circuit using transistors, capacitors and resistors to induce a blinking pattern between two LEDs was constructed. We will use a potentiometer to vary the amount of power reaching the lights and will investigate how we are able to affect the timing, brightness, and pattern of the blinking.

Application of Potentiometers in Variable Speed DC Motors

Presenters: Gabriel Garneau, Robert Hampton, and Joshua Johnson
Faculty Advisor: Jeannette Russ

To analyze the behavior of a potentiometer, this project explores the effect of using a potentiometer to drive a dc motor. The potentiometer provides one way to control the speed of dc motors, and variable speed motors are critical in numerous applications. A basic dc motor driven by a variable speed controller operates on the principle of an electric current inducing a magnetic field as it passes through the stator coil. This magnetic field repels the permanent magnetic field, causing torque on the stator coil and resulting in rotational motion. In order to control the torque, and consequently the rotation, the circuit uses a potentiometer to control the amount of current flowing into the stator coil.

Wireless Battery Charger Circuit

Presenters: Davis Johnson, Ashton Lund, and Daniel Porter
Faculty Advisor: Jeannette Russ

In this project, we will use passive elements to create a series of two circuits that can charge a battery wirelessly. This has numerous applications, from being able to charge electronics without needing a cord, to making an external power source feasible for medical devices such as pacemakers. While this technology is already in existence, it is not commonly used because it has an extremely limited range of approximately 3 cm. The limited range is due to the number of capacitors it requires to produce any range at all. We will be building on this basic idea by adding a potentiometer to better control the amount of voltage transferred from the transmitting circuit to the receiving circuit. We will also attempt to use that information to minimize the amount of voltage lost in the transaction.

Potentiometer Application in a Chladni Plate

Presenters: Mark Carbonell, Angel Claudio, and Thomas Foster
Faculty Advisor: Jeannette Russ

The goal of this project is to demonstrate the application of potentiometers using an interactive and simulating method. To achieve this, the project team has created a tone-generator driven Chladni plate with variable pitch. A Chladni plate operates by vibrating a sheet of metal with a particulate on its surface, which causes the particulate to form geometric patterns corresponding to certain frequencies. Vibration of the plate is achieved by placing a speaker below the plate surface, and the resulting sound waves cause flexural movement. The potentiometers are used to alter the pitch of the tone-generator in order to achieve the proper frequencies for geometric patterns to form. A frequency generating circuit is used in conjunction with and amplifier to drive the speaker, which is affixed below the plate. Using the potentiometer to change the tuning resistance of the frequency generator circuit allows the team to finely adjust the system resonance.

Investigation of Microfluidics Boundary Conditions

Presenter: Matthew Owen
Faculty Advisor: Georg Pingen

From experience, we know that a fluid sticks to surfaces and that the temperature of a surface and the fluid immediately adjacent to that surface are equivalent. This physical understanding, however, is approximate and becomes less and less correct as we consider smaller devices, such as lab-on-a-chip devices. At small length-scales, fluids slip along surfaces and experience a temperature jump. To exhibit the importance of considering these boundary conditions for engineering designs, two different problems are considered. First, we used an expansion of FEMDOC implement by Dr. Pingen to model a Knudsen Pump, which works specifically because of the micro-fluidic boundary conditions. Second, we revisited a heat sink optimization problem to see if micro-scale would cause the designs to have a different solution.

Backup Power in an Industrial Setting

Presenters: Zachary Benson, Andrew Ford, and Samuel Jeong
Faculty Advisors: Randal Schwindt and Georg Pingen

Backup power is a common concern in industry. However, because every business is different, there is no universal solution. Our team partnered with local aluminum plant Tennalum to design such a system. The goal is to reduce lost productivity in the event of an extended power outage. There are many factors that must be taken into account for this design. Those that will be explored include cost, environmental impact, size, and convenience or practicality. In order to determine the most effective system to be implemented, the impact of each of these factors must be determined, and then a solution selected that satisfies both the technical requirements as well as the goals of the customer. The details of making such a decision will also be explored, such as quantifying goals and interpreting the result into a final decision.

Volume Controlled Speaker

Presenters: Nyla Gwan, Gavin Hamann, and Addison Turner
Faculty Advisor: Jeannette Russ

Our team decided to build a circuit that uses a potentiometer to vary volume of sound and display rough volume level via lights. We will use P-spice to analyze the circuit and determine various aspects of the circuit. The circuit will then be implemented using a prototyping board and tested for functionality. The circuit will use the potentiometer as a volume knob. As the volume increases from mute, the lights in the circuit will begin to turn on, indicating the level of volume. ■

HISTORY

The Fall of Tenochtitlan: The Difficult Distinction Between Civil War and Conquest

Presenter: Seth Reid
Faculty Advisor: Stephen Carls

As regrettable as the destruction of the pre-Spanish Mexican culture is, the blame may fall more on the Aztecs (more accurately called the Mexica) than the Spanish. From their early beginnings as a tribe attempting to find a foothold in a new land, to the dominating power of Central America, the Mexica were frequently known to be bad neighbors. Their culture was viewed as detestable and painful to outsiders. As the tribe became a city, and the city became a power, the grossness of their culture did not fade away. In their power, the Mexica oppressed the region, and in doing so, crippled themselves. ■

INTERCULTURAL STUDIES

American Busyness: Understanding and Respectfully Living in a "Doing" Culture

Presenter: Angela Jacks
Faculty Advisor: Cynthia Jayne

This presentation explores Kluckhohn and Strodtbeck's cultural value orientations of "doing" and "being." First, through integrated intercultural theory and research, including Ting-Toomey's Identity Negotiation theory, this presentation positions the intercultural phenomena of "doing" and "being" within an intercultural theoretical framework before then situating these orientations in the context of sojourner's experiences.

Muslim Women's Views of the Hijab: A Qualitative Study in Memphis, Tennessee

Presenter: Kimberly Chavers
Faculty Advisor: Cynthia Jayne

This study draws from identity negotiation theories as it investigates the values surrounding the hijab, the traditional garment that covers most Muslim women's head, hair, and neck. Extensive qualitative, subject-driven interviews were conducted with five Muslim women of various backgrounds, with the goal of understanding how the women view the hijab as a cultural, religious, and/or political symbol, as well as a personal identity marker. This study is supported by a literature review that 1) discusses identity negotiation theory and how it plays out in majority-minority groups, 2) briefly compares the research results to similar studies, especially those concerning American-Muslims, and 3) further validates the women's stories by presenting research done on their home culture(s)/countries. The purpose of this research is to foster understanding of Muslim culture and of the vast diversity within that culture.

Hip Hop's Biopolitics: Critics and Defenders

Presenter: Sarah Troxel
Faculty Advisor: Cynthia Jayne

In this intercultural research presentation, I explore the implications of hip hop as a form of public discourse for the dialogue and actions of race relations in the U.S. The critical framework for this research, set by Paul Gilroy, acknowledges the troubles that raciological thinking has caused and calls for a reevaluation of the delineations of color lines. Instead, Gilroy favors the culturalist perspective. With this framework, I examine both the positive and negative aspects of hip hop for the identity negotiation of race. First, I set the historical narrative of the hip hop phenomenon in the context of its initial origins. I will use an interdisciplinary set of sources to study the complex phenomenon of hip hop as public discourse. Sociological theory and research contributes to the historical narratives and the description of public events intertwined with hip hop. Linguistics (particularly discourse analysis and sociolinguistics) allows for the analysis of particular hip hop texts as meaningful choices of code. Ethnomusicology speaks to the importance of art forms to the ways a culture views and expresses itself. Lastly, I cannot ignore journalism and the media because hip hop is constantly evolving and a topic of racial discussions in the public sphere. Through multiple case studies, I will demonstrate that hip hop is a form of discourse that frequently lends itself to discussion of race and culture; Moreover, while retaining its original audience, it is increasingly mainstream and even global. This internationalization further complexifies its role in identity negotiation and intercultural engagement. ■

LANGUAGE

A Comparative Analysis of Dyslexia in English, Arabic, and Chinese Readers

Presenter: Jordyn Battistelli
Faculty Advisors: Phillip Ryan and Jean Marie Walls

This research project explores the neural processes and cognitive behaviors associated with dyslexia in readers of three different orthographies: English, Arabic, and Chinese. Dyslexia is a term used for a broad range of what have generally been referred to as reading disorders. Because dyslexia is a complex issue based on differences in brain processing, the question must be asked, how much does dyslexia differ or remain the same across writing systems? This paper will explore specifically those differences found between dyslexia in the orthographies of English, Arabic, and Chinese readers by investigating the differences and similarities of the orthographies, the brain function required for normal reading, the brain function of dyslexic readers, and the cognitive behaviors of dyslexic readers across the three languages. ■

MUSIC

Destabilization of the Tonic as an Expressive Device in the Song Cycles of Mahler

Presenter: Giggi DeCoursey
Faculty Advisor: Daniel Musselman

In the late 19th and 20th century, the works of Gustav Mahler illustrates a trend that supplants and distorts the basis of tonality. Mahler frees tonic from its primary role as a tonal pillar and allows it to be used as an expressive element. Examples of the tonal distortion occur throughout Mahler's song cycles including the use of nonfunctional cadences, dissonant tonics, tonic avoidance, and dual modality within a song. Composers have often used harmonic elements to draw the listener's attention to images already present in the text. Traditionally these images are supported by non-tonic harmonies while tonic is used to provide and maintain stability and stasis. With tonal distortions and the free of tonic allows it to be used as an expressive agent by means of various permutations. This paper will explore several prominent examples of tonal distortion as an expressive element in the song cycles. ■

NURSING

Creating Social Support for Patients with Psoriasis

Presenter: Lisa Medlin

Psoriasis is an autoimmune disorder that causes a buildup of skin cells leading to red, sore, itchy plaques that slough off in silvery scales. Of the 7.5 million Americans who suffer from this disorder, 35% have a moderate to severe case. Seventy-five percent of Psoriatics report that it affects quality of life leading to embarrassment, isolation, pain, discomfort, decreased physical intimacy, absenteeism, anxiety and depression. Many studies tout the importance of social support to health outcomes associated with chronic health conditions. Research conducted with support groups provides evidence that proper social support can provide the patient suffering from a chronic condition with a better chance of realizing a more positive emotional, social, and physical health status. Ongoing research indicates there are four categories of social support: emotional, tangible, informational, and companionship. Jackson Area Psoriasis Support (JAPsS) is a peer support group that was created to provide Psoriatics with positive support and practical solutions for living with chronic disease through group sharing and education and to increase public awareness of the effects of Psoriasis. The above stated four categories of social support are incorporated into JAPsS and are operationalized through group meetings and events.

Using Traditional and Non-traditional Pedagogical Strategies to Teach Communication Theory in Psychiatric Mental Health Nursing

Presenters: Donna Sachse, Connie Cupples, Nathan Knappier, Lucinda Linney

Theory and skills covered in this two-day workshop for BSNA student nurses are specific for mental health nursing but can be applied to all nursing practice as effective communication is essential for effective nursing practice. Several venues of pedagogy were used: Socratic questioning, simulation, videos, gaming, and interactive stations. The development of effective communication begins with an understanding of how an individual's communication pattern is learned. Therefore, the workshop begins with an examination of one's own communication pattern. Workshop objectives covered topics such as effective and ineffective communication techniques; the relationship between thoughts, emotions, and behavior; significance of the Johari Window to communication; the relationship of temperament and developmental tasks to personality and communication; empathy theory and empathic communication. Communication patterns were examined including assertive, aggressive, passive and passive aggressive styles; promoting assertive communication with "I feel…" and empathic communication with "You feel…" statements. Finally, students were provided with interactive opportunities for understanding and effectively responding to features of mental disorders that can interfere with effective communication, e.g. Hearing Distressing Voices (toolkit and program developed by Dr. Pat Deegan); Tardive Dyskinesia and Abnormal Involuntary Movement Scale Exam (AIMS); anger and aggression theory with correlating interventions to effectively manage.

Egypt Healthcare System

Presenters: Arshada Hayes, Nikole Jackson, and Raven Rucker
Faculty Advisor: Shari Wherry

The purpose of this presentation is to provide an overview of the Egyptian healthcare system. In 2015, the total population in Egypt was 91,508,000 (World Health Organization, 2017). Egypt's healthcare system ranking is 63rd globally (World Health Organization, 2000). Financing and management of health services is through three sectors that include governmental, parastatal, and private agencies (Jurjus, 2015). The Ministry of Health and Population is the major provider of healthcare services in Egypt. Total expenditure on health per capita in Egypt for 2015 was $594 and total expenditures of Gross domestic product spent on healthcare were 5.6% (WHO, 2017). The Egyptian healthcare system has challenges that affect health and wellness. All nations must honor God and He will heal as stated in Jeremiah 33:6 (New International Version) "Nevertheless, I will bring health and healing to it; I will heal my people and will let them enjoy abundant peace and security."

South Korea's Healthcare System

Presenters: Tiffany Faulkner-Hines and Fred Reed, III
Faculty Advisor: Shari Wherry

South Korea has become one of the world's most rapidly developing countries; the utilization of universal health care has revolutionized as well. National health insurance in South Korea was mandated and extended to the entire nation in 1989. Currently, the South Korean healthcare reformation promotes the single payer system and decentralization of healthcare insurance premiums among corporation employees and self-employees (Lee, 2003). According to the World Health Organization, South Korea's healthcare system is ranked number 58 of 190 (Patient, 2017). The purpose of this presentation is to determine the status of South Korea's healthcare system in comparison to that of the United States on the following areas:

- Payer system
- Financing
- Reimbursements
- Providers choice
- Challenges
- World Ranking
- Gross domestic products spent on healthcare

Is there a Relationship between Health Literacy and Knowledge of the Transmission of Sexual Disease in Low-Socioeconomic Females?

Presenter: Shanytel Weathersby Cook
Faculty Advisor: Shari Wherry

Understanding how information is processed or what the information means to a patient can lead to making better health care decisions. Although there are many contributing factors that play a role in the health of patient populations, research has shown that the major contributing factor is the lack of understanding health information. One specific clinical area of health literacy concern is the women's reproductive health care setting, where sexually transmitted disease is common. Healthy People 2020 states, "Transmission of sexually transmitted diseases has become problematic in the United States, particularly with young women who are having unprotected sex, engaging in high risk sexual behavior, noncompliant with sexually transmitted disease treatment, and living in areas of poverty" (2016, para. 1). This DNP project will discuss a relationship between health literacy and knowledge of the transmission of sexual disease in low-socioeconomic females.

NURSING

Assessment of Tennessee Nurse Practitioners' Educational Practices in the Prevention of Teen Pregnancy

Presenter: Elizabeth Fulmer
Faculty Advisor: Shari Wherry

Teenage pregnancy throughout the United States has been a cause for concern for many years. In 2014 approximately 249,000 babies were born to teenagers 15 to 19 years of age (Centers for Disease Control and Prevention, 2015). Though this number has decreased from previous yearly reports, the outcomes for many teens involved are still the same; increased health concerns, lower education completion, and higher rates of unemployment (Centers for Disease Control and Prevention, 2011). Pregnancy prevention has been deemed a "winnable battle" by the CDC and is considered one of the organizations top seven priorities (Centers for Disease Control and Prevention, 2015). The purpose of this study was to survey Nurse Practitioners throughout Tennessee to see what type of education, if any, they provide to their teen/adolescent patients for the prevention of pregnancies.

Comparison of International Health Care Systems: India

Presenters: Hannah Abinteh, Cody Pittman, and Christopher Wright
Faculty Advisors: Shari Wherry and Cathy Ammerman

India accounts for 21% of the world's global burden of disease (Balarishnan & Vesvikar, 2016) and is ranked 112 out of 190 in the world's health care systems (Tandon, Murray, Lauer, Evans, n.d.). India has introduced reforms in the health sector with the explicit aim of improving performance measured by accessibility, quality, and affordability with the goal of a universal health care policy (Reddy, K. S., 2015). The purpose of this presentation is to evaluate India's health care system while comparing it to the United States. Information gathered will include payer system, finances, reimbursement, provider choice, challenges, world ranking, and gross domestic product spent on health care.

Suture closure compared to staple closure in affecting postoperative wound infection rates in cesarean section patients: An Integrative Research Review (IRR)

Presenters: Leann Grimes, Kara Hoover, Jesus Legarda, April Swoner, and Jayna Wood
Faculty Advisors: Connie Cupples and Sánchez

A leading complication for women that undergo a cesarean section is surgical site infections, and it affects more than 4.8% women. While staple closure is quicker than suture closure, it may be contributing to surgical site infections within the first two weeks postop. The purpose of this IRR is to examine evidence-based research between suture and staple closure during a caesarean delivery and how each affect postoperative surgical site infections rates. Databases used will be MEDLINE, CINAHL, and the PubMed that are after May 2011. Keywords searched will be "sutures infection", "staples infection", and "cesarean section". The IRR suggests that suture closure provides a decreased risk for wound infections in patients that are delivered by cesarean section. Future studies should be conducted to compare postoperative cesarean section infection rates between suture and staple closure in patients presenting at different gestational weeks and with varying comorbidities.

Development of an Algorithm for the Identification and Management of Perioperative Corneal Abrasions in the Adult Population after Non-ocular Surgery: A R.E.D. Tabs Initiative

Presenter: Kristen Carper
Faculty Advisor: Melissa Lefave

This project aims to present a current, evidence-based algorithm regarding the recognition, diagnosis, and treatment for the perioperative complication of corneal abrasions to all anesthesia providers. Corneal abrasions are the most common ocular complication following non-ocular surgery. Delays in recognition and treatment of the injury increase the risk for permanent visual disturbances. Therefore, prompt recognition of the injury is key. The GRADE tool was utilized to ensure all recommendations were based on evidence of the highest quality. The developed algorithm clearly and concisely displays the clinical manifestations, risk factors, methods of diagnosis, and treatment options for corneal abrasions. The algorithm was peer reviewed and derived from only high quality evidence.

Russian Federation Healthcare System

Presenters: Missy Arwood, Nikki Barrett, and Jehan Ellis
Faculty Advisor: Shari Wherry

In 1996 "the new Constitution of the Russian Federation created a healthcare system that provided all citizens the right to free healthcare" (Health-rights.org, 2010, p.3). The government oversees the healthcare system and attempts to assure a degree of stability by evenly distributing the way services are provided to the citizens (Henry, 2015). Medical care is profit motivated and is divided into a mix of public and private hospitals and clinics. State funded basic (public) services are limited. Private healthcare is expensive, but highly recommended to ensure access to higher quality of care (Arkhipov & Meyer, 2015). Poor hospital conditions, poorly paid staff, and limited quality care leads to patients bribing doctors or paying extra for public and private services (Europe-cities, 2017). Russia's healthcare payer system, financing, reimbursement, production, provider choice, challenges, World Health Organization ranking, and Gross Domestic Product spending will be presented in this poster.

China Healthcare System

Presenters: Daniel Bermea, Jazmin Santiago, and Meredith Tatarzycki
Faculty Advisor: Shari Wherry

The World Health Organization has ranked China's health care system as 144th for overall performance out of 191 countries worldwide (World Health Organization, 2000). The Republic of China's Constitution requires state regulations for medical and health services in order to protect the people's health (Embassy of the People's Republic of China in the United States of America, 2012). With multiple health care reforms over the years, and an extraordinarily quick transition from a Third-World to a First-World economy, China has achieved healthcare coverage for 95% of the population (Blumenthal & Hsiao, 2015; Gao, Xu, & Liu, 2014). As of 2014, the percentage of gross domestic product spent on health care in China was 5.4% (Mossialos, Wenzl, Osborn, & Sarnak, 2016). The purpose of this presentation is to assess China's health care system and to improve the global health perspective of the public through dissemination. The following topics will be presented: payer system, financing, reimbursement, provider choice, and challenges.

France's Healthcare System

Presenters: Jake Chandler, Calvin Hocker, and Grady Johnston
Faculty Advisor: Shari Wherry

American Healthcare is in tumult with uncertain changes looming. Knowledge about other healthcare systems is invaluable. One country with a healthcare system that has clear pros and cons is France. According to the World Health Organization (2017), France has the number one ranked healthcare system as well as the third most expensive as a percentage of gross domestic product (GDP). To promote knowledge about the positives and challenges of France's system, three students in the Doctor of Nursing Practice class of Nursing Health Policy and Economics have examined a variety of factors surrounding France's healthcare system. The poster will examine the universal healthcare system of France including its single payer system, methods of finance, reimbursement practices, and provider referral system. Additionally, the poster will also explore the challenges of the system as well present data on world ranking and GDP spent on healthcare.

Intraoperative Unstable Hypertension Related to Pheochromocytoma: A R.E.D Tab's Initiative

Presenter: Alex M. Witcher
Faculty Advisor: Molly Wright

Background: Pheochromocytoma is a rare tumor that grows either in or just outside of the adrenal glands causing stimulation of the release of catecholamines. "Pheochromocytomas present a high risk of morbidity and mortality especially during surgical procedures and pregnancy. Ninety-five percent of those diagnosed with Pheochromocytoma will have essential hypertension. Methods: Utilization of the latest evidence based practice, along with other effective treatments that have been documented in the clinical scenario of an unforeseen Pheochromocytoma in the treatment of unstable hypertension. Being able to distinguish it from similar diseases will aide in proper treatment. Discussion: The ability of being able to think through and understanding this rare disease could prove detrimental in allowing the provider to being able to appropriately distinguish and treat the disease in a safe manner. Conclusion: Additional documentation of the assessment, and treatment utilization for safe stabilization of the Unstable Hypertension is needed.

The Dominican Republic Health Care System

Presenters: Cheryl Dodson, Angela Warren, and Paula Walker
Faculty Advisor: Shari Wherry

This study describes the health care system of the Dominican Republic – a sovereign nation, with a population of approximately 10.5 million that is situated in the Caribbean on the island of Hispaniola (Central Intelligence Agency, n.d.). The Dominican health care system's World Health Organization ranking will be highlighted alongside the payer and reimbursement system, provider structure, coverage of care, financial sources and constraints, gross domestic product, and overall health expenditure. This poster will also outline the unique challenges – including economic and political – that are currently faced by the Dominican Republic's health care system in meeting the health needs of the country and its people.

NURSING

Cervical Cancer Screening: Determining Compliance to the American Congress of Obstetricians and Gynecologists (ACOG) Guidelines in a Primary Care Setting

Presenter: Emily Pudlo
Faculty Advisor: Patsy Crihfield

Cervical cancer screening is important to identify cells leading to cancer. However, primary care providers continue to perform cervical cancer screening tests, or Papanicolaou smears (Pap smears), more frequently than what is safely recommended by the American Congress of Obstetricians and Gynecologists (ACOG) guidelines. This study examined the adherence to ACOG's cervical cancer screening guidelines in the primary care setting. A retrospective chart review, using 100 charts of women, ages 21-65, between the dates of January 1st, 2010 and December 31st, 2015 at a designated primary care office revealed that 14% of the Pap smears performed met the guidelines while 86% did not. These conclusions were derived from descriptive statistical analysis, such as measures of central tendency, measures of dispersion, and frequency findings. This data can be used to educate these providers on the cervical cancer screening guidelines, as well as to enforce or enhance policies regarding cervical cancer screening.

Nurse Practitioner Perceptions Post-residency: How Their NP Residency Program Prepared Them for the Primary Care Role

Presenter: Julie C. Stuckey
Faculty Advisor: Shari Wherry

New healthcare environments demand "safe, timely, efficient, equitable, and patient-centered care in complex environments," (Iglehart, 2014). A pilot study with a quantitative descriptive survey and a nonprobability purposeful sample of Nurse Practitioner post-residency graduates from one FQHC were surveyed to determine if a Residency Program transitioned them into the PCP role. Qualitative results support the perceived importance of Residency, Spearman's rho (rs = 0.393; 0.383) show a possible low relationship, but data still supports non-relationship.

Use of Total Body Skin Examination by Primary Care Nurse Practitioners in the State of Tennessee

Presenter: Rebecca Guthrie Moody
Faculty Advisor: Patsy Crihfield

Skin cancer is the most common form of carcinoma; 1 in 5 Americans will develop skin cancer in their lifetime. The American Cancer Society recommends skin cancer screening every 3 years for those 20 to 40 years of age and annually for those older than 40 years of age. The purpose of this study was to assess the use of total body skin examination (TBSE) screening by nurse practitioners serving the primary care population in the state of Tennessee. The data was gathered through a descriptive, cross-sectional, self-administered survey design. Of the 20 participants, 50% stated they conduct TBSEs in their practice. Though the sample size was small, findings suggest that TBSEs are not performed regularly in primary care by the nurse practitioner. Therefore, further education is warranted on skin cancer screening for Tennessee's primary care nurse practitioners so that we may enhance overall patient outcomes.

Regional Anesthesia versus General Anesthesia and their Effect on Postoperative Cognitive Decline: An Integrative Research Review (IRR).

Presenters: Adam Bland, Nahada Gudger, Dane Mitchell, Bradley Steg, and Tyler Thompson
Faculty Advisors: Connie Cupples and Zoila Sánchez

In the elderly population undergoing elective surgery, postoperative cognitive decline (POCD) is reported 15-53% of the time with general anesthesia, and it can potentially lead to irreversible cognitive deficits. After reviewing the literature, there is a lack of evidence of the effectiveness of regional versus general anesthesia in preventing postoperative cognitive dysfunction. The purpose of this IRR will be to assess the effectiveness of regional anesthesia in preventing postoperative cognitive decline in elderly patients undergoing elective surgery. Databases to be used: PubMed, CINAHL, MEDLINE, anesthesia textbooks and journal articles. Terms to be searched: "regional anesthesia", "general anesthesia", "cognitive decline", and "elderly". We expect that regional anesthesia will be less causative to postoperative cognitive decline in elderly patients; however, this research is still in progress and results have not been finalized. Early literature analysis has failed to substantiate a direct link between anesthetic technique and POCD.

Development of an Algorithm for the Identification and Management of Intraoperative Acute Coronary Syndrome: A R.E.D. Tabs Initiative

Presenter: Mitch Frank
Faculty Advisor: Melissa LeFave

Background: Prolonged ACS can lead to myocardial ischemia and ultimately irreversible tissue death. An algorithm designed to assist skilled anesthesia providers in the identification and treatment of ACS can lead to decrease time to intervention, decreased complications, and ensures only the most beneficial of therapies are implemented. Methods: Extensive research on treatment options for ACS was conducted. Research results were entered into the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) assessment tool. Results: Four treatment options were found to be beneficial in reducing mortality rates associated with ACS. The treatment options include: provide adequate oxygenation with a goal of SaO2 > 90%, start IV beta blocker therapy, titrating nitroglycerin drip to patient response, and starting patient on oral antiplatelet therapy after surgery is complete.

Screen Time Effects on Head and Neck Posture in a Pediatric Population

Presenter: Kayla Yates
Faculty Advisor: Patsy Crihfield

The amount of time spent interacting with a screen is drastically increasing for the American children. A forward head posture is one of the most common postures practiced when interacting with a screen. The purpose of this project was to determine if reported screen time greater than 2 hours in any given day correlated with a smaller craniovertebral angle measurement. The screen time included for this study included time spent on any gaming system, iPod, iPad or other tablet, smartphone, social networking tool, or the Internet. Fifty assenting participants that met eligibility criteria and had guardian consent were measured utilizing a goniometer. A nonsignificant correlation with a significance level of 0.628 was produced, with a negative correlation, meaning as one variable went up the other went down. The recommendation is for health care providers to inquire at all well-child visits about the amount of time spent interacting with a screen.

An Orthopedic Curriculum and Clinical Course for Family Nurse Practitioners in the Memphis Metropolitan Area

Presenter: Mary Hardin
Faculty Advisor: Shari Wherry

The U.S. Bone and Joint Initiative (USBJI, 2014) estimates that nearly half of adults are affected negatively by orthopedic conditions; these ailments are the number one reason adult patients seek health care. There is evidence of national shortages of physicians who specialize, including orthopedic providers (Association of American Medical Colleges [AAMC], 2015). There is evidence that primary care providers are not equipped to appropriately care for musculoskeletal conditions (Benham & Geier, 2014 & Lynch, Schmale, Schaad, & Leopold, 2006). Nurse practitioners (NPs) may be one answer to fill the gap of orthopedic providers in the U.S. Presently, there are two NP formal orthopedic training opportunities in the U.S. There is no formal orthopedic training available for NPs in the Memphis area. This presentation will demonstrate a curriculum and clinical course for an orthopedic fellowship in the Metropolitan Memphis area that could prepare post-graduate NPs for a career in orthopedic practice.

Identification of Barriers to Implementing Two Competencies Using the *Donna Wright Competency Assessment Model* for Registered Nurses

Presenter: Susan Strange-McClora
Faculty Advisor: Denise Thornton-Orr

Nursing competencies are essential in every healthcare organization (Wright, 2005). The purpose of this pilot was to identify barriers to implementation of a new competency assessment model, the *Donna Wright Competency Assessment Model*. Two competencies were selected based on low frequency, high risk nursing actions: EKG Interpretation and Suicide Precautions. Sixteen registered nurses participated in the pilot. The only barrier identified by the participants was more time to complete the competency assessment. Fifty-six percent of the participants indicated satisfaction with the *Donna Wright Competency Assessment Model* without adjustments." Ninety-three percent expressed satisfaction with the form.

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Examining the Role of Ultrasound Viewing by Pregnant Females in the Decision Making Process whether or not to have an Elective Abortion

Presenter: Ashley York
Faculty Advisor: Laurie Bagwell

Ultrasound use in abortion care is currently a topic that is in the forefront of news and medical discussions. There has been limited research in determining whether or not ultrasound viewing of the fetus has any effect on the pregnant female's decision to choose elective abortion or to carry the fetus to term when contemplating abortion. In addition, current available studies are from different settings. This pilot-study samples a population from a pregnancy resource center in West Tennessee. The results indicate viewing the ultrasound in certain populations can alter or aid in the decision making process with the pregnant female that is considering abortion.

Business Sharing Agreement Between Cumberland University and WEMA

Presenter: Andrew Donadio
Faculty Advisor: Cynthia Powers

The simulation assets of the Jeanette C. Rudy School of Nursing and Health Professions are utilized in the education of Baccalaureate nursing students at the school. There are times when the assets are not being utilized. The goal of this agreement is to collaborate with Wilson County Emergency Management Agency in the training and retention of emergency medical technician staff and provide training opportunities to the students of the Jeannette C. Rudy School of Nursing and Health Professions.

Use of Mechanical Compression Devices in Cardiopulmonary Resuscitation: An Integrative Research Review

Presenters: Amanda Blassl, Brian Brown, Lavonne Clifford, Josh Dragan, Jonathan Huggins
Faculty Advisors: Connie Cupples and Zoila Sánchez

Adequate quality chest compressions in cardiopulmonary resuscitation (CPR) increase the chances of return of spontaneous circulation (ROSC). Mechanical compression devices (MCD) provide consistent compression rates while reducing the physical burden of CPR on the provider. The Integrative Research Review (IRR) will examine the evidence of using MCDs as compared to mechanical compressions during CPR regarding patient outcomes. In adult cardiac arrest patients, in and outside the hospital setting, how do MCDs compare to manual compressions during resuscitation? Databases to be used are MEDLINE, CINAHL, and UpToDate. Search terms will include "LUCAS machine", "mechanical compression devices", "leaning" and "quality compressions". This is a work in progress. Based on preliminary findings, MCDs will exhibit a higher rate of ROSC in the patient population and settings. We anticipate the use of MCDs will reduce rescuer fatigue, resulting in better patient outcomes.

Heart Failure Patients: Are We Meeting Their Needs?

Presenter: Kellee Etghayi
Faculty Advisor: Laurie Bagwell

Heart failure is a leading cause of hospital admissions. It is estimated that by 2030, hospital care for heart failure patients will be greater than 70 billion annually. Nurse Practitioners are absorbing more of the primary care for these patients, thus placing Nurse Practitioners in a position to readily identify the appropriate evidenced based treatment. The purpose of this research project was to evaluate Nurse Practitioners' knowledge of current heart failure guidelines. A survey was developed and distributed from August 15, 2016 through October 30, 2016 to gather information regarding the knowledge of heart failure guidelines by Nurse Practitioners. The surveys were analyzed using quantitative descriptive methods. Results showed 70% of participants identified themselves as being compliant with current guidelines. However, 60% proved to not be knowledgeable of the guidelines. The conclusions reveal a gap in treatment of outpatient heart failure treatment as a result of lack of guideline knowledge.

Spain's Healthcare System

Presenters: Abigail Andrews, Kelsey Chance, and Mary Crouse
Faculty Advisor: Shari Wherry

In this poster presentation, our group will discuss the health care system in Spain. The World Health Organization ranks Spain's healthcare system as the seventh best in the world. The Spanish National Healthcare System (SNS) was created by the Healthcare General Act in 1986, which remains the center of the SNS. The SNS system is a universal healthcare system that is predominantly funded by taxpayers and operated within the public sector. In 2002, devolution of health competences occurred at the regional level, which resulted in the formation of 17 regional health ministries that continue primary jurisdiction over the delivery of health within the territory area. The National Ministry of Health and Social Policy has some authority over certain healthcare areas, which include pharmaceutical legislation and equal health care services. The purpose of our Health economic poster is to provide an overview of the healthcare system in present Spain.

Increased Airway Pressures in the Mechanically Ventilated Surgical Patient

Presenter: Mario Johnson
Faculty Advisor: Melissa Lefave

When a patient is being mechanically ventilated, the amount of work needed to deliver a breath can be thought of in terms of pressure (Seigel, 2013). The total amount of pressure needed can be divided into two components one of which consists of work to overcome resistance in the airways also called resistive work (Siegel, 2013). The other component involves work to distend the lungs and chest wall or elastic work which normally moves into the opposite direction of lung compliance (Seigel, 2013). Increases in airway pressure are caused be either increases in airway resistance and/or decreased lung compliance. High peak airway pressures are important because they often indicate a change in the patient's condition or an equipment issue that needs to be quickly addressed. High airway pressure is not necessarily the culprit unless it reflects excessive alveolar pressure. High airway pressures may result in inadequate ventilation. It is a fact that some causes can be treated quickly while others might be more complicated in terms of identification and treatment. Issues that revolve around ventilator issues and those that pertain to increased airway resistance can typically be resolved quickly while those that involve lung compliance issues tend to be more complicated. Anesthetists must be able to properly manage surgical patients' airway pressures intraoperatively during mechanical ventilation based on a rapid, thorough, and efficient assessment. A comprehensive step by step guideline to assist in both identifying and treating excessive peak airway pressure in the surgical mechanically ventilated patient would be beneficial for anesthetists. For the purposes of this algorithm, interventions will mainly focus on differential diagnosis and subsequent treatment of high peak airway pressures due to ventilator issues and increased airway resistance. Lung compliance issues also often cause high peak airway pressures, but can be infinitely more complicated than the two issues aforementioned and would not be best served in this guideline. Advanced searches were done using multiple sources to determine appropriate interventions. Over 20 articles were screened to determine effective treatment measures for issues that revolve around ventilator complications (including inappropriate settings) and issues that cause increased airway resistance. The GRADE tool was used to assess the quality of evidence presented in research studies. Excessive peak airway pressure is but a symptom of an underlying issue that many times can be resolved by the anesthesia provider fairly quickly. Many issues, particularly those that involve decreased lung compliance, may require more complicated interventions outside the scope of these guidelines. Issues that revolve around ventilator settings/function and increased airway resistance can typically be resolved quickly and without the interruption of surgery or additional personnel provided the anesthetists has a guideline/algorithm readily available.

Switzerland Healthcare System

Presenters: Kevin Lum, Joseph Sudderth, and Paige Williams
Faculty Advisor: Shari Wherry

Switzerland's healthcare system is multifaceted where influence stems from three tiers of government, civil organizations, and civilian popularity (WHO, 2016). Switzerland's healthcare policy is rot with complexity generated from disjointed legislative and financial burdens shared amongst these powers. Health insurance is mandatory and guaranteed through legislation and subsidies (Camenzind, De Pietro, Sturny, Crivelli, Edwards-Garavoglia, Spranger, Quentin, 2015). Private insurers and healthcare providers are in charge of determining tax rates used to reimburse

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for health services. Switzerland's total health expenditure, per capita health spending, and out-of-pocket payments are among the highest in the European Union (Camenzind et al., 2015). Assumptions indicating the quality of Switzerland's health being poor would be incorrect. Health indicators combined with the perceived satisfaction among the Swiss show the quality of healthcare is high (Camenzind et al., 2015). However, reform is necessary to improve financial burdens of Switzerland's population. Topics presented will include:

- Payer system
- Financing
- Reimbursement
- Provider Choice
- Challenges
- World Ranking
- Gross Domestic Product spent on Healthcare

Development of an Algorithm for the Identification and Management of Atrial Fibrillation following Cardiothoracic Surgery: A R.E.D. Tabs Initiative

Presenter: Cory York
Faculty Advisor: Brian Foster

Introduction: Atrial fibrillation is the most common arrhythmia occurring following cardiac surgery in the adult patients. The incidence of occurrence is about thirty percent in cardiac surgeries. Methods: Only 39 articles of the 110 meet the inclusion and exclusion criteria for pharmacological treatments following cardiac surgery. The pharmacological treatments were broken down using the Vaughan-Williams antiarrhythmic drug classification system. The evidence-based grading tool GRADE system is used for rating quality of the body of the evidence. Results: There is still limited evidence-based research on the treatment of atrial fibrillation after cardiac surgery, therefore, the choice of an antiarrhythmic pharmacological treatment needs to be patient-specific treatment. It is recommended that amiodarone is used for the pharmacological conversion of postoperative atrial fibrillation following cardiac surgery.

Development of an Algorithm for the Management of Anesthesia During Electrical Power Failure

Presenter: Catherine Mask
Faculty Advisor: Brian Foster

Introduction: Cognitive aids can assist anesthesia providers in streamlining interventions to be performed during an event of power failure. Unfortunately, anesthetic management during electrical power failure is a neglected topic in anesthesia provider education. Research Question: How should anesthesia providers respond to operating room power failure to prevent patient harm? Methods: Database searches via the Cumulative Index to Nursing and Allied Health Literature, Medical Literature On-Line, the Cochrane Database, Read by QxMD, the online Discovery Service for Union University, and anesthesia textbooks used in nurse anesthesia programs. Results: Analysis of selected articles and the application of GRADE resulted in the algorithm steps for immediate anesthesia provider response during an intraoperative power failure. Conclusion: To my knowledge, this is one of only a few cognitive aids aiding with anesthetic management during power failure. This gap needs to be addressed to mitigate the impact of power failures on surgical patient outcome.

Clinical Intraoperative Dependability of Pulse Oximetry Monitoring on Adults Undergoing Anesthesia: A R.E.D. Tabs Initiative

Presenter: Scott Awtry
Faculty Advisor: Brian Foster

Aim: To produce an algorithm for issues that arise with the dependability of the SpO2 monitor. Background: Pulse oximetry is universally used for monitoring patient's oxygen status in real time during the intraoperative period. Since its invention in the 1940's it has continued to be developed and today both CRNA's and physician anesthesiologists rely on this monitor to constantly update them on the oxygen status of a patient during a case. This constant update of the oxygen status allows the anesthesia provider to make quick decisions that can affect the patient's outcome. It is because of the heavy reliance on this apparatus that quick decisions need to be made to correct errors that occur with the monitor that affect its dependability. Methods: The information sought was obtained thorough only academic listings and papers. Many of these papers have not

been updated since the early 1990's and thus were included in this study. A full search through research was done with goal of providing a high yield of evidence to provide the best algorithm for solving a variety of issues with SpO2 dependence. Results: An algorithm was able to be developed using a list of different case studies that demonstrated certain problems and how they were resolved. This was then placed into the GRADE instrument to determine the overall evidence to decision ratio Discussion: There were many different databases that were studied and most of the yielded results were in the form of case studies. There was a large amount for many of the issues that can arise with the SpO2 monitor, but there were also many that lacked large bodies of evidence. This led to the development of an algorithm in which many of the steps can be highly recommended while yet others can only be recommended in certain circumstances. Conclusion: While an algorithm was indeed able to be forged, there is much information that is still lacking and thus needs to be addressed. While this algorithm can be a tool to recommended steps to take next, there is very little evidence to back up some of the methods despite clinical evidence of it working in a past setting. Therefore, there is much improvement to the evidence that could be made that would allow for a more solid and functioning algorithm.

Developing an Algorithm for End Tidal Carbon Dioxide Waveform Not Returning to Baseline: A Plan to Help Anesthesia Providers

Presenter: Lauren Brown
Faculty Advisor: Brian Foster

Introduction: Continuous monitoring of ETCO2 for a patient undergoing general anesthesia is a standard of care. Presence of expired carbon dioxide is one of the best indicators of a secured advanced airway. Problem Statement: A common abnormal waveform seen in anesthesia practice is ETCO2 not returning to baseline. Review of Literature: There is no study illustrating overall causes and treatments of abnormal ETCO2 not returning to baseline. Methods: Articles and case reports that met inclusion criteria were evaluated using the GRADE assessment tool prior to the design of the algorithm. Results: The GRADE assessment tool determined the algorithm to be "moderate" quality. Discussion: The order of causes addressed in the algorithm were based on frequency of occurrence, interventions used by anesthesia providers in case reports, and common practice seen by anesthesia providers. Conclusion: Peers utilizing the AGREE II tool evaluated the algorithm and determined it was applicable to anesthesia practice.

Development of an Algorithm for the Identification and Management of Post-anesthetic Seizure

Presenter: Katherine Brown
Faculty Advisor: Brian Foster

A guideline was developed to serve as a reference for anesthesia providers caring for post-anesthetic patients suspected of having a generalized convulsive seizure (GCS). It is important for anesthesia providers to be able to distinguish between seizures and other phenomena with similar presentation, such as shivering and psychogenic non-epileptic seizures (PNES). A thorough literature review was conducted. Evidence was assessed using the GRADE tool for guideline development. A guideline was formulated using a guideline development group of anesthesia providers. The guideline first serves to identify whether patients have shivering, PNES, or GCS and then provides guidance for management.

Germany's Healthcare System

Presenters: Aaron Lewis, Jason Poletti, and Alan Richardson
Faculty Advisor: Shari Wherry

The United States in the year 2017 has seen the introduction of a new presidential regime and will likely face drastic changes to its health care system. Germany, who's healthcare structure differs from that of the United States, is ranked 25th by the World Health Organization for overall health care and 3rd in the world for GDP expenditure (WHO, 2015). While an internal evaluation of strengths and weaknesses would benefit the U.S. as it attempts to restructure national health care, it also would prove valuable for the U.S. to observe the health care systems of other countries to see their successes and failures. We have examined and evaluated the health care system of Germany in the following aspects: prayer system, financing, reimbursement, provider choice, challenges, world ranking, and gross domestic product spent on healthcare. A poster presentation was prepared to demonstrate the aforementioned information in an organized and methodical display.

Development of an Algorithm for the Identification and Management of Intraoperative Bronchospasm: A R.E.D. Tabs Initiative

Presenter: Britley White
Faculty Advisor: Melissa Lefave

In the United States, intraoperative bronchospasm remains a large percentage of anesthesia-related respiratory events that result in brain damage or death due to substandard care, inadequate practice, and system failures. Bronchospasms are highly prevalent in patients that present with asthma, chronic obstructive pulmonary disease, anaphylaxis or those who smoke and are easily triggered by laryngoscopy, intubation, and airway suctioning. With each anesthetic, the patient is introduced to a large range of potential allergens and instrumentation that could exacerbate an underlying hyperreactive airway and lead to devastating consequences if the provider does not take action immediately and accurately. The purpose of this research is to develop an algorithm that will aid in the identification and management of intraoperative bronchospasm so that the appropriate treatment and intervention is expedited. Optimal management skills and early recognition of this life-threatening intraoperative event will promote an uneventful patient outcome.

Perioperative Hypothermia in Elderly Patients

Presenter: Ann Kumbani
Faculty Advisor: Molly Wright

This paper will explore evidence-based literature detailing the various causes of perioperative hypothermia and the different methods of warming surgical patients in order to reduce incidences of hypothermia. "Hypothermia is defined as core body temperature less than 36 degrees Celsius…" (Luis, Silva, Pascoa, Abelha, 2014, para. 1). Perioperative hypothermia in elderly surgical patients is often caused by uncomfortable operating room (OR) temperatures which are often maintained at 17 degrees Celsius and 20 degrees Celsius. Moreover, volatile agents are further believed to lower the body's core temperature which alters its ability to auto-regulate (Hart, Bordes, Hart, Carsino, & Harmond, 2011). The Surgical Care Improvement Project (SCIP) in conjunction with the Center for Medicare and Medicaid Services (CMS) came up with measures to reduce incidences of perioperative hypothermia (The Joint Commission, n.d.). Despite these efforts, many incidences of perioperative hypothermia are still reported in elderly surgical patients. This paper will further explore various warming methods, forced-air warming, etc., used by anesthesia providers and physicians with the aim of maintaining normothermia in patients undergoing surgical procedures. Perioperative hypothermia is known to affect as many as 20% to 90% of all patients (Torossian, Brauer, Hocker, Bein, Wuf, & Horn, 2015) undergoing surgical procedure. Such patients are believed to be at greater risk of developing surgical site infections, increased loss of blood, and prolonged stay in postoperative care unit (PACU) (Torossian, et al., 2015). Uniform implementation of evidence-based perioperative warming guidelines can substantially reduce incidences of hypothermia in elderly patients undergoing surgical procedures.

Effectiveness of Therapeutic Hypothermia on Neurological Outcomes in the Adult Post Cardiac Arrest Patient: An Integrative Research Review

Presenters: Morgan Neil, Amanda Rogers, and Shenell Thompkins,
Faculty Advisors: Connie Cupples and Zoila Sánchez

Approximately 500,000 Americans annually experience cardiac arrest. Neurological function is threatened during cardiac arrest and shortly after return of spontaneous circulation (ROSC).

Therapeutic Hypothermia (TH) has been shown to improve neurological function in adult post cardiac arrest patients. Improved neurological outcomes consists of patients that are discharged from the hospital to home or rehabilitation. The purpose of this integrative research review will be to evaluate the effectiveness of TH on neurological outcomes in adult post-cardiac arrest patients. Question: Is TH on adult post-cardiac arrest patients effective in improving neurological outcomes? Databases that will be used are PubMed, EBESCO, CINAHL, Sciencedirect, and Medline Plus. Terms to be searched: "therapeutic hypothermia," "cardiac arrest," "brain," "neuroprotection," and "neurological outcome." This review is ongoing. Based on precursory literature review, TH leads to improved neurological outcome, decreased complications, and increased survival to hospital discharge.

Comparison of the International Health Care Systems: Australia

Presenters: Anita Langston, Lori Taylor, and LeAnne Wilhite
Faculty Advisor: Shari Wherry

The health care system in Australia is a multi-faceted delivery system governed by both public and private sectors. The funding for health care services is provided mostly by the government and is supported by legislative, regulatory, and funding arrangements (Australian Institute of Health and Welfare, 2014). Although Australia offers a universal health system with a plethora of services, their health problems such as obesity, cardiovascular disease, and diabetes demonstrate continued need for health interventions (OECD, 2015). The purpose of this presentation is to examine the health economic status of Australia in relation to health quality data. The following topics will be included:

- Payer System
- Financing
- Reimbursement
- Provider choice
- Challenges
- WHO Ranking
- Gross Domestic Product spent on Healthcare

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Music Therapy: An Integrative Healthcare Implement

Presenter: Thomas Bryan Barnes
Faculty Advisor: Shari Wherry

As human beings, we are all wired to be music enthusiasts either lovers of music or musicians. As such, music therapy is a diverse discipline in practice and has been used extensively in medical settings. As an established health profession, music therapy uses music to form a therapeutic association to address the needs of clients such as emotional, social, physical and cognitive needs. Studies in music therapy provide substantial support on its effectiveness in various aspects like enhancing movement and physical rehabilitation, providing emotional support and outlet to express feelings for the clients. The current study is an evidence-based review of music therapy as a healing implement with suggestions for its use as a safe and effective integrative implement in clinical practices for healthcare providers.

Comparing the Side Effects of Tamoxifen in Women with Estrogen Positive Breast Cancer Who are in their 1st-5th Year of Tamoxifen Therapy and Women in their 6th-10th Year

Presenter: Worthy S. Walker
Faculty Advisor: Joyce Snyder

Tamoxifen, a selective estrogen receptor modulator (SERM), can cause side effects affecting the quality of life in women with estrogen positive breast cancer. The Adjuvant Tamoxifen: Longer Against Shorter (ATLAS) trial (2013), found tamoxifen to be more effective in decreasing breast cancer recurrence when extending the use from five to ten years; however, there is limited research involving the extended side effects and quality of life issues in these patients. Women at the Kirkland Cancer Center were divided in to two groups and surveyed using the Functional Assessment of Cancer Therapy – Endocrine Symptom Subscale (FACT-ES) to evaluate perceived side effects. Their answers were compared using a 2-Group MANOVA, overall, showing no statistical difference between the two groups. Going forward, this will help us to give women statistical evidence that there is no significant difference in side effects experienced during the extended use of tamoxifen therapy.

Development of an Algorithm for the Identification and Management of Unanticipated Intraoperative Hemorrhage: Utilization of Plethysmograph Waveform Variation with Low Volume verses High Volume Resuscitation of Lactated Ringers or Albumin:A R.E.D. Tabs Initiative

Presenter: Rachel Elizabeth Tonahill
Faculty Advisors: April Yearwood and Molly Wright

Background: Intraoperative hemorrhage is a constant threat in any invasive surgical procedure and can initiate a deadly cycle of events leading to inadequate tissue perfusion, end-organ injury and death. Intraoperative hemorrhage remains a poorly defined and highly subjective phenomena, therefore, in the absence of advanced hemodynamic monitoring and readily available blood products such as are available in the case where hemorrhage is highly anticipated (trauma, obstetrics, and cardiovascular surgeries), providers must be ready to assess for subtle clinical indicators of hemorrhage before the spiral into uncompensated hemorrhagic shock begins. Methods: A systematic search of the literature was then performed in order to find evidence for the validity of plethysmographic waveform variability as an early indicator of hemorrhage. A second review of literature geared towards appropriate management for intraoperative hemorrhage indicates the current trend towards low volume resuscitation, goal directed therapies, and permissive hypotension treatment modalities for hemorrhage. Discussion: Following the recommendations of the guideline development group based on the findings of this project as assessed for quality by the GRADEpro Algorithm Development Tool, an evidence based decision can be made that plethysmographic variability may be an early indicator of intraoperative hemorrhage, and therefore, based on the results of this study, a low volume resuscitation of either 1:1 replacement with lactated ringers or albumin 5% has fewer post operative complications up to and including increased morbidity and mortality. Conclusion: Unanticipated intraoperative hemorrhage may be clinically indicated by increased plethysmographic waveform variability. The first step for treatment in this R. E. D. Tabs algorithm project development is a low volume 1:1 resuscitation of either lactated ringers solution or albumin 5%.

An Algorithm for the Identification and Management of Pediatric Emergence Delirium

Presenter: Juli Johnson
Faculty Advisor: Brian Foster

Pediatric emergence delirium (P.E.D.), a post-anesthesia occurrence among pediatric patients, is a psychological and physiological state manifested as disorientation, restlessness, and lack of awareness. This type of agitated recovery can cause harm to patients and surgical sites. P.E.D. leads to increased medication administration, higher perioperative costs, and risk of serious postoperative events. The purpose of this project is to identify current evidence-based recommendations and develop an algorithm to assist in clinical decision-making regarding P.E.D. A database search of evidence-based practice, centered on three research questions, encompassed all topics necessary to create the algorithm. After review of literature, decision tables assessed the resources and their ability to contribute to algorithm recommendations. Evidence was summarized, and recommendations were then developed. Most recommended treatments were ranked as strongly recommended for the intervention. Following the steps of this algorithm will provide an optimal way to recognize and minimize this distressing adverse effect of anesthesia.

Mexico: A Tiered System

Presenters: Damani Johnson, Megan Ruszczyk, and Margaret Whitehead,
Faculty Advisor: Shari Wherry

Mexico has a two-tier healthcare system with access to care determined by insurance type and the ability to pay for health care services. There is a private insurance health care system and a public health care system. According to ManattJones Global Strategies (2015), "The quality, scope, and approach to health care vary across the six institutions (IMSS, ISSSTE, Seguro Popular, PEMEX, SEDENA, and SEMAR). Each has its own independent network of doctors, clinics, hospitals, pharmacies, treatment centers, and unions" (p. 3). The private system is only available to those with private insurance or the financial means to pay out of pocket. The public system is controlled by the government and all providers and institutions of care are regulated by the government. We will be discussing the Mexican health care system in more depth and highlighting recent healthcare developments and comparing that to the United States current systems.

United Kingdom Healthcare System

Presenters: Billie Browning, Christian Lopez, and Tammie Vanstory
Faculty Advisor: Shari Wherry

In this poster presentation our group will be discussing the intricacies of the United Kingdom's healthcare system. The National Health Service (NHS) is the name of the government sponsored healthcare system founded in 1948 that currently exists today in the United Kingdom. The NHS is composed of four publicly funded healthcare systems the National Health Services (England), NHS Scotland, NHS Wales and Health and Social Care in Northern Ireland. The government-sponsored universal healthcare system is a single-payer system funded through central taxation with everyone being eligible for care. The purpose of our Health Economic Poster is to provide an overview to the reader of the current healthcare system of the United Kingdom while discussing:

- Payer system
- Financing
- Reimbursement
- Provider Choice
- Challenges
- World Ranking
- Gross Domestic Product spent on Healthcare

Development of an Algorithm for the Identification and Management of Negative Pressure Pulmonary Edema: A RED Tabs Initiative

Presenter: Lucy Oliver
Faculty Advisor: Melissa Lefave

Negative pressure pulmonary edema (NPPE) occurs as the result of the high negative intrathoracic pressures generated to overcome upper airway obstruction. In adults, 74% of postoperative NPPE occurs post-extubation, and morbidity and mortality associated with NPPE is greater than 40%. Currently, no algorithm exists concerning the management of NPPE in adult postoperative patients. This NPPE algorithm was developed based on the WHO Handbook for Guideline Development. In adult postoperative NPPE patients, the priority intervention is having a secure airway. Hypoxia should be treated with the least invasive to the most invasive ventilation modalities. Pulmonary edema in NPPE can be treated with loop diuretics if the patient's fluid status has been corrected, but treatment with steroids is controversial and beta-agonist treatment is theoretical. Use of this NPPE algorithm as part of the RED Tabs Initiative can help guide anesthesia providers increase patient safety and improve patient outcomes.

Examining the Knowledge Base of Nurse Practitioners in Prescribing Trigger Point Dry Needling (TrP-DN) when Treating Chronic Pain

Presenter: Jessie Yu
Faculty Advisor: Laurie Bagwell

Chronic pain is a prevalent issue that primary care providers are challenged with on a daily basis. Millions of Americans are reliant upon pharmacological methods to manage chronic pain. The purpose of this report is to examine the knowledge base of Nurse Practitioners' understanding of trigger points and using dry needling for treatment with chronic pain. A quantitative, descriptive research study was used to assess the knowledge base. From August 15, 2016 to November 15, 2016, a thirteen

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question survey was emailed to qualified providers to establish a better understanding of the role dry needling plays treating chronic pain. 73.68% of providers' report that the primary reason for not treating chronic pain with dry needling is due to lack of knowledge. With the information provided from this study, primary care providers can be educated in the use of dry needling and how to better manage patients who experience chronic pain.

A Pilot Study to Assess the Efficacy of the Use of a Smartphone Application on the Intake of Sugary Beverages on the Overweight and Obese Adult

Presenter: Stacey LaBarre-Powell
Faculty Advisor: Joyce Snyder

America's consumption of sugary drinks is very popular. Sweetened sugar beverages (SSB's) are liquids which contain sugar and other artificial sweeteners such as sodas, fruit drinks, energy drinks, sport drinks and other ready-to-drink teas and coffees (McGuire, 2012). The increased intake of sugary beverages has been associated with overweight and obesity (McGuire, 2012). The purpose of this study was to determine if inducing a change in behavior regarding SSB intake, using a standard fact sheet from the American Heart Association and the My Fitness Pal™ app (2016), will increase awareness in reducing SSB intake in the overweight and obese patient. The participants completed the Beverages 15-Item Questionnaire (BEVQ-15), at the initial visit and at the follow-up thirty-day visit. The results showed significant differences with the reduction of SSB's, resulting in participants becoming keenly aware of their SSB intake and significantly reducing SSB intake after a thirty-day period.

A Comparison Between Colloid and Crystalloid Administration in Managing Intracranial Pressure (ICP): An Integrative Research Review (IRR)

Presenters: Wendy Caudle, Jeremiah Cole, Jack Fields, Justin Harrison, and Kathryn Tims
Faculty Advisors: Connie Cupples and Zoila Zoila Sánchez

Increased intracranial pressure has been associated with intra-operative fluid administration in patients in Trendelenburg position. There is a lack of evidence to show if crystalloids or colloids are most effective in mitigating ICP in Trendelenburg position. We will conduct an IRR to compare crystalloids and colloids and determine the best choice in lessening the rise of ICP. Databases include EBESCO, PubMED, and CINAHL from 2007-2017. Search terms include: "Trendelenburg", "colloids", "positioning", and "crystalloids". This study is a work in progress. We anticipate that the research will reveal that the use of crystalloids in patients requiring Trendelenburg will demonstrate a greater rise in ICP than those who received fluid resuscitation with colloids.

Effect of Blood Sugar Control on Surgical-Site Infection Rates: An Integrative Research Review

Presenters: Maizee Black, Meggy Hayes, Racheal Howard, and Shana Mosley
Faculty Advisors: Connie Cupples and Zoila Sánchez

Surgical-site infections (SSI) are associated with an estimated 8,205 deaths annually. Blood vessel narrowing and decreased ability of red blood cells to carry nutrients result from hyperglycemia. An IRR will be conducted to examine evidence of glycemic control less than 200 on SSI's in adult diabetic patients. Databases used will include PubMED and EBSCO. Search terms will include "hyperglycemia" and "surgical-site infections." This is a work in progress and it is anticipated that the findings related to glycemic control will result in decreased surgical-site infections in adult diabetic patients. It is believed that results will show that glycemic control less than 200 will decrease the rate of SSI's. Limited glucose monitoring is a possible limitation.

Complications of Regional Anesthesia

Presenter: Ana M. Dragoiescu
Faculty Advisor: Molly Wright

Regional anesthesia is a form of anesthesia in which only a remote area of the body is blocked from sensory and motor input. This practice affords multiple benefits compared to general anesthesia including reduced morbidity and mortality, superior postoperative analgesia, and cost effectiveness. However rare, complications of regional anesthesia can be distressing to patients and practitioners and can increase hospital stays and per capita healthcare costs. Healthcare organizations that routinely practice regional anesthesia lack guidelines on the most commonly occurring and serious

complications of regional anesthesia. Resultantly, research indicates geographical variation and inconsistency in quality and safety measures of treatment. With the advent of evidence-based practice, there has been a widespread move in developing clinical practice guidelines, which are designed to improve the quality of care, reduce the use of ineffective or harmful interventions, and facilitate treatments of maximum benefit and cost. The purpose of this project is to develop a set of guidelines on complications of regional anesthesia.

Canadian Healthcare System

Presenters: Brent Earwood, Stacey Hodges, and Patience Whitten
Faculty Advisor: Shari Wherry

Healthcare in Canada is provided through a universal system funded by tax payer dollars. The Canada Health Act of 1984 defined the current Canadian healthcare system which provides all qualifying citizens with "medically necessary" healthcare (Bielska, Hampel, & Johnson, 2012). While hospital visits and physician costs are covered services, medications are covered through a separate public program, unless the medications are administered in the hospital (Bielska, Hampel, & Johnson, 2012). Although, there is an average 13.3-week delay in the provision of certain services, the majority of Canadians are satisfied with their current healthcare plan (Ridic, Gleason, & Ridic, 2012). The purpose of this poster presentation is to provide the reader with baseline characteristics of healthcare delivery in Canada. The discussion will include the payer system, financing, reimbursement, production, provider choices, challenges, WHO ranking, and GDP spent on healthcare.

Development of an Evidence Based Algorithm for the Recognition and Treatment of Intra-Operative Beta-Blocker Withdrawal Tachycardia

Presenters: Nathaniel Crum and Brian Foster
Faculty Advisor: Molly Wright

Beta-blocker therapy is common among surgical patients, making withdrawal from such therapy an ongoing concern for anesthesia providers, yet an algorithm designed specifically to aid in intra-operative diagnosis and treatment of beta-blocker withdrawal is not currently available to anesthesia providers. An algorithm that assists in the identification and treatment of intra-operative beta-blocker withdrawal could increase response time and decrease adverse outcomes related to the phenomenon. An extensive review of literature surrounding beta-blocker withdrawal was conducted to determine the signs and symptoms, at risk population, and evidence-based treatment. Upon synthesis of data, confirmation was made concerning the danger of beta-blocker withdrawal and the impact it has on surgical patients, as well as the population most at risk. An algorithm was constructed from this data that addresses intra-operative diagnosis and treatment based on the most up to date pharmacological recommendations.

Comparison of International Health Care Systems: Japan

Presenters: Fhteachia Andrews, Tameka N. Jones, and Marilyn Wilbourn
Faculty Advisor: Shari Wherry

Japan has provided universal healthcare coverage for over fifty years. They have been able to control healthcare costs, provide access to care, and maintain positive health care outcomes. (Osborn, 2011). Japan's national and local governments are required by law to provide quality medical care to the nation (Matsuda, 2016). However, Japan is now facing some challenges fiscally within their health system due to a sluggish economy, low birth rate, and aging of its population (Reich & Shibuya, 2015). Their government regulates the majority of their public health insurance system (PHIS). This presentation will examine Japan's PHIS including:

- Payer System
- Financing
- Reimbursement
- Provider Choice
- Challenges
- World Ranking
- Gross Domestic Product spent on healthcare

Effect of 12 Hour Shifts Compared to 8 Hour Shifts on Nursing Burnout: An Integrative Research Review

Presenters: Pamela Kendrick, LaQuisha McFerrin, Debbie Mitchell, and Kimberly Thompson
Faculty Advisors: Connie Cupples and Zoila Sánchez

Evidence shows an increase in fatigue, decreased alertness, decreased job satisfaction, and increase in errors among nurses who work 12 hour shifts. Studies to date primarily focus on the benefits of working 12 hour shifts. After searching the literature, there is a lack of evidence on the effect of 12 hour shifts compared to 8 hour shifts on nursing burnout. The purpose of this Integrative Research Review will be to evaluate the effect 12 hour shifts have on burnout in nurses in comparison to those working 8 hour shifts. Databases to be used are PUBMED, CINAHL, and EBSCO. Search terms will be "burnout", "12 hour shifts", "nursing shifts", and "fatigue". This study is a work in progress with preliminary reviews indicating that the incidence of burnout in nurses is increased by working 12 hour shifts.

Effectiveness of Cricoid Pressure During Endotracheal Intubation for Aspiration Prevention: A Systematic Review (Integrative Research Review)

Presenters: Maureen Balmeo, Jason Bolt, Brian Gibbs, Benjamin Stephens, Qianwen Williamson
Faculty Advisors: Connie Cupples and Zoila Sánchez

Cricoid pressure has been long used to prevent aspiration. There are controversies regarding its efficacy in preventing aspiration. The purpose of this Integrative Research Review will be to evaluate current evidence on the effectiveness of cricoid pressure in aspiration prevention during tracheal intubation. A systematic review will be conducted by using the literature databases of MEDLINE (Ebesco), PubMed, and Google Scholar. Terms that will be searched are: "cricoid pressure", "Sellick maneuver", and "anesthesia". A preliminary review of literature indicates that more well-designed and conducted randomized controlled trials (RCTs) are needed. This is a work in progress. We surmise that cricoid pressure, if correctly applied, can contribute to aspiration prevention, increased ease of intubation, and improved patient safety. Further RCTs need to be conducted so that the risks and benefits of cricoid pressure for aspiration prevention will be more clearly defined and training on cricoid pressure application will be enhanced.

A Comparison of Aerobic Exercise versus Thiazide Diuretics in Establishing Normotensive Blood Pressure in African Americans: An Integrative Research Review (IRR)

Presenters: Frankie Carroll, Brooke Garner, James Mooty, Ema Uko-Abasi, Angela Upchurch
Faculty Advisor: Connie Cupples and Zoila Sánchez

Hypertension is a leading cause of death in the United States, affecting one out of every three adults. African Americans develop hypertension more often, and at an earlier age than any other race. After reviewing the literature, there is a lack of information regarding effective blood pressure control with aerobic exercise compared to thiazide diuretics in this population. The purpose of this IRR will be to examine the evidence and evaluate if thiazides or aerobic exercise

results in more effective blood pressure control. Databases to be used are PubMED and EBSCO. Search terms will be "hypertension","exercise", "thiazide", and "African American". Inclusion criteria will be African Americans that are 18 years or older and newly diagnosed with hypertension. The results will be limited to from 2012-2017. Based on preliminary reviews, this population will achieve better blood pressure control with aerobic exercise.

Prophylactic Aspirin Regimen for Preventing of Colorectal Cancer: An Integrative Research Review

Presenters: Anna Brown, Ginnifer Hutcheson, Mollie Kinard, and Bonnie Sweat
Faculty Advisors: Connie Cupples and Zoila Sánchez

Colorectal cancer is a common malignancy in the United States. New evidence suggests that the use of prophylactic aspirin may significantly decrease the risk of colorectal cancer. The purpose of this study will be to evaluate the effectiveness of prophylactic aspirin within the U.S. population in reducing the risk of developing colorectal cancer. We will conduct a systematic review by searching electronic databases including UpToDate, Medline, and PubMed. Search terms will include: "aspirin", "prophylaxis", and "colon cancer." A preliminary review of literature shows the benefits of prophylactic aspirin in reducing the risk of colorectal cancer incidence and mortality versus no prophylactic aspirin regimen.

Development of an Algorithm for the Identification and Management of Intraoperative Atrioventricular Junctional Tachycardia: A R.E.D. Tabs Initiative

Presenter: Alexandra A. Maynard
Faculty Advisors: Molly Wright and April Yearwood

Objective: Develop an algorithm that will allow for prompt and accurate diagnosis and treatment of intraoperative atrioventricular (AV) junctional tachycardia in the adult population undergoing general anesthesia. Method: A systematic literature review (SLR) was conducted based on three research questions. The databases searched included Academic Search Premier, CINAHL, MEDLINE, Science Direct, PubMed and Google Scholar. The GRADE approach was used to evaluate the quality of evidence. With the expertise of the guideline development group, the final data was reviewed and incorporated into an algorithm. Results: An evidence-based algorithm was formulated highlighting the clinical indicators, possible causative factors, and the step-by-step treatment options for both the hemodynamically stable and unstable adult patient presenting with AV junctional tachycardia under general anesthesia. Implications: This specific algorithm will be incorporated into a Ready Evidence (based) Decisions (R.E.D.) Tabs folder that will guide anesthesia providers in times of crises. The goal is to augment the anesthetist's diagnosis and treatment of events that occur perioperatively to prevent undue harm to their patients.

Effectiveness of Adding Contrave to a Hypocaloric Diet and Exercise Regimen to Increase the Results of Weight Loss: An Integrative Research Review

Presenters: Suzanna Barnhart, Marianne Kirk, Ashley McTyre, Kristina Smith, Marlo Smith
Faculty Advisors: Connie Cupples and Zoila Sánchez

Contrave is a drug approved for weight loss in individuals with BMIs greater than 27 with at least one comorbidity or a BMI of 30 or greater. The purpose of this Integrative Research Review will be to evaluate the effectiveness of Contrave with a hypocaloric diet and exercise regime on weight loss in overweight individuals. Databases, books, abstracts, and conferences will be used. Search terms will be "obesity", "Contrave", "buproprion HCL", "naltrexone HCL", "diet and exercise", "BMI" and "weight loss". This is an ongoing study. We foresee that adding Contrave will be more effective in weight loss than a hypocaloric diet and increased physical activity alone.

Pharmacologic Interventions versus Non-Pharmacologic Interventions for Prevention of Chemotherapy Induced Nausea and Vomiting in Pediatric Patients

Presenters: Cassie Clark, Adrianne Dunbar, Alaina Little, Jamia Moore, and Nicole Rivera
Faculty Advisors: Connie Cupples and Zoila Sánchez

Nausea and vomiting are well-known adverse effects of chemotherapy. Many pediatric patients undergoing chemotherapy report the occurrence of chemotherapy induced nausea and vomiting (CINV). After reviewing the literature, there is inadequate evidence on the effectiveness of pharmacologic and non-pharmacologic interventions in CINV.The purpose of this Integrative Research Review study will be to evaluate current evidence that assesses the effectiveness of pharmacologic and non-pharmacologic interventions in the prevention and treatment of CINV in pediatrics. Databases to be used are MEDLINE and CINAHL. Search terms include "chemotherapy", "nausea", "vomiting", and "pediatrics". This is a work in progress. Preliminary findings indicate pharmacologic interventions will show greater efficacy in prevention and treatment of CINV.

The Effect of Antibiotics Compared to Cranberry Supplement Ingestion in Preventing Urinary Tract Infections in Women: An Integrative Research Review

Presenters: Bethany Hardison, Angela Harriger, Lisa Hellmann, Ann Napier, and Haley Walters
Faculty Advisors: Connie Cupples and Zoila Sánchez

Recurrent urinary tract infections (UTI) are common among women in various ages and stages of health conditions. Due to the physiological nature of the female anatomy, women are more susceptible to UTIs. In recurrent UTI prevention, there is conflicting evidence regarding the efficacy of cranberry supplementation in comparison to prophylactic antibiotics. The

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purpose of this Integrative Research Review will be to assess the effectiveness of cranberry supplement ingestion versus antibiotics in preventing recurrent urinary tract infections in women. Databases and other sources to be used are UpToDate, EBSCO, PubMED, abstracts, and academic articles from 2012 to 2017. Search terms will be "urinary tract infection," "cranberry supplementation," and "antibiotic prevention." Based on preliminary reviews, antibiotic prophylaxis provides more consistent prevention of recurrent urinary tract infections when compared to the use of cranberry supplement ingestion.

Effectiveness of Video Laryngoscopy Compared to Direct Laryngoscopy on Reducing Patient Injury During Endotracheal Intubation: An Integrative Research Review

Presenters: Jennifer Estes, BethAnn Jones, Jane Kopecky, Natalya Malenko, and Caleb Wagler
Faculty Advisors: Connie Cupples and Zoila Sánchez

Laryngoscopy is an irritating, invasive procedure with complications including dental and airway trauma and adverse systemic effects. Evidence has shown that video laryngoscopy increases glottic visualization, improves first attempt intubation success, and reduces injury. The purpose of this Integrative Research Review will be to evaluate the effectiveness of video laryngoscopy compared to direct laryngoscopy in patients requiring endotracheal intubation. Searches will be conducted of reputable online full-text and peer-reviewed articles. Searched terms will include: "glidescope", "direct laryngoscopy", "intubation", and "video laryngoscopy". This study is a work in progress. Based on preliminary reviews, video laryngoscopy will be effective in reducing complications in patients requiring endotracheal intubation.

Effectiveness of Alcohol-Based Hand Antiseptics on the Prevention of Methicillin-resistant Staphylococcus (MRSA) in the Intensive Care Unit (ICU)

Presenters: Kenneth Krzyzkowski, Amber Palmer, Hannah Shaw, Camie Sherer, and Kenneth Spart
Faculty Advisors: Connie Cupples and Zoila Sánchez

MRSA is a type of multidrug resistant bacteria caused by staphylococcus that can cause infections in different parts of the body spread by contact. Evidence has shown alcohol-based hand antiseptics decreases MRSA associated infections, although there is lack of evidence in the effectiveness in preventing MRSA. An IRR will be conducted to assess alcohol-based hand antiseptics and the prevention of MRSA in ICU. Databases used will be PubMed, Medline, and ScienceDirect, using terms,"MRSA infections", "ICU", "alcohol-based hand antiseptics", and "non-alcohol based hand hygiene". We foresee that the findings related to the use of alcohol-based hand antiseptics in the ICU. We anticipate alcohol-based hand antiseptics will be effective in preventing MRSA infections in the ICU setting. Additional research continues to be conducted on the effects of alcohol-based antiseptics and to decrease risks of MRSA in the ICU.

Efficacy of Artificial Skin Barriers in Sacral Pressure Wound Prevention in ICU Patients: An Integrative Research Review

Presenters: Shayla Alexander, Heidi Flowers, John Gordon, and Rebecca Gray,
Faculty Advisor: Connie Cupples and Zoila Sánchez

Sacral pressure wounds have been found to increase length of stay, increase the cost of care, and are associated with increased mortality. The addition of prophylactic artificial barriers has been shown to reduce the incidence of sacral pressure wounds in the ICU seen with standard sacral pressure wound prevention alone. The purpose of our integrative research review will evaluate the reduction in incidence of ICU sacral pressure wounds though the addition of prophylactic artificial barriers. Question: Does the addition of prophylactic artificial barriers reduce the incidence of ICU sacral pressure wounds seen with the use of standard practices? Based on the preliminary review, we anticipate our findings will demonstrate that the addition of prophylactic artificial barriers added to standard ulcer prevention practice will reduce sacral pressure wound occurrence.

Development of an Algorithm for the Identification and Management of Pediatric Bradycardia upon Induction of Anesthesia: A.R.E.D Tabs Initiative

Presenter: Meagan Gallaher
Faculty Advisor: Melissa Lefave

Despite the growing amount of research being done within pediatric anesthesia, stepwise algorithms were lacking for specific problems an anesthetist may be challenged with during the perioperative period. The pediatric bradycardia upon induction of anesthesia algorithm was created to guide anesthesia providers to recognize and intervene appropriately. Pediatric patients present with differing anatomy and physiology from the adult patient, making them vulnerable to bradycardia upon induction of anesthesia. Cognizance of these differences and possible causes of pediatric bradycardia upon induction is crucial to prevent morbidity and mortality. A rigorous systematic literature review was completed to review current recommendations. Literature analysis was performed utilizing GRADE data entry to examine levels of evidence for guideline propositions. The World Health Organization (WHO) Handbook for Guideline Development was utilized to create, assess, and direct guideline recommendations. This guideline delivers anesthesia providers valuable information to provide safe, competent care to the pediatric population. The pediatric bradycardia algorithm can serve as a useful resource while in the operative setting and as a beneficial review for providers with insufficient expertise prior to pediatric cases.

Development of an Algorithm for the Prevention and Management of Postoperative Nausea and Vomiting: A R.E.D. Tabs Initiative

Presenter: Bradley Beckstead
Faculty Advisor: Melissa Lefave

Postoperative nausea and vomiting (PONV) affects a large population of surgical patients within the first 24 hours of surgery. The effects of PONV can be mild, but also can result in serious physical and emotional complications as well. A systematic search was performed in order to find the most recent data regarding postoperative nausea and vomiting. Only data from peer-reviewed journals were used from the years 2001 to present to find data in order to develop the algorithm. The results from current evidence-based literature stated that the major causes of PONV are volatile anesthetics, nitrous oxide, use of opioids, and long duration of surgery. Evidence-based literature showed that beneficial pharmacological interventions for preventing PONV include aprepitant, ondansetron, dexamethasone, transdermal scopolamine, metoclopramide, diphenhydramine, droperidol, and promethazine. The evidence-based results were implemented into an easy-to-follow algorithm that may be used for prophylaxis and treatment of PONV in the adult surgical patient.

Development of an Algorithm for Recognition and Management of Pseudocholinesterase Deficiency Following the Administration of Succinylcholine to Facilitate Endotracheal Intubation: A R.E.D. Tabs Initiative

Presenter: Ashley Reecht
Faculty Advisor: Molly Wright

More than 100 million doses of neuromuscular blocking agents (NMBAs) are administered in the United States every year, and an estimated 40% result in residual neuromuscular blockade (RNMB). RNMB can result in aspiration, hypoxia, increased upper airway collapsibility, delayed extubation, prolonged hospitals stays, and death. The administration of the rapid acting, depolarizing NMBA, succinylcholine, however, does not typically result in RNMB. Full spontaneous recovery is normally achieved within five to ten minutes due to rapid hydrolysis of the drug by the enzyme plasma cholinesterase (PChE). When a genetic condition known as pseudocholinesterase deficiency (PCD) is present, however, the metabolism of succinylcholine is impaired. PCD is estimated to occur in six to seven percent of adult surgical patients, with most unaware of this underlying condition until after receiving succinylcholine. The aim of this project was to develop an evidenced-based algorithm on the recognition and management of pseudocholinesterase deficiency, in order to improve health care decision-making and quality outcomes for patients undergoing general anesthesia who require succinylcholine to facilitate endotracheal intubation. An initial comprehensive review of literature was conducted on PCD, to determine the scope of the complication and its significance for anesthesia providers. The formulation of three main overarching research questions sought to determine outcomes for the signs and symptoms, risk factors, and treatment and management options for PCD. Each research question was addressed in an individual systematic search, with the databases Medline (EBSCO), CINAL-fulltext, PubMed, Science Direct, and Union University's article database. Inclusion criteria was studies, involving adult surgical patients who received the standard intubating dose of succinylcholine (0.5-1mg/kg) to facilitate endotracheal intubation. Exclusion criteria was studies involving succinylcholine drips/large intubating doses/re-dosing, studies exclusively involving mivacurium, pediatric and animal studies, and non-English written articles. The results were formally assessed for quality using the Grades of Recommendation, Assessment, Development and Evaluation (GRADE) instrument, which evaluated the evidence of outcomes across 28 studies. A summary of findings table was created and presented to a guideline development group to determine each outcome's applicability for use in the algorithm and assign a numerical score based on the strength of the evidence. Five signs and symptoms, nine risk factors, and three treatment options were incorporated into the development of the algorithm. This algorithm will serve as a component of the Ready Evidence (based) Decisions (R.E.D.) Tabs Initiative Project, which serves to consolidate, interpret, and evaluate the most current evidence into a practice guideline algorithm to help anesthesia providers make the best decisions for their patients in times of crisis.

Algorithm Development: Identification and Management of Hypotension not Responsive to Ephedrine or Phenylephrine.

Presenter: Kalyn Thompson
Faculty Advisor: Brian Foster

Background: Intraoperative hypotension (IOH) is a common occurrence leading to an increase in 30-day morbidity and mortality rates if not promptly treated. Current treatment guidelines support ephedrine and phenylephrine as first-line treatment modalities. In the presence of IOH not responsive to ephedrine or phenylephrine anesthesia providers are without evidenced-based treatment guidelines. Aim: The purpose of this project is to identify the at risk population in the development of refractory IOH and treatment recommendations expanding beyond the Hypotension Crisis Checklist (2013). Methods: A systematic search of literature was conducted based on two research questions. Data was extracted and entered into the GRADE tool, which ranked the evidence quality. The studies were obtained through several databases including: Cochrane Database, PubMed/Medline, CINAHL, Google Scholar, Ovid, and ScienceDirect. Results: The guideline development group reviewed data from the GRADE tool and made appropriate treatment recommendations. Most of the recommended treatments were ranked as conditional recommendation for the intervention, which is the second to highest recommendation. Implications: Implementation of an algorithm for the identification and management of hypotension not responsive to ephedrine or phenylephrine may eliminate uncertainty and inconsistency in the operating room when faced with a hypotensive crisis.

Algorithm for the Identification and Management of Airway Fire: A RED Tabs Initiative

Presenter: Kip Courtney
Faculty Advisor: Molly Wright

Airway fire is a potential disaster in the operating room carrying serious consequences including morbidity and mortality. Although the relative incidence is low when taking into account the total amount of surgeries performed each year, the devastating effects of airway fire call for diligent research to determine causative factors as well as ensuring competency on how to prevent the incidence of airway fire. A systematic approach was taken when performing literature review to acquire current evidence to support the causative factors of airway fire in the operating room as well as associated preventative interventions. The three risk factors for creating a "high-risk" situation for airway fire are the following: Oxygen-enriched atmosphere; surgical procedures in/on the airway, head, neck, or upper chest; electrocautery or laser. The recommendations to reduce the incidence of airway fire are as follows: use cuffed endotracheal tube; FiO2 < 30%; scavenge the oropharynx.

Development of an Algorithm for the Identification and Management of an Intraoperative Laryngospasm: A R.E.D. Tabs Initiative

Presenter: Brandon Young
Faculty Advisor: Molly Wright

Aim: Development of an algorithm consisting of commonly found evidence-based signs and symptoms, causative factors, and treatment of an intraoperative laryngospasm to assist aesthesia providers in quickly identifying and treating a laryngospasm. Background: A laryngospasm is a significant airway complication encountered by anesthesia providers, with an incidence of 0.78%-5% depending on surgical type, patient age, pre-existing condition and anesthetic technique (D'souza & Garg, 2008). If not treated promptly, it can lead to increased morbidity and mortality such as cardiac arrest, arrhythmia, pulmonary edema, bronchospasm, or gastric aspiration. Methods: A systematic literature review was conducted on eighteen systematic reviews, randomized control trials, and case studies on the signs and symptoms, causative factors, and treatment of an intraoperative laryngospasm. Results: The commonly found signs and symptoms, causative factors, and treatments will make up the RED Tabs algorithm for an intraoperative laryngospasm. The components of the algorithm were developed using only strong-evidenced based literature, which was determined by the GRADE data analysis tool. Discussion: The algorithm for an intraoperative laryngospasm is completely evidence based information. There was no bias encountered throughout the literature search. This algorithm will allow others in the future to build upon the current algorithm as new evidence arises into practice. Multiple colleagues and the guideline development group evaluated the entire algorithm using the AGREE II instrument, which are explained in Appendices A-C. Conclusion: A laryngospasm is obvious in 75% of cases but the study by Visvanathan showed that 25% present atypically. Currently, there is not an algorithm for identification and treatment of an intraoperative laryngospasm; therefore, with the development of an algorithm, as part of the RED Tabs initiative, for an intraoperative laryngospasm, anesthesia providers can quickly identify and treat this life threatening complication.

The Impact of Purposeful Nurse Rounding on Patient Satisfaction: An Integrative Research Review

Presenters: Paula L. Buckner, Anna H. Gallion, Dorothy E. Hiatt, and Jessica L. Phillips
Faculty Advisors: Connie Cupples and Zoila Sánchez and Zoila Sánchez

Hospital reimbursement is tied to patient satisfaction; thus, patient perception of care has become increasingly important. Evidence shows that nurse rounding is quality nursing care, but there is a question regarding patient satisfaction improvement with nurse rounding. The purpose of this study is to synthesize the evidence regarding nurse rounding in inpatient medical/surgical units on patient satisfaction scores. In medical surgical inpatients, does purposeful nurse rounding, compared to lack of rounding, improve patient satisfaction scores? EBSCO and PubMed databases will be utilized with the following terms: "HCAHPS", "purposeful rounding", "improved HCAHPS", "nurse rounding", "patient satisfaction", and "hourly rounding". This is a work in progress. The anticipated findings will reflect purposeful nurse rounding improving patient satisfaction resultantly improving patient satisfaction scores. Based on current review of the literature, we would recommend the initiation of purposeful nurse rounding in an effort to improve patient satisfaction scores.

Development of an Algorithm for the Identification and Management of Vagally Mediated Symptomatic Intraoperative Bradycardia in Laparoscopic Surgical Patients: A R.E.D. Tabs Initiative

Presenter: Christian Haynes
Faculty Advisor: Molly Wright

Cardiac arrhythmias are an inherent risk associated with laparoscopic procedures as a result of pneumoperitoneum. Vagally mediated symptomatic intraoperative bradycardia is a common occurrence associated with insufflation of the abdomen. Early recognition and treatment of cardiac arrhythmias is imperative, as rapid onset cardiac arrest is often preceded by symptomatic bradycardia. The purpose of this study is to determine if the current practice guidelines in place for the treatment of vagally mediated symptomatic intraoperative bradycardia associated with laparoscopic surgery are consistent with those recommendations based on current evidence based practice. Conclusion: In adult surgical patients ungergoing laparoscopy, the current practice guidelines in place for the treatment of vagally mediated intraoperative symptomatic bradycardia are consistent with current evidence based practice.

Fetal and Neonatal Resuscitation: Intrauterine and Extrauterine

Presenters: Amanda Couch and Ashton Privitt
Faculty Advisor: Sheilla Foster

There are many factors that can contribute to fetal distress. Careful monitoring is required to detect intrauterine fetal changes in physiologic homeostasis manifested as alterations in fetal heart rate and variability and fetal blood pH. Nonreassuring alterations in these values require specific interventions such as maternal position changes, intravenous fluid bolus administration, maternal supplemental oxygen administration, medications, and amnioinfusion. After birth, neonatal distress may be indicated by poor muscle tone and poor respiratory effort. Basic interventions to promote neonatal improvement include simple stimulation, neonatal oxygen administration, and medications; if neonatal distress is severe, intubation and chest compressions may be required for resuscitation efforts. Adequate education of healthcare team workers and parents of the newborn is crucial to facilitating the health of the newborn. The healthcare team is responsible for ensuring the physical and psychological needs of mother and infant are met during this stressful time. ■

PHARMACY

Vitamin C Effect on Human Colorectal Adenocarcinoma Cells (CaCo2)

Presenter: Man-To Lee
Faculty Advisor: Lunawati Bennett

Colorectal cancer is the third most frequently diagnosed cancer for both genders with 1.3 million new cases reported worldwide in 2012. Patients with colorectal cancer are usually given combinational antineoplastic such as fluorouracil and irinotecan, but these drugs can cause undesirable adverse events. Metastatic event, recurrence cancer symptoms after receiving desirable response to chemotherapy, drug-induced side effects, and delayed response to second line treatment are amongst several reasons as to the urgent need for new and effective chemotherapy. High doses of water-soluble vitamin C (ascorbic acid, or ascorbate) has been shown to have effect on certain cancers. The present study aims to identify efficacy of vitamin C in causing programmed cell death "apoptosis" in colorectal cancer CaCo2 cell line, to study the concentration of vitamin C to cause 80% and 20% of cell death in CaCo2, and to investigate apoptosis effect of vitamin C using various staining methods such as Hoeschst33342, Rhodamine123, Live Dead Probes, and ROS Probes. The finding from this study showed that neutral vitamin C at 0.8mM caused most optimal toxicity in killing CaCo2 cells as determined from the MTT data plot.

Vitamin C Synergistically Enhances the Effects of Bortezomib in Colorectal Adenocarcinoma Cells (CaCO2)

Presenter: Monica Barrett
Faculty Advisor: Lunawati Bennett

Due to the increasing prevalence and significant morbidity and mortality of colorectal cancer, research remains an important focus to decrease this third most frequently diagnosed cancer. This research examined a potential adjuvant treatment option to be used with chemotherapy. By using the lowest possible dose of a chemotherapeutic agent and using high dose of a non-toxic adjuvant, unwanted side effects that commonly occur with chemotherapy can be avoided. Vitamin C has been studied as an alternative treatment option in various types of cancers due to its antioxidant and possible antineoplastic properties. Vitamin C was tested in combination with bortezomib, a chemotherapeutic agent used for the treatment of myeloma and mantle cell lymphoma, in its ability to kill colorectal adenocarcinoma cells. Using MTT assay to detect cell viability, the combination of low dose of bortezomib and vitamin C synergisticly kill Caco2 colorectal adenocarcinoma cells.

Ascorbic Acid and 1,2-dithiole-3-thione Effect on Human Liver Carcinoma Cells

Presenters: Yuchen Yang and Man-To Lee
Faculty Advisor: Lunawati Bennett

Liver cancer is the 5th and 8th most common cause of cancer death among men and women, respectively. Metastatic events, recurrence of cancer symptoms after receiving desirable response to chemotherapy, drug-induced side effects, and delayed response to second line of treatment are amongst several reasons as to the urgent need for new and effective chemotherapy. Ascorbic acid (vitamin C), found in citrus fruits and dark leafy vegetables is a dietary, bioactive compound that has shown to have cancer-preventing and anti-cancer properties. 1,2-dithiole-3-thione (D3T), a unique inhibitor of chemical-induced tumors in multiple tissues, may also afford protection against cell-mediated toxicity in human liver carcinoma cells (HepG2). Our aim is to assess how neutral ascorbic acid and D3T may cause apoptosis in HepG2 cells. We performed MTT assay, Hoechst33342, H2DCFDA, Rhodamine 123, and Live-Dead staining. The finding from this study showed that vitamin C is more potent than D3T, and vitamin C has greater apoptotic potential at higher concentrations on HepG2 cancer cells.

An Educational Strategy to Enhance Leadership Development of Pharmacy Students

Presenter: Erin Allen
Faculty Advisor: Sean King

Objectives: The purpose of this investigation was to evaluate the impact of an educational intervention, based on social cognitive theory (SCT), on enhancing leadership development among third-year pharmacy students. It was hypothesized that the pharmacy student group receiving the SCT based educational intervention would report significantly higher scores on the three dependent measures compared to the control group. Method: This SCT-based intervention employed a pretest-posttest control

group design. The intervention was administered to third-year pharmacy students (n=48) as part of a required Patient Assessment course. Pre and post-test data were collected one week prior to and one week following the delivery of the SCT-based educational intervention to the experimental group. Second-year pharmacy students (n=42) served as the control group and did not receive the educational intervention. Results: The two groups did not differ in the distribution of demographic or SCT variables at pretest. Analysis of covariance (ANCOVA) revealed significant differences between the groups on self-efficacy (p=0.014), situational perception (p=0.004), and outcome expectations (p=0.000). Implications: The findings of this investigation provide evidence that self-efficacy, situational perception, and outcome expectations are modifiable among pharmacy students through an educational intervention focused on enhancing leadership development. These results may assist other schools of pharmacy in efforts to incorporate leadership development into their curricula. The intervention may be modified and implemented in advanced pharmacy practice experiences, residency programs, and continuing education programs. The value of using a theoretical approach to focus attention on important concepts and skills to create a more efficient leadership development process requires further evaluation.

Vitamin C Effect on Bone Cancer Cell Lines (Saos 2)

Presenter: Japonica Gilliam
Faculty Advisor: Lunawati Bennett

Osteosarcoma is bone cancer that accounts for about 1% of all cancers. It is the most common type of bone cancer that starts in bone cells of the arms, legs or pelvis. It occurs most frequently in people between the ages of 10 to 20 during the period of rapid bone growth, and is more common in males than females. Depending on the progression of the disease, surgery, radiation therapy, and chemotherapy are often employed. Due to the toxicity of anti-neoplastic and the possible recurrence of cancer symptoms and metastatic event of the osteosarcoma, there is a need for effective adjuvant therapy with minimal side effects to the normal cells. Vitamin C is an antioxidant that has been known to have a chemotherapeutic and protective effects on certain cancers. The focus for this research was to find if vitamin C can cause cells death in osteosarcoma SaOS2 cell line by observing the highest and the lowest concentration of Vitamin C that could kill 80% and 20% the cells. HOECHST/ Rhodamine 123 Staining and MTT assay were performed to test the hypothesis. The results from this study showed that neutralized Vitamin C at 0.8 mmol was at optimal concentration to kill SaOS2 osteosarcoma cells. ■

PHYSICS

Pendulum of Varying Length

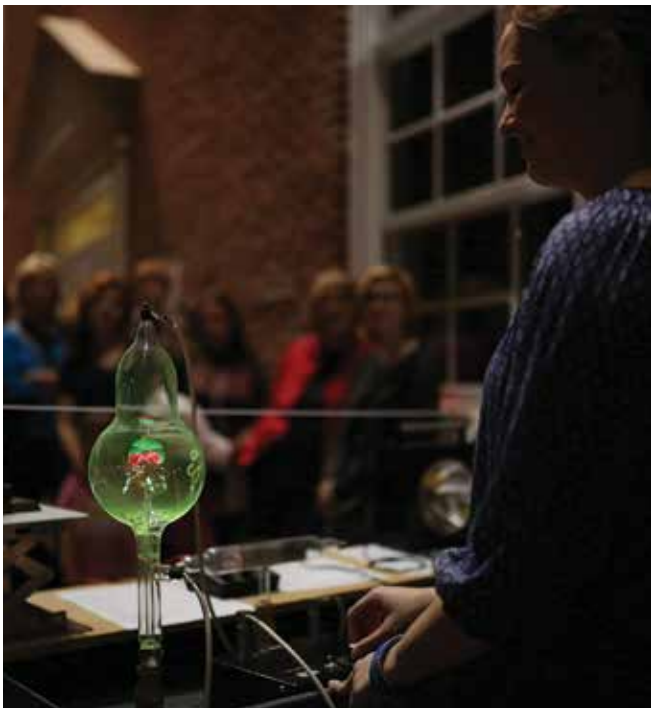
Presenter: Dominick Jaynes
Faculty Advisor: Geoffrey Poore

The purpose of this experiment was to compare the periods of oscillation of a simple pendulum and a pendulum that varies in length during its motion. Solving for the period of the simple pendulum is a rather simple process, and varying the length of the pendulum over time makes things rather complicated. The goal was to see if there was a theoretical difference between the two periods at large amplitudes, and if that difference could be measured experimentally. The large amplitude in this case was an initial angle of sixty degrees. The simple pendulum case could be solved analytically, while the varying length pendulum has no analytic solution and required numerical analysis using Mathematica. The theory showed a difference between the two periods, and this difference was detected experimentally using the initial angle of sixty degrees, although it was not as great of a difference as the theory predicted.

Building a Lock-in Amplifier for an Ionization Experiment

Presenter: Mason Ruby
Faculty Advisor: Fonsie Guilaran

A lock-in amplifier is a device used to recover information from an electric signal with a high signal-to-noise ratio. It achieves this using phase sensitive detection in which a periodic signal is multiplied by a reference signal with the same frequency. The result is then integrated, resulting in a DC signal proportional to the original signal without any influence from the noise. Our research focused on implementing this technique in an ionization experiment utilizing time-of-flight mass spectrometry so that we could dramatically increase the range of our detector. The



experiment required that we keep the waveform of the signal intact which is usually impossible with a lock-in amplifier since the output is a DC signal. We developed a method in which the phase of the reference was incrementally changed, causing the output of the lock-in to change also. Taking the derivative of the output reproduced the original waveform. Thus, we were able to show that it is possible to retrieve temporal information from a lock-in amplifier, potentially allowing us to use it for this experiment as well as any other requiring a large detection range. ■

PSYCHOLOGY

Social Connectedness as a Function of Intimate Communication Preference

Presenters: Brooke Bates, Deja Moorer, Stephanie Olford, and Cameron Skonhovd
Faculty Advisor: Jinni Leigh Blalack

The relationship between the preferred utilization of text messaging (Computer Mediated Communication - CMC) and face to face communication (FtF) to transmit messages of three levels of self-disclosure (peripheral, intermediate, core) and social connectedness with friends and family was examined. Undergraduate students (n=123) completed the Communication Method Survey (CMS) and the Social Connectedness Scale-Revised (SCS-R). Using bivariate correlation, data revealed that use of both CMC for intermediate-intimacy self-disclosure and FtF for core-intimacy self-disclosure correlated significantly with social connectedness. Additionally, a significant negative correlation was found between overall preference of CMC over FtF and social connectedness. Thus, preference of text messaging correlated with social disconnectedness. Using a paired samples t-test, significant differences indicated patterns of communication (measured by CMS) by variables of communication method (CMC or FtF) and closeness of the recipient to the sender (family or friends). These findings provide insight into the role of intimacy in CMC and FtF. ■

Overeating Self-Efficacy

Presenter: Dawn Bailey
Faculty Advisor: Rhonda Hudson

The purpose of this exercise was to decrease overeating by moderating caloric intake and replacing the desire to overeat with low calorie fluids and Yoga exercises. A log will be kept of caloric intake, reasons for the desire to overeat, and amount of time performing Yoga. Consistent patterns of overeating, combined with a sedentary lifestyle, were identified, by the participant, as two primary causes of unwanted weight gain. In the International Journal of Obesity, Johnson, Pratt, and Wardle (2012), pointed out that, in the Western world, pleasing food is easily accessible, and, without self-control, weight gain is likely. To monitor overeating, caloric intake during the three weeks of intervention was set to a maximum of 1,800 calories per day, as recommended for a 44-year-old female, 5', 3" tall, with a sedentary lifestyle, in the 2015-2020 Dietary Guidelines for Americans (2015). ■

THEOLOGY AND MISSIONS

An Exegesis of 2 Peter 2:1-10a

Presenter: Audrey Mitchell
Faculty Advisor: James Patterson

This research involves an exegesis of 2 Peter 2:1-10a (or perhaps a few more verses if space allows) by consideration of the Greek text. In addition to my own translation and verse-by-verse exegesis, I will consider the surrounding context as well as discuss what application should come from this passage. In the first part of chapter two, Peter writes that even among the righteous prophets in the past who spoke from God, there were also false prophets, just as false prophets were among Peter's audience. These false teachers arose from within the church—they were not outsiders who infiltrated the faithful. These prophets would draw in many, but Peter reminds his readers that their judgment is coming by giving examples of God preserving the righteous and preserving the wicked for judgment.

Of Monstrosities and Men: Intercultural Dynamics through the Eyes of C.S. Lewis

Presenter: Brandon Harper
Faculty Advisor: Harry L. Poe

This paper will examine the range of intercultural communicative implications found in the fictional, apologetic, and scholarly writings of C. S. Lewis, giving primary emphasis to the relationship between demons and men in The Screwtape Letters. This will also include an exploration of intergalactic, cross-dimensional, and trans-theological communication as seen in The Space Trilogy, The Chronicles of Narnia, and various non-fiction works such as Mere Christianity and Abolition of Man, respectively. The evaluation will additionally stress the quintessential role that language plays herein. Finally, this will culminate in an address of how Lewis uses these intercultural themes to form a proper understanding of how to share the Gospel more effectively through intercultural competency.

Old Testament Prophesies of Christ

Presenter: Brian Breedlove
Faculty Advisor: James Patterson

The main thesis of this paper is to make connections from Old Testament prophesies to the life, work, death, and resurrection of Jesus as the Messiah. Five OT passages that accomplish this task will be discussed. The first is found in Genesis 3:15, called the protoevangelium. God is telling the serpent that there is coming one who will beat you. The second is in Exodus chapter 12. This is the Passover of ancient Israel predicting the Messiah's blood will be the ultimate sacrifice. The third passage is Deuteronomy 18:15. Moses predicts that a new prophet will come who is greater than himself. Fourth, is Isaiah 53, which is the suffering servant prophesy. Last is Jeremiah 31, which is the predication of a time when there will be a new covenant for God's people.

The Lasting Relevancy of C.S. Lewis's Works

Presenter: Becca Robertson
Faculty Advisor: Harry L. Poe

C.S. Lewis's works were written in a particular context, namely, in Britain during World War II. And yet, his works have maintained a lasting popularity, even in a completely different context than when they were originally written. This research will explore the lasting relevancy of Lewis's works. What themes in his works span time, geography, and cultures in order to capture imaginations generation after generation? This project will be limited to the themes of love, truth, and the existence of God as developed primarily in two of his most popular works, Mere Christianity and The Screwtape Letters. This information will demonstrate universal truths that could prove helpful in clarifying the Gospel in a variety of cultures and contexts.

The Mystery of the Table: The Historical Development of Baptist Thought and Practice of the Lord's Supper

Presenter: Wesley Chatham
Faculty Advisor: James Patterson

Although Baptists today agree that the Lord's Supper is a significant ordinance of the church, there has been substantial disagreement as to how the theology of this sacred meal should be properly understood and applied in local congregations. As a result, there has been a drastic decline in the prominence that the Lord's Supper plays in worship, and many Baptists have come to think of the Supper as simply an occasional afterthought of worship. Thus, many Baptists need a recovery of their true roots about this meal and a synthesis of its implications for their lives. The purpose of this paper is to trace the historical development of how Baptists have thought about and applied the Lord's Supper into their ecclesiology and encourage a recovery of a true biblical view of the Lord's Supper in the Baptist tradition as a source of comfort and encouragement for believers.

An Exclusivistic Interpretation of Romans 2:12-16: Analysis Guided by Pauline Soteriology

Presenter: Zach Wylie
Faculty Advisor: James Patterson

Romans 2:12-16 has the potential to be misunderstood as a text that hints at an inclusivistic understanding of Paul's soteriology. Reading the text in this way moves away from the true issue Paul addressed in this section of the letter. Not only this, it moves away from Paul's soteriology all together. In this paper, proper exegetical procedure, as well as theological reflection on Paul's other epistles, gives way to an exclusivistic understanding of this text that is consistent with Paul's thinking as it relates to the necessity of faith in Christ for the justification of sins. The aim of this work is to ensure proper interpretation of God's word that avoids decontextualized understandings of a text.

Meeting the Master

Presenter: Ryan Pattat
Faculty Advisor: James Patterson

This research will look in-depth at three of the various discussions and interactions Jesus has with people within the Bible. The first encounter that will be examined is that of Jesus healing the lame man by the pool in Jerusalem found in John 5:1-15. Second, found in Luke 7:1-10, is the story of the Roman officer who demonstrates faith. Last, Jesus's interactions with Mary, Martha, and Lazarus, found in John 11:17-44, will be examined. To sum up, each story will be studied in light of what we can glean from looking at how Jesus deals with various people-groups and how we can implement His characteristics into our own lives.

Church Planting in Acts

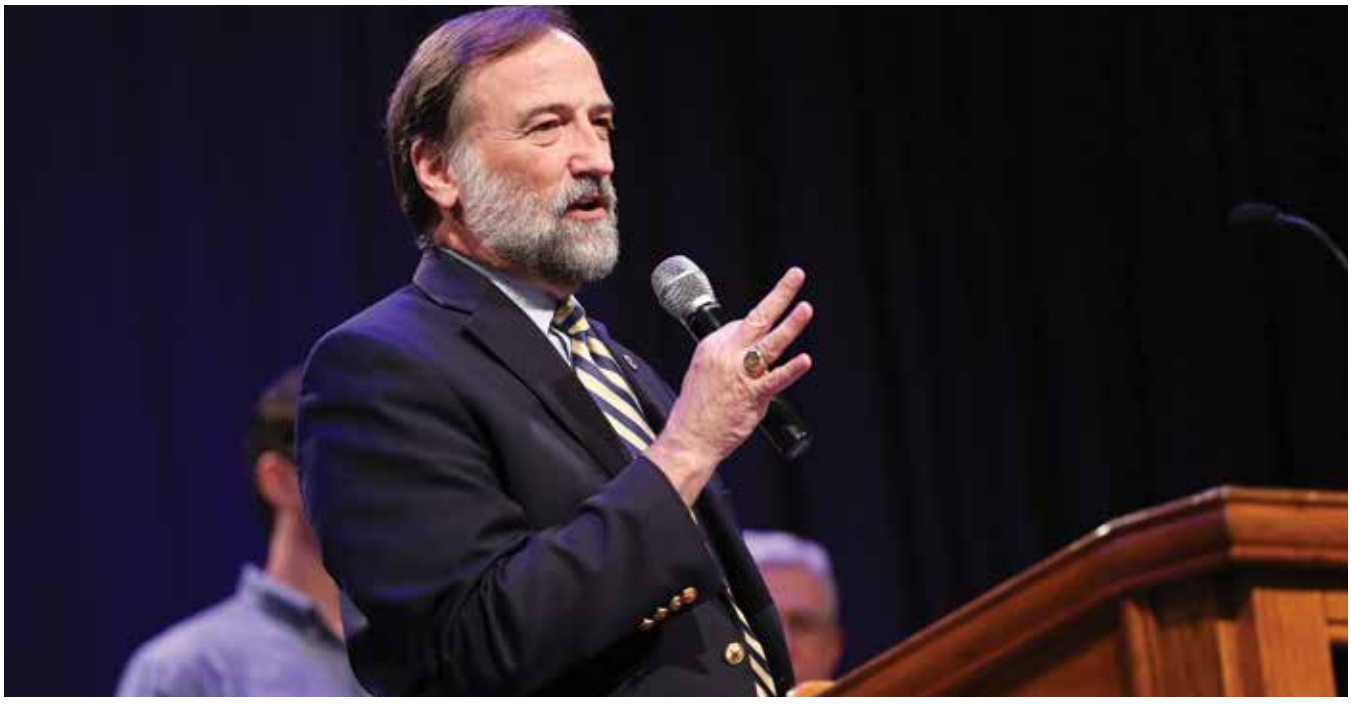
Presenter: Jalen Sowell
Faculty Advisor: James Patterson

The gospel has been on the move since the beginning of the New Testament church. It all began whenever the Disciples were sent out from where they were into the world. What followed would become the most influential faith in the history of the world. They managed to take what they had learned, heard, and seen, and translate it into the culture in a way that has shaped the world. My paper will look back on the church's beginning, what can we learn from what they've done, and how can we use that in our attempts to mobilize the church in this day and age.

An Analysis of God as a Counselor and the Implications for a Christian Presence in Mental Healthcare

Presenter: Rachel Ewing
Faculty Advisor: James Patterson

Clinical counseling and Christian pastoral counseling are frequently pitted against one another. The result of this conflict is that there is not a great enough interest in counseling and mental healthcare by the church. Counseling is widely delegated to pastors as clinicians are dismissed in many Christian circles. This research paper is meant to analyze the revelation of God as a counselor and healer in scripture in order to model the role Christians should seek to imitate. The purpose of this research is to spur Christians to take an active role in facilitating the mental and spiritual healing of Christ. Further, believers must do so ethically and effectively, in both ministerial and clinical positions.



THEOLOGY AND MISSIONS

Bringing The Voyage of the Dawn Treader to Life Through Theatrical Design

Presenters: Hannah Brandt and Cayley Cantwell
Faculty Advisor: Harry L. Poe

One of C. S. Lewis' most well-loved tales, *The Voyage of the Dawn Treader*, is a story full of magic, peril, and adventure on the high seas. Lewis' works have impacted our own lives to such a great degree that we wish to bring this beloved story to life for others through one of the great creative mediums—the theatre. This project undertakes the task of creating this episode in Narnia's history through theatrical design, presenting a sample of what a production of this story onstage might look like through original set and costume designs.

Christ in the Counter-Culture: How Christianity Can Thrive in a Non-Christian Culture

Presenter: Christopher Primeaux
Faculty Advisor: James Patterson

The church in America currently faces a culture moving towards post-Christianity, and in some parts of the country the post-Christian culture has already arrived. This will not be the first time Christianity has been in the minority, and the actions of the American church should look to other cases of the church being in the minority for direction in the coming years. In particular, the early church in the Roman Empire and Asian churches of recent years. Christianity in America is not doomed by any means, but the actions of Christians in response to a cultural shift of the current magnitude must be intentional and carefully measured with a healthy understanding of historical and contemporary precedents if the church in America is not only to survive, but thrive in a new cultural climate.

The Vital Voices from the Cross

Presenter: William L. Watson
Faculty Advisor: James Patterson

The aim of this research paper will be to express the transcending theological implication of Jesus' saying from the cross, for the believer and the church as they continue to be the lifeline of this postmodern generation. Jesus on the cross presented seven short concise sermons. These seven sermons were recorded over the span of four gospels, by four separate writers, with an intentional message for all believers. It will be my task to express the vitality of each saying, each voice, each breath, to the faithful, from these last words of Christ, as words to be transformed and to dissect each of the "Seven Vital Voices," the sayings from Calvary, in order to connect the theological dots of Jesus entire ministry. I will take each sermon by author, book, chapter, verse, and scholastic supporting documentation to defend this premise. It is my aim to provide ample food for thought for the "Voices from the Cross" to be considered in our present, not as simple sermons to be preached about on Good Friday. I submit that these concise "Voices" should be used as vital every day words, sayings, and voices for the believer and the church to live life by. ■

SYMPOSIUM

FOURTEENTH ANNUAL UNION UNIVERSITY SCHOLARSHIP SYMPOSIUM

RESEARCH GRANT RECIPIENTS *Fall 2016*

Undergraduate

Jeremy Blaschke and Joe Bakeer
"Detecting Novel Antibiotics from a Parasitoid Fly (Trichopoda pennipes)"

Mark Bolyard and Caleb Bernui
"Regeneration of the African Mahogany Tree"

Jimmy Davis and Dallas Abraham
"Green Chemistry: Investigation of Non-cyclic Seven-coordinated Complexes as Catalysts for the Bleaching of Cotton"

Marc Lockett, Hannah Porter, and Rachel Walters
"Hemostatic Proteins in the Latex of Plants from the Family Apocynaceae"

Georg Pingen and Matthew Owen
"Computational Microfluidics Study of a Knudsen Pump"

Gavin Richardson and Beth Adams
"Cataloguing and Curating the Roger Uselton Collection of Ancient and Biblical Coins at Union University"

Michael Schiebout and Emma Bilbrey
"Utilizing DNA Barcoding to Verify First Morphological Identification of Quercus margaretta in Tennessee"

Randal Schwindt, Rachel Brewer and Brady Chandler
"The Experimental Design Optimization of a Solar Hot Water Heater for Orphanage Emmanuel"

William Thierfelder and David Taylor
"Evaluating Deiodinase Expression by qPCR in Adipose Tissue in Response to the Pro-inflammatory Stimulus IL-6"

Colene Trent and Kyle Yeoman
"Vehicle Make and Model as Determinant of Automobile Loan Default"

Faith Zamamiri-Davis and Jasmine Hailey
"Assessment of the Impact of Exogenous Hydrocortisone on PTPN22 Expression in a Zebrafish Model"

Graduate

Sean King, Virginia Schwindt, Erin Allen, and Stephanie Coley
"An Educational Strategy to Enhance Leadership Development of Pharmacy Students"

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The Fourteenth Annual Scholarship Symposium is sponsored by the Union University Research Program