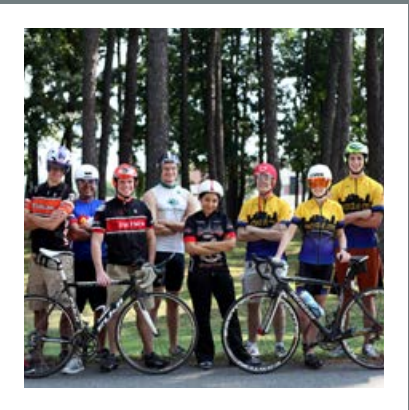




SYMP SIUM

ELEVENTH ANNUAL UNION UNIVERSITY SCHOLARSHIP SYMPOSIUM

SYMP

SIUM

ELEVENTH ANNUAL UNION UNIVERSITY SCHOLARSHIP SYMPOSIUM

TUESDAY, APRIL 29, 2014

Reception for Participants, Faculty *and* Outside Guests
Carl Grant Events Center 12:00–12:30 p.m.

Afternoon Concurrent Sessions

Dept.	Room	Student Presenters	Time
Poster Displays	Grant Events Center	Derek Reynolds, Whitney Moskovitz, and Karli Schumaker (BIO)	12:30–1:30 p.m.
		Daniel A. Crall, Sr., Jennifer Griffith, and Taylor Wadley (BIO)	
		Jared Haney, Lisle Whitman, and Megan Phipps (BUS)	
		Kathryn Eudy (CHE) Tyler Jones (CHE) Brittany Hagler (CHE)	
		Monica Austin (CHE) Matthew Taw (CHE) Andrew Stricklin (CHE)	
		Lyndi Strange (CHE) Chase Bouchillon (CHE)	
		Andrew Tan and Eric Ramirez (EGR)	
		Erin Picard, Chelsea Johnson, Nathaniel Parke, Jonathan Vailes, Emily Pace, Dillon Lisk, Aaron Hively, and David Brewer (EGR)	
		Jeremiah Murila, Chelsea Johnson, and Seth Guiler (EGR)	
		Jeremiah Murila, Levi Hartsfield, Connor Bailey, Chris Boccarossa, Beau Fant, Seth Guiler, Ryan Harris, Bridgette Steiner, and Josh Wakefield (EGR)	
		Chelsea Johnson, Jeremy Murila, Nathaniel Parke, Chris Boccarossa, and Erin Picard (EGR)	
		Shiva Hemmatian, David Adams, Joshua Guthrie, Matt Bentley, Lyndi Strange, Michael Kelly, Chris Love, Eric Ramirez, Andrew Tan, Chris Lanham, Shane Caver, and William Duncan (EGR)	
		Chris Lanham, Beau Fant, Shiva Hemmatian, Matt Bentley, Cody Giles, Kian Jost, Kenneth Mayo, Eric Ramirez, and Andrew Tan (EGR)	
		Daniel Keylon, Dillon Lisk, and Zachary Benson (EGR)	
		Dillon Lisk, David Adams, David Brewer, and Zachary Benson (EGR)	
		Jonathan Vailes, Seth Guiler, Michael Kelly, and Emily Pace (EGR)	
		Matthew Bentley, Michael Kelly, and Chris Lanham (EGR)	
		Camilla Haddix, Donna Cannon, Linda Clark, Stacey Hubbard, and Kathryn Wright (NUR)	
		Lisa Clark, Sandy Tharpe, Laura Beth West, Shelley Attaway, Brandon Pate, and Kristen Hunt (NUR)	
		Ashley Craig, Desiree Miles, Michelle Patton, and Dorothy Braden (NUR)	
		Christina Davis, Rhonda Cavitt, Jennifer Delk, Tiffany Hare, and Debra Ridley (NUR)	
		Brandi Rose, Haley Long, Erin Legens, Brandy Bartholomew, Allison Adams, and Sara Brown (NUR)	
		Heather Wright, Tabitha Anglea, Kody Sanderfer, and Kimberly Wilks (NUR)	
		Sarah Spraggins, Manju Thankachan, Jancy John, Alftan Turner, and Ashley Weiss (NUR)	
		Jennifer Clevenger, Stephanie Moore, Makenna Wright, Kurvis Davis, Lesley Glasgow, and Amanda Cieskiewicz (NUR)	
		Crystal Coulter, Shemika Washington, Brittany King, Stacey Ortiz, and Meghan Rains Patton (NUR)	
		Josh Donnan, Jason LaSource, Paul Orman, and Pelu Ogunyemi (NUR)	
		Edwin Martinez, Andrea Baker, Ian Bicol, Casey Ellington, Nichelle Kirkland, and Cory Prewitt (NUR)	

SCHEDULE

CONTINUED FROM PAGE 1

Brittnie Bird, Caitlyn Harrison, Kourtney Hartwell, Travis Lilley, Katie Pruitt, and Britney Younkin (NUR)

Betsy Akin, Christine Tomes, Stephanie Reeves, Susan Spencer, and Barbara David (NUR)

Lauren Hamrick, Ashley Burdette, Haleigh Sligar, and Niki Stivers (NUR)

Nathan Birky, Tyler Cabell, Troy Christopher, Michael McNair, and Joey Specker (NUR)

Kristen Hayes, Brianna Campbell, Leanne Haverkost, and Lindsay Greenfield (NUR)

Courtney Batey, Cametra Avery, and Courtney Goode (NUR)

Megan Pittman, Robert Callery, Jennifer Wise, Andrea Bazzell, and Kelly Patterson (NUR)

Linda Billings, Alvin Kauffman, Joy Kimbrell, and Jane Walker (NUR)

Audra K. Jones, Charlene Bonner, Rhonda Davis, Emmily Hurdle, and Alison Stucker (NUR)

Robert Holland, Amanda Balof, Charles Ezelle, Meagan Edelen, Dawson Bryant, and Timothy Parrish (NUR)

MaryBeth Mungle, Ashley Gipson, Lauren Parker, Karen Runyon, Callie Tuggle, and Linday White (NUR)

Benjamin Duffy, James Lee, Kara Bruning, Rebecca Land, and Shannon Weed (NUR)

Carlos Buford and Anne Burnett (NUR)

Jane Walker and Alvin Kauffman (NUR)

Linda Billings and Joy Kimbrell (NUR)

Kemi Douglas and Martin Rivera (NUR)

Jeannie Walker and Lisa Pearson (NUR)

Dawn Henderson and Cynthia Powers (NUR)

Darel L. Davis (NUR) | Malinda Conrad (NUR) | Melissa Lefave (NUR)

Shari D. Wherry (NUR) | Karen Davis (NUR) | Cathy Ammerman (NUR)

Tara Y. Mabon (NUR) | Veneine Cuningkin (NUR) | Rachel Barber (NUR)

Rene Stark (NUR) | Traci Abram (NUR) | Quintrisa Harden (NUR)

Katelyn Morris, Rachel Robbins, and Kelsey McFarland (PSY)

Kelsy Dement, Emily Russell, Jake Fry, and Kendra Loh (PSY)

BIO Session Chair: Andy Madison	WH 101	Brandon Churchill Shelby Priddy Joshua French Brooklin Byrd Joseph Dresser Rebecca Blevins Nar'Asha Randall	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.
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CHE/PHY/MAT Session Chair: Geoffrey Poore	WH 102	Ward Howard (CHE) Jonathan Eldridge (PHY) Michael Hunter Cochran (PHY) David Clark (MAT)	2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m.
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CSC Session Chair: Jim Kirk	PAC A-9	Courtney Valentine and Megan Bishop Stephen A. Clement Alexander Roberts Grant Godel Cullen Sanderson Benjamin D. Horne Nathan Rankin Webb Timothy Johnson	1:15 p.m. 2:00 p.m. 2:30 p.m. 3:00 p.m. 3:30 p.m. 4:00 p.m. 4:30 p.m. 5:00 p.m.
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DMS Session Chair: Cam Tracy	JEN 225	Chelsea Wood (ART) Abigail Winters (ART) Thomas Woods and Ethan Smith (ART) Benjamin Hamilton (COM) Jeff Lancaster (COM) Chris Brown (COM) Daniel Young (COM) Benjamin Wright (COM) Gabe Farmer (COM)	1:30 p.m. 2:00 p.m. 2:30 p.m. 3:00 p.m. 3:30 p.m. 4:00 p.m. 4:30 p.m. 5:00 p.m. 5:30 p.m.
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ENG Session Chair: Gavin Richardson	THEATRE	Stephen Wunrow, Brandy Fisher, Wyatt Keener, Aneice Lunsford, Joseph McFtridge, Holly Harris, Bailey Shearon, Kaitlen Graves, Joy Atkinson, Katelyn Benedetti, Alexis Broussard, Emily Winters, Grace Pepper, Raven Richardson, Stephanie Traylor, Cameron Wilson, and Meredith Holden	2:00 p.m.
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ENG/HIS/MUS Session Chair: David Thomas	PAC D-3	Allie Durham (HIS) Colby Benefield (HIS) Autumn Hitt (MUS) Vicki Searl (MUS) Jacqueline Paige Tang (MUS) Autumn Hitt (MUS) Kalee Hall (ENG)	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.
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BUS/EGR Session Chair: Jeannette Russ	PAC A-7	Morgan Kroeger (BUS) David Brewer, Chris Lanham, Beau Fant, Ryan Harris, David Adams, and Nathaniel Parke Jonathan Vailes, Emily Pace, and Erin Picard Michael Kelly, Chris Boccarossa, and Josh Wakefield Alex Wainscott, Grace Morriss, and William Murray Alex Charles, Kenneth Mayo, and Zachary Baker Dylan Baker, Cody Giles, Todd Jones, and Kian Jost Grace Morriss, Zachary Baker, Shane Caver, and Chris Love	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.
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ICS/LAN/TESL/SW Session Chair: Cynthia Jayne	BAC-44	Zac McMillan (ICS) Zac Calvert (ICS) Daniel Young (ICS) Emily Wood (ICS) Rebecca Leon (SW) Morgan Kroeger (LAN) Allie Durham (LAN) Jonathan Rogers (LAN) Kaitlin Nonweiler, Anna Lewis, and Holly Harris (TESL) Katie Hayes (ICS) Jeimy Barrantes (ICS) Megan Bailey (ICS)	1:20 p.m. 1:40 p.m. 2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m. 3:20 p.m. 3:50 p.m. 4:10 p.m. 4:30 p.m. 4:50 p.m. 5:10 p.m.
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THM Session 1 Chair: James Patterson	JEN 325	Daniel Shelton Caleb Valentine Brian Osborne Zach Thompson Matt Moore Trey Weise Stephen Charlton Patrick Augustin	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.
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THM Session 2 Chair: Ben Mitchell	JEN 223	Grant Dew Caleb Creel Colton Gebben Ashley Nichole Carswell Holly Beverly Tracy Frisbee Christine Ryan	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.
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BIOLOGY

Relationship between Water Chemistry and the Presence of Eustrongylides

Presenter: Joshua French

Faculty Advisors: J.R. Kerfoot and Marc Lockett

Pollution can increase infection rates of native wildlife with parasitic species that thrive in contaminated bodies of water. *Eustrongylides* is a genus of nematode found worldwide that, in its larval stages, infects fish then requires an avian host to complete its life cycle. This research sampled mosquitofish (*Gambusia sp.*) from bodies of water near the University of Tennessee Agricultural Station, Cypress Grove Park, Riverside Drive and Airways Blvd in Jackson, TN. Mosquitofish were collected using minnow traps and stored in 10% formalin until examination of the fish's gut for parasites. The aquatic environment was tested for dissolved oxygen, temperature, conductivity, salinity, total dissolved solids, pH, and oxidation reduction potential. The fish were dissected and the prevalence of *Eustrongylides sp.* was determined. This was then correlated to the water chemistry data to observe if any relationship between infection and aquatic environment was apparent. A correlation was observed between the water chemistry at UT Agricultural Station and at Airways Blvd. Due to the similarities between these two areas a correlation is observed between *Eustrongylides* populations and the water chemistry of a body of water.



Investigation of Preferential Behavior for Modified Nesting Boxes in Eastern Screech Owls

Presenter: Brooklin Byrd

Faculty Advisor: James Huggins

In areas of intense deforestation, a lack of natural roosting and nesting locations has been noted for many bird species, such as the eastern screech owl (*Megascops asio*). While not a lasting solution to the problem of habitat degradation, the placement of suitable nesting boxes has been encouraged to provide a short-term solution to this growing problem. Eight of seventeen nest boxes placed on trees on a private farm in Beech Bluff, TN, were modified by altering the box opening

shape. The boxes were monitored for 3 months to determine the box type preferred for roosting by eastern screech owls. No owls used modified boxes for roosting. A paired t-test showed no significant difference between modified and unmodified box occupation rates among all organisms. An ANOVA test revealed that temperature, humidity, box type, and combinations of those factors had no effect on box habitation by all organisms.

The Effects of Antibiotics Acting in Synergy against Serratia Marcescens

Presenter: Shelby Priddy

Faculty Advisor: James Mahan

Serratia marcescens is a Gram-negative bacillus that is the causative agent in numerous nosocomial infections. Increasing antibiotic resistance is resulting in medical professionals turning to alternative methods for treating bacterial infections. A prominent technique uses antibiotics in combination to produce a synergistic effect. Antibiotic synergy results in greater inhibition of bacterial growth while greatly reducing the cumulative resistance of the bacteria to the individual antimicrobials. The main objective of this research was to determine if using antibiotics known to be effective against *S. marcescens* in combination would yield a synergistic effect and thus provides greater growth inhibition than use of either antibiotic individually. This was completed using E-test antibiotic strips. Aztreonam was found to have the greatest inhibitory effect with a determined MIC range from .0023 mg/L to .0497 mg/L. Synergy was observed for some strains with antibiotic combinations of aztreonam/erythromycin and aztreonam/amikacin.

Influence of Temperature on Predator-Prey Interactions between the Invasive Cichlasoma urophthalmus and the Native Gambusia affinis

Presenters: Derek Reynolds, Whitney Moskovitz, and Karli Schumaker

Faculty Advisor: J.R. Kerfoot

The invasion of a non-native piscivore to novel areas can potentially lead to disruptions in established predator-prey interactions. This study investigated the influence of temperature on non-native/native predator-prey interactions by filming interactions (600 fps) between *Cichlasoma urophthalmus* (predator) and *Gambusia affinis* (prey) at varying temperatures (19, 27, and 35°C). At the lowest temperature of 19°C, preliminary video analyses suggest that the average prey escape velocity is 96.6 mm/s in comparison to the average predator attack velocity of 69.6 mm/s. This initial data supports the hypothesis that temperate, native prey have a significant physiological advantage over the tropical, invasive



species at decreased temperatures. By understanding the regulatory ability of temperature on the specific predator-prey interactions in this study, expansion of the invasive species can be predicted by climate zones. With this knowledge, delicate Florida ecosystems that are heavily dependent on native predator-prey interactions, such as the Everglades, can be better preserved.

Formation of an Indicator for Thrombin Inhibitors Using Recombinant Green Fluorescent Protein

Presenter: Brandon Churchill

Faculty Advisor: Mark Bolyard

Anticoagulants are used in medicine to prevent the formation of dangerous blood clots. These clots are formed via the activation of proteases like thrombin in the blood coagulation pathway at inappropriate times. Protease inhibitors prevent clot formation at the molecular level, so a quick, easy indicator for the recognition of protease inhibitors could prove useful to researchers in studying anticoagulant mechanisms. The goal of this research was to create such an indicator by inserting DNA encoding the thrombin cleavage site into the gene encoding the bioluminescent green fluorescent protein (GFP). This was attempted using polymerase chain reaction (PCR) mutagenesis. Two sequences were successfully incorporated into the target gene which continued to express fluorescing protein. Active thrombin should cause a loss of fluorescence in

these recombinant proteins while a thrombin inhibitor would allow continued fluorescence. More work is being done to test these mutants and to attempt mutagenesis with additional primers.

African Violet Tissue Culture Manipulation

Presenters: Daniel A. Crall Sr, Jennifer Griffith, and Taylor Wadley

Faculty Advisor: Mark Bolyard

African violet, *Saintpaulia ionantha*, is a leading research model for plant tissue cultures. Therefore, numerous culturing protocols exist involving similar growth medium pH characteristics (5.6-5.8) and lighting intensities. Our team's undertaking was to manipulate these two variables with five different pH growth mediums (4.0, 5.0, 6.0, 7.0, 8.0), and three growth lights of varying color temperature and Color Rendering Index values (CRI). We hypothesized the best growth would result from a growth medium pH of 6.0 due to its proximity to established pH protocols, 4100K color temperature because it provided a light spectrum promoting vegetative growth, and 89 CRI due to its light output closest to peak absorption of chlorophyll. Initial contamination issues were overcome by washing whole leaves, flaming the leaf punch, and increasing sterilization time from 10 to 20 minutes, resulting in a 72% reduction in culture contamination loss. The experiment and data collection is still ongoing.

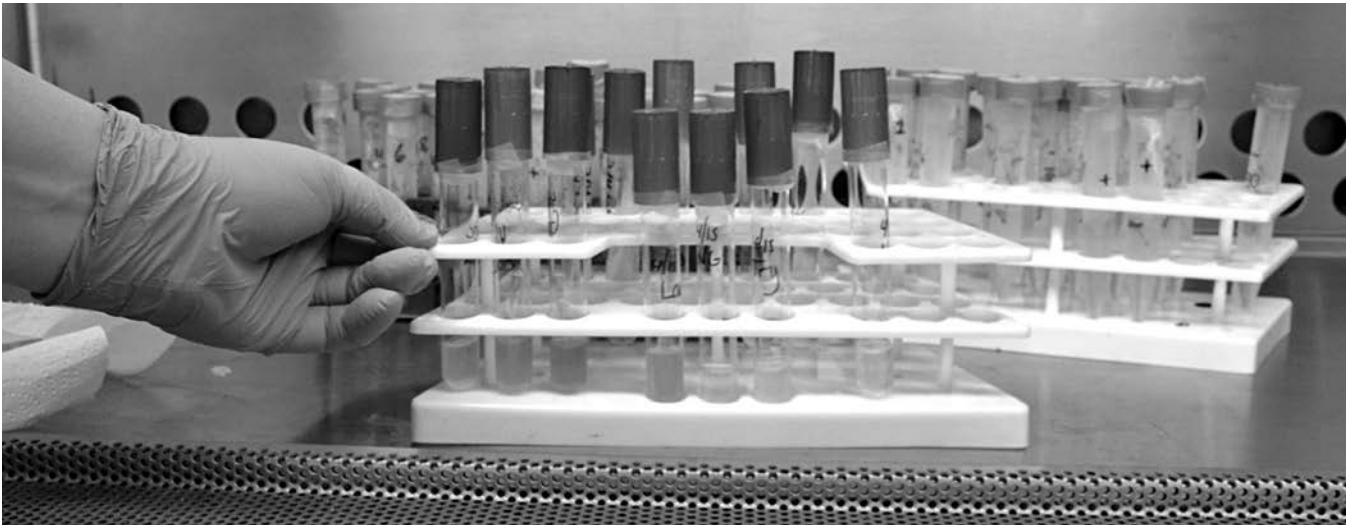
BIOLOGY



Mutagenesis of pGLO Plasmid to Create a Green Fluorescent Protein Containing a Factor Xa Recognition Sequence

Presenter: Joseph Dresser
Faculty Advisor: Mark Bolyard

This research aimed to continue the pursuit of creating an assay to identify Factor Xa (FXa) inhibitors, thereby leading to improved research and development of anticoagulant medications. Using several sets of mutagenic primers, the nucleotide sequence for an FXa recognition site was inserted into the pGLO plasmid using polymerase chain reaction. The regions between the 9th and 10th, and 10th and 11th strands of green fluorescent protein (GFP) have been identified as vital for fluorescence and were therefore selected as regions for mutation. Different primer designs and different points of insertion along the GFP gene were identified. Synthetic DNA was incorporated into the GFP gene and analyzed. Research is ongoing to synthesize recombinant plasmids and transform them into *Escherichia coli* cells for expression. Ultimately, when the purified protein is cleaved by FXa, this modified GFP should lose fluorescence, thereby establishing a system for the identification of FXa inhibitors.



The Effect of Chlorpromazine on Hybridoma Formation

Presenter: Rebecca Blevins
Faculty Advisor: Jennifer Gruenke

In order to produce monoclonal antibodies indefinitely, immortal B cells or hybridomas must be formed. B cells are made immortal by fusing them to myeloma cells. It is difficult to cause cells to fuse correctly and fully. Because of this, hybridomas are difficult to produce and better fusion methods are needed. This experiment tested the efficacy of chlorpromazine (CPZ) in inducing hybridoma formation. Cells were incubated with different CPZ concentrations in PEG then diluted at a particular time interval to test its efficiency in improving hybridoma formation. Results from this experiment are pending and will be added at a later date.

Detection of Hydrogen Sulfide by *Sarcina lutea*

Presenter: Nar'Asha Randall
Faculty Advisors: James Huggins and Cathy Huggins

Sarcina lutea is a bacterium known for hydrogen sulfide production. Our goal was to find a better procedure for detecting *S. lutea* hydrogen sulfide production for the Microbiology laboratories at Union University. Lead acetate strips were inserted into test tubes to detect hydrogen sulfide. *Micrococcus roseus* and *Staphylococcus epidermis* were used as negative controls while *Proteus vulgaris* was a positive control. Each bacterium was inoculated in tubes that contained either peptone or triple sugar iron agar, along with a lead acetate strip. Half of the test tubes were placed into candle jars with a tight seal to create an oxygen-free environment. The other half of the tubes were left in an aerobic environment. The results were read after 1 week and then 2 weeks to determine if hydrogen sulfide was produced. If hydrogen sulfide was produced, then the lead acetate strips and the media darkened. ■

BUSINESS ADMINISTRATION



Logical Laptops, LLC: Supply Chain Analysis in Quantitative Business Functions

Presenters: Morgan Kroeger and Elyssa Strand
Faculty Advisor: Andy Tiger

A system was designed through SIMUL8, where the basics of supply-chain management are studied through a fictional retail company named Logical Laptops, LLC. The goal is to find an optimal solution that keeps costs as low as possible while still retaining a service level of at least 90%. Additional issues addressed in the model include finding the reorder point, reorder quantity, and maximum inventory level. The model runs for one year and exports the information, including costs, to Excel at the end of each quarter. This game was created to be used in a business classroom to show how a real life retail system functions while still allowing the user to perform various trials to see how the system is affected. The more the simulation is run and tweaked, the better the answers can become. The game is won when the cheapest price and the required service levels are found.

Modeling a High Traffic Intersection

Presenters: Jared Haney, Lisle Whitman, and Megan Phipps
Faculty Advisor: Andy Tiger

The goal of our research was to successfully model the traffic intersection of Union University Drive, Stonebrook Boulevard, and Lanese Dockery Drive in Simul8 Modeling Software. To construct and validate our model, we gathered real traffic data and measurements from the intersection. Using MS Excel we were able to run statistical analysis that helped us model the speed and movements of the intersection. Upon completion of the initial goal, we will propose a new design for the intersection that will reduce overall risk. We will do this by using our model to test several hypotheses, then select the design that produces the fewest risky situations. ■

CHEMISTRY

Programming Berendsen Thermostat Subroutines for Molecular Dynamics Simulations

Presenters: Ward Howard and Brittany Hagler
Faculty Advisor: Michael Salazer

Molecular dynamics (MD) provides a powerful tool for computing the behavior of atoms and molecules using force calculations over all particles in a system. MD simulations are broken up into many time steps. At each step, the quantum mechanical (QM) and molecular mechanical (MM) energy and forces, positions, velocities, and accelerations are recalculated from the values found at the previous time step. These MD basics are nearly always supplemented by other considerations, such as temperature control. Several thermostat variations that provide such functionality to an adaptive, multilevel QM/MM interpolation-based code were investigated. The Accelerated Molecular Dynamics with Chemistry (AMolDC) is designed for simulations of large molecular systems that can undergo very complex reactions. Unlike some Berendsen thermostats that act on simple particles in Brownian motion, we created thermostats that control temperature for molecules in several different ways, such as molecular center-of-mass velocity frame transformations, Gaussian thermostat control via system-level velocity scaling of all atoms, and intramolecular level velocity scaling. This is primarily application-based research that integrates well-known methods into a specific and groundbreaking code. Results are extremely preliminary, but these tests show promise for future enhancements to the capability of AMolDC.

Cloning of Wapl Proteins for Antibody Production and RNA Interference

Presenter: Kathryn Eudy
Faculty Advisor: Randy Johnston

Cohesin complexes hold sister chromatids together during nuclear division and are important for DNA repair and transcription. It is important that Cohesin is loaded onto the sister chromatids at the proper time and removed at the proper time. Two proteins involved in an antiestablishment complex that removes Cohesin from chromosomes are Wapl and Pds5. Deficiency in Wapl has been shown to cause improper sister chromatid segregation, which can lead to diseases such as cancer. Arabidopsis has been shown to have two copies of Wapl. Inactivation of Wapl results in meiotic defects and reduced fertility. As part of this study the Arabidopsis Wapl-1 cDNA has been cloned into pet22b for future overexpression, antibody production, and immunolocalization. A portion of Wapl-2 has been cloned into an RNAi vector with a meiosis specific promoter and transformed into Agrobacterium, from where it will be transformed into Arabidopsis double homozygous Wapl mutants and the effects of Wapl depletion observed.



Incorporating Green Chemistry Principles into General Chemistry Labs for Organic Synthesis, Coordination Compound, and Determination of An Equilibrium Constant

Presenter: Tyler Jones
Faculty Advisor: Sally Henrie

Nationwide, chemistry courses at the collegiate levels have become more interested in eliminating health hazards and minimizing harmful waste products. Key principles are applied in this research to create a greener general college chemistry laboratory manual. The new procedures focus not only on making 'greener' experimental procedures, but also on improving student understanding of green chemistry concepts. This research specifically created labs for the examination of an equilibrium constant, the synthesis of an organic compound, and the determination of a coordination compound.

Adding a Berendsen Thermostat Subroutine to an Accelerating Molecular Dynamics Simulation Code

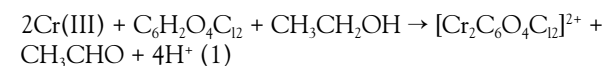
Presenter: Brittany Hagler
Faculty Advisor: Michael Salazar

Molecular dynamics is both a useful and powerful tool that assists in understanding the macro-behavior of systems by following the atomic motion of the chemical system. The most time-consuming calculation for each time step is the evaluation of the total potential and atomic forces. The most accurate and time-consuming way of calculating these quantities is through quantum mechanical (QM) methods, but often lower-level molecular mechanical (MM) methods are used to reduce the computational costs of the simulations. Another method of reducing the computational expense of QM methods is through the use of interpolations (INT) of the QM surface. Oftentimes, chemical systems of interest, such as the complicated systems of combustion reactions, involve the need to vary the temperature of the system. One way to vary the temperature of the simulation is through the use of a Berendsen thermostat. The Berendsen thermostat makes use of Newton's Law of Cooling and velocity scaling. A thermostat of this type was adapted and written for the Accelerated Molecular Dynamics with Chemistry (AMolDC) code, which is an adaptive, multilevel QM/MM/INT method designed for performing simulation of complex reactive chemical systems. Successful performance of AMolDC on single molecules with the thermostat shows promise for the future application of the thermostat on large systems of molecules and ultimately on reactive systems.

Oxidation of 1-Propanol via Transition and Non-transition Metal Quinone Complexes

Presenter: Monica R. Austin
Faculty Advisor: Randy Johnston

Alcohols are an important class of organic molecules and they are readily oxidized to aldehydes, ketones, and carboxylic acids. Robert Linck and Henry Taube reported the oxidation of ethanol by a chromium-quinone complex, yielding a 0.75:1 aldehyde:quinone ratio for (see equation 1).¹



This research was conducted to determine the ability of other metal-quinone complexes to oxidize 1-propanol into its respective aldehyde using either chloranilic acid or tetrahydroxy-1,4-benzoquinone as the quinone, and either Cobalt (II), Chromium (III), Iron (II) & (III), Magnesium, or Nickel (II) as the metal. Each metal-quinone complex oxidized 1-propanol into propanal, with a majority of the complexes producing a ratio around 1:1 aldehyde:quinone. These results support that the quinone is receiving two electrons from the alcohol and that a variety of metal quinone complexes will oxidize alcohols.

1. Linck, R.G.; Taube, H. *J. Am. Chem. Soc.* 1963, 85, 2187.

Faraday Rotation of CdSe and Ga Doped CdSe Quantum Dots

Presenter: Matthew Taw
Faculty Advisor: Randy Johnston

Nanoparticles, often metallic, with large Faraday rotations have been used to increase sensitivity in optical devices such as current sensors, current transformers, and optical isolators, usually by embedding them in glass matrices used with in the device. CdSe quantum dots and 12% gallium doped CdSe quantum dots were synthesized in order to determine if doping the quantum dots increased the Faraday rotation. The Faraday rotation measurements were obtained using a home built instrument and analyzed using Matlab programs developed in our lab. Trends in the preliminary data seem to indicate that doping the CdSe quantum dots with gallium does not increase the Faraday rotation.

Mechanism of Simple Alcohol Oxidation by Quinone Complexes Of Chromium (Iii) Ion

Presenter: Andrew Stricklin
Faculty Advisor: Randy Johnston

The oxidation of simple alcohols by chromium(III)-quinone complexes is an established procedure. In an attempt to understand the mechanism of the reaction, *fac*-triquadrate

thylenetriaminechromium(III) ion was synthesized. The chromium complex ion was reacted with either tetrahydroxy-1,4-benzoquinone or chloranilic acid in 1-propanol order to determine if the complex would oxidize the alcohol with only one coordination site for a solvent molecule. Subsequent GCMS analysis indicated successful oxidation of 1-propanol to propanal. The synthesis of *cis*-diaquabis(ethylenediamine)-chromium(III) ion was also attempted, but further research must be done in order to synthesize this compound. This complex ion can be used to determine whether the quinone-complex will oxidize alcohol with no vacant coordination sites for alcohol molecules. The mechanistic implication of these results will be reported.

Growing and Dyeing KDP Crystals

Presenter: Lyndi Strange
Faculty Advisor: Joshua Williams

Growing both undyed and dyed KDP crystals is an area of research that has potential benefits for applied and basic research. Huge, undyed crystals of KDP, formally known as potassium dihydrogen phosphate, are used in the National Ignition Facility as frequency converters for high-powered lasers. Dyed KDP has also been a subject of fascination since 1946 when Blattner *et al* initially stained it. When KDP crystals are grown in the presence of amaranth, an organic dye, crystallographically selective inclusions are observed. Understanding how large organic dye molecules are included into an inorganic salt crystal, such as KDP, as it grows, is not only interesting, but will also increase our understanding of the organic/inorganic interactions. Further, this understanding could lead to the design of dyed salt crystals for potential applications. This research specifically addresses growing undyed KDP crystals via an automated growth chamber and understanding the growth patterns of KDP when doped with organic dye.

Identification and Preliminary Evaluation of Simple Wet Chemical Analytical Techniques for Measuring the Kinetics of Glucoheptonate Synthesis

Presenter: Chase Bouchillon
Faculty Advisor: Michael Hayes

Kiliani-Fischer synthesis of glucoheptonate via the aqueous reaction of glucose with sodium cyanide is a commercially important process, the details of which are not well understood. Considerable economic opportunity exists for optimizing process yields. The present work aims to determine the reaction kinetics in one or more of the key steps of the process by measuring time-varying concentrations of reactant or product species. Substantial progress was made; however, further research is required to develop a practical procedure. ■

COMPUTER SCIENCE

Road Wizard: An Android Application for Traffic Condition Information

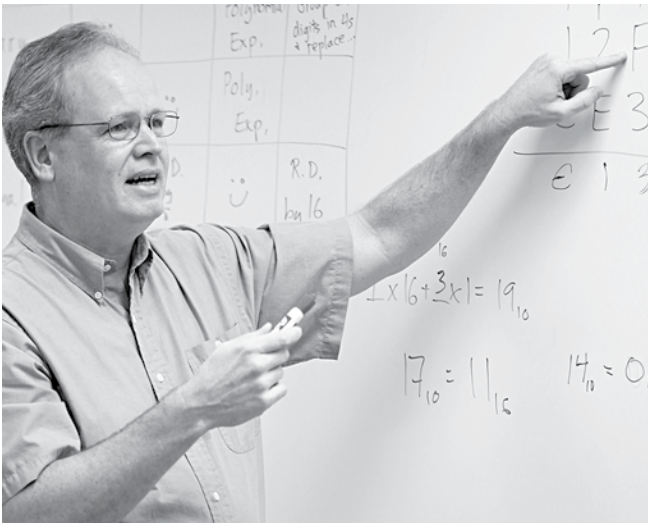
Presenters: Megan Bishop and Courtney Valentine
Faculty Advisor: J.S. Kirk

Road Wizard is a traffic alerting application that is built off of the Android API Framework. It uses Google's Global Positioning System and Google's play services to create a map and show locations and tags. It uses user input and advanced tagging capabilities to create alerts based on different traffic conditions. When a user sees a traffic condition that they want to report, they are able to create a tag for the condition at the specified location. Once two people alert the system by tagging the same location, an alert is sent out to all users using the application's alert notifications. The tags will be disregarded after a 24 hour time span since initial creation.

Penelope Paints: Game Development Using the Blender Animation Suite

Presenter: Alexander Roberts
Faculty Advisor: J.S. Kirk

Blender is a free open source 3D animation suite. This software can be used for modeling, animation, video editing, and game creation. Blender's Application Programming Interface allows for customization of the application through Python scripting, which gives users more overall control of the application and allows for a more complete artistic experience. Blender's game engine allows for porting to the Android mobile platform, which is also open source. In this project, Blender is used to create an open world adventure game about a charismatic Panda, Penelope, who fights for creativity. Her arch nemesis, Dr. Skunk, only sees in black and white and thinks only numbers and figures are important. He fights against Penelope's push for a world of color and imagination because he believes that time should be spent doing math instead of art.



Creating a Tool Assisted Speedrun in Retro Videogaming

Presenter: Grant Godel
Faculty Advisor: J.S. Kirk

A recent trend that has been gaining popularity in videogame culture is called speedrunning. The goal of this trend is simple - complete a videogame as quickly as possible. However for some speedrunners, the human limitations of processing information from the screen and relaying the runner's decision to the controller is simply not fast or efficient enough. A Tool Assisted Speedrun (TAS) enables the user, through computing and other interfaces, to analyze each portion of the game down to the frame. A TAS also allows users to redo each action as many times as they desire. This research project examines creative techniques on how to create an optimized speedrun. It also details research and possible future experimentation in utilizing an outside program to run the TAS on an actual console.

Expanding the Missions Field: Using Facebook API as a Ministry Tool

Presenter: Timothy Johnson
Faculty Advisor: J.S. Kirk

One of the biggest byproducts of the information age is the invention of social media networks. These systems have brought about a sense of global connectedness that has never previously existed. Of these social network systems, Facebook dominates with approximately 58 percent of the visitor market share, making it a prime target for people-centric application development. Due to its people focused nature, such applications can be invaluable in mission work in Facebook accessible areas. In an attempt to utilize Facebook applications in this manner, possible benefits and drawbacks of social network based missions were explored along with general research into the engineering, development and deployment of applications.

Buyer Fraudulence in Peer-to-Peer eCommerce: Building Tools for Alleviation

Presenter: Benjamin D. Horne
Faculty Advisor: J.S. Kirk

Traditional security is based on techniques that provide trust between networks of computational entities, but this security is not necessarily adequate with today's networks of humans; thus, significant research is still needed in facilitating trust between human entities on the internet. In particular, this project applies this concept to well-established peer-to-peer (P2P) ecommerce platforms such as eBay and Craigslist. Despite these platforms being well-established, fraud is still rampant. In fact, ecommerce auction scams claimed a spot in the Wall Street Journal's 10 biggest scams of 2013 list. This top ten spot illustrates that our current methods of securing



P2P interactions are inadequate. In order to begin building tools to alleviate ecommerce fraudulence, we must study the consistencies in these acts of deception. Hence, the research methods employed include a statistical analysis of selling data collected during a 9 week period. With this analyzed data, a fraudulence verification tool was created. This tool will be released along with a set of guidelines to help users take notice of fraudulence before it is too late. In a broad sense, this project will be used as a stepping stone in the understanding of trust in online P2P environments.

WagonWheels: A Demonstration of OpenGL ES and iOS

Presenter: Nathaniel Webb
Faculty Advisor: J.S. Kirk

OpenGL is an extremely powerful framework used on a variety of different platforms to produce amazing 3D and 2D graphics. Among these platforms are the iOS and Android devices as well as the Linux, Windows, and Macintosh computer operating systems. The core focus of this research is to use the power of OpenGL, iOS, and Apple's GameCenter to produce an exciting 3D kart racing game in which the users can compete online with their friends and family by racing through a fun-filled country terrain. The users will also have the ability to communicate with their opponents through an in-game voice chat system.

The Benefits of Using jQuery and jQueryMobile in Web-Based Applications

Presenter: Cullen Sanderson
Faculty Advisor: J. S. Kirk

With the introduction of JavaScript nearly 20 years ago, the world of client-side scripting and execution has vastly affected the way we create and present browser-based products.

Extensions of JavaScript, like jQuery and jQueryMobile (which is built on the foundation of jQuery), have allowed for very dynamic development of the user-interface/experience environment as opposed to native applications. Sarah Perez, a writer for ReadWrite says, "It [jQueryMobile] provides a solid foundation for building a plethora of mobile apps that work on more than one device." The base-layer of jQueryMobile's library, built on the foundation of jQuery, will allow more dynamic and quicker development of web-based applications. The abilities and functions of these two JavaScript extensions will allow for an enhanced user experience for years to come. The research of this project will present the benefits and advantages of using jQuery and jQueryMobile for web-based development. For demonstration purposes, this project will use an updated and modified prototype of a product called Callibrain.

Testing the Functionality of the Microsoft Kinect for Physical Therapy Purposes

Presenter: Stephen Clement
Faculty Advisor: G. Jan Wilms

The Microsoft Kinect is a powerful piece of computer hardware and the capabilities of its functionalities are still being put to the test. The Kinect was primarily developed by Microsoft to provide an enjoyable experience for casual household gamers on the Xbox, but more recently they released a Windows version with a research focused direction. However, Microsoft has also opened up its Kinect libraries to researchers and developers to find many new purposes for it such as interactive shopping stalls and advanced robotics detection. This study is a proof of concept research demonstration of the Kinect's capabilities for aiding patients in conducting physical therapy exercises. The purpose of this study is to provide feedback to a user on the correctness of their exercise performance through visual aids incentives and prove that the Kinect could be effectively made use of in this realm of medicine and treatment programs. ■

DIGITAL MEDIA STUDIES

Flash Killer: CSS Animation in Web Development

Presenter: Jeff Lancaster
Faculty Advisor: Cam Tracy

Flash is dead, and HTML5 has taken its place. Recent innovations in CSS3 animation properties allow web designers to create animations and built-in interactivity entirely in CSS markup, performing motion-based functions usually delegated to JavaScript or Flash. The principal objective of this project was to explore these recent developments, culminating in the inclusion of eye-catching animations into a functional, hand-coded personal portfolio website. Because the technology is still relatively new, steps were taken to ensure as many modern browsers supported the content as possible.

The Power of Payment Processing and How to Wield It

Presenter: Chris Brown
Faculty Advisor: Cam Tracy

This project examined the various methods of payment processing that can be used by today's organizations consisting of a single freelancer all the way through Fortune 500

companies. The pros and cons of several popular methods have been observed and weighed in terms of accessibility, usability, and cost. Methods such as Paypal, WordPress, mobile POS apps, crypto currency, as well as large scale corporate hardware and software implementations were considered in the scope of this presentation. The overall goal of this endeavor was to educate students on how to better utilize these tools as they could very well be depending on one of these sometime in the near future as a part of their own livelihood.

Parallax Scrolling: The Next Generation

Presenter: Daniel Young
Faculty Advisor: Cam Tracy

The focus of this project was on the new concept called parallax scrolling. Parallax scrolling is a new concept in web design that comes from the worlds of animation and 2d game design. It is characterized by a background that goes at a slower rate than the foreground. The history of parallax scrolling is unique due to its origins in animation (Disney's Snow White and the Seven Dwarfs) and in video games (Sonic the HedgeHog). It has been defined as "a foreground layer with transparent bits scrolls over a background layer, giving



the illusion of interactionary movement." Parallax scrolling gives websites the ability to amaze visitors to a website with page depth and animation while delivering a story. This third generation use of parallax scrolling will be explored in the form of a student portfolio.

The Future of Video Delivery in the Modern Browser

Presenter: Benjamin Wright
Faculty Advisor: Cam Tracy

While video content kings like YouTube and Vimeo control how we view videos online, we are seeing a shift toward a more interactive experience with added capabilities in the modern browser. One trend that is emerging is the use of video as the website's background. We are seeing this trend explode predominately on agency and portfolio sites. Using HTML5, CSS3, JavaScript, and jQuery, this project will explore the best practices and techniques for the future of displaying video in the modern web browser.

Paper to Pixel: Rethinking the Delivery of the Renewing Minds Journal

Presenter: Abigail Winters
Faculty Advisor: Melinda Posey

With the desire to move to electronic publishing, this project assisted Union University Press in exploring digital delivery options for the Renewing Minds journal. The project culminated in the production of digital versions of an issue of the journal in e-reader and web formats to help Union University Press visualize the potentials of each format.

The Modern-Day Album Cover: Interacting with Bands Online

Presenter: Chelsea Wood
Faculty Advisor: Melinda Posey

In a field where design and technology are constantly evolving, digital media designers must learn to be adaptive to the ever-changing trends. Designing on a 960 grid and using parallax scrolling are frameworks that can enhance the appearance,

layout, responsive design, and functionality of a website. This project looks at how using these methods enrich the functionality and interaction of a band website in concordance with the brand of a band. It also looks at how the power of design through print, web, and various media can enhance the interaction between a band and their potential audience.

Establishing Convenience and Standardization: The Printing Services Initiative

Presenters: Ethan Smith and Tommy Woods
Faculty Advisor: Cam Tracy

The mission of this project was to create a website and database to organize and standardize the format of the ordering process for the Office of University Services done through online submission. This idea originated with giving back to printing services for all the work they do for the students and faculty, but also to help reduce the number of unclear orders submitted through email. The project creates print requests in a consistent and easy to interpret manner for printing services through the use of an online submission form.

Delivering Tailor-made Content to Varying Devices

Presenter: Gabe Farmer
Faculty Advisor: Cam Tracy

Web designers today are striving to provide correctly sized media to an increasingly broad spectrum of web devices. In an age where instantaneous delivery is a must, designers need to deliver media in a presentable fashion as well as in a digestible file size. Using java commands that retrieve the size of the screen on a device, smaller or larger files can be chosen to be presented from the server. This project demonstrates the ability to present smaller image files, compressed jQuery files, and optimized web fonts in order to best display on any chosen device.

DiaLog: A UX Driven Model for Better Data Input

Presenter: Benjamin Hamilton
Faculty Advisor: Chris Blair

Type 1 Diabetics are constantly working to manage their blood glucose levels and store the information for later review. There are many applications to help store and track their data, but one of the reasons that apps are abandoned is due to the complex methods required to routinely input data. This project considered concepts and theories behind the emerging fields of User Experience and User Interface Design to produce a user-friendly input method for apps that allow fast and easy tracking of routine data. This project produced a working model (A fictitious app called 'DiaLog') for better data input using HTML5, CSS3, and Javascript, making these methods accessible regardless of device or browser. ■



ENGINEERING

Make Shift Light Source

Presenters: Andrew Tan and Eric Ramirez
Faculty Advisor: Jay Bernheisel

Light is a basic necessity. All we have to do is to flip a switch and we can illuminate a dark room instantly. However, in a land where blackouts are a rare occasion, we have become so ignorant of the challenges that still hinder that livelihood of many impoverished communities. The slums, for instance, are in need of the basic necessity of a light source to illuminate their dark homes even during broad daylight. Many of them live near junkyards that keep piling up because people are throwing away everything they consider to be of no use to them. Plastic bottles, compact discs and mirrors are a few of the things people often disregard. This project is aimed at utilizing such materials that are often overlooked to optimize the functionality of a simple light source—a make shift light bottle.



Composition of Success: The Materials of Softball Bats

Presenters: Chelsea Johnson, Erin Picard, Jonathan Vailes, Emily Pace, Dillon Lisk, Aaron Hively, David Brewer, and Nathaniel Parke
Faculty Advisor: Jay Bernheisel

Hitting one over the fence is much more than a formula, but having the right formula for the composition of your bat can make a big difference. This project analyzes different materials for different softball bat compositions. We perform a comparison of the benefits of wood, metal and composite bats. We determined the properties of each type of bat and compare them. We use the concepts of hardness, resilience, toughness, ductility and more to analyze the performance of various bats. We offer a final conclusion for the best material for bats.

Cell Phone Anti-Lost Bracelet

Presenters: Chelsea Johnson, Seth Guiler, and Jeremy Murila
Faculty Advisor: Jeannette Russ

In today's society, technology is crucial to the function of daily life. Cell phones have become a necessity for most people. Due to their compact size, losing them is altogether too easy. This project seeks to remedy this misfortune by creating an alarm triggered by an extended distance between you and your cell phone. The device we are creating will use a radio-signal to continuously contact the cell phone. When the established range has been exceeded, the lack of response from the phone will trigger an alarm on the device to sound, alerting you to the increased proximity from your phone. This will allow you to retrace your steps and avoid the frustrations of a lost phone. The device we are designing comes in bracelet or clip form, removing the need to keep track of this device as well.

Running Shoes: Perspective of Benefits

Presenters: Jeremiah Murila, Levi Hartsfield, Connor Bailey, Chris Boccarossa, Beau Fant, Seth Guiler, Ryan Harris, Bridgette Steiner, and Josh Wakefield
Faculty Advisor: Jay Bernheisel

The EGR 210 course gives a brief glimpse into understanding how various materials function and how they can be utilized, and our poster demonstrates that knowledge. Our particular group delved into the major differences between hyper-engineered running shoes versus minimalist running shoes, e.g. toe shoes. What makes the Nike Free or the Adidas Running Energy Boost silos better than any minimalist running shoe out there such as the Vibram five finger shoes? Are there ample benefits that come from such shoes? Are we looking for comfort and safety or hoping to stand out from the crowd? We hope to point out all the major differences between these two families of shoes for the sake of the audience. We show what types of materials go into the souls and bodies of these shoes and see if their retail price is an adequate reflection of what you get out of the shoe.

Thermal-Imaging Project Abstract: Home Energy Study

Presenters: Chelsea Johnson, Erin Picard, Nathaniel Parke, Chris Boccarosa, and Jeremy Murila
Faculty Advisor: Georg Pingen

This project aims to research the energy losses of a standard home by utilizing a thermal-imaging camera and other techniques, including light emission. The first law of thermodynamics states, "Energy must be conserved." Our purpose in this project is to utilize the first law of thermodynamics, and other concepts presented in EGR 250 to analyze the energy of a system, in this case, Dr. Pingen's

home. We will approximate measurements of the energy entering the home in terms of electrical work, mass, and heat, and determine via the thermal images taken where the home is least energy efficient. The team will use principles of heat transfer to estimate the severity of "problem-spots" in the home, and the specific amounts of heat lost through the windows and other un-/under-insulated areas, and will suggest cost effective improvements that most efficiently reduce the energy loss from the home.

Tracking Elements

Presenters: David Brewer, Christopher Lanham, Beau Fant, Ryan Harris, Nathaniel Parke, and David Adams
Faculty Advisor: Jeannette Russ

The objective of this project is to invent and design a device that is able to alert a user if he leaves a specified distance from an element. This device should alert the user to movements of said object. Our team will explore RFID tags as a solution. RFID stands for Radio Frequency Identification. It is the same technology that has been used on library tags. Recent technology has made it cost efficient and capable enough to solve our problem. The device can send periodic signals to a passive element and retrieve a confirmation signal from that element. The challenge is to incorporate the new technology into a functional and practical user device. This has rarely, if ever, been done in as small a scale as we need. If accomplished, it would be the optimum solution to problems posed in the project.

Aero/TT vs Road Helmet: An On-Road Comparison

Presenters: Shiva Hemmatian, David Adams, Joshua Guthrie, Matt Bentley, Lyndi Strange, Michael Kelly, Chris Love, Eric Ramirez, Andrew Tan, Christopher Lanham, Shane Caver, and William Duncan
Faculty Advisor: Georg Pingen

The objective of this year's EGR 342 (Engineering Experimental Methods) course project at Union University was for students to design and then perform tests that compare the "on-road" performance of aero/tt helmets to regular road helmets. While most aero/TT helmet manufacturers test their helmets extensively with pro-athletes in wind-tunnels, we were not aware of extensive "on-road" tests that have been performed to determine how much advantage aero-helmets provide and if that advantage differs for cyclists of varying experience level (Novice – CAT 3 & Triathlete). The goal was not to perform a head-to-head comparison between the helmets of our sponsoring manufacturers. The results of this study will be presented.



Implementation of RFID in Small-Scale Proximity Devices

Presenters: Jonathan Vailes, Emily Pace, and Erin Picard
Faculty Advisor: Jeannette Russ

The goal of this research and design project is to produce a small-scale proximity device using modern technology. The purpose of the research is to determine how current technology can be used for proximity recognition and quantitative analysis of micro-movements. Ideally, specific alerts would be given depending on the micro-movements, while maintaining a long battery life. Radio Frequency Identification (RFID) technology could be used to locate and provide information about objects to the user. RFID is not cutting edge technology, but the applications for it are being reconsidered. There are also many developing technologies that can provide the same result as RFID in a more efficient manner. Technologies such as these can also be implemented into small-scale proximity devices, and may hold the key to unlocking the future of such devices.

Protec Metal Treatment

Presenters: Beau Fant, Shiva Hemmatian, Chris Lanham, Matt Bentley, Cody Giles, Kian Jost, Kenneth Mayo, Eric Ramirez, and Andrew Tan
Faculty Advisor: Georg Pingen

Engines and motors lose potential rotational energy to friction caused by metal on metal contact. This contributes to engine inefficiency and can lower the miles per gallon output of a car. Protec is a metal treatment rather than an oil additive and claims to treat the first few atoms of metal surfaces to help metal on metal surfaces glide with less friction. This metal treatment has been shown to be more effective than just oil. As students in EGR 250 and 450, we investigate how well Protec works, including a comparison to competitors, a durability study (how long do the effects of Protec last, and a study to determine the ideal oil/Protec ratio.

ENGINEERING

The Application of Radio Frequency Technology to the Problem of Proximity Location

Presenters: Daniel Keylon, Dillon Lisk, and Zachary Benson
Faculty Advisor: Jeannette Russ

In this research project, we explored the commercial applications of radio technology. In particular, we tested to see whether we could use existing radio technology to create a simple, yet powerful connection between two points. We theorized that we could shrink the technology down to a small size and then use a radio receiver as a wireless “tether” to detect when the transmitter as left a given area. We have concluded that the reuse of existing wireless technologies, which incorporate many more features than we desire, would be counterproductive; we have therefore decided to construct our own wireless technology with a minimum of features in order to minimize size and power requirements. In this way, we hope to develop a small, low cost, low power solution to the problem of proximity location detection.

The Application of Parallel Computing to Computational Fluid Dynamics

Presenters: Dillon Lisk, David Adams, David Brewer, and Zachary Benson
Faculty Advisor: Georg Pingen

For our Fundamentals of Thermo-Fluid Sciences research project, we are studying the compressibility error in the lattice Boltzmann method. Doing so requires the numerical solution of computationally costly flow problems. Our goal is to utilize parallel computing to solve these computational fluid dynamics problems efficiently, so that highly detailed models can be analyzed in a reasonable amount of time, using MATLAB. High-end graphics cards, which contain the equivalent of hundreds of streamlined processors (GPU's), can be utilized for such parallel computing, so that even low-budget workstations can take advantage of this increased efficiency. We will take an existing MATLAB program for flow analysis implemented as part of the EGR 250 Lab, enhance it with MATLAB's parallel computing toolbox in order to study compressibility effects in the lattice Boltzmann method, and present our results at the Union University Scholarship Symposium.

GoPro Drone: Cost Effective Aerial Photography

Presenters: Alex Charles, Zac Baker, and Kenneth Mayo
Faculty Advisors: Don Van and Randal Schwindt

Every three to five years, the Office of University Communications pays a helicopter service to take aerial photographs and videos of the campus. This media is then used for various promotional purposes such as recruitment fairs, flyers, and general use on the university website. These aerial photo shoots are not cheap. Our research shows

that in Jackson, the average price for a helicopter rental is approximately \$700 per session. In order to save the university money, a group of three senior engineering students are aiming to design and build a drone with a mounted camera that will be able to take these pictures at a significantly lower cost.

Research of Proximity Alert Devices

Presenters: Michael Kelly, Chris Boccarossa, and Josh Wakefield
Faculty Advisor: Jeannette Russ

Today, people carry expensive electronics with them wherever they go. Losing these valuable devices can prove to be extremely costly, not only because of the value of the device itself, but also because of the important information it may contain. Thus, there is a great need for safeguards which protect the loss or theft of these products. Proximity devices are one type of implementation for this precaution. These devices can be used to alert a person when a gadget is no longer within a certain distance of the person. This project deals with designing and prototyping a proximity device which communicates with a gadget through wireless signals.

Modeling Aerodynamics: Velocity Profiles in Wind Tunnels

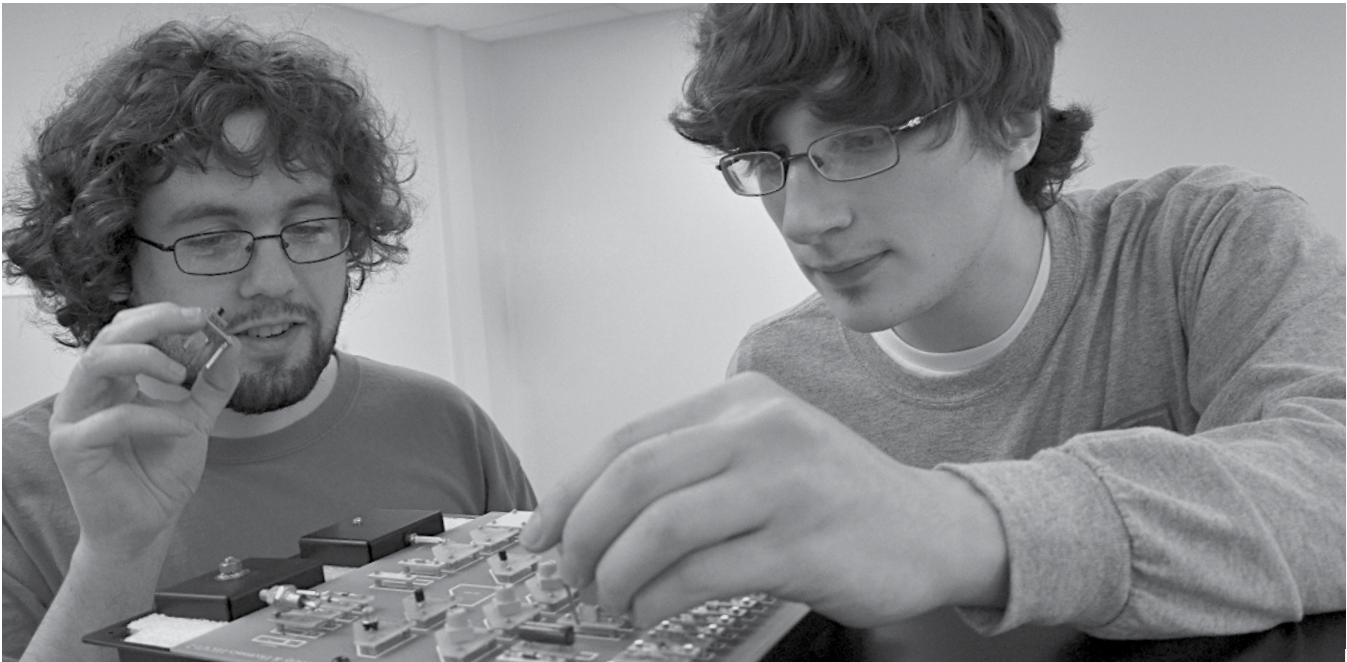
Presenters: Jonathan Vailes, Seth Guiler, Michael Kelly, and Emily Pace
Faculty Advisor: Georg Pingen

Wind tunnels are commonly used to model airflow over an object. This can help in the design process to make things more aerodynamic, resulting in better efficiency. The Union Engineering department has a low-velocity wind tunnel that is currently unable to take quantitative measurements. The goal of this project is to remedy this by installing a system that records pressure measurements, which can be used to model airflow over test objects. The design is able to measure velocity profiles using a pitot-static tube and differential pressure sensors. The tube is able to be placed at known distances from the plate in order to be able to calculate the velocities. By taking readings at different distances from a flat plate, we can quantify airflow over the plate. For MATLAB based data acquisition the sensor will be coupled with an Arduino microcontroller to interpret the data.

Cabling Innovations

Presenters: Grace Morriss, William Murray, and Alex Wainscott
Faculty Advisors: Randal Schwindt and Don Van

The goal of this project is to construct a system for General



Cable that will bunch 10,000 feet of Cat 5 CMX outdoor wire that meets the necessary electrical standards. The cable will need to run at a minimum speed of 100 fpm up to 200 fpm on the manufacturing line. In order to achieve the electrical characteristics and avoid crosstalk, the wire will be bunched with both a left-hand and right-hand lay over 10,000 feet. The wire will pass through a delrin stock inserted in a pillow block, which is driven by a timing belt pulley system and servo motor. The servo motor will be controlled by a CompactLogix PLC and Kinetix drive to allow the speed and direction of the shaft to change dynamically. The end result of this project will be a system that proves to General Cable's management that cabling without a traditional buncher is possible.

A Washer Sorter of Sorts: PLCs and Manufacturing

Presenters: Zachary Baker, Shane Caver, Chris Love, and Grace Morriss
Faculty Advisor: Jeanette Russ, Ethan Wilding

Before there were Programmable Logic Controllers (PLCs), processes were controlled by closed loop, hardwired electrical systems. If a factory was to change or upgrade a product, hundreds, if not thousands, of relays would have to be rewired one by one. As industrial manufacturing continued to grow in the second half of the 20th century, it became clear that a better method of control was necessary. So, PLCs were developed as a space and time efficient alternative. This project took an existing PLC and manufacturing simulation that in the Engineering Department at Union and worked to decipher the program and create the documentation necessary to allow the simulation to be used by future classes.

Scrap Wire Reclamation

Presenters: Dylan Baker, Cody Giles, Todd Jones, and Kian Jost
Faculty Advisors: Don Van and Randal Schwindt

The General Cable plant in Jackson, Tennessee, produces Ethernet cable, composed of four pairs of insulated copper wire twisted together. During the process, scrap wire is inevitably produced. This scrap wire has reclaim value; however, separating the wire into insulation and clean copper yields a significantly higher reclaim value. Currently, General Cable only has a method for separating single strands of wire, but a considerable amount of their scrap is in the form of two strands twisted together which must be sold at the lower reclaim price. The goal for our capstone project is to develop a method for separating and sorting these twisted strands of wire into insulation and clean copper using the knowledge we have gained from the engineering curriculum.

Ultraviolet Water Disinfection

Presenters: Matthew Bentley, Michael Kelly, and Chris Lanham
Faculty Advisor: Jay Bernheisel

Ultraviolet light is known to damage living cells, and this attribute has been applied by many to disinfect and destroy harmful pathogens present in water sources throughout the developing world. This project investigates the purification properties and limitations of ultraviolet light to disinfect water samples. Ultraviolet mercury lamps are used to disinfect a collection of water samples by altering the time exposure, container volume, and water clarity. In order to compare the effects of these factors on disinfection, the water samples are cultured to compare the presence of bacteria in each sample. These comparisons reveal general trends that reflect the benefits and weaknesses of ultraviolet water disinfection. ■

ENGLISH

The Ethics of Infanticide: Motherlove in Toni Morrison’s *Sula* and *Beloved*

Presenter: Kalee Hall
Faculty Advisor: Janna Chance

Readers and critics of Toni Morrison have intense, most often negative, reactions to the ideas and scenes of child-killing throughout the novels *Sula* and *Beloved*. To these readers, the mothers who slay their children in these stories can only be characterized as cruel or unnatural. As a response to these reactions, this paper explores Morrison’s representation of a different, preservative side of motherlove that is at play here and is clearly seen in the poor African-American communities Morrison portrays. Rather than a site of powerlessness for the African-American mother, I will show how motherhood can be a locus of empowerment and agency that resists a racist and sexist culture. This resistance to objectification through motherhood also involves a resistance to a definition of mothering that is solely private; in both *Sula* and *Beloved*, the act of mothering is communal.



Rendering Freedom: The Works of Winslow Homer and the Condition of the Emancipated Slave

Presenter: Allie Durham
Faculty Advisor: David Thomas

The artistic school of American Realism which first gained popularity in the middle of the nineteenth century insightfully reflected the culture and society of the Gilded Age and Progressive Era. Some of the most provocative works from this school originated in the studio of Winslow Homer. Affected by his own life experiences and aware of the struggles confronting the country in the nineteenth century, Homer’s artwork revealed a detailed vision of America as it existed during and after the Civil War. Homer’s depictions of racial inequality and despondency differed notably from the popular art that existed during the Reconstruction period. Winslow Homer’s portrayal of African-American individuals and their culture offered a creative, original, and humanizing vision of the emancipated slave while illustrating the fact that though free in theory, former slaves remained bound by social, economic, and cultural standards of the white majority who consistently ignored their plight.

“De Deluvio Noe” A Reader’s Theater Presentation of the Medieval Play “Noah’s Flood” from the Chester Mystery Cycle

Presenters: Stephen Wunrow, Brandy Fisher, Wyatt Keener, Aneice Lunsford, Joseph McFatrige, Holly Harris, Bailey Shearon, Kaitlen Graves, Joy Atkinson, Katelyn Benedetti, Alexis Broussard, Emily Winters, Grace Pepper, Raven Richardson, Stephanie Traylor, Cameron Wilson, and Meredith Holden
Faculty Advisor: Gavin Richardson

Students will read the play in Middle English. The star of the show is the language, but students will do some light performing of roles such as God, Noah, Noah’s wife, and their children. The comedic highlight of the play, of course, is the famous struggle Noah undergoes as he tries to persuade his shrewish wife to get on the boat before the storm comes. Running time is approximately 30–40 minutes.

About Mystery Plays: 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 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, our play of Noah’s Flood was sponsored by the waterleaders, or those who sold large amounts of water for commercial purposes such as brewing. ■

HISTORY

The American Civil War in Madison County, Tennessee

Presenter: Colby Benefield
Faculty Advisor: David Thomas

Madison County, Tennessee played an important role in the American Civil War. Jackson, the seat of Madison County, played host to a yearlong Union occupation that was a vital factor in General Ulysses S. Grant’s victory in Vicksburg, Mississippi. The county was also the site of two important battles that ultimately decided the fate of the southwestern theater of the war. Tennessee seceded from the Union on June 8, 1861. On June 7, 1862, the Union Army captured Jackson, Tennessee. On September 1st, Union soldiers marching in the southwestern part of the county ran into Brigadier General Frank C. Armstrong’s Confederate Army. This encounter resulted in the Battle of Britton’s Lane. In December of 1862, Nathan Bedford Forrest led a raid on West Tennessee to disrupt supply lines to Grant in Mississippi. In 1863, Union troops began evacuating Jackson. ■

MUSIC

Beethoven and His Influence on the Violin Sonatas

Presenter: Jacqueline Paige Tang
Faculty Advisor: Joshua Veltman

At a time when sonatas focused mainly on the piano, Beethoven innovated new ideas, which gave instruments such as the violin a new height. In his F Major Sonata for Violin and Piano, Beethoven uses the instruments equally. At the time of this composition, Beethoven received many harsh responses from both performers and music critics. However, the audience enjoyed his music. Listeners have highly approved of Beethoven’s works for centuries and still do so today. It is considered an art as a violinist and pianist to perform pieces such as this sonata. Beethoven composed in a way that gave strict instructions to the performer on how it should be played. Tempo, dynamics, and emotion are all very important to Beethoven. Thus, his music should be played the way he intended.

Mikhail Glinka and the Emergence of Russian Music

Presenter: Vicki Searl
Faculty Advisor: Joshua Veltman

If the course of true love never did run smooth, it would be unreasonably optimistic to think that Russian music would have a different fate. Mikhail Ivanovich Glinka’s life, and more specifically his *Variations on a Theme by Mozart*, written for harp, demonstrate the struggles of the emerging Russian music in the early 19th century. Emerging from a nearly exclusively liturgical Byzantine chant foundation, distinctively Russian music built upon the foundation of Western opera to emerge as a distinct art form. Glinka, credited as the leader of the vanguard of Russian music, provides an illuminating look into Russian music and the culture that shaped it through the early 1800’s.

A Study of Bach’s Cantata 61: *Nun komm, der Heiden Heiland*

Presenter: Autumn Hitt
Faculty Advisor: Joshua Veltman

How is music used to preach the gospel? Johann Sebastian Bach finished each of his compositions with the words *Soli Deo Gloria*, which means “Glory to God alone.” This specific cantata is from a much larger group of works that is meant to be sung for each important day in the Church-year calendar. This presentation will focus on a brief biography of Johann Sebastian Bach’s life, why he is considered one of history’s most proficient composers, and what message he was speaking through this Advent cantata. Musical analysis will also be a primary focus to demonstrate how he used to music itself to mirror, or support, the message of the text.

A Study of Maurice Ravel’s *Pavane: Pour une Infante Défunte* for the Piano

Presenter: Autumn Hitt
Faculty Advisor: Joshua Veltman

What is behind a piece of musical composition? This question, though it seems simple at first, holds so much weight. This question approaches not only the sound of a composition, but the composer, musical analysis, ideas behind the work, and its influences. The focus of this project is on the famous composer Maurice Ravel. This presentation will delve into his life and works, dealing specifically with his solo piano piece *Pavane: Pour une Infante Défunte*. The main points will be: a brief account of his life, a musical analysis of the piece, reactions to the piece, and historical implications of the musical time period in which Ravel’s *Pavane* was written. ■



INTERCULTURAL STUDIES

Risk Factors for Food Aid Dependency and the Need to Promote Sustainable Development in Sub-Saharan Africa

Presenter: Zac Calvert
Faculty Advisor: Cynthia Jayne

The United Nations World Food Programme (WFP), the largest food aid organization, reports that there are 842 million people worldwide who suffer from chronic hunger. Sub-Saharan Africa has the highest rate of undernourishment in the world. One in four people in this region do not have enough nourishment to sustain health. While food aid has been effective for many populations at risk, there is a high potential for dependency on external emergency food aid long after the immediate crisis is over. Using selected WFP programs as examples, this research examines risk factors that lead to long-term dependency on food aid and explores ways to shift to a more sustainable system of development and empowerment of local communities.

The Influence of Social Media in the Arab Spring

Presenter: Daniel Young
Faculty Advisor: Cynthia Jayne

This research project takes an in-depth look into how social media influenced the Arab Spring. By looking at the history of Arab cultures, the protestor's use of the new media to get the information they have to the rest of the world, and the government and international community's response that that medium of information flow, it is easy to see the vital influence social media has had on the Arab Spring.

Shaping Identities: Religious Institutions and the Nation State

Presenter: Emily Wood
Faculty Advisor: Cynthia Jayne

Identity construct consists of multiple layers which create an individual who is diverse and unique. Some of these layers will be more highly valued or more prominently emphasized by the individual, in what is known as identity salience. This paper examines some of the many factors that shape identity; specifically by looking at the relationship religious institutions and the nation state have with the individual. The influence of religious institutions on a collective audience will be explored as extending beyond the mere foundations of identity, such as worldview and beliefs. Similarly, the nation state will be seen as a multifaceted entity that consists not only of the entire government structure, legislation, and national policies, but also of the collective nationalistic culture. Thus both religious institutions and the nation state will be found to have a broad influence on the individual identity, which will reveal both national values.

Capstone Paper

Presenter: Zac McMillan
Faculty Advisor: Cynthia Jayne

This paper discusses the relationship between the cultures of the Christian church and the Gay community. There are many beliefs, ideas, and a long history that stand in the way of effective communication that has led to increasingly divisive arguments. I hope to be able to elevate the discussion beyond arguments and

create open discussions so as to avoid greater disagreements that keep the two cultures from integrating effectively.

Corporate Wellness: Incentives, Employee Participation, and How the Social-Ecological Approach May Provide Answers to Sustainable Health

Presenter: Katie Hayes
Faculty Advisor: Cynthia Jayne

As insurance premiums rise and awareness of preventable illnesses grows, many businesses look to establish wellness initiatives within the company. Wellness programs are growing in number, and range from fortune 500 companies to small local businesses. Besides the obvious benefits to the individual becoming healthier, a decrease in medicine consumption and doctors' visits equates to less money spent by the company in health care costs. Whether an individual is personally responsible for his/her health is an issue pertinent to this research. To simply say it is a choice to be healthy fails to address all the factors affecting one's health. The relationship between a human and his environment, and all of the factors influencing those two components is seen as part of the theory of Structuralism. When one factor changes, others change, too, which in turn affects the entire structure. This grand theory, along with various social-ecological models, helps to better explain and provide implementation for permanent health changes. Ecological models do not hold individuals solely responsible for harmful behavior, because this fails to look at all facets of the issue. One's environment and its related systems play a large role in behavior and decisions. This social-ecological viewpoint helps one better understand human behavior through the recognition that ecological factors may help or hinder one's ability and motivation to live healthily. By understanding this theory, business leaders may more successfully approach corporate health and wellness by providing appropriate support and guidance for employees needing to make positive health-related changes in their life.

The Relationship Between Acculturation and Immigrant's Mental and Physical Health

Presenter: Jeimy Barrantes
Faculty Advisor: Cynthia Jayne

Regardless of where immigrants come from, most immigrants go through a process of acculturation to the United States. As a 1.5 generation Hispanic immigrant who has gone through and continues to go through an acculturation process, my interest in the phenomenon of acculturation has been for personal insight but has turned into a strong curiosity about how this phenomenon affects other immigrants. Furthermore, as a professional nurse, it has come to my attention the positive

and negative aspects acculturation may stimulate in the health of immigrants. As a result, I believe further research to the relationship of health to acculturation and the research that fosters better health and health care among immigrants are much needed. Using my knowledge and experience in nursing along with intercultural understanding of identity development and acculturation, I will address in this study the relationship between acculturation and the well-being of immigrants and what specific factors could influence a successful healthy acculturation process.



Aiding or Crippling?: An Exploration of Power in Humanitarian Aid

Presenter: Megan D. Bailey
Faculty Advisor: Cynthia Jayne

This presentation explores power relationships within the context of humanitarian aid. It looks at organizational processes that contribute to those power relationships, and explores how power dynamics promote either the dependency or the empowerment of aid recipients. ■



LANGUAGE

Ambiguous Identities: Vichy France and Jewish Oppression in North Africa

Presenter: Allie Durham
Faculty Advisor: Jean Marie Walls

The violence carried out against the Jews in North Africa during WWII forms a startling backdrop for the exploration of the concept of identity and the implications of colonization. Prior to World War II, the colonial situation of the region of North Africa known as the Maghreb created an ideological environment which naturally escalated into the persecution of the Jewish people under Vichy France. The Jewish communities of Morocco, Tunisia, and Algeria serve as examples of the failure of European assimilation, the power of racial stereotypes, and the difficulty of establishing a unique identity in the midst of the complexities of colonial relationships.

A Fictitious Representation of a Jewish Reality

Presenter: Morgan Kroeger
Faculty Advisor: Kristie Niemeier

When King Ferdinand and Queen Isabella took control of Spain in 1474, they zealously sought religious unity throughout Spain, causing persecution, false accusations, mistrust, and corruption within the nation. The Spanish Inquisition began an obsessive concern to differentiate the purity of blood between “New” and “Old” Christians. The

idea pure blood referred to a person free of Jewish, Muslim or heretical ancestry. Converts were dubbed “New Christians” and those claiming to have pure blood called themselves “Old Christians.” The oppression converts faced during this time was crucial to Spanish history as a whole, and has been portrayed in numerous literary works. Fernando de Rojas, an author whose status as a convert was questioned during his life, uses the female characters in his novel, *La Celestina* (1499, 1502), to depict societal tensions during the Inquisition by portraying the women who embody his own frustrations with his family’s marginalized status in Spain. ■



TEACHING ENGLISH AS A SECOND LANGUAGE TESL

Impacts and Effects of Dominant Education Policy on Ethno Linguistic Minority Groups

Presenters: Kaitlin Nonweiler, Holly Harris, and Anna Lewis
Faculty Advisor: Phillip Ryan

This presentation will be a three person panel. The panelists will discuss problems dealing with ethnic minority groups and initiatives to improve their societal and educational mobility. The first presentation will discuss undocumented students and how they navigate their ethno-linguistic identities in the United States education system. The second presentation investigates how the U.S. education system reflects a capitalistic framework with a focus on the Chicano population. The third presentation explores how current and pre-service educators can teach with a critical framework and can implement Freirian pedagogical theory into their classrooms while navigating the capitalistic and test-driven U.S. education system and its faux critical thinking emphasis in Common Core. Systemic education policy significantly impacts the ethno linguistic identity of minority students. The panel will explore initiatives to improve minority student’s navigation of this system.

Inhibitory Control: How Bilingualism and ADHD Affect Attention and Cognition

Presenter: Jonathan Rogers
Faculty Advisor: Phillip Ryan

This presentation will address how inhibitory control is affected by bilingualism in individuals diagnosed with ADHD. It contains an overview of the theories and methodologies used to research inhibitory control in both these domains. There is a growing amount of research supporting the beneficial role bilingualism plays in the development of executive functioning, particularly inhibitory control, that is the brain’s ability to suppress irrelevant stimuli. ADHD, on the other hand, is characterized by symptoms that reflect a deficiency in inhibitory control. This presentation will establishes a theoretical justification for the relevance of research in this area while outlining some of the epistemic limitations and challenges of various research methodologies. ■

MATHEMATICS

Discrete Calculus on a Scaled Number Line

Presenter: David Clark
Faculty Advisor: Bryan Dawson

Calculus is widely accepted as a mathematical tool used to analyze the characteristics of continuous functions. Discrete calculus, a generalized calculus implemented in non-continuous settings, has recently gained popularity for its provision of a meaningful analysis on a variety of domains. As a result, discrete calculus has proven applicable in disciplines ranging from viscoelasticity to statistical methods. While the foundations of discrete calculus have been widely developed, techniques for solving difference equations (the discrete analogues to differential equations) are sometimes

limited. Our research explores the use of discrete calculus and a corresponding Laplace transform on a domain called the “scaled number line,” a generalization of the natural numbers. We develop operations that allow us to work with an exponential function in familiar ways, enabling us to define a Laplace transform. We further show that a unique Laplace transform exists under certain conditions for the analogues of many common functions, and we demonstrate how Laplace transforms can be utilized to solve difference equations on the scaled number line. Additionally, we find that the discrete Laplace transform has many properties similar to those of the continuous Laplace transform; and in many cases, it yields almost identical results. ■



SOCIAL WORK

Honduran Orphan Care

Presenter: Rebecca Leon
Faculty Advisor: Mary Anne Poe

This project was undertaken with the purpose of learning more about international orphan-care, specifically in Honduras, within the construct of a hands-on internship experience, and to compare these findings to well-researched information on ideal orphan-care. Firstly, this project involved intensive research on ideal international orphan-care and detailed examination of Honduras’ present and past. Secondly, I volunteered full-time for 3 months at the largest orphanage in

Honduras, while executing extensive research on the structure, history, and success of this orphanage through interviews while researching or visiting other orphan-care organizations. Lastly, I analyzed research and experiences through the NASW code of Ethics and several Social Work theories. Research findings support Family and community-based care over institutionalized care emphasizing quality care and discussing the unique environment and challenges faced by Honduran orphans. This project compares current and best practice giving real life examples to promote the healthy development of orphans within orphan-care. ■

NURSING

Co-Treatment of Chronic Pain and Post Traumatic Stress Disorder in Adults: An Integrative Research Review

Presenters: Donna Cannon, Linda Clark, Camillia Haddix, Stacey Hubbard, and Kathryn Wright
Faculty Advisors: Connie Cupples and Ziola Sanchez

Many adults suffer from chronic pain, which may trigger a physiologic stress syndrome similar to post-traumatic stress disorder (PTSD). The purpose is to assess the effectiveness of treatment of chronic pain while treating PTSD. In adults with chronic pain will co-treatment of PTSD and pain management versus pain management alone decrease perceived pain? CINAHL, PubMed, Medline and NIHL were searched using the key terms: chronic pain, PTSD and pain perception. Synthesis reveals management of chronic pain using PTSD treatment in conjunction with pain management is more effective than pain management alone in lowering levels of perceived pain. As most studies consist of male subjects, future research consisting of a female population is recommended.

Integrative Research Review: Assessing the Effectiveness of Antibiotic Treatment Compared to Observing Signs and Symptoms for Nonbacterial Acute Otitis Media

Presenters: Lisa Clark, Sandy Tharpe, Laura Beth West, Shelley Attaway, Brandon Pate, and Kristen Hunt
Faculty Advisors: Zoila Sanchez and Connie Cupples

Acute otitis media (AOM) is one of the most common conditions for which children are prescribed antibiotics, regardless of the etiology. Due to growth in the number of antibiotic-resistant microbes, there is increasing concern with the over prescribing of antibiotics to children. Treatment guidelines for nonbacterial AOM are dependent on the child's age and severity of symptoms associated with bacterial infection. The purpose of this review is to assess current evidence on observing signs & symptoms of nonbacterial AOM compared to antibiotic interventions in the treatment of this condition in children, ages 2 to 10. Databases reviewed: PubMed, Ovid, Cinahl, and Cochrane Systematic Reviews. Search terms used: otitis media (OM) pediatrics, OM bacterial, OM noninfectious, OM guidelines, and OM treatment. Results: This is a work in progress. The anticipated conclusions/results are that observation will be equal to antibiotic treatment in time to symptom relief in nonbacterial AOM.

Incidence of Malignant Hyperthermia in Patients with Traumatic Injuries: An Integrative Literature Review

Presenters: Ashley Craig, Desireé Shammass, Gloria Michelle Patton, and Dorothy Braden
Faculty Advisors: Connie Cupples and Zoila Sanchez

Malignant hyperthermia (MH) is a life threatening pharmacogenetic disorder that is triggered by volatile anesthetics or depolarizing muscle relaxants in predisposed individuals. The purpose is to examine the incidence of malignant hyperthermia in trauma patients as compared to non-trauma patients. Question: Are patients with traumatic injuries, who have received volatile anesthetics and succinylcholine (muscle relaxant) compared with those without traumatic injuries, at increased risk for malignant hyperthermia? Databases reviewed: PubMed, JSTOR, Medline (Ebsco). Search terms: malignant hyperthermia, malignant hyperthermia in trauma patients. This is a work in progress, however, results are expected to reveal a significant relationship between malignant hyperthermia and trauma patients. Implication may be that trauma patients will have a higher risk for developing malignant hyperthermia than patients without traumatic injuries. Recommendation: Use care when administering volatile anesthetics and succinylcholine in trauma patients, and consider alternate sedation, such as a high narcotic technique.

An Integrative Research Review: Catheter Associated Urinary Tract Infections in Elderly Female Patients Who Have Undergone Hip Surgery

Presenters: Rhonda Cavitt, Christy Davis, Jennifer Delk, Tiffany Hare, and Debra Ridley
Faculty Advisors: Connie Cupples and Zoila Sanchez

Catheter associated urinary tract infections (CAUTIs) in elderly patients can lead to many medical complications. The purpose of this IRR is to determine if there is an association between the duration of catheter placement and incidence of CAUTIs. Question: In female patients > 65 years of age having undergone hip surgery requiring a foley catheter, does the removal of the catheter at 24 hours compared to the standard requirement of 48 hours affect the incidence of CAUTIs? Databases reviewed: PubMed, CINAHL, OVID, & Cochrane. This is a work in progress. The anticipated results will be that CAUTIs are less likely to occur if the removal of the catheter takes place earlier rather than later. Conclusion: Evidence will indicate that removal of indwelling catheters at 24 hours instead of the standard 48 hours may lead to a decrease in the incidence of a CAUTI for elderly female patients.



Integrative Research Review: The Effectiveness of Dietary Modifications as a Non-Pharmacological Approach to Reduce ADHD Symptoms in Children Age 5-12

Presenters: Brandi Rose, Haley Long, Erin Legens, Brandy Bartholomew, Allison Adams, and Sara Brown
Faculty Advisors: Zoila Sanchez and Connie Cupples

Attention deficit hyperactivity disorder (ADHD) is a childhood disease, characterized by limited impulse control, decreased concentration, and hyperactivity. Parents are often concerned about the long-term effects of pharmacological interventions, and seek alternatives to medication therapy. The purpose of this study is to identify the effectiveness of dietary modifications as an intervention for ADHD symptoms in children ages 5-12. Clinical question: In children, 5-12, with diagnosed ADHD, does providing a high protein, limited additive diet affect concentration ability and hyperactivity over a period of 6 months. A review of literature will be performed utilizing the databases CINAHL, OVID, UpToDate, and PubMed. Findings: Work in progress, but it is anticipated that studies reviewed would not report significant positive effects. The expected conclusion is that dietary modifications will enhance the therapeutic effects of a pharmacologic approach, but will not significantly decrease symptoms when used alone.

Is There a Relationship Between Demographic Characteristics, Reason for Separation, and Unit Assignment of Nursing Personnel Who Have Left an Acute Psychiatric Hospital?

Presenter: Veneine Cuningkin
Faculty Advisor: Denise Thornton-Orr

Nursing turnover is a complicated phenomenon that requires effective research to retain qualified nursing staff. The Arkansas State Hospital (ASH) experiences nursing turnover at a rate of 41% among registered nurses (RN) and 68% among Licensed Practical Nurses (LPN) and Licensed Psychiatric Technician Nurse (LPTN) combined. These statistics far exceed the national average of 13% (American Association of Colleges of Nursing, 2012). The purpose of this retrospective descriptive study (August 2011 –August 2013) was to examine nursing demographics and unit assignment of nurses, who separated from ASH during this two year period, to determine specific attributing factors to nursing turnover at ASH and develop future retention strategies. De-identifiable demographic data of 115 fulltime and part time nurses (RN & LPN) was collected from human resource (HR) records by their personnel. Variables examined were length of employment, age, gender, nursing experience, prior psychiatric experience, employment stats, level of education, voluntary or involuntary separation, and unit assignment. Results confirmed

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fulltime employees stayed 30 months longer than part time staff and those individuals with prior psychiatric experience remained employed longer.

Integrated Research Review: The “Sundowning” Treatment: Melatonin vs. Light Therapy

Presenters: Tabitha Anglea, Kody Sanderfer, Kimberly Wilks, and Heather Wright

Faculty Advisors: Connie Cupples and Zoila Sanchez

Sundowning is a phenomenon characterized by the increased symptoms of confusion, restlessness, agitation, delusions, paranoia, and wandering within 1 hour of sundown and 1 hour of sunset. The purpose of this project is to compare the effects of light therapy and melatonin in treating sundowners syndrome associated with dementia. Clinical question: In older adults (>65 years) with dementia, how does light therapy compared to melatonin affect neuropsychiatric symptoms associated with sundowning? Databases reviewed: CINAHL, Ovid & Cochran Databases. Key terms: sundowners, sundowning, dementia, pharmacologic interventions, and neuropsychiatric symptoms, non-pharmacologic interventions. This is a work in progress. Anticipated results will indicate that light therapy will be more effective than melatonin in preventing and treating “sundowning” because sundowning symptoms are closely related to an irregular circadian rhythm resulting in agitation and aggression at nighttime.

Preoperative Adjunctive Anxiolytic Interventions in Pediatric Surgery: Integrative Research Review

Presenters: Jancy John, Sarah Spraggins, Manju Thankachan, Alftan Turner, and Ashley Weiss
Faculty Advisors: Connie Cupples and Zoila Sanchez

School age children are prone to anxiety associated with surgical procedures, which affects overall health outcomes. The purpose of this study was to identify and assess the effectiveness of adjunctive anxiolytic interventions, therapeutic play and parental presence, to reduce anxiety in school age children during the preoperative period. In school age children, how will parental presence and therapeutic play as adjunctive anxiolytic treatments affect anxiety within the preoperative period? The following databases were used: CINAHL, EBSCOhost, Ovid, and Cochrane. The key terms used were: pediatric surgery, preoperative anxiety, and coping strategies for pediatric surgery patients. This study is a work in progress. The anticipated results are that both therapeutic play and parental presence will reduce anxiety in school age children in the preoperative period prior to surgery and thus be recommended for inclusions in future practice. The hypothetical conclusions are that the preoperative interventions, parental presence and therapeutic play, reduce anxiety in school age children undergoing surgical procedures.

Ultrasound guided Central Venous Access versus Landmark based technique – Integrative Research Review

Presenters: Amanda Cieskiewicz, Jennifer Clevenger, Kurvis Davis, Lesley Glasgow, Stephanie Moore, and Makenna Wright

Faculty Advisors: Connie Cupples and Zoila Sanchez

Adult and pediatric hospital patients often require central venous access for medications, volume resuscitation, and nutrition. Lines are placed using landmark based or ultrasound guided technique. Multiple insertion attempts can lead to complications extending hospital stay or death. The purpose is to determine if ultrasound guided is more successful than landmark based technique. In adult and pediatric hospital patients requiring central line placement is ultrasound-guided technique more successful than landmark-based technique? Databases reviewed: CINAHL, OVID, and PubMed. Search terms: central line insertion, ultrasound guided, and landmark technique. This is a work in progress. It is anticipated that ultrasound guided technique will result in fewer attempts at cannulation than landmark based technique.

Assessing the Effectiveness of Mentor Programs in the Success of Nurse Leaders

Presenter: Rachel Barber
Faculty Advisor: Cindy Powers

Today’s healthcare industry is filled with nursing shortages, high patient acuity, and often times high patient to nurse ratios. The success of the department or institution depends greatly on the success of the nurse leader. Shifflet & Moyer (2010) state, “staff and patient satisfaction, quality outcomes, and even fiscal status correlate with strong nurse leaders” (p. 252). “Nurse managers are required to be conversant and comfortable with information technology, financial and human resource issues, risk assessment, quality, clinical



governance, and politics” (Waters et al., 2003, p. 516). Often times, a nurse moves into a management position only to be expected to learn by doing. Mentor programs are becoming more popular in today’s nursing profession, but are they effective? Grindel (2003) states, “Unless special attention is focused on the need to create a nurturing environment for role socialization of new managers, it is likely that these new managers will feel overwhelmed, frustrated, and ultimately seek a new career path” (p. 518). The purpose of this Integrated Research Review (IRR) was to summarize current evidence based literature regarding mentor programs in the success of nurse leaders as well as examine studies that have evaluated mentor programs to discern if they are proven effective in the development of the nurse leader. A total of thirty-four articles were initially collected with twenty-two having relevance to purpose of this IRR.

Comparison of Hand Washing Versus Anti-septic Products to Decrease Surgical Site Infections – Integrative Research Review

Presenters: Crystal Coulter, Brittany King, Stacey Ortiz, Meghan Rains Patton, and Shemika Washington
Faculty Advisors: Connie Cupples and Zoila Sanchez

Surgical site infections are the most common nosocomial infections among surgical patients. Nosocomial infections increase patients’ incidence of post-surgical complications. Infection control measures must be analyzed and enhanced to prevent nosocomial infections. This project examines the most effective infection control technique used in the operating room. Among surgical room personnel, which sterilization technique, hand-washing or alcohol-based rub, provides the lowest occurrence of surgical site infections? EBSCOhost articles were explored on infection prevention techniques. Synthesis reveals randomized trials highlighting differences between disinfecting techniques used within the operating room. While the addition of alcohol-based hand products is new to the surgical setting, after limited initial research, it is expected that the overall effectiveness of pathogen eradication will be similar. However, given the ease of alcohol-based rubs over pre-surgical scrubs, it is anticipated that the overall occurrence will be lower with the alcohol-based products due to increased compliance.

The United Kingdom Healthcare System

Presenters: Kemi Douglas and Martin Rivera
Faculty Advisor: Shari Wherry

The United Kingdom (UK), comprises of England, Scotland, Wales and Northern Ireland (D’Avanzo, 2008). Health services in England are largely free at the point of use. These health policies were established in 1948 and it is regulated by the National Health Services (NHS), who provides



preventative medicine, primary care and hospital services (Boyle, 2011). Public health in England is the responsibility of the Department of Health; the Chief Medical Officer leads on public health and is responsible for health improvement and protection. Health services in England are mainly financed from public sources, primarily general taxation and National Insurance Contributions (Boyle, 2011). This presentation will discuss general information about the UK, including the gross domestic product in terms of health care, WHO ranking among countries health care systems. It will also discuss the financing for these programs and challenges faced by the British as it relates to their national health programs.

NURSING

Integrative Research Review: “Impact of GlideScope Laryngoscopy vs. Fiber Optic Laryngoscopy in Improving the Success Rate of Endo-tracheal Intubation.”

Presenters: Josh Donnan, Jason LaSource, Pelu Ogunyemi, and Paul Orman

Faculty Advisors: Connie Cupples and Zoila Sanchez

In adult patients diagnosed as having an airway that is difficult to intubate (a difficult airway) who are undergoing general anesthesia, the use of direct laryngoscopy (the gold standard) for intubation may not be successful, prompting the use of alternative methods such as GlideScope laryngoscopy or fiber-optic laryngoscopy. The purpose of this study was to determine if GlideScope laryngoscopy is the fastest method for endotracheal intubation in a difficult airway patient compared to fiber-optic laryngoscopy in achieving successful endotracheal intubation in difficult airway patients undergoing general anesthesia. Databases reviewed: Google Scholar, Pubmed, CINAHL, Medline, Ebsco Host. Search Terms: GlideScope and Flexible Fiber Optic, Fiber optic intubation, GlideScope intubation versus Fiber-optic, Work in progress; it is believed that evidence will show that GlideScope laryngoscopy is the superior method of achieving successful endotracheal intubation when compared to direct laryngoscopy (McGrath and Miller Techniques), and fiber optic laryngoscopy.

Blood Loss Prevention with the Use of Tranexamic Acid in Total Knee Arthroplasty: An Integrative Research Review

Presenters: Andrea Baker, Ian Bicol, Casey Ellington, Nichelle Kirkland, Edwin Martinez, and Cory Prewitt

Faculty Advisors: Connie Cupples and Zolia Sanchez

Blood transfusion and postoperative blood loss is a significant complication related to total knee arthroplasty (TKA). TKA has the potential for significant blood loss, averaging 761 mL-1784 mL postoperatively. The purpose of this study was to determine how tranexamic acid will influence blood loss compared to not using tranexamic acid in adult patients undergoing TKA. In adult patients undergoing TKA, how does the use of tranexamic acid compared to not using tranexamic acid, influence blood loss within 48 hours postoperatively? Studies were evaluated which assessed the use of tranexamic acid in the postoperative period in the adult population, utilizing CINAHL, Ovid, and ScienceDirect databases. Search terms included: tranexamic acid, total knee arthroplasty, postoperative, and blood loss. Tranexamic acid decreases blood loss in the postoperative period in patients undergoing unilateral TKA. Tranexamic acid use would be recommended to decrease blood loss in the postoperative period in patients undergoing unilateral TKA.

Efficacy of the BIS Monitor to Assess Depth of Anesthesia

Presenters: Brittnie Bird, Caitlyn Harrison, Kourtney Hartwell, Travis Lilley, Katie Pruitt, and Britney Younkin

Faculty Advisors: Zoila Sanchez and Connie Cupples

The purpose of the project was to identify the efficacy of the bispectral index monitor (BIS) as an adjunct approach for assessing depth of anesthesia intraoperatively. The BIS monitor is a non-invasive device which measures brain activity to monitor depth of anesthesia. The BIS is similar to an electroencephalogram (EEG) reading, however, it only measures one area of the brain's activity. Question: In patients undergoing general anesthesia, does the use of the BIS monitor decrease the incidence of awareness during the intraoperative period? Conclusions: Use of the BIS monitor to determine depth of anesthesia is a useful adjunct to the anesthetic plan to decrease the incidence of intraoperative awareness. Recommendations: Proper use of the BIS monitor to assess depth of anesthesia reduces the occurrence of intraoperative awareness for patients while undergoing general anesthesia, however should not be fully relied upon due to incidences of false readings.

An Integrative Research Review of the Impact of Bystander Training on Violence for Utilization in Nursing

Presenters: Christine Tomes, Betsy Akins, Barbara David, Stephanie Reeves, and Susan Spencer

Faculty Advisors: Zoila Sanchez and Connie Cupples

Lateral violence in nursing can be defined as negative behavior expressed towards a coworker through attitudes, actions, or words leading to burnout, staff turnover and poor patient outcomes. Green Dots bystander training teaches direction, distraction and delegation to those who witness this behavior. The purpose of this project is to evaluate the effectiveness of bystander training on violence. Will nurses undergoing bystander training be able to impact lateral violence as compared to those without training? CINAHL, OVID, and



PubMed were searched utilizing terms such as bystander training, lateral violence, bullying, and incivility. Through analyses of previous studies we were able to assess different bystander methods and their effects. Although this is still a work in progress, the synthesis revealed that bystander training is an effective method for addressing violence and Green Dots could be utilized for nursing. This is shown in our table of comparisons of environments, populations, and results.

Integrative Research Review: Patient Respiratory and Hemodynamic Response in Monitored Anesthesia Care Using Dexmedetomidine Compared to Traditional Methods

Presenters: Ashley Burdette, Lauren Hamrick, Haleigh Sligar, and Niki Stivers

Faculty Advisors: Zoila Sanchez and Connie Cupples

Respiratory depression often occurs in patients undergoing monitored anesthesia care (MAC) procedures with the use of traditional sedation such as propofol, fentanyl, and/or midazolam. The purpose of this research is to identify the effects on respiratory and hemodynamic response in MAC cases when using dexmedetomidine compared to traditional methods. In monitored anesthesia care cases, how does dexmedetomidine compared with traditional regimens affect respiratory and hemodynamic response of patients throughout the perioperative period? Ovid, Google Scholar, and Ebscohost searched for Precedex, dexmedetomidine, monitored anesthesia care, respiratory depression, sedation, and anesthesia. Findings: Dexmedetomidine provides adequate anesthesia with minimal respiratory depression. Negative hemodynamic effects correlate with increased dose. Conclusion: The use of dexmedetomidine in MAC is a beneficial alternative to traditional approaches while continuing to provide safe and efficient anesthesia.

Dexmedetomidine decreases the need for multi-drug use and can decrease the amounts of opioids and benzodiazepines used throughout the case.

The Japanese Healthcare System

Presenters: Carlos Buford and Anne Burnett

Faculty Advisor: Shari Wherry

The World Health Organization ranked Japan's healthcare system #10 in the world for quality and cost effectiveness (Corker, 2011). The Japanese spend 8.5% of the gross domestic product for their mandated universal health care (Hashimoto et al., 2011). They use a combination of private and public funding to pay for healthcare services (Henke, Kadonaga, & Kanzler, 2009; WHO, 2014). The Japanese system is geared for one-stop care delivery where all medical needs are met in one facility. Unlike many healthcare systems in other countries, the provider receives the bill instead of the patient (Goya, 2013). The challenges within the Japanese system are with the locus of control for funding, lack of physician oversight, and poor fee controls leading to imbalances in care delivery (Masako, 2009).

Integrative Research Review of Whether IV Lidocaine Provides Adequate Analgesia for Propofol Administration

Presenters: Nathan Birky, Tyler Cabell, Troy Christopher, Michael McNair, and Joey Specker

Faculty Advisors: Connie Cupples and Zoila Sanchez

Propofol, frequently used during induction of general anesthesia for surgery, is commonly associated with the undesired side effect of pain on injection. The purpose of this meta-analysis is to determine the efficacy of Lidocaine

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administration before Propofol in attenuating this pain. To make this determination, relevant randomized controlled trials from MEDLINE, Science Direct, CINAHL, PubMed, and General Onefile were examined to compare Propofol pain with or without Lidocaine being used first. This information is presented in table and graph formats for comparison of whether or not Lidocaine effectively blunts the pain of Propofol when administered on induction. Critical appraisal of the data shows that IV Lidocaine decreases the pain associated with Propofol administration. However, the optimal therapeutic dose, mechanism of action, duration of time, use of tourniquet, and other variables of Lidocaine administration to blunt the pain associated with Propofol were not analyzed, and should be further researched.

Comparing the Incidence of Postoperative Nausea and Vomiting in Patients Receiving Intraoperative Ondansetron Alone vs. Receiving Intraoperative Ondansetron and Dexamethasone Simultaneously.

Presenter: Quintrisa Harden
Faculty Advisors: Bradley Harrell and Molly Wright

Due to the discomfort involved with post-operative nausea and vomiting (PONV), preventive measures had to be re-examined. The purpose of this study is to determine the incidence of PONV among female patients between the ages of 18-65 having undergone laparoscopic gynecologic surgery under general anesthesia. This re-examination required the comparison of two commonly used antiemetics (ondansetron and dexamethasone). A retrospective review of charts dating



up to 5 years ago was completed to obtain a sample of 100 charts. Fifty women received only ondansetron and the other fifty women received ondansetron and dexamethasone simultaneously. All 100 women were monitored for 24 hours to see if they received additional antiemetics. Receiving additional antiemetics was evidence of PONV. There was no significant difference in the PONV amongst the two groups. The results provide evidence that ondansetron alone is just as efficient at preventing PONV as giving ondansetron and dexamethasone together. The information gained from this study is significant because it will be beneficial to patient comfort and satisfaction.

Inhaled Nitrous Oxide as a Viable Epidural Alternative during Childbirth: An Integrative Research Review

Presenters: Brianna Campbell, Lindsay Greenfield, Leanne Haverkost, and Kristen Hayes
Faculty Advisors: Connie Cupples and Zoila Sanchez

Other countries utilize inhaled nitrous oxide to achieve efficacious pain control amongst laboring women. Problem: Although inhaled nitrous oxide may not afford the same level of pain control as an epidural, it may be a viable intervention. Question: In laboring women, how does inhaled nitrous oxide compared to an epidural affect pain control during childbirth? Methods: A literature search was completed using the databases of CINAHL, Cochrane Review, PubMed, UpToDate, EBSCO and Google Scholar. The following key words were used: “nitrous oxide”, “pain”, “labor” “inhaled analgesia”. Findings: Inhaled nitrous oxide is a viable option for pain control amongst laboring women, although it does not afford the same level of relief. Conclusion: Nitrous oxide offers a comparable alternative to an epidural during childbirth.

Spain Healthcare System

Presenters: Carmetra Avery, Courtney Batey, and Courtney Goode
Faculty Advisor: Shari Wherry

Spain’s national healthcare system is categorized among the best in the world and ranks number seven according to the World Health Organization (WHO). The core objectives of the Spanish healthcare system is universal access for all citizens, effective care for better health outcomes, efficient use of resources, high-quality services, and responsiveness to patient concerns (Figueras, McKee, Mossialos, & Saltman, 2002). The Spanish healthcare system is a single payer system funded predominately through general taxation. According to the WHO, 71% of the health expenditure is funded by the public sector and 29% private; with private consisting of only 12% of the population. Private health insurance (PHI) can be used in conjunction with public health resources. The

challenges associated with the healthcare system are long wait times for publicly funded services, inability to select physicians without PHI, lack of coverage for rehabilitation services, and variations in quality of care.

Integrative Research Review: Use of Intramuscular or Vaginal Progesterone Therapy during Pregnancy to Reduce the Risk of Preterm Delivery in Women with a History of Spontaneous Premature Delivery

Presenters: Andrea Bazzell, Robert Callery, Kelly Patterson, Megan Pittman, and Jennifer Wise
Faculty Advisors: Connie Cupples and Zoila Sanchez

Babies delivered prior to 37 weeks gestation are at an increased risk for respiratory complications and hypothermia. The purpose is to determine if the use of progesterone decreases the incidence of preterm delivery. Question: In women with a history of spontaneous preterm delivery (<37 weeks), how does the administration of progesterone during gestation compared to the standard pre-natal care affect the incidence rate of preterm delivery? Databases reviewed: Ebscohost, CINAHL, PubMed, UpToDate, and Cochrane Databases. Search terms: progesterone injection in pregnancy, vaginal progesterone therapy in pregnancy, 17-alpha-hydroxyprogesterone caproate injection, and spontaneous premature delivery. This study is a work in progress. The anticipated results will be that progesterone therapy, whether administered intramuscularly or vaginally during pregnancy, will reduce the risk of preterm delivery. Conclusion: Progesterone, administered as part of pre-natal visits, is an effective medication in preventing preterm delivery in women with a history of spontaneous pre-term delivery.

An Integrative Research Review (IRR) of Gender Differences in Post-traumatic Stress Disorder (PTSD) among Children after a Moderate to Severe Earthquake

Presenters: Linda Billings, Alvin Kauffman, Joy Kimbrell, and Jane Walker
Faculty Advisor: Zoila Sanchez

The effects of moderate to great earthquakes on a population can be devastating, especially to the pediatric subjects. Healthcare providers caring for the children after such a disaster must be equipped to identify the most vulnerable individuals within the population. The purpose of this IRR is to retrospectively evaluate the differences between male and female psychological responses leading to Post-traumatic Stress Disorder (PTSD) after an earthquake rating 5.9 or higher on the Richter scale. The literature review identified eight studies that met the inclusion criteria for this review. Overall, the

female gender showed a higher prevalence of psychological responses consistent with PTSD than the males. Through identifying the most vulnerable individuals within this population, healthcare providers can identify and treat these children helping to avoid potential mental decay.

Integrative Research Review: The Effectiveness of HMG CoA Reductase Inhibitors (Lipid Lowering Drugs) to Reduce the Risk of Cardiovascular Events in Individuals

Presenters: Charlene Bonner, Rhonda Davis, Emmily Hurdle, Audra Jones, and Alison Stucker
Faculty Advisors: Connie Cupples and Zoila Sanchez

Cardiovascular disease, the leading cause of mortality in the United States, affects 26.6 million individuals. The purpose of this research project is to review evidence-based literature concerning the effectiveness of HMG CoA reductase inhibitors on individuals to reduce the risk of cardiovascular events. Question: How effective is the administration of a HMG CoA reductase inhibitor at decreasing the risk of cardiovascular events such as a cerebrovascular accident or myocardial infarction? Databases utilized include: Nursing On-line Journals, CINAHL, MedlinePlus, and PubMed. Synthesis of the data reveals: an overall lowering of the risk of cardiovascular events by 20-30%. The results will be presented on a poster and include: a table of findings, graph comparing variables, statement of application to practice and graphics. Conclusion: Individuals that undergo HMG CoA reductase inhibitor treatment will effectively lower their risk of a cerebrovascular accident or myocardial infarction by 25% over a period of 1-2 years.

The Canadian Healthcare System

Presenters: Lisa Pearson and Jeannie Walker
Faculty Advisor: Shari Wherry

Canada is a single-payer healthcare system in which each of the ten provinces and three territories are responsible for funding, administration, providing services, and delineating what services are covered (Health Care System, 2014). Canadians may choose any provider who is accepting new patients within their assigned province; however, they may be required to pay a premium (Chua & Rutledge, 2006). Private insurance plans can ensure that out of pocket costs are kept to a minimum as dental care, long term care, complementary medicine, prescription drugs, and emergency treatment outside of their home province are not always covered services. Health care challenges may include long waiting times and equitable health care allocation (LaPierre, 2012). According to the World Health Report (2000), ranking of the world’s health systems Canada is 30th out of 190 countries with a total expenditure of approximately 11% from 2011 to present (NHA Indicators, 2014).

Analysis of Cricoid Pressure Force and Technique among Anesthesiologists, Nurse Anesthetists, and Registered Nurses

Presenter: Melissa Lefave
Faculty Advisors: Molly Wright and Brad Harrell

The application of cricoid pressure became common practice when Sellick (1961) described the technique as a vital skill to prevent regurgitation of gastric contents and pulmonary aspiration during bag-mask ventilation or tracheal intubation. The purpose of this project was to assess the ability of perioperative hospital personnel (anesthesiologists, nurse anesthetists, and registered nurses) to correctly apply cricoid pressure. The participant’s application of cricoid pressure applied to a laryngotracheal model was evaluated before and after an educational intervention utilizing a pretest-post-test design. Findings revealed that the educational intervention was successful as participants’ identification of the anatomy of the cricoid cartilage, cricoid pressure technique, and force of pressure improved significantly post-test. Nurse anesthetists applied more appropriate cricoid force pretest than other participants. However, post-test results showed all participants applied cricoid force equally well revealing adequate interventional education.

Integrative Research Review: Etomidate Use in the Septic Adult Surgery Patient for Induction of Anesthesia

Presenters: Amanda Balof, Dawson Bryant, Meagan Edelen, Charles Ezelle, Robert Holland, Timothy Parrish
Faculty Advisor: Connie Cupples and Zolia Sanchez

Septic patients present a challenge for the anesthesia provider during induction phase of surgical anesthesia. Etomidate offers hemodynamic stability; however, postoperative outcomes suffer due to intrinsic adrenocortical suppression. The purpose of this project was to identify septic adult patient outcomes after undergoing induction of anesthesia with Etomidate compared with Propofol. Clinical Question: In septic adult patients undergoing in-patient surgery is administration of 20mg IV etomidate associated with increased morbidity/mortality rates at 15-30 days postoperatively compared with those receiving 150mg IV propofol for induction of anesthesia? CINAHL, PubMed, Medline, and Cochrane were searched. Keywords: Etomidate, Mortality, Unstable, Sepsis, Cortisol. Synthesis method shows correlation of negative postoperative outcomes using single-dose Etomidate at anesthetic induction in septic patients. Etomidate is hemodynamically stable at induction; however, negative postoperative outcomes at 15-30 days due to adrenocortical suppressive effect will be increased. Etomidate is inappropriate for anesthetic induction of septic adult patients compared with Propofol.

Integrative Research Review: Kangaroo Care Leads to Regulation of Temperature and Weight Gain in Pre-term Infants

Presenters: Ashley Gipson, MaryBeth Mungle, Lauren Parker, Karen Runyon, Callie Tuggle, and Lindsay White
Faculty Advisors: Zolia Sanchez, Connie Cupples

Pre-term infants lack the ability to regulate their vital signs due to decreased body surface area and an immature neurodevelopmental status. The aim of this research review is to determine if kangaroo care leads to regulation of temperature and weight gain in pre-term infants. A literature review on this topic was conducted using CINAHL, Google Scholar, Ovid, and Gale Cengage Learning. Search terms used include “kangaroo care”, “preterm infants”, “thermoregulation”, and “breastfeeding”. Synthesis revealed preterm infants that receive kangaroo care during their hospital stay exhibit improved weight gain and thermoregulation compared to those who did not. Results will be presented and will include reflections on practice and comparisons of kangaroo care versus no skin-to-skin contact during the preterm infant’s hospital stay. Findings suggest preterm infants should receive kangaroo care as soon as possible following delivery and frequently throughout their hospital stay.

Integrative Research Review: C. Difficile Fecal Microbiota Transplant vs. Antibiotic Treatment

Presenters: Kara Bruning, Benjamin Duffy, Rebecca Lard, James Lee, and Shannon Weed
Faculty Advisors: Connie Cupples and Zolia Sanchez

Clostridium difficile (C. difficile) is the most prevalent cause of antibiotic related diarrhea. Traditional treatment of C.



difficile includes discontinuing causative antibiotics and starting the patient on different antibiotics. Fecal microbiota transplantation (FMT) utilizes donor stool to treat the C-difficile. The purpose of this research is to determine in adults, what is the effect of FMT on C. difficile compared with antibiotics? Academic One file, CDC.gov, CINHALL, Medline Plus, Google Scholar were utilized. Search terms included stool transplant, antibiotic treatment of C-Diff, C-Difficile treatment, duodenal infusion of donor feces, prevention, conclusions and incidence of FMT and C-Diff. This is a work in progress and results will be presented on a poster. Synthesis reveals FMT is effective in treating C-Difficile. When compared with the traditional use of antibiotics, FMT is preferred due to decreased side effects of the treatment, decreased treatment time, and quick response to therapy.

The Australian Healthcare System

Presenters: Jane Alison Walker, Alvin Kauffman
Faculty Advisor: Shari Wherry

The purpose of this study is to review economic information related to the healthcare system of Australia. The relevant aspects of the Australian healthcare system’s financing, both government and private sectors, are reviewed. They include the payer system, the reimbursement system for healthcare providers, and the total spending on healthcare relative to gross domestic product. The World Health Organization (WHO) ranking for international healthcare systems is presented. Individual choices available through the healthcare system to patients are discussed. Special considerations are given to the structural and organizational challenges, as well as the anthropometric issues, confronting the Australian healthcare system.

The Mexican Healthcare System

Presenters: Linda Billings, Joy Kimbrell
Faculty Advisor: Shari Wherry

The purpose of this presentation is to describe the health economic structure of Mexico. The Mexican system, called Seguro Popular, is funded by the government and has the goal of ensuring that even the poorest citizens of Mexico have access to health care for illness and preventative services. Prior to instituting this system of universal health care in 2012, 50 million Mexicans were excluded from coverage. Some citizens have private insurance. Mexico ranks significantly below the Organisation for Economic Co-operation and Development (OECD) average in health spending per capita. Total health spending accounted for just 6.2% of GDP in Mexico in 2010, the third lowest share among OECD countries.

Spiritual Care Practices of Nurse Practitioners in Tennessee

Presenter: Darel L. Davis
Faculty Advisor: Shari Wherry

This research project examined the spiritual self-perception and the spiritual care practices of Nurse Practitioners (NPs) in Tennessee. Previous research has shown that spirituality is a vital component in overall health and healing and patients desire for healthcare providers to address their spiritual needs. Sixty-two NPs responded to questions related to spiritual self-perception from Reed’s Spiritual Perspective Scale and questions related to spiritual care assessment and intervention from the Vincenzi Spiritual Assessment Tool and the Vincenzi Spiritual Care Intervention Tool. A significant relationship was found between heightened NP spiritual self-perception and their perceived ability to identify and act upon the spiritual needs of their patients. Developing ways to enrich NP spiritual self-perception within and outside of the academic setting appears to be a way to increase spiritual assessment and spiritual care intervention for patients.

Evaluating the Presence of Grief in Persons Living with the Diagnosis of HIV/AIDS

Presenter: Malinda R. Conrad
Faculty Advisor: Patsy Carihfield

Background: A common misconception of grief limits its definition to mourning a loss of life as a result of death. However, grief may be experienced with life altering events or the potential loss of life for persons living with chronic diseases or complicated illnesses, i.e. diabetes, cardiovascular disease and HIV/AIDS. This qualitative study evaluates the presence of grief in persons living with the diagnosis of HIV/AIDS. Method: Seven operational paradigms were assessed using the Psychosocial Adjustment to Illness Scale Self Report (PAIS-SR). There were 78 study participants evaluated with 50 participants completing the survey. There were male participants (N=33) and female participants (N=17) from an HIV clinic in the southern region of the United States. Results: The data analysis compared gender and age within the sample group (N=50). The statistical analysis revealed the presence of grief in both genders. Data analysis indicated the presence of grief had a significant impact on sexual relationships. This study proposes adopting a universal and functional definition of grief to include persons experiencing despondency related to living with chronic diseases with periodic clinical assessments and appropriate interventions when necessary.

To What Extent Do Faith Community Nurses Perceive They Practice According to the Faith Community Nursing Standards?

Presenters: Dawn Henderson and Cynthia Powers
Faculty Advisor: Cynthia Powers

Health Ministry Association (HMA, 2010), the professional membership organization for Faith Community Nurses (FCN), noted the “ANCC’s process of formal recognition requires a significant number of nurses who exemplify the scope and standards of faith community nursing in their practice” for competency. According to the American Nurses Association (ANA, 2010), competencies correlate with each Standard of Practice that is applied to care. Research demonstrates the connection of spiritual well-being, participation in religious practices, and holistic health, but there is little research on competency, application of standards, and benefits of the FCN practice (ANA, 2012). This quantitative study surveyed 152 FCN to determine the frequency faith community nurses (FCN) apply the Standards of Practice for FCN in providing care to the faith community.

Comparison of International Health Care Systems: United States

Presenter: Shari D. Wherry, DNP, APRN, FNP-C

According to Frank Newport (November 2013), “79% of Americans rate the quality of healthcare they personally receive as excellent or good, roughly at the average on this combined positive measure since 2001” on the Gallup’s annual Health and Healthcare poll (“Americans’ Views of Healthcare” para. 3). The DNP class of Nursing Health Policy and Economics has examined the economic and political factors affecting health care in the United States. To compare the United States Healthcare to other nations, the class will present posters for Canada, Germany, Japan, France, United



Kingdom, and Switzerland that will include:

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

The faculty for the class (Dr. Shari D. Wherry) compiled a poster with the same information for the United States for comparison purposes.

Substance Use Recidivism among Arkansas Nurses

Presenter: Karen Davis
Faculty Advisor: Cynthia Powers

Substance-use recidivism among nurses is a serious and complex issue that endangers the health of nurses and the safety of patients. The Arkansas State Board of Nursing (ASBN) is responsible for protecting the public by effectively regulating nursing practice. This retrospective study was designed to explore whether there is a relationship between lengths of probation for nurses with substance use violations and recidivism. Data collected from computer files at the ASBN was allocated to two groups (n=76); RNs with one substance-use disciplinary probation, and RNs with more than one substance-use disciplinary probation. Variables were: length of probation for substance use, age, race, gender, educational level, felony substance conviction, and whether violations involved habit-forming drugs, alcohol or both. Results indicated no statistically significant difference in rates of recidivism based on length of probation (p=.05.) Odds of recidivism for nurses with a felony substance conviction were 4.6 times higher than for nurses without a felony substance conviction. Odds of recidivism were 5.9 times higher for nurses addicted to both alcohol and habit-forming drugs. Because substance use poses a threat to patient safety and also impacts employers and co-workers, further research is needed to identify solutions to this growing problem.

Incorporation of Faith Practices into a Diabetes Self-Care Educational Model

Presenter: Cathy Ammerman
Faculty Advisor: Kelly Harden

Purpose: To provide a classroom curriculum for a Diabetic self-management class to be used alone or incorporated into an existing educational program. Review of Literature: Twenty five million Americans have Diabetes. Lifestyle modifications necessary to minimize the risk of long-term complications are often viewed as unrealistic ideals that are unachievable within the Diabetic’s current circumstances. Diet and

activity habits are tightly interwoven with cultural, social, and spiritual beliefs. Spiritual beliefs influence a person’s healthcare behavior choices and provide a source of strength and hope that can instill a sense that change, though difficult, is possible. Implications for Practice: Nurse Practitioners, Faith Community Nurses, and others involved with Diabetic care have a unique opportunity to assess the spiritual beliefs of patients and help them explore how the disciplines of their faith may assist them in lifestyle modification.

A Self-Assessment Survey of Advanced Practice Nurses (APRNs) in the Southeastern United States Regarding Beliefs and Attitudes toward the Obese Patient Population

Presenter: Tara Y. Mabon
Faculty Advisor: Melissa Swinea

Obesity is a global epidemic that causes serious health problems that are very costly. Advanced Practice Registered Nurses (APRNs) are, as part of the healthcare collaborating team of providers, responsible for combating this epidemic to improve health outcomes. Personal beliefs and attitudes about patients have been found to affect the way in which healthcare providers address health issues with patients. Existing studies have examined the beliefs and attitudes of physicians, nurses, and physical therapists toward the obese patient population, but studies of the APRN beliefs and attitudes are lacking. APRNs in the southwestern US practicing in a convenient care setting were surveyed. The survey results revealed a belief that in some cases the obese patient’s weight was due to conditions out of their control and a general positive attitude when treating the obese population. The study supports the APRN provider population as a target population to include in the collaboration team for addressing, educating, and treating the obese patient population.

The Impact of Transformational Leadership on Job Satisfaction

Presenter: René Stark
Faculty Advisor: Denise Thornton-Orr

The purpose of this review was to explore the literature to answer the question: In the healthcare setting, how does transformational nursing leadership impact staff nurse’s job satisfaction? Transformational leadership is described as being visionary, inspirational, motivational, and a positive role-modeling influence on those who follow. A search was conducted via the CINAHL, PubMed, Ovid MEDLINE and Google Scholar data bases. Studies conducted within the United States and internationally were reviewed. Search terms included transformational leadership, job satisfaction, nurse leaders, nurse managers, nurses. After a thorough review of

all the articles, 19 articles were found to be pertinent to this review. Results indicated that transformational leadership is an effective style of leadership that positively impacts staff nurse’s job satisfaction as it relates to overall wellbeing in the workplace, one’s role performance, reward for that performance, and organizational commitment. Developing programs to ensure nurse managers have the education and training to become transformational leaders should be a top priority in the field of nursing. For optimal results, this training should begin in the academic environment and through collaborative efforts students will continue to become transformational leaders in the clinical setting.

Do Nurse Practitioners Adhere To Evidence-Based Practice Guidelines When Treating Upper Respiratory Tract Infections?

Presenter: Traci Abram
Faculty Advisor: Shari Wherry

Purpose: The purpose of the project was to evaluate the practicing habits of Nurse Practitioners who treat Upper Respiratory Tract Infections. Design: This was a systematic extension replication project. Methods: A thirty-five question Likert style survey was adapted from a study by Fakhri, Hiiu, Savoy-Moore, & Saravolatz (2003) using a 5 point scale and multiple choice questions, specific to Upper Respiratory Tract Infections, to determine their adherence to Evidence-Based Practice Guidelines through self-reporting. Results: Seventy-five Nurse Practitioners (NPs) from different specialty areas agreed to participate in the survey. Eighty-three percent (n=74) surveyed agreed that Evidenced-Based Guidelines do not suggest prescribing an antibiotic for fever, cough and runny nose. Eighty-one percent (n=74) of NPs disagreed with the statement that a 35 year old healthy woman with cough and sputum production for 3 days should be prescribed an antibiotic for acute bronchitis. Ninety-percent (n=70) of NPs agreed that Evidence-Based Practice Guidelines do not recommend antibiotics for children with fever and runny nose. Of the 73 respondents on prescribing an antibiotic for patients with a history of COPD and heart disease, 85% (n=73) would prescribe an antibiotic as suggested in the practice guidelines when treating Upper Respiratory Tract Infections. Thirty-seven percent (n=73) of respondents surveyed prescribe antibiotics at least 50% of the time in their practice and 81% (n=73) have taken at least one course in Evidence-Based Guidelines. Conclusions: The vast majority of NPs who took the survey, regardless of demographic factors, are consistently adhering to Evidenced Based Practice Guidelines when treating URTI in adult and pediatric populations. Nurse Practitioners are treating URTI conservatively and without prescriptions for antibiotics. This practice is consistence with the Centers for Disease Control and Infectious Diseases Society of America practice guidelines. ■

PHYSICS

The Relative Yields of 149-153Pr in the Spontaneous Fission of 252Cf
Presenter: Jonathan Eldridge
Faculty Advisor: Geoffrey Poore

The relative yields of the fission partners of 149-153Pr, resulting from the spontaneous fission of 252Cf, were studied. This study was done by means of γ - γ , γ , and γ - γ - γ



coincidence data taken in 2000 by the multi-HPGe, Compton-suppressed, gamma detector array, Gammasphere, at Lawrence Berkeley National Lab. The coincidence data were analyzed by double- and triple-gating on transitions in 149-153Pr and obtaining the intensities of the 93-101Y transitions. For 150,151,152,153Pr the 3n channel was found to be the strongest. The 149Pr, however, was found to peak at the 4n channel. These results were used to verify the assignments of the level schemes of 151,152,153Pr. The data are found to be in agreement with Wahl's independent yield tables

AFM Cancer Research
Presenter: Michael Hunter Cochran
Faculty Advisor: Geoffrey Poore

The atomic force microscope (AFM) has given researchers many ways to understand and affect material on the nanoscale. My goal this summer was to use an AFM to thermally modify the surface of a polymer, which would later be immersed in a solution of biomarkers in the hope that those particles would attach specifically to the thermally changed areas and later be used to test for cancer. ■

PSYCHOLOGY

Investigating Perceived Control and Birth Order
Presenters: Katelyn Morris, Rachel Robbins, and Kelsey McFarland
Faculty Advisor: Jinni Leigh Blalack

Perceived control (Rotter's Locus of Control Scale) and birth order were examined in relation to academic achievement (GPA). Participants (n= 346) were single college students between the ages of 18-24, excluding freshmen. Participants were classified as high or low in perceived control based on their Rotter's Locus of Control score. From the sample, 62.1% (n = 215) were high in perceived control, while 37.9% (n = 131) were low in perceived control. Data was analyzed with the Spearman 2-tailed test using the SPSS, $p < .05$. The correlation between perceived control and GPA was approaching significance ($r = -.103$, $p = .056$). Analysis of birth order data yielded no significance. However, a positive correlation was found between the time commitment to student organizations, course load, and GPA. Overall, the results from this sample failed to support the research hypotheses.

Exploring the Impact of Mindfulness on Academic Achievement
Presenters: Kelsy Dement, Emily Russell, Jake Fry, and Kendra Loh
Faculty Advisor: Jinni Leigh Blalack

This study examined the relationship between college students' levels of mindfulness, measured by the Mindfulness Attention Awareness Scale (MAAS), and level of academic achievement, measured by GPA. The participants (n = 346) were single college students between the ages of 18-24 of sophomore classification or higher. Of the 346 participants, 11% (n = 38) scored low in mindfulness, 15.3% (n = 53) scored high in mindfulness, and 73.7% (n = 255) scored average. Data was analyzed with the Spearman 2-tailed test with $p < .05$. No statistical significance was found between mindfulness and GPA ($r_s = -.01$; $p = .858$). Analysis of mindfulness as related to students' demographics (age, classification, employment, course load, time commitment to extracurricular activities) was conducted and yielded no statistical significance. Analysis of demographics and academic achievement revealed a positive correlation between hours devoted to student organizations, course load, and students' GPA. ■

THEOLOGY AND MISSIONS



The Person and Divinity of Christ In Biblical Narrative: John 18:28-40 As Test Case
Presenter: Grant Dew
Faculty Advisor: C. Ben Mitchell

This presentation argues that narrative biblical passages are the most beneficial for understanding the person and divinity of Christ. These texts show Jesus' actions in everyday life, his encounters with sin and its tragic effects on individuals, and his ability to overcome evil despite the devil's schemes. The presentation will focus on the account of Jesus before Pilate in John 18:28-40. After careful analysis of this passage, along with similar supporting narratives, I hope to demonstrate the fruitfulness of consulting the narrative passages first when considering the person and divinity of Christ.

The Church Should Help Teens Handle the Challenges of the 21st Century by Using the Bible
Presenter: Tracy Frisbee
Faculty Advisor: C. Ben Mitchell

This presentation examines challenges that teens in today's society have to deal with, and how and/or if the Church should get involved in helping them deal with those challenges. The Bible is what Christians should turn to for guidance. Moreover, the Bible commissions Christians to help each other as they face difficult decisions. Furthermore, the Bible speaks a lot about the issues teens are facing today, such as cussing, drugs, homosexuality, and suffering. However, many teens, especially non-Christians, are unaware of what the Bible says concerning these issues, so they are unequipped to make responsible decisions. Therefore, it is the Church's responsibility to help them.

Eschatology and Ethics in Petrine Literature
Presenter: Zach Thompson
Faculty Advisor: James Patterson

New Testament authors motivate readers by grounding exhortations in truth. Every ground they employ is founded in either consequence or reality. Consequential groundings appeal to the result of an action. Reality based groundings point to a specific truth which motivates action and will remain true if the action is not performed. Subsuming thought under these two major categories, I will suggest subcategories and demonstrate their effectiveness in order to encourage a more robust understanding of New Testament motivations for exhortations. I will then apply them to the Petrine Epistles and discern how Peter relates the end times to present action.

Paul Ricoeur and Aesthetic Discourse
Presenter: Trey Weise
Faculty Advisor: Taylor Worley

By his own admission, Paul Ricoeur approached aesthetic questions from the perspective of narrative, only incidentally dealing with the other arts, such as poetry, music, or painting. As such, his hermeneutic theory is tightly focused on works of literature, and the work of applying his principles to other fields is left to others. Building on an excavation of Ricoeur's hermeneutic which reveals the concept of different modes of discourse as foundational to the entire project, this section of my paper attempts to trace a parallel trajectory to Ricoeur's, only in this case from the perspective of painting. The project begins by mapping onto Ricoeur's distinction between speculative and metaphoric discourse Aristotle's three aspects of rhetoric—logos, pathos, and ethos. I suggest that logos corresponds to speculative discourse, and that ethos and pathos—which both belong to metaphoric discourse—correspond more specifically to narrative and aesthetic discourse, respectively. In the rest of this section I then sketch out briefly the aesthetic mode of discourse. First, drawing on Ricoeur's Rule of Metaphor, I establish that the aesthetic functions according to metaphorical reference in the same way as narrative and poetry. Then, putting Ricoeur's Interpretation Theory in conversation with Paul Crowther's concept of phenomenological depth and Jason Gaiger's insistence on the interplay of representational and configurational elements, I lay out some of the unique characteristics of the interpretation of visual art. Finally, I apply Ricoeur's three-fold mimesis in Time and Narrative, Vol.1 to painting, appealing to Oscar Wilde's assertion that life imitates art, as well as Scott Huelin's conception of the aesthetic experience as a place of hospitality. I conclude with some thoughts on the broader theological implications of the distinction between the three modes of discourse.

THEOLOGY AND MISSIONS

The Value of Children: Comparing the Greco-Roman and New Testament Views of Childhood

Presenter: Christine Ryan
Faculty Advisor: C. Ben Mitchell

In this presentation, I will compare the Greco-Roman view of childhood with the view of childhood developed in the New Testament. Towards this end, comparison will be made between the Pauline household codes found in Colossians and Ephesians and Greco-Roman household codes. In order to further develop the New Testament view of childhood, I will also examine Jesus' own teaching about children, his interactions with children, and his own childhood, culminating with a discussion of his incarnation. In short, the New Testament values childhood significantly more highly than the surrounding Greco-Roman culture. In conclusion, I will briefly suggest how this knowledge affects the way the 21st century church should view childhood.

Defining the Office and Role of Elder as Found in the New Testament

Presenter: Matt Moore
Faculty Advisor: James Patterson

In the New Testament, the word translated as elder is used a variety of times to describe a leader within the church, and Paul gives both Timothy and Titus a list of qualifications for elders among other leadership in the church in 1 Timothy 3:1-7 and in Titus 1:7-9. In the centuries since that time, the issue of church government, specifically what an elder is and what an elder does, has been a source of great conflict. My goals are to examine the New Testament itself and various sources from Church History to provide a resource for other Christians who want to better understand the role of an elder within the church. To accomplish this, I plan to research both church history and exegetical sources in order to consider various opinions on who and what an elder in a local church is.

Church Revitalization in Post-Christian Culture

Presenter: Stephen Charlton
Faculty Advisor: James Patterson

In my presentation I will be discussing the building churches in different developed cultural societies within the North America. I will examine church planting through the insights from the book of Acts. Then I will discuss and explore the differences between Pre-Christian and Post-Christians cultures, the differences between planting new churches and church revitalization (or "replanting"), and that planting new churches is intended for Pre-Christian culture, and church revitalization is intended for Post-Christian culture. My purpose is to establish an awareness within the Christian community about the churches in dying communities and

the struggle of rebuilding churches in the midst of planting new churches in Post-Christian culture. The presentation will conclude with an application for replanting churches in an area like Memphis, Tennessee, and how there is a need for revitalization for in a culture that is declining into a Post-Christian mindset.

A Theology of the Holy Spirit and His Role in Christian Community

Presenter: Daniel Shelton
Faculty Advisor: James Patterson

Dietrich Bonhoeffer believed that the Holy Spirit was essential to understanding true Christian community. By looking at the life of Bonhoeffer (especially his time at the underground seminary at Finkenwalde) and a few of his major works (in particular: Sanctorum Communio, Act and Being, and Life Together), I intend to piece together his theology of the Holy Spirit and why it is important to true Christian community. Although this piecing together of Bonhoeffer's theology will not be complete because there is a limited amount of information we can obtain from his writings and life. Nevertheless, I intend to bring together some of Bonhoeffer's theology with the works I will be using.



The Local Church: A Home for Christian Teaching and Transformation

Presenter: Caleb Creel
Faculty Advisor: C. Ben Mitchell

This presentation will examine the purposes of the local church and argue that the common activities of church members should both teach Christians and transform their actions. I will begin by examining those Scriptural commands which can only be fulfilled within a community of believers. Having laid this foundation, I will then address the issues of confession and covenant within the local church. Local churches often err in one of two ways with these issues. Some churches emphasize the need for proper confession and neglect the need for covenant. Other churches do the opposite, neglecting the need for a convictional confession, while pouring great energy into following a covenant. I will argue that both confession and covenant are essential for a proper church, and suggest practical steps to include both in any local church.

Witnessing Ireland: A Historical and Religious Context

Presenter: Colton Gebben
Faculty Advisor: C. Ben Mitchell

This presentation explores the socio-religious context of Ireland for the purpose of better evangelism. I will examine pivotal points in Irish history such as the Norman occupation of

Ireland around the Eleventh Century, the English Reformation, and the unification and eventual dissolution of Ireland with Great Britain. Moreover, I will analyze this historical context along with the viewpoints of contemporary Christian leaders in order to provide a greater understanding of the current socio-religious climate of Ireland so that evangelists may more effectively witness.

Don't Waste Your Trial: A Christian Response to Suffering

Presenter: Ashley Nichole Carswell
Faculty Advisor: C. Ben Mitchell

Whether it comes in the form of illness, physical pain, emotional pain, or unavoidable death, all humans experience suffering. Christians must have a strong theological foundation of suffering to process their own affliction for their good and God's glory. Suffering inevitably poses questions for the Christian. Can God be good? And if so, can He still be all-powerful? In this presentation I will address these questions by asserting that 1) God is, indeed, good, 2) God must play an active role in suffering, and 3) the preachers of the "health and wealth gospel" have incorrectly interpreted the Scriptures in regards to suffering. I give evidence that Scripture promises suffering for believers. Finally, I will also address the ways God uses suffering: 1) to bring nonbelievers to repentance, 2) to punish the unrighteous, and 3) to sanctify the righteous by disciplining, refining and producing endurance.

THEOLOGY AND MISSIONS

The Pastor Who Watches: An Examination of the Essence of Pastoral Ministry

Presenter: Caleb Valentine
Faculty Advisor: Ray Van Neste

What does it mean to pastor a people? What does God require of those who lead his church? This presentation will argue for a specific philosophy of ministry based on key biblical texts and a sampling of figures from the long stream of Christian thought. The foundational argument is that pastoral ministry, at its heart, requires that a pastor know his people individually and substantively in order to fulfill his duties. In order to urge believers on to maturity and guide them safely until they enter eternity, shepherds of God’s flock must be aware of and involved in the lives of those they lead. Some practical and specific application will be made.

Making Disciples unto All the Nations

Presenter: Brian Osborne
Faculty Advisor: Ray Van Neste

I believe when Jesus told the disciples to go into the entire world and make disciples, he meant it. We as pastors are often guilty of leading people to Christ, but then not letting them grow in all of the truths of the Bible. We are doing the church much harm when we send a bunch of baby Christians into the world without being equipped with the gospel and the rest of the Bible. We should follow the command of the Great Commission because Jesus said it so it must be important, and we allow new Christians to become vulnerable to temptation without telling them how to handle it. In my presentation I will stress the importance of discipleship by pastors and the church. It is our responsibility to raise people up in the way of Christ.

What to Expect: Christianity and Islam

Presenter: Holly Beverly
Faculty Advisor: C. Ben Mitchell

This presentation examines the differences and similarities between Christianity and Islam with respect to how they gain converts. Fear is used frequently to bring people into the fold of Islam. For Christianity, love and salvation are the main reasons for a person to join into the body of Christ. Other examples will be offered in order to compare and contrast conversion experiences in Islam and Christianity.

God’s Sovereignty and Evil

Presenter: Patrick Augustin
Faculty Advisor: James Patterson

For my Senior Thesis, I chose to write a paper over the issue of how God can be completely sovereign, yet evil still exist. I chose to write this paper because I feel that Christians need to be better informed on the topic, and many atheists refuse to believe in the Christian God because evil exists. This paper is designed to be a short yet concise synopsis of some of the better theological ideas on how to make sense of the Problem of Evil. In doing so, I first explain the views of St. Augustine, St. Thomas Aquinas, John Calvin and some modern theologians in the Reformed Tradition, and lastly some modern theologians in the Arminian Tradition. After doing so, I make a critical analysis of each of these views. Lastly I state my personal conclusions of what is the best way to make sense of the issue. The paper is based on the understanding that this issue cannot be completely resolved, but is designed to help the reader at least come to peace with the issue. Also, this paper is in no way a complete summary of what the Church has had to say on the topic in its entirety. I handpicked the views that I found made the most sense. ■



RESEARCH GRANT RECIPIENTS

Fall 2013

Undergraduate

Georg Pinggen and Zachary Benson
“Development of Kinetic Theory Model for
Macro- to Micro-Scale Applications”

Don Van and Alex Charles
“GoPro Camera Drone”

Jennifer Gruenke and Rebecca Blevins
“Testing the Effect of Chlorpromazine (CPZ)
on the Formation of Hybridoma Cell Lines”

Jennifer Gruenke and Jillian Evans
“Comparing the Effect of Three Adjuvants on
Antibody Production in Mice”

Mark Bolyard and Brandon Churchill
“Formation of an Indicator for Thrombin
Inhibitors Using Recombinant Green
Fluorescent Protein”

Mark Bolyard and Joseph Dresser
“Integration of a Factor Xa Recognition Site
Into Green Fluorescent Protein”

Mark Bolyard and Josh Brinkman
“Development of a Tool for Factor Xa
and Thrombin Inhibitors Using DNA
Mutagenesis”

James Mahan and Shelby Priddy
“The Effect of Antibiotics Acting in Synergy
Against *Serratia Marcescens*”

G. Jan Wilms “Using Motion-Tracking
Kinect Platform for Pervasive Physical
Rehabilitation”

Randy Johnston and Andrew Stricklin
“Understanding the Mechanism of the
Oxidation of Alcohols by Chromium [III]-
Quinone Complexes”

Randy Johnston and Monica Austin
“Oxidation of N-Propyl Alcohol via Transition
and Non-transition Metal Quinone Complexes”

James Huggins and Brooklin Byrd
“Investigation of Preferential Behavior in Eastern
Screech Owls for Modified Nesting Boxes”



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