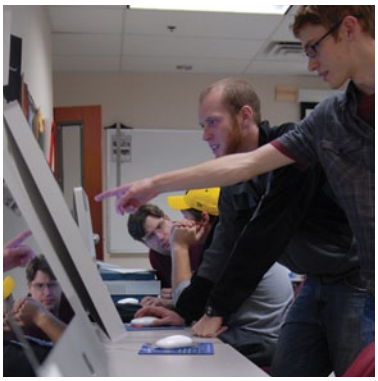


SYMPOSIUM

SEVENTH ANNUAL UNION UNIVERSITY SCHOLARSHIP SYMPOSIUM

SYMPOSIUM

SEVENTH ANNUAL UNION UNIVERSITY SCHOLARSHIP SYMPOSIUM

TUESDAY, MAY 4, 2010

Reception for Participants, Faculty & Outside Guests
Grant Events Center 12:00-12:30 p.m.

Afternoon Concurrent Sessions

Dept.	Room	Student Presenters	Time
Poster Displays	Grant Events Center	David Tosh (BIO) Mollie Carter, Chelsea Harden, Jared Littlejohn, Dakota Tracy, Tara Tucker (BIO) Jill Frank (CHE) David Harlan (CHE) Lindsay Flynn (CHE) Christian Wallen (CHE) Matthew Kent (CHE) Karl Magnuson, Nate Peterson, Rachel Quinn (EGR) Christian Christensen and Daniel Kennedy (EGR) Robert Lynn and Daniel Sikes (EGR) Jacob Hodge, Daniel Kennedy, Jeff Maharrey (EGR) Chris Hayes and Aaron Taylor (EGR) John Hall, Bailey Moore, Daniel Sikes (EGR) Tayo Adedokun, Paul Morris, Rhett Woody (EGR) Casey Ash, Rob Calvert, Heather Dede, John Hall, Jacob Hodge, Karl Magnuson, Jeff Maharrey, Paul Morris, Sean Norton, Eric Olson, Nate Peterson, Aaron Porterfield, Rachel Quinn, Britten Rush, Andrew Smith (EGR) Ian Allen and Robert Lynn (EGR) Claire Elmblad, Kyle Harris, James Jones (EGR) Bradley Kiddie, Eric Olson, Aaron Porterfield (EGR) Ben Fondren, Idrees Hamzeh, Sean Norton, Will Stewart, Tim VanCleave (EGR) Sean Norton and Tim VanCleave (EGR) Troy Cooper (SOC) Darleen Cervasio, Anne Marie Dudas, Paige Jennings (SW) Rachael Collins, Carman Griffith, David Quick, Lauren Reeves, Emily Welborn (SW)	12:30-1:00 p.m.
ART **Session Chair:** Lee Benson	D-3	Titus Fern Katy Pope Megan March Abby Priddy Chris Malloy Kelsey Roberts *Break 3:00 p.m.*	2:00 p.m. 2:20 p.m. 2:40 p.m. 3:10 p.m. 3:30 p.m. 3:50 p.m.
BIO **Session Chair:** Andy Madison	WH 318	Brandon Lowe Candice Thompson Luke Burleson Danielle Teichen Augusta Paffrath Cameron Humble Jonathan Love Lauren Medforth *Break 3:00 p.m.*	1:40 p.m. 2:00 p.m. 2:20 p.m. 2:40 p.m. 3:10 p.m. 3:30 p.m. 3:50 p.m. 4:10 p.m.
CHE/PHY	WH 312	Lindsay Flynn (CHE) Aaron Davenport (CHE)	1:40 p.m. 2:00 p.m.
Session Chair: Charles Baldwin		Christian Wallen (CHE) Jill Frank (CHE) Matthew Kent (CHE) David Harlan (CHE) David Moore (PHY) *Break 3:00 p.m.*	2:20 p.m. 2:40 p.m. 3:10 p.m. 3:30 p.m. 3:50 p.m.
CHR/ENG/MUS/PSY **Session Chair:** Ray VanNeste	JEN 325	Benjamin Duffey, Ashlie Jackson, Amanda Lynn, April McCulley, Ryan Spickard, Lindsey Woods (PSY) Cory Taylor (CHR) Amanda Bush (CHR) Raina Leah Shults (ENG) Jordan Baker (MUS) *Break 3:00 p.m.*	2:00 p.m. 2:20 p.m. 2:40 p.m. 3:10 p.m. 3:30 p.m.
DMS **Session Chair:** Cam Tracy	JEN 225	Kristi McMurry (DMS-ART) Rachael Kapavik (DMS-COM) Corey Ladymon (DMS-COM) Ryan Brewer (DMS-COM) Patricia Christy (DMS-COM)	1:30 p.m. 2:00 p.m. 2:30 p.m. 3:00 p.m. 3:30 p.m.
ENG **Session Chairs:** Roger Stanley & Patty Hamilton	Barefoots Joe Patio	Rebekah Anderson, Jordan Buie, Sarah Chitwood, Josh Garcia, Andrew Gostlin, Michael Grubb, Kayleigh Hines, Katie Johnson, Tristan Major, Ruth Newby, Michael O'Malley, Keaghlan Sheridan, Bonnie Smith, Dave Williamson	2:00 p.m.
EGR/CSC **Session Chairs:** Jay Bernheisel & Jim Kirk	PAC A-7	Idrees Hamzeh and Kyle Swafford (EGR) Christian Christensen, Zack Jackson, Bradley Kiddie, David Moore, Aaron Taylor (EGR) Jacob White (CSC) Dan Harwell and Jacob White (CSC)	2:00 p.m. 2:20 p.m. 2:45 p.m. 3:15 p.m.
ICS **Session Chair:** Cynthia Jayne	BAC-87	Emma Kane Alyssa Bantz Anna Wharton Justin Holder Rachel Donaldson Abi Calvert Brandon Lang *Break 3:00 p.m.*	1:40 p.m. 2:00 p.m. 2:20 p.m. 2:40 p.m. 3:10 p.m. 3:30 p.m. 3:50 p.m.
LAN/TESL **Session Chair:** Jean Marie Walls	PAC D-52	Emily Alm (LAN) Leah Maddox (TESL) Courtney Bragg (TESL) Courtney Wade (LAN)	2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m.
PSC/BUS **Session Chair:** Sean Evans	PAC C-6	Matthew Kuchem (PSC) Matthew Kuchem (PSC) Katie Mohler (PSC) Katie Miller (BUS)	2:00 p.m. 2:20 p.m. 2:40 p.m. 3:00 p.m.
SW **Session Chair:** Todd Stanfield	BAC-44	Rachael Collins, Carman Griffith, David Quick, Lauren Reeves, Emily Welborn Sarah Brubaker, Michele Marks, Erin Palm, Abigail Perez, Bradley Poyner Rachel Curtis, Amber Gaylord, Emily Gillespie, Brittney Wright Darleen Cervasio, Anne Marie Dudas, Paige Jennings	1:40 p.m. 2:00 p.m. 2:20 p.m. 2:40 p.m.
Interdisciplinary **Session Chairs:** Mary Anne Poe & Jeannette Russ	BAC-44	Tayo Adedokun, John Dawson, Kyle Harris, Bailey Moore, Lauren Robinson, Emily Welborn, Amy Williams (EGR/SW) Ian Allen, Jonathan Crouch, Anna Marie Deschenes, Bri Hansen, Allison Huggins, James Jones, Daniel Sikes (EGR/SW) Kayla Bryant, Claire Elmblad, Morgan Farquhar, Evan Holder, Robert Lynn, Mattie Lynn Whatley, Rhett Woody (EGR/SW)	3:10 p.m. 3:30 p.m. 3:50 p.m.

schedule

art

A Closer Look at Illustration

Presenter: Titus Fern
Faculty Advisor: Chris Nadaskay

Illustration has always played an important role in the enjoyment and the understanding of literature. The ancient Egyptians and Chinese understood this thousands of years ago when they carved images in wood and stone. This research project will take a closer look at illustration, starting with the history, how its roots have taken hold within cultures and how it has developed through time. This presentation will break down some of the processes and methods used by some of the greatest illustrators known. Early illustration was necessary for the recording of cultures and their history - it played a vital role in society. Today its function has changed, but is still an important part of everyday life. The most treasured role that modern day illustration plays is in the stories that have been read to us and in turn, to our children. It has become a valuable method for breaking down and sharing fascinating stories.

Sensography: The Story Behind the Senses

Presenter: Katy Pope
Faculty Advisor: Melinda Eckley

Behind every individual, regardless of age, elements of senses, life experience and relationships exist and possesses a common link, one that is timeless, tangible, and personal. I have found this common link to be candy. Behind every person there is a story about candy involving both the mind and the senses that is just waiting to be told. In this art exhibition I have translated these stories into type portraits, where type is chosen based on the personality of the individual. The interview composes the figure accompanied with the candy to give the viewer an interactive experience. This combination of the senses tells a more accurate perspective, which I describe as *sensography*.

Scherenschnitte, Sewing, and Art Nouveau: Three Traditions of Influence

Presenter: Megan J. March
Faculty Advisor: Christopher Nadaskay

Artwork is the artist's chance to tell a story. No matter what the subject matter, every artist's work provides the chance to tell a visual version of their particular narrative. The purpose of this project is to explain the traditions behind my own work, as well as my purpose, and how they are my own unique way of telling a story to my viewers.

In my work, I bring together three artistic traditions that seem to have nothing to do with each other and use them to create a narrative. Scherenschnitte is the German form of the art of paper cutting, a type of art that has existed in many different cultures since the invention of paper. The art of sewing is something distinctly feminine and is something that has been passed down from mother to daughter. In many cases, this tradition has been used to tell stories for generations upon generations. These two traditions, married to the ideology and stylistic tendencies of Art Nouveau have created a style of art-making that is both unique and interesting to my viewers.

Rubric for a Renaissance

Presenter: Abby Priddy
Faculty Advisor: Melinda Eckley

This year, twenty-five percent of public high schools in the United States are operating without any type of art education courses. This dissipation calls for a closer look at the discipline's pattern in American history, noting its birth during the Industrial Revolution, its peak in the 1960s and its digression in the 1980s. This timeline will be used to further analyze the cultural events surrounding the growth or decline of art education. Finally, this project will use cognitive, social, and developmental benefits of art education to insist that the discipline survive. The project demands that art education be revived- even reborn.

The Platonic Theory of Art Applied to Hieronymus Bosch's *The Garden of Earthly Delights*

Presenter: Chris Malloy
Faculty Advisor: Melinda Eckley

The Greek philosopher Plato is one of the most important figures in the history of western civilization, having written profound and seminal works on a myriad of subjects, including one of the earliest theories of art. This project will examine the work of the well-known medieval painter Hieronymus Bosch in light of Plato's writings, specifically focusing on Bosch's most famous work, *The Garden of Earthly Delights* triptych. Many aspects of Bosch's work dovetail admirably with Plato's teachings, such as the instructive purpose of Bosch's painting, a purpose highly praised and indeed demanded by Plato. Other characteristics of Bosch's work, however, show a marked deviation from Platonic teaching, such as the grotesque representations of phantasms and the intrinsically allegorical nature of the entire painting. Thus, although conformities to Platonic teachings are present, Bosch's work would ultimately have been unacceptable under Plato's philosophy.

Portraiture: The When and The Why

Presenter: Kelsey Roberts
Faculty Advisor: Chris Nadaskay

The idea of the portrait is steeped in rich visual history. Semblances of the wealthy and powerful have been commissioned for the past two millennia to remember those past and to honor those present. Images of famous personages include Alexander the Great, Constantine, and others. Additionally, early depictions of Christ were formed with tempera on panel. Da Vinci, Rembrandt, and others, with the modern examples of Warhol and Close, immortalized themselves and their contemporaries for posterity by composing their likenesses.

Following such a diversified tradition, I have produced portraits reflecting on contemporary life. In my presentation I will discuss the portrait as a method beyond the tradition of painting and into the art forms of environment and installation. Objects and memories speak of the legacy we leave behind. As a vehicle for visual expression, contemporary views of portraiture can bespeak the essence of what it means to be human. ■

biology

Detection of *Francisella tularensis* in the Western Tennessee American Beaver Population

Presenter: David Tosh
Faculty Advisor: Carol Weaver

Tularemia (also known as "rabbit fever", "deer-fly-fever", and "*Francis disease*") is an infectious disease caused by the bacterium *Francisella tularensis*, a gram negative, nonmotile coccobacillus. To our knowledge no research has been conducted to determine if Francisella tularensis is present in the American beaver (*Castor canadensis*) population of western Tennessee. In this study we extracted DNA from beaver liver samples and performed a polymerase chain reaction (PCR) on the DNA using primers specific for *Francisella tularensis*. We found that more than half of the samples tested were positive for the bacterium and that the percentage of American beavers in western Tennessee infected with the bacterium is significantly greater than 50 percent.

Site-Directed Mutagenesis of the Green Fluorescent Protein to Restore Florescence to GFP Transported into the Periplasmic Space of Escherichia coli

Presenter: Brandon Lowe
Faculty Advisor: Mark Bolyard

Green Fluorescent Protein (GFP) has become a powerful tool in scientific research. Its distinctive green glow allows for the visualization of proteins within a cell. Research has shown active GFP can be successfully transported from the cytoplasm of *Escherichia coli* to the periplasmic space through the twin-arginine translocation pathway. In contrast, the export of functional GFP to the periplasm of *E. coli* using the Sec-dependent transport pathway has been unsuccessful. This is due to the formation of a disulfide bond at cysteine 48 which lies on the outer surface of the protein. This research evaluates whether site directed mutagenesis to replace cys48 with valine or serine will restore fluorescent activity to the GFP. This will provide a tool for tracking proteins which are exported via the sec pathway.

The Effects of Tartrazine and Allura Red AC on Hyperactivity in *Drosophila Melanogaster*

Presenter: Candice Thompson
Faculty Advisor: Wayne Wofford

Artificial food colorings are thought to be a possible cause of hyperactivity in children. Children are exposed to food additives frequently through candy, toothpaste, and even daily multivitamins. In this study *Drosophila melanogaster* was used as a model organism to determine hyperactivity caused by two food colorings, tartrazine and allura red. The flies were exposed to these dyes via their food and their behavior was noted, both as larvae and adults. It was determined that allura red caused hyperactivity in the larvae, while tartrazine did not. The adult flies exposed to these two dyes both exhibited hyperactive behavior, but the flies exposed to allura red were more hyperactive that those exposed to tartrazine.

Detection of Toxoplasma gondii in West Tennessee Waterfowl

Presenter: Luke Burleson
Faculty Advisor: Marc Lockett

Toxoplasma gondii is an obligate intracellular parasite capable of infecting nearly all avian and mammalian species worldwide with high serological prevalence in many species. Antibodies to *T. gondii* have been documented in many avian species such as domestic chickens and some types of geese, but never in waterfowl. This study was designed to detect antibodies against *T. gondii* in a variety of West Tennessee waterfowl species including common mallards (*Anas platyrhynchas*), northern pintail (*Anas acuta*), wood ducks (*Aix sponsa*), Canada geese (*Branta canadensis*) and a species of rail, the American coot (*Fulica americana*). Sera were obtained from 31 samples and tested by the Gold Immuno-chromatography Assay for anti-toxoplasma IgG antibodies. No samples showed evidence of infection with *T. gondii*.

Effects of Ascorbic Acid on Metabolic Rate and Glutathione Liver Tissue Content in Mus Musculus

Presenter: Danielle Teichen
Faculty Advisor: Wayne Wofford

Many individuals consume supplemental ascorbic acid, but when ingested in excess it has been hypothesized to increase metabolic rates. Additionally, glutathione is a tripeptide important to several metabolic pathways. Oxygen consumption and tissue glutathione concentrations were measured in mice to determine if the hypothesized effects of ascorbic acid are true. This was done through respirometry and liver tissue spectrophotometry. Ascorbic acid is water soluble and easily administered (by dissolving in water); the mice in turn could be observed for changing metabolic rates. The trichloroacetic acid precipitated proteins by cross-linking them. This created an acidic environment, preventing glutathione from oxidizing. Absorbance readings of the liver tissue were taken with a spectrophotometer to determine glutathione concentrations in mouse liver tissue samples. I hypothesized that an optimum ascorbic acid range exists where metabolism is most efficient and does not exhibit toxicity. The results displayed a definite rise in glutathione content and respiration rate.

Phyoextraction Potential of Brassica Rapa in Zinc and Lead Contaminated Soils

Presenter: Augusta Paffrath
Faculty Advisor: Wayne Wofford

Phytoremediation, the use of plants to extract pollutants from contaminated soils, has been hypothesized to be a cost-effective environmental cleanup alternative. In this study the ability *Brassica rapa* to absorb lead (Pb) and zinc (Zn) from contaminated soils through phytoextraction was examined. Three growing trays containing approximately 70 individual *B. rapa* species were grown for a five week period. Two of the trays were irrigated with aqueous water solutions containing of Pb and Zn acetate. The Zn plant tray was irrigated regularly with a solution of approximately 0.286g Zn/L and the Pb tray with a 0.9154g Pb/L solution. The control was watered regularly with distilled H2O. After their five week growing period, the plants were removed, separated into individual freezer bags and stored at 80ºC until they could be analyzed using the atomic absorbance spectrometer. The results from the study showed that *Brassica rapa* is suitable for the accumulation of heavy metals from contaminated soil.

Does Ginkgo Biloba Increase Cognitive Function and Memory in Laboratory Mice?

Presenter: Cameron C. Humble
Faculty Advisor: Andy Madison

Using non-pharmaceutical medications for treating disease has increased substantially over the last decade, with the use of herbal supplements at the forefront. *Ginkgo biloba* has shown promise in treating several forms of neurodegenerative diseases, including Alzheimer's disease and other various stages of dementia. Attention-deficit/hyper activity disorder is a common neurological disorder caused by decreased levels of the neurotransmitters dopamine and noradrenaline within the central nervous system. Recent studies have shown that the *Ginkgo biloba* might help increase these chemicals by hindering the enzymes responsible for their degradation, and by increasing cerebral blood-flow via neurovasodilation. In this blind, placebo controlled study, 3 female mice were given a daily regimen of *Ginkgo biloba* over a 28 day period. Three more female mice were not given the supplement and designated as the control group. A simple behavioral test in the form of a maze was used to measure the efficacy of the supplement in improving cognitive ability and function. Every 8th day the mice were put through the maze and their times were recorded. At the end of the study interval, the times of the two groups were compared using a general linear model with repeated measures via an Analysis of Variance or ANOVA test. This test revealed that there was no statistically significant difference between the completion times of the experimental and control groups, indicating that the *Ginkgo* supplement had no effect. Thus, the null hypothesis that *Ginkgo biloba* has no effect on the cognitive abilities of mice was accepted.

biology

Morphological Variation in Native and Introduced Populations of Pike Killifish, *Belonesox belizanus*

Presenter: Jonathan Love
Faculty Advisor: James Kerfoot

The introduction of a species into a new environment may subject them to new challenges which they must overcome to survive and establish, and in turn may affect their morphology. This ability to respond morphologically is called phenotypic plasticity. The pike killifish (*Belonesox belizanus*), indigenous to the Yucatan Peninsula, was introduced into the canals of Dade County, Florida, in 1957. Since then, pike killifish have multiplied and spread past Miami, Florida, to Big Cypress National Preserve. The objective of this research is to examine if phenotypic plasticity is occurring in these pike killifish. The hypothesis to be tested is that there is a significant difference in morphology between native and introduced populations. Fin ray counts and several length measurements (mm) were taken of these specimens. Comparison between measurements of native and introduced species will show if significance exists between their morphology and, thus, will determine if they exhibit phenotypic plasticity.

Inhibition of *Serratia marcescens* and Staphylococcus epidermidis by Essential Oils of Cumin and Clove

Presenter: Lauren Medforth
Faculty Advisor: Carol Weaver

Bacterial resistance to traditional antibiotics has prompted researchers to explore other natural products, such as food spices, for their antibacterial properties. *Staphylococcus epidermidis* and other staphylococci are responsible for many infections in hospitals. *Serratia marcescens* is a common microbe associated with urinary and respiratory tract infections in humans. This study tested essential oils from clove and cumin to determine if they inhibit the growth of *S. epidermidis* and *S. marcescens* by growing bacterial cultures on nutrient agar in the presence of each oil. A sterile filter paper disk was dipped in essential oil from clove or cumin until saturated and placed in the center of the agar. Rings of inhibition were observed on all treated petri dishes treated with cumin oil and clove oil, regardless of spice or bacteria. The ring of inhibition was largest on petri dishes treated with clove, where it had a greater effect of *S. epidermidis*.

The Influence of Temperature on the Feeding Rates of Two Introduced Species, *Astronotus ocellatus* (Oscars) and *Archocentrus nigrofasciatus* (Convict Cichlids): Implications for Their Successful Establishment in Florida

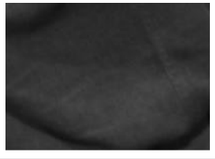
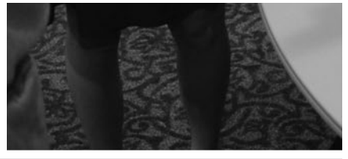
Presenters: Mollie Carter, Chelsea Harden, Jared Littlejohn, Dakota Tracy, Tara Tucker
Faculty Advisor: James Kerfoot

Introduction of a species into a novel environment may subject them to a suite of new challenges. Not all introduced fishes have flourished equally well in aquatic habitats of Florida, and temperature may limit their distribution. Introduced *Archocentrus nigrofasciatus* have established in central Florida, whereas introduced *Astronotus ocellatus* have established and remained in south Florida. Due to differences in average seasonal temperatures between central and south Florida locations, and its effects on the physiology of ectotherms, the objective of this study was to investigate the influence of temperature on the feeding rates of these two introduced species. Individuals of each species were fed at 20, 25, and 30 °C temperature and their feeding rates recorded. Results of a two-way Repeated Measures ANOVA indicated that for each species there was no significant difference in feeding rates across temperatures, or significant difference in feeding rates between species. However, there was a significant interaction between temperature and species. *Astronotus ocellatus* maintained similar feeding rates with *Archocentrus nigrofasciatus* at 20 and 25 °C, but increased their feeding rate significantly at 30 °C. This study reveals that differences in the affect of temperature on the feeding rates of these introduced species may be a plausible mechanism limiting their distribution. ■

business administration & english





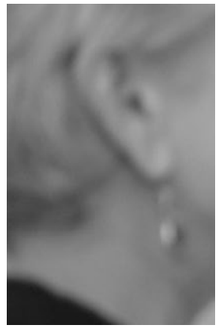
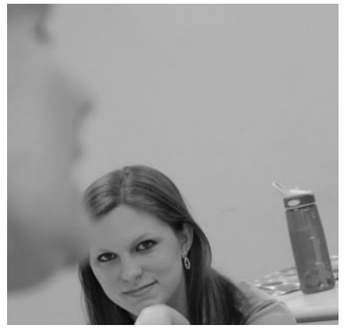



BUSINESS ADMINISTRATION

Sweetwater Nursing Center: An Examination of Healthcare Economics

Presenter: Katie Miller
Faculty Advisor: Walton Padelford

This paper examines the microeconomics of Sweetwater Nursing Center (SNC), a 100 bed skilled nursing facility in Sweetwater, Tennessee. Few models learned in the typical microeconomics course apply to the nursing home industry since these models assume a laissez-faire capitalist economy. Instead, the nursing home industry operates more closely to economic fascism or socialism than capitalism. This project uses data from SNC to show why certain models do not apply and explores the distinctions and implications of a part fascist, part socialist, healthcare industry. The findings of this project not only apply to the nursing home industry, but also to the healthcare industry as a whole, making the task extremely relevant. This study also points to the importance of studying economic models other than capitalist, as the microeconomies of the United States cannot adequately be analyzed using capitalist models alone.



ENGLISH

Literary Prose and Poetry Readings by the Students of ENG 312 and ENG 426

Presenters: Rebekah Anderson, Jordan Buie, Sarah Chitwood, Josh Garcia, Andrew Gostlin, Michael Grubb, Kayleigh Hines, Katie Johnson, Tristan Major, Ruth Newby, Michael O'Malley, Keaghlan Sheridan, Bonnie Smith, Dave Williamson
Faculty Advisors: Roger Stanley and Patty Hamilton

Creative writing students will read selected poetry, fiction, and narrative nonfiction produced this semester in Introduction to Creative Writing and Poetry Writing.

Shylock: The Castrated Jew

Presenter: Raina Leah Shults
Faculty Advisor: Janna Chance

This paper explores Shylock's masculinity and castration anxiety in *The Merchant of Venice*. I analyze the medieval myth of the Jewish male menses in relation to the dichotomy between Judaism and Christianity by explicating the relationship between religion and gender within the play. As the dominant religion in Shakespeare's Venice, Christianity wields the flint. However, I examine the way that Shylock tries takes the posture of bereaver with the stipulations of his bond in order to regain his masculinity. I argue that Shylock ultimately fails in this attempt and undergoes complete emasculation when he is forced to convert at the end of the trial scene. The most complete psychological othering that the Christians can employ is bereavement of gender; therefore, I argue that this castration reflects the Christian tendency to render the Jewish people as other. ■

chemistry

Inhibition of the IGF-II Pathway in Adrenocortical Carcinomas

Presenter: Lindsay Flynn
Faculty Adviser: Charles Baldwin

Adrenocortical carcinoma (ACC) is a rare, malignant type of cancer with a long-term survival rate of only fifty percent. Currently surgery is the most important prognostic factor, while the role of chemotherapy is largely unestablished. Compared to normal adrenal glands, the gene *insulin-like growth factor II* (IGF-II) is upregulated in ACC's. Upregulation of IGF-II is believed to aid tumorigenesis and cancer cell survival. Inhibitors of targets along the IGF-II pathway, such as the phosphatidylinositol 3-kinase and mammalian target of rapamycin, are believed to be key treatment options. By inhibiting these targets with LY294002 and Rapamycin, respectively, it was determined that cell viability was decreased and cell death occurred. Common chemotherapeutic agents were also tested for cell viability and cell cycle analysis. Topotecan appears to be a promising chemotherapeutic option, as high levels of G2 arrest were present at low concentrations.

Characterization of Protein in Soybean Seedlings

Presenter: Aaron Davenport
Faculty Advisor: David Wing

The purpose of the research was to determine the best way of separating the protein from the tissue using extraction buffers of varying composition. Three methods were compared on the basis of protein yield per gram of root tissue. The three methods all involve grinding root tissue in liquid nitrogen and separating the proteins using extraction buffers. Assuming that the different tissue samples have the same quantity of protein, the method which extracts the most is what will be used in future research. Preliminary characterization of extracted protein was accomplished by SDS gel electrophoresis. These studies are a first step toward identifying the molecular mechanism of infection of the soybean plant by the pathogenic oomycete, *Phytophthora sojae*.

Metal Quinone Complexes for Catalysis of Alcohol Oxidation

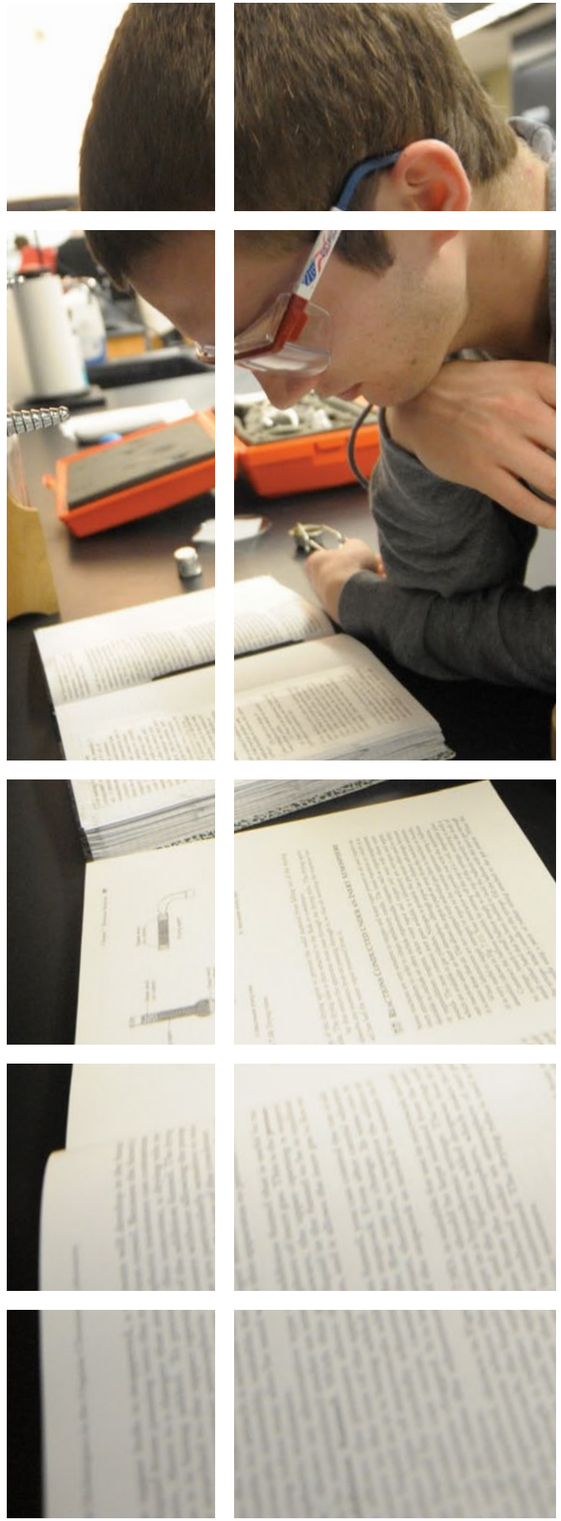
Presenter: Christian Wallen
Faculty Advisor: Randy Johnston

In this project, metal-quinone complexes were studied for the purpose of developing an effective catalyst for the oxidation of alcohols into aldehydes or ketones. Spectrophotometric studies were performed using the tetrahydroxy-1,4-benzoquinone as the quinone and aluminum perchlorate or chromium(III) perchlorate as the metal. Metal-quinone complexes that are 1:1 and 2:1 formed in ethanol. Additional experiments were run using chloranilic acid and tetrahydroxy-1,4-benzoquinone complexes with chromium and aluminum to determine the stoichiometry of the oxidation reaction of alcohols by the metal-quinone complexes.

Pancreatic Lipase Hydrolysis of Triacylglycerides

Presenter: Jill Frank
Faculty Advisor: Charles Baldwin

Pancreatic Lipase Hydrolysis (PLH) selectively hydrolyzes triacylglycerides (TAG) at the first and third positions yielding one monoacylglyceride (MAG) and two free fatty acids (FFA). To validate the analytical procedure, Triolein, a TAG with three 18-carbon chains was hydrolyzed in pancreatic lipase. The resulting MAG and FFA were separated using solid phase extraction, saponified with potassium hydroxide in methanol, and esterified with BF_3•MeOH. Both fractions of MAG and FFA consisted of fatty acid methyl esters (FAMEs) which were analyzed using gas chromatography/mass spectrometry (GCMS) in the selected ion monitoring (SIM) mode. The resulting GCMS should yield a 1:2 ratio of MAG/FAMEs fraction to FFA/FAMEs fraction; however, numerous modifications of the overall method have failed to produce a satisfactory analytical protocol to this point. Adding pancreatic lipase separately and lengthening the reaction time increased FFA/FAME yield a modest 10% to 24% of the theoretical amount.



Synthesis and Isolation of Solid Chromium (III) Quinone Complexes

Presenter: Matthew Kent
Faculty Advisor: Randy Johnston

Previous studies show that 2:1 chromium (III)-quinone complexes were able to oxidize alcohols to corresponding ketones or aldehydes. Attempts to isolate the chromium (III)-quinone complexes as solids were unsuccessful. In this work, chromium (III)-quinone complexes ([(Cr (L)) $_2$ BQ] (BF_4)$_4$) were synthesized that could be isolated as solids. The chelating ligands (L) studies were 1, 10-Phenanthroline, 2, 2'-Bipyridine, Pyrazolylborato, and Triethylenetetramine, in addition to tetrahydroxy-1, 4-benzoquinone (BQ). The synthesis and characterization of each of these complexes is described.

Hydrogen Bonding in Substituted Benzoates

Presenter: David N. Harlan
Faculty Advisor: Charles Baldwin

Hydrogen bonding is known as the bonding of an electronegative atom (O,N,F) to a hydrogen. The goal of this research project is to study the nature of hydrogen bonding in a substituted benzoate molecule. Prior research has shown that a hydrogen bond exists between carbonyl oxygen and an adjacent C-H donor. The target molecule that we are studying is ethyl 5-bromo-2-bromomethylbenzoate. The compound was synthesized by an electrophilic aromatic bromination followed by an NBS reaction. An alternative method studied to synthesize this compound was a bromination of 5-amino-2-methylbenzoic acid to get 5-bromo-2-methylbenzoic acid. This was then followed by an esterification then an NBS reaction. The hydrogen bonding in this molecule was studied through infrared spectroscopy, dynamic NMR, and X-ray crystallography. ■

christian studies

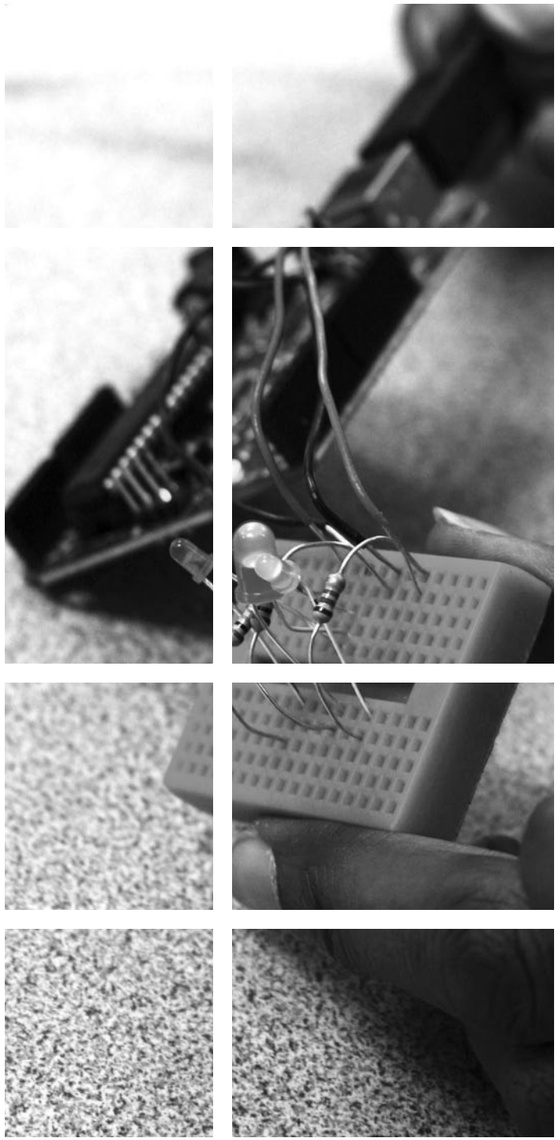
The Might of His Glory
Presenter: Cory Taylor
Faculty Advisor: Ray Van Neste

The phrase kata to kratos tēs doxēs autou in Colossians 1:11 is problematic. Of the 31 times in the NT that doxa appears as a genitive in relation to a noun, Colossians 1:11 is the only appearance where translators almost universally take it as a Semitic genitive (using the translation "glorious") rather than a Greek genitive (using "of glory"). Commentators are fairly evenly divided on the matter. In light of translations of doxa in the genitive across the NT and of parallels between Colossians 1:11, Ephesians 1:19-20, and Romans 6:4, though, it seems preferable to take tēs doxēs in Colossians 1:11 as "of glory." This translation prevents several doctrines of Theology proper and Christology from being obscured in this verse.

A.R.T: Creation or Commodity? The Ethics of Artificial Reproductive Technologies
Presenter: Amanda Bush
Faculty Advisor: C. Ben Mitchell

This research project examines a Christian response to artificial reproductive technologies (A.R.T). In both secular and Christian culture, many assume that infertility should be solved through artificial means. Many options are available due to medical and technological advances ranging from artificial insemination of husband's sperm to In Vitro Fertilization, which begins the reproduction process outside of a mother's womb. The paper explores the meaning of health, the nature of infertility, and responds from the perspective of Christian ethics. Creation of life should be viewed in terms of procreation, in which new life is given by God's grace. "Reproduction" terminology has diluted the intrinsic nature of life and leads to an inordinate pursuit of overcoming infertility. ■

computer science



Seeing the World through Augmented Reality
Presenter: Jacob White
Faculty Advisor: G. Jan Wilms

Augmented Reality is the real-time merging of real-world vision with computer-generated imagery. By adding information on top of the world that we see, a user can see more than the senses detect, such as the yellow first-down line on televised football games or a pre-ruin Coliseum. Using this idea, I will demonstrate an application for the iPhone that displays information about some old computers in the B hallway on top of what is already visible through the iPhone camera. In addition, this presentation will outline some of the difficulties inherent to this technology, the mathematics necessary, and other uses of augmented reality.

The Scientific Applications of Distributed Computing
Presenters: Dan Harwell and Jacob White
Faculty Advisor: Jim Kirk

In our increasingly networked world, distributed computing has become a popular platform for numerous computationally intensive applications. By harnessing the computational power of multiple computers to perform a single task, distributed computing allows modern users to tackle previously intractable problems. This presentation will show the potential benefits associated with distributed computing by demonstrating an application designed for a specific scientific problem, and will delve into the underlying principles that help accomplish tasks over a network. ■

digital media studies

Textiles in a Flash
Presenter: Patricia Christy
Faculty Advisor: Cam Tracy

Though it is controversial whether or not the idea of Flash-based websites is appropriate at this time in technology, they are popular in the world of web design for small businesses who want to make a lasting first impression. This project involves the creation of a Flash-based website for the Nashville-based company Tennessee Textile Supply. This site will show a catalog of products, such as the model machines that are specific to the company as well as content about the company. This Flash site will allow for interactive browsing, and once it is selected the user will be able to interact with the images in the catalog and there will also be videos that the user can watch.

First Union Film Festival Blu-ray Disc: Exploring New Optical Media Options
Presenter: Rachael Kapavik
Faculty Advisor: Cam Tracy

This senior project will involve the production of the first Blu-ray for Union's annual student film festival featuring all of the student films, as well as DVD copies that will be for sale at the festival. Utilizing Union's high-definition editing suite's new Blu-ray burner, Adobe Encore, and Photoshop, the project will include menus from scratch that have easy navigation, built-in chapters for the longer film projects, and a conversion and/or compression of each film's footage into the H.264 standard for the best image quality.

GradeScale: An iPhone App for Education
Presenter: Corey Ladymon
Faculty Advisor: Cam Tracy

This project will involve the creation of an iPhone App that will be used among teachers and students alike that will be based off the E-Z Grader. It will be an app dedicated to bringing the same and convenient E-Z Grader concept to the mobile platform. The concept is simple, the app will allow a user to input the number of questions and then the app will automatically configure the grade for all the possible number of questions missed. This is a very convenient tool for teachers and students alike because it takes the time and effort out of grading. This app will also have the ability to store grades and keep up with grade history among classes.

Alpha Tau Omega's Photo Sharing Web Application
Presenter: Ryan Brewer
Faculty Advisor: Cam Tracy

This project will create a fully functioning photo sharing web application for the Alpha Tau Omega Fraternity on Union's campus. This application will allow public photos to be viewed on ATO's website. Behind the public site will be an application that only the active members may login to for uploading and downloading high-resolution images and leaving comments about the pictures that are posted. The photos will be displayed using a fashionable jquery application to allow for easy usability.

Navigating Art Space: The Making of a User-Centric Art Website
Presenter: Kristi McMurry
Faculty Advisor: Melinda Eckley

In the 21st century, one of the most important aspects of any organization is web presence. However, having web presence is not enough. With the rise of social media, a personal connection with the organization is vital. The project will be to reformat Union's Art Department website in order to emphasize the personality of the department using social media, photography and other visual elements. Testimonials and photographic representation of the department will give alumni, prospective students, and even current students a clear picture of what Union's Art Department has to offer. ■

engineering

Different Batteries for Different Applications
Presenters: Casey Ash, Rob Calvert, Heather Dede, John Hall, Jacob Hodge, Karl Magnuson, Jeff Maharrey, Paul Morris, Sean Norton, Eric Olson, Nate Peterson, Aaron Porterfield, Rachel Quinn, Britten Rush, Andrew Smith
Faculty Advisor: Jay Bernheisel

Portable electric power is ubiquitous. Batteries power satellites, cell phones, implantable medical devices, even automobiles. Choosing a battery is an important design decision with many inherent trade-offs. There are a variety of different battery chemistries available in today's marketplace such as lead-acid, nickel-cadmium, nickel-metal hydride, lithium phosphate, and lithium polymer. This project compares examples of different applications and their typical choice of battery. It examines the trade offs between cost, longevity (number of discharge/recharge cycles), environmental robustness, power to weight ratio, and power to volume ratio. Some designs lend themselves to multiple battery chemistries, while in other applications there is a clear winner.

How to Make the Fastest Derby Car
Presenters: Ian Allen and Robert Lynn
Faculty Advisor: Jay Bernheisel

The goal in this project is to test and design the different parameters of a derby car. Many factors affect how fast a derby car goes down the track, so we will be researching and testing cars to find the largest factors that affect derby cars. With this knowledge we will build derby cars and vary each factor finding which ones have the largest affect on speed of the cars down the track. After all the testing and research we will build the optimal fastest car and hopefully share this information with many youngsters.

Solar Powered Electronics Chargers
Presenters: Claire Elmblad, Kyle Harris, James Jones
Faculty Advisor: Jay Bernheisel

For this project, we are going to build solar powered cell phone or iPod chargers out of rechargeable batteries, solar cells, and a small enclosure such as an Altoids can. We will vary parameters of the charger in order to optimize the design. We will vary parameters such as the voltage of the batteries, solar cell type, etc. We will incorporate the variations of these parameters into our different designs in such a way that we will able to determine what the most important factors are and ultimately determine what qualities the most effective charger will have. The end goal is to have an effective solar powered electronics charger design obtained through experimental methods.

On-The-Go Dynamo
Presenters: John Hall, Bailey Moore and Daniel Sikes
Faculty Advisor: Jay Bernheisel

For this project we will be building and analyzing a portable generator to be used to power different portable devices such as cell phones and mp3 players. We will vary different aspects of the generator in order to determine which parts influence the power output the most. Our primary building materials for our generator will be Lego blocks, magnets, rubber bands, and magnet wire. Once we wind the crank, the generator will spin on its own until all the momentum is lost. The power generated will be AC current; however, we will need DC current, so we will need to put in a rectifier to make this change. The power will then be transferred to the device we choose.

CharDelaux
Presenters: Tayo Adedokun, Paul Morris and Rhett Woody
Faculty Advisor: Jay Bernheisel

The team was assigned the task of designing a product whose parameters can be experimentally varied. The product's design will be optimized by testing the parameters, and the most viable option will be chosen. The group considered many experimental designs and, after much thought, settled upon a charcoal producing device deemed the CharDelaux.

The CharDelaux is a homemade charcoal maker that the task force will both design and build. A charcoal maker is a machine that allows the user to insert wood, or some other organic compound, and heat in the absence of air until charcoal is produced. That charcoal can then be removed, stored, and later reused as fuel. Having a device such as this provides benefits of removing unwanted plant life from one's backyard and converting them into a useful resource.

Flight of a Helicopter Under Varying Air Temperatures
Presenters: Chris Hayes and Aaron Taylor
Faculty Advisor: Don Van

The goal of this project was to determine and present how temperature affects the density of air, and how this phenomenon affects lift made by aircrafts such as helicopters. Density altitude restricts the payload of the helicopter, causing a trade-off between usable payload and fuel. Atmospheric temperature also contributes to the effects of density altitude. Warmer or hot air, especially in the summer, can drastically reduce the payload and capability of helicopters operating at higher altitudes. By using a radio-controlled helicopter and an enclosed cabinet, we can re-enact this situation, and we are therefore able to see how the helicopter reacts under varying temperatures. Through observation, we were able to find and calculate data that proves this phenomenon true through means of energy consumption.

Hydroelectric Power Generation: Modeling the Relationship Between Pressure Head and DC Power Output
Presenters: Jacob Hodge, Daniel Kennedy, Jeff Maharrey
Faculty Advisor: Don Van

Since the economic downturn, home hydroelectric generation has become much more popular. The basic idea behind a hydroelectric power plant is to extract the energy stored in elevated water or rapidly moving water and convert that into electrical power for home distribution. The goal of this project was to determine the relationship between the available water supply or pressure head and the DC power output capable and investigate whether or not it is a linear, exponential, or some other relationship. The design team was presented with the problem of modeling an elevated water tank in a very limited space. The solution was to employ a water tank with variable pressure output to model different heights of water supplies. The data to the right includes the pressure and corresponding power output as well the height that would be required to obtain such results.

Harvesting Waste Energy Generated by the United States Highway System
Presenters: Idrees Hamzeh and Kyle Swafford
Faculty Advisor: Don Van

When energy is converted from one form to another, some energy loss to the environment is inevitable. Although nothing can be done to prevent some energy from being wasted, the loss of energy can be minimized. The National Highway System is comprised of 15,267 bridges that are classified as "high-volume NHS bridges" which has an average daily traffic (ADT) of over 50,000 vehicles per day. What if the wasted energy from these vehicles could be converted in order to supplement the power grid? An idea that has been proposed is to use passing vehicles to turn magnets which would then power electric generators. The team will present their exploration of the efficacy of this idea when applied to the conditions present across the NHS's high-volume bridges.

Power Generation through Speed Bumps
Presenters: Robert Lynn and Daniel Sikes
Faculty Advisor: Don Van

This project is an analysis of how to recover energy from the United States roadways using speed bumps. Every day millions of people drive over speed bumps and energy is lost during the contact between the car tires and the speed bump. We plan to design different systems that can recover this lost energy and use it to generate electricity to power different devices that may be located near the speed bumps; for example, street lights. We also plan to determine which of the systems we design will be the most efficient as well as the most cost effective.

IEEE SoutheastCon 2010 Student Hardware Competition
Presenters: Christian Christensen, Zack Jackson, Bradley Kiddie, David Moore, Aaron Taylor
Faculty Advisor: Jay Bernheisel

As Union University's first appearance at the SoutheastCon as an official IEEE student chapter, our team designed, developed, and built an autonomous, solar-powered, small-scale robot that could successfully navigate an obstacle course using only its own collected and stored energy. We examined issues such as power collection through solar panels, energy storage through capacitors or mechanical means, power consumption and efficiency, obstacle detection while in motion, software flow to properly program decisions, and structural stability

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engineering

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in hardware design to make a good showing at the competition. Each of these challenges were individually addressed and overcome.

Our team successfully competed against 43 other teams on March 20th in Charlotte, NC. Our presentation will detail the design of the robot itself, including selection of components, design synthesis, and the calibration and improvement processes; as well as a report on our performance at the competition.

Energy Conservation Through Regenerative Braking

Presenters: Christian Christensen and Daniel Kennedy
Faculty Advisor: Don Van

Technological and ecological advancement has been generating a shift toward energy conservation in recent years. In our highly energy conscious society, the demand and desire for energy saving products is ever increasing. One area of the American economy with extreme energy saving potential is the automotive sector. Braking in an automobile generates enormous amounts of energy that is currently being wasted. This project will demonstrate the design and implementation of a device to convert the wasted mechanical energy of the braking process to reusable electrical power.

Regenerative braking is a new concept that attempts to make this energy efficient process possible. Running equipment such as the automobiles air conditioning system or stereo with power converted from regenerative braking will result in a noticeably less consumption of gasoline. If the United States can reduce its consumption of fossil fuels, it will not only reduce the emission of harmful greenhouse gases such as carbon dioxide, but it will soften dependence on foreign energy as well.

Small Absorption Cooler

Presenters: Karl Magnuson, Nate Peterson, Rachel Quinn
Faculty Advisor: Don Van

This project is intended to show a practical and economical application of absorption cooling technology. While this model is used in large scale commercial cooling applications such as air conditioning and dry cleaning, the concept of absorption cooling has not been applied to small scale consumer products. Based on research of current models for this technology, this project will focus on the principle of absorption cooling to create a cooler that will fit in a vehicle and could be used as a food and beverage cooler. The system will be powered using excess heat from the engine that would otherwise be wasted. Design of this technology for our purposes will be challenging mainly due to the constraint of space.

Friction and Flow Dynamics: A Qualitative Analysis of Pressure and Temperature Change in Pipes

Presenters: Bradley Kiddie, Eric Olson, Aaron Porterfield
Faculty Advisor: Don Van

Our team plans to explore a concept typically ignored in lab experiments – the effects of friction and laminar or turbulent flow on the energy of a fluid as represented by pressure and temperature. Pressure specifically decreases proportionally to the length of the pipe and temperature is expected to act similarly, as energy is dissipated through friction. The dynamic pressure and Darcy friction factor equations model this behavior. Typically these losses are considered negligible, but may actually be significant over long lengths or under specific conditions.

To demonstrate these effects, our team will show the comparative pressure losses and temperature changes in pipes of different materials and different lengths, as well as how ignoring these losses may induce experimental error or affect practical performance outside of the laboratory. Other variables which calculate into these phenomena such as pipe diameter and choice of fluid will also be researched and tabulated.

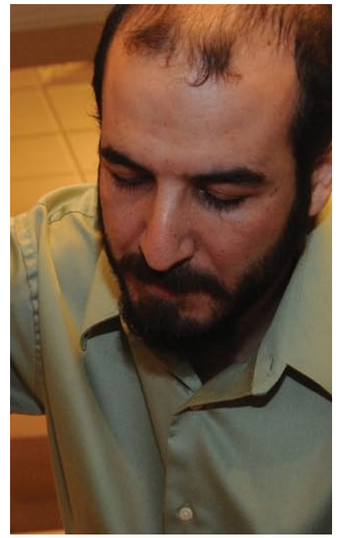
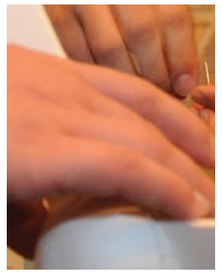
Electric Car Conversion

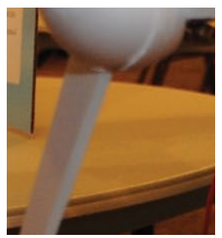
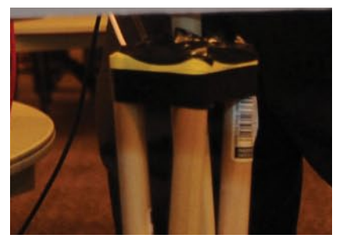
Presenters: Ben Fondren, Idrees Hamzeh, Sean Norton, Will Stewart, Tim VanCleave
Faculty Advisor: Jay Bernheisel

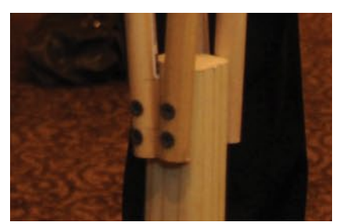
Modern society has a growing interest, as well as an increasing demand, for renewable energy; energy that is cost effective and can be used without putting an excess of harmful pollutants into our atmosphere. Ultimately, while these standards need to be met, power must be produced efficiently enough to keep up with demand while alternative replacements are developed.

Our team was presented with the challenge to retrofit a gasoline car into a purely electric car. The customer that imparted the challenge also provided the donor car. At that point it was the team's responsibility to establish a plan from removal of gas components to the new user interfaces. The customer was presented with different options throughout this process (i.e. different electric motors), and his choices would determine what would be placed in the car. The final goal is to have a vehicle that is emission free on the road, able to travel 25 – 50 miles and have a top speed of around 70 mph.





Off-Grid Tornado Memorial Chapel Memorial Chapel "Unplugged"

Presenters: Sean Norton and Tim VanCleave
Faculty Advisor: Don Van

The Art Department has approached the Engineering Department, asking for assistance in developing a memorial chapel that would allow students to have a place to reflect and worship in these days post February 5th. The part where engineering students are needed would be to design the heating, cooling and lighting components of the building without being plugged into the power grid. In other words, a self-sufficient building that uses renewable energy with the goal of minimal maintenance, allowing it to "outlast Union itself". Furthermore, since this building represents the blessings God has poured out to the University, it would be appropriate to use wind in such a way to not only provide energy but also creating a rhythmic, "soothing" sound throughout the structure. At the very least, power would be generated to run a musical device. The proposal would be added to the overall building proposal and presented to the Trustees and Dr. Dockery. ■

international & intercultural studies





Motives For Violent Islamic Extremism
Presenter: Anna Wharton
Faculty Advisor: Cynthia Jayne

In a post-9/11 world, radical Muslims have come to the forefront of news in the United States. Almost a decade later, we continue to seek information about those responsible for 9/11 and develop our understanding of them. The purpose of this report is to identify and study possible motives for the actions of violent Muslims. In this research, Religious Studies, Political Science and Sociology are used as lenses through which to examine some of the factors that may motivate Muslim extremists to violence.

Walking Alongside: Approaching New Haitian Amputees
Presenter: Alyssa Bantz
Faculty Advisor: Cynthia Jayne

There is a new community of people in Haiti who must live with constant physical reminders of the earthquake of January 12, 2010. A life without the use of all four limbs poses challenges in any culture, but in a nation with pre-existing struggles of poverty, a disability such as amputation potentially triggers overwhelming and reverberating effects. Although the complex challenges of an amputation can be discussed from many different perspectives, the scope of this paper will be to examine the health, economic, and social factors facing Haiti's new amputees. The research will endeavor to understand how these factors affect the new population as it seeks healing and restoration while also surveying the approach of current aid interventions regarding those factors.

Where Are You From?
Presenter: Emma Kane
Faculty Advisor: Cynthia Jayne

There is a human need to belong somewhere or be "from" somewhere. This research discusses the idea of identity and how it relates to place attachment. Interviews with Union University students about how they answer the question "where are you from?" are examined in light of selected theories on identity and place attachment. Perspectives from anthropology and sociology, psychology and political science provide insight to the question of how knowing where we are from influences our concept of personal identity.

Food: Constructing a Cultural Identity Through an Aesthetic Relationship to the Land
Presenter: Justin Holder
Faculty Advisor: Cynthia Jayne

This paper discusses the influences that food production has on the construction of cultural identity, particularly with regard to man's connection to food, the land, place and space. The goal of the research is to propose successful and adaptive interdisciplinary strategies that allow for a more inclusive understanding of the multifaceted dynamics surrounding food production and cultural identity. The disciplinary perspectives of history, cultural studies and biology provide insights to understanding identity construction, and suggest important ways that our identities contribute to our views of our culture, the world and our relationship to it.

The Development of Christianity in Taiwan from 1949 to 1975
Presenter: Rachel Donaldson
Faculty Advisor: Cynthia Jayne

Christianity in Taiwan progressed rapidly after the Nationalists gained control of the island in 1945 and Communists established control of the mainland four years later. But now, even with an open door to the gospel, its impact has greatly diminished. The objective of this paper is to study the development of Christianity during this time of political change and great uncertainty, examining certain events that brought missionaries to Taiwan and influenced the growth of Christianity over the next 30 years, and evaluating the importance of the presence of Christian missionaries in Taiwan today. The research explores multiple text resources from historical and political perspectives, including the archives of a well-known mission group, and personal stories from residents who lived in Taiwan from 1949 to 1975.

Creating Community in Multiethnic Churches
Presenter: Abi Calvert
Faculty Advisor: Cynthia Jayne

Multiethnic and multiracial churches are few and far between in the United States, only accounting for 8 percent of congregations. As voluntary societies, these churches face unique challenges as they endeavor to be both diverse and united. Why and how do multiethnic and multiracial congregations build and sustain community between diverse ethnic and racial groups? This presentation examines how American Protestant congregations move beyond barriers to work towards the ideal of diversity in community by studying sociological, intercultural, and theological aspects of complex intergroup relationships and identity orientation.

Gender and Sexuality and Art
Presenter: Brandon Lang
Faculty Advisor: Cynthia Jayne

How does a culture's view of gender influence its art? Do the creative artists in that culture follow certain gender rules in creating characters in literature or film? When these rules are broken, is it a conscious effort on the creator's part to defy convention? Many works produced during the last few decades which boldly represent the view of gender and sexuality in the times they were produced. This research seeks to answer the above questions through the lenses of history, social science, and psychology by examining select creative works from this time period. ■

language & music

LANGUAGE

Spain: The Transition from Turbulence to Triumph During the 20th Century

Presenter: Courtney Wade
Faculty Advisor: Karen Martin

At the beginning of the 20th century, Spain was a country in tatters, having recently lost the last of her proud empire and suffering from centuries of poor rulers. The first few decades saw a dizzying variety of governors and governments, and culminated with Spain's bloodiest civil war. Yet, by the end of the 20th century, Spain had taken her place in the EU as a proud, stable and economically thriving modern country. How did such an enormous change take place? This project explores the two most influential governments of 20th century Spain, the 40-year dictatorship under General Francisco Franco and the constitutional monarchy under Juan Carlos II, to demonstrate how Spain's success was made possible. Particular emphasis is given to the effects economic shifts involving autarky and free trade, also political change concerning democracy vs. strong central government.

The Art of Poetry

Presenter: Emily Alm
Faculty Advisor: Jean Marie Walls

Throughout French history, the rules of poetry have changed drastically with each literary movement. From Classicism to Surrealism, each movement had a different perspective on the author, subject, style, structure, criticism, and creation of a poem. Nicolas Boileau's *Art Poétique* (Classicism), Viollet-le-Duc's *Nouvel Art Poétique: Poème en un Chant* (Romanticism), Théophile Gautier's *L'Art* (Parnassien), Paul Verlaine's *Art Poétique* (Symbolism), and Raymond Queneau's *Pour un Art Poétique* (Surrealism) all address these questions and establish the Art of Poetry for their time period. This presentation will address the Art of Poetry, what distinguishes poetry from prose, and the rules for writing poetry from each literary movement.

MUSIC

Dehumanizing Music: A Consideration of 'Naturalistic' Critiques of Serial Music and Suggestions for a Broader Aesthetic

Presenter: Jordan Baker
Faculty Advisor: Shawn Okpebholo

Avant-garde music has been the subject of heated debate both within the musical community and among the public as a whole. Because of its relative complexity and thus its inaccessibility to the 'common audience' it has often been attacked as "elitist" or "blackboard music." Furthermore, the particular modernist musical technique of serialism has drawn much condemnation for its overly "mechanical" nature. The core of these conservative critiques is centered on appeals to the "nature" of sounds. But, are these 'naturalistic' arguments well formed, or are they merely ruminations of "armchair aestheticians," as many Avant-garde artists accuse?

This presentation will discuss the most common 'naturalistic' argument concerning the generative function of the overtone series in musical systems. After discussing some important flaws with this kind of argumentation suggestions for a broader aesthetic will be made; an aesthetic that places emphasis not on the nature of tones, but on the nature of humanity as a possible means of forming value judgments concerning music in general and serialism in particular. ■

physics, political science & psychology

PHYSICS

Measurement of DNA hybridization via Redox Currents and Interferometry

Presenter: David Moore
Faculty Advisor: Bill Nettles

This presentation summarizes two summers of research in medical physics and chemical engineering at the University of Nebraska, Lincoln. Using optical interferometry, we are able to observe the modulation of ions under an AC field on the surface of an electrode with high sensitivity. This system can detect the redox current of a sample at a controlled potential, thus enabling measurement of such things as enzyme reactions. Applying this to Jacqueline Barton's work on electrochemical measurement of DNA hybridization, we anticipate constructing a reliable DNA microarray analysis technique that is less expensive than current methods. We demonstrate the ability to read a localized 10 micrometer spot on any sized electrode surface, as well as the ability to determine the differences between specific DNA binding, nonbinding, and nonspecific binding.

POLITICAL SCIENCE

Natural Law as a Social Apologetic: A Critique

Presenter: Matthew Kuchem
Faculty Advisor: Micah Watson

Natural law theory holds that all people—no matter their religious beliefs—through reason know self-evident, universal moral truths. This paper critiques natural law theory as a method of social apologetic for Christians—in other words, as a means of crafting arguments pertaining to moral matters in society with the goal of persuading others to a specific position. Because people have a sense of morality, reason is a means by which one can persuade others to accept certain moral stances without resorting to religious argumentation. However, all people hold presuppositions about the universe that influence their understanding of morals and all of reality. Some of these presuppositions impede effective appeals to the human sense of morality. This paper critiques natural law as a social apologetic using this presuppositionalist approach. The purpose is to expose the merits and demerits of both theories while casting a vision for their future synthesis.

CEPS Results: Marriage and Gender Issues

Presenter: Matthew Kuchem
Faculty Advisor: Sean Evans

Union University's Department of Political Science performed a survey of Union students this spring as a part of the College Evangelical Political Survey for the purpose of studying the political, theological, and social attitudes and beliefs of traditional undergraduate students. This particular presentation will evaluate a small part of the survey's findings, particularly in the realm of marriage and gender issues. Additionally, it will offer a basic comparison between the CEPS data and the results of a similar project done in 1996 by James Penning and Corwin Smidt, as described in their book, *Evangelicalism: The Next Generation*.

Evangelicals: The Millennial Generation

Presenter: Katie Mohler
Faculty Advisor: Sean Evans

How are the political beliefs of evangelical students today different from those of students in the past? Evangelical students were surveyed about their political beliefs in the 1980s and 90s, but the past decade and a half has seen political changes that have the capacity to affect evangelical college beliefs. The College Evangelical Political survey administered in March 2010 measured the orthodoxy and political views of current students. This was a pilot study of evangelicals using Union students to see if the orthodox and political beliefs have changed. A change in ideas is clearly seen in elements of this survey, and this study will probe these differences to reveal the reasons why the current generation of Christian students differs from the past.

PSYCHOLOGY

Self-confidence and Regret as a Function of Decision Making Style

Presenters: Benjamin Duffey, Ashlie Jackson, Amanda Lynn, April McCulley, Ryan Spickard, Lindsey Woods
Faculty Advisor: Jinni Leigh Blalack

This research project examined the relationship of regret and self-confidence as functions of decision making style (maximizer or satificer). The research hypothesis stated that classification as a maximizer will correlate with higher regret measures and a lower sense of self confidence. Classification as a satisficer will result in lower self-reported measures of regret, along with higher self-reported self confidence. The researchers administered surveys to selected undergraduate students at Union University (n=273). It was found, through a correlational method, that 59% (n=161) were classified as being more likely to satisfice. Forty-four percent (n=119) are likely to experience regret after having made a decision. Eighty-two percent (n=224) of the sample needed strengthening in regards to self-confidence in decisions. The research hypothesis was not supported by the results, perhaps due to many college students not having yet made significant life decisions. ■

social work & sociology

SOCIAL WORK

Improved Education for an Improved Future

Presenters: Rachael Collins, Carman Griffith, David Quick, Lauren Reeves, Emily Welborn
Faculty Advisor: Todd Stanfield

This presentation examines the current policy on education qualifications for employees working within the Tennessee Department of Children Services and the problems within this policy. It then shows what could be gained by improving those education standards. The policy recommends that all new hires of TN DCS hold a licensure in either a Bachelors or Masters of Social Work. If this were required it would ensure new hires would have the knowledge on how to utilize current resources and research for quality services to clients. It then recommends that existing employees be grandfathered in under this new policy through a Child Welfare Certificate. This would consist of education classes that would update them on current research on child and adolescent development and client assistant tools available to social workers today. Through this heightened education plan it will improve agency competence and services to clients and families.

Benefits of Bilingualism: Promoting a Bilingual America

Presenters: Sarah Brubaker, Michele Marks, Erin Palm, Abigail Perez, Bradley Poyner
Faculty Advisor: Todd Stanfield

As the Hispanic Spanish-speaking population in America increases, society experiences language barriers in businesses, schools and other institutions. To solve this problem, many states have mandated a policy called the *English-Only* or *English-First policy*. The policy has been mandated first in restaurants, for example, requiring that all Spanish-speakers only use English or find work elsewhere. The policy assumes that English is the only language to be spoken and thus devalues the language and culture of Hispanic persons and communities. This policy is analyzed in accordance with the NASW Code of Ethics and specific recommendations are discussed in order to promote bilingualism as a beneficial alternative to the *English-Only Policy*.

"Hand in Hand" Tennessee's Peer Support Centers

Presenters: Rachel Curtis, Amber Gaylord, Emily Gillespie, Brittney Wright
Faculty Advisor: Todd Stanfield

This policy analysis focuses on the budget cuts and their impact on Peer Support Centers of Tennessee. The currently proposed budget cuts take $37.9 million dollars from Tennessee Mental Healthcare. From that cut $2.6 million dollars is being cut from peer support center funding, which reduces the funding by 50%. Peer Support Centers are a very cost effective way of a helping those living with a mental illness. These centers also provide community involvement which is something a psychiatric hospital has trouble doing. By enacting these budget cuts, approximately half of Tennessee's 49 Peer Support Centers will close. In this analysis we offer five recommendations to remedy this problem.

Refugee Youth

Presenters: Darleen Cervasio, Anne Marie Dudas, Paige Jennings
Faculty Advisor: Todd Stanfield

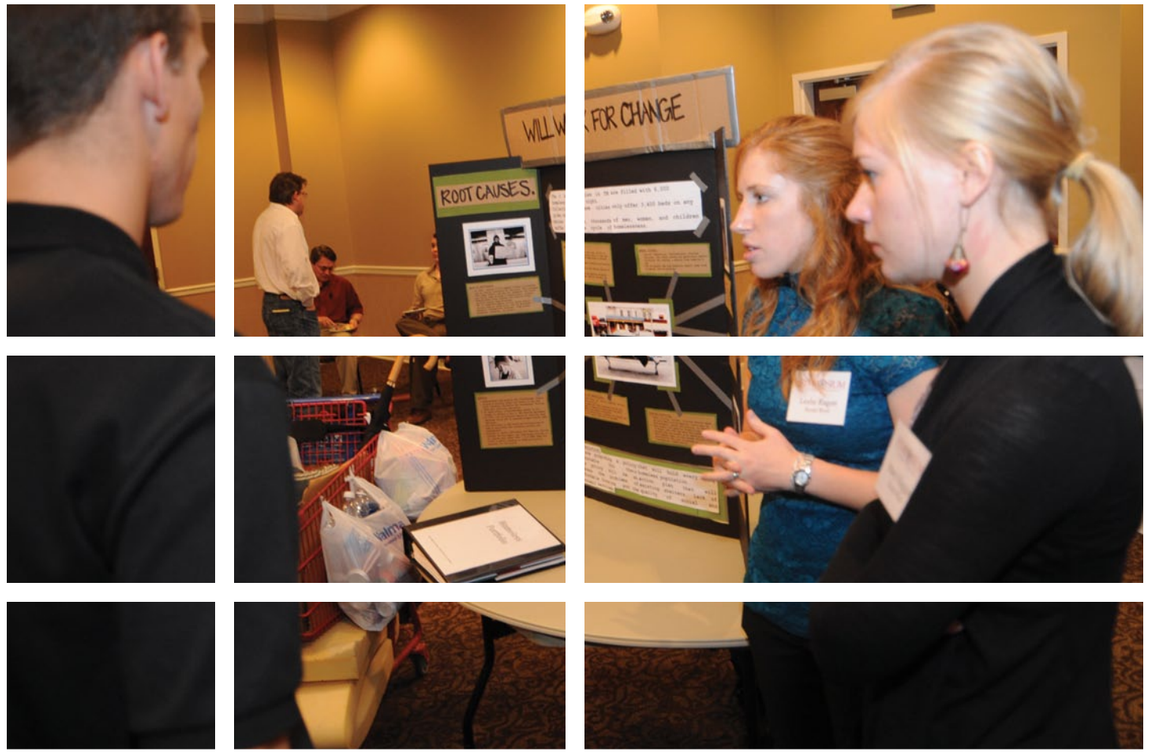
Tennessee is facing a potential crisis as refugee youth enter the public education system without a viable understanding of the culture of their new community. This lack of acculturation can lead to decreased success in school, which has been shown to increase the likelihood that individuals will become negative participants in and dependents upon society. Unfortunately, current Tennessee state policy does not provide the needed cultural education to help these youths learn about their new communities and connect with their new neighbors. Therefore, it is crucial to revise the current state policy to account for this increasing need for cultural education programs. Revision of the policy must include making acculturation programs available to every refugee youth in the state through either an educator or placement agency's referral. Since the state budget does not have the funds to support expansion of the two pilot refugee acculturation programs currently offered in Davidson and Shelby Counties, it is important that funding for these programs come from federal and other grants. Through these programs, refugee youth who would be at risk for not completing their education and becoming dependent upon the state will now have the chance to create a positive impact on all levels of society.

SOCIOLOGY

Does Social Exchange Theory Affect Participation in Discipleship, Evangelism, and Philanthropic Efforts of Southern Baptists?

Presenter: Troy Cooper
Faculty Advisor: Joanne Stephenson

Social exchange theory asserts that social behavior is the result of an exchange process meant to maximize benefits and minimize investment /risk to the individual. According to this theory, people would compare the achieved or potential benefits of their participation in social relationships with their investment of time, effort, or money as well as the risks involved. When the investment and/or risk outweigh the reward, people (according to this theory) would reduce or end their participation. Do local Southern Baptists participate in discipleship, evangelism, and philanthropic efforts in response to altruism, or are these efforts driven by social exchange theory? This study will attempt to answer this question by examining members from Baptist churches in Desoto County, Mississippi. ■



tesl & inter-disciplinary

TEACHING ENGLISH AS A SECOND LANGUAGE

English Language Learners with Learning Disabilities: Complexities and Strategies

Presenter: Courtney Bragg
Faculty Advisor: Phillip Ryan

This research presentation explores the administrative and pedagogical complexities that educators and other various stakeholders face regarding the education of English Language learners (ELLs) with learning disabilities. Two goals of the US education system—under No Child Left Behind— are the mainstreaming of ELLs as quickly as possible and for students with disabilities to be in a least restrictive environment. For ELLs with learning disabilities, these goals suggests that productive and communicative interface among various stakeholders, including mainstream teachers, special education teachers, English as a Second Language (ESL) teachers, and school administrators is essential. Unfortunately, in many current school systems, the interface among these students' educators is often challenged if not nonexistent. In addition to administrative issues, this presentation also explores practical strategies for mainstream and ESL teachers that could be used to offset these challenges.

'The World Has Come to Us': An Evaluative Look at a Volunteer-based Church ESL Program

Presenter: Leah Maddox
Faculty Advisor: Phillip Ryan

This research presentation evaluates the goals and outcomes of a volunteer-based church English as a Second Language (ESL) program. Given the limited amount of research available on church-based and volunteer ESL programs in general, this particular research project primarily utilizes participant observation and current language education theory and practice to develop a set of criteria by which to evaluate the goals and outcomes of this particular program. After analyzing the successes and challenges of this program based on these criteria, possible solutions are presented for enhancing the program's service to the international community in its particular context.

INTERDISCIPLINARY ENGINEERING AND SOCIAL WORK

The Financial Analysis and Social Injustices of Hearing Impairment

Presenters: Tayo Adedokun, John Dawson, Kyle Harris, Bailey Moore, Lauren Robinson, Emily Welborn, Amy Williams
Faculty Advisors: Mary Anne Poe and Jeannette Russ

This presentation project addresses the problem of those living with hearing disabilities. It examines the scope of the disability and what the reality for those living with deafness or hearing impairment experience on a daily basis. This presentation focuses specifically on the injustices that those living with a hearing disability are subject to. It focuses both on a social injustices, in terms of accessibility to helpful resources to reduce the impact of the problem, and economic injustices in terms of cost accessibility. It also examines the biblical and theological principles that address this disability. After examining the scope of the problem and the issues of justice related to hearing disabilities it will then seek to present a solution to the problem and injustices occurred. This solution will focus on a specific hearing aid that will provide greater ease of living to those with hearing disabilities and will form a business plan that will address the task of making sure there is accessibility, both physically and financially to those in need.

An Investigation of the Design, Availability, and Need for Prosthetic Arms in America's Amputee Population

Presenters: Ian Allen, Jonathan Crouch, Anna Marie Deschenes, Bri Hansen, Allison Huggins, James Jones, Daniel Sikes
Faculty Advisors: Mary Anne Poe and Jeannette Russ

The Engineering and Social Work Departments are working together to investigate a disability need in a specific population. The engineers will develop an economic plan to set up an entrepreneurial enterprise to provide and maintain a product to support the disabled. The social workers will assess the application of this plan to the target audience, specifically the underprivileged of America in need of prosthetic arms. Prosthetic limbs provide a pertinent topic for study today, since many amputees are forced to simply go without. There are many recent innovations in the field that have increased both ability and cost of prosthetic limbs. We will communicate the plan we create, and make our audience more aware of the possibilities and struggles that amputees face.

Prosthetics as a Solution to Aid Amputees in Haiti: A Social and Economic Justice Perspective

Presenters: Kayla Bryant, Claire Elmblad, Morgan Farquhar, Evan Holder, Robert Lynn, Mattie Lynn Whatley, Rhett Woody
Faculty Advisors: Mary Anne Poe and Jeannette Russ

Following a devastating earthquake, former French colony Haiti struggles to rebuild itself. Amongst the many homeless and poor rises Haiti's new majority, amputees. Executive director of Canadian humanitarian group Healing Hands for Haiti Eric Doubt says, "…that at least 2,000 amputations have been performed since the earthquake" (Lantigua, 2010). Before the earthquake it was estimated that Haiti had 800,000 disabled people, most of whom had never been counted by the government, for people with disability are a strain upon families and society. Most of the handicapped in Haiti are disregarded and usually abandoned (Berry, 2010).

By understanding the social injustices and stigmas associated with Haitian amputees, researchers will explore the financial aspects involved in adapting and implementing a product or service to assist the growing number of victims. Research will propose a solution that will address their physical, social, and emotional needs. ■

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