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Abstracts 2013: Highlights of Student Research and Creative Endeavors

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The background of the cover is a stylized, textured version of J.M.W. Turner's 'Rain, Steam, and Great Railway Bridge' or a similar scene, but with a prominent clock tower on the left side. The sky is filled with swirling, luminous patterns in shades of blue and yellow, reminiscent of 'The Starry Night' by Edvard Munch. The overall style is painterly and expressive.

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ABSTRACTS 2013

Highlights of Student Research & Creative Endeavors



COLUMBUS
STATE
UNIVERSITY

Abstracts 2013: Highlights of Student Research
and Creative Endeavors

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THE HONORS PROGRAM

at Columbus State University

*Cover art by Caitlyn Christain, an Art Major in the
Honors Program*

Abstracts 2013:

Highlights of Student Research and Creative Endeavors

What follows is a collection of abstracts summarizing the scholarship conducted by undergraduates at Columbus State University during the 2012-2013 academic year. These projects highlight undergraduate research conducted in a wide variety of disciplines, ranging from literary analysis to laboratory based sciences. The abstracts represent many ongoing projects on our campus and catalog those that have been published or presented.

This volume begins with articles published in peer-reviewed journals, including *Momentum*, *Columbus State University's Journal for Research and Critique*. It continues with projects that have been selected for presentations at national, regional and statewide disciplinary conferences. Among them are several that have garnered awards for outstanding undergraduate scholarship. Projects that have received competitive research grants, including our campus Student Research and Creative Endeavors (S-RACE) Grants, are also featured.

Many undergraduates have presented their work with our local community, either through the dissemination of best practices in nursing to regional hospitals, colloquium presentations of lecture-recitals or at Columbus State University's Tower Day held in April 2013.

Together these abstracts demonstrate the commitment of our faculty to engage students in their disciplines and represent outstanding mentorship that occurs on and off our campus throughout the year. Our students have amassed an impressive collection of projects that contributes to both academia and our local community, and these abstracts will hopefully inspire others to delve into scientific and creative inquiry.

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PUBLISHED SCHOLARSHIP

A Picture Worth a Thousand Words: Visual Clues in Political Cartoons

Caricatures, stereotypes, analogies and symbols are necessary visual clues when communicating messages in political cartoons. The objective of this study was to see how the well-known editorial cartoonist, Mike Luckovich, utilized these visual clues in his work.

Luckovich's cartoons of Governor Mitt

Romney from this past election were of the main focus. After discovering persisting themes of Romney's character in 100 cartoons and utilizing the semiotic theory, a detailed examination was done. The 100 cartoons that were chosen were within the election months from September to November. Research on Mitt Romney's campaign helped qualitatively analyze the true meanings Luckovich conveyed in the political cartoons. Mike Luckovich successfully displayed his views of Governor Romney's character through the use of visual clues.

Kayla Brown

*Faculty Mentor: Dr. William Edwards
Communication*

Published: Southern Communication Journal

Presented: Southern States Communication Convention, Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$300)

Media Usage and Learning Style Preferences

Carla Burton

*Faculty Mentor: Dr. Rose Danek
Psychology*

Research has shown that children have higher recall of storylines presented in audiovisual or interactive format, such as television. Others have revealed both children and adults perceive television to be easier than reading when taking in new information. Both could be possibilities of why children are introduced at an early age to learning from TV. However, other studies have suggested that even though television seems easier to understand, accuracy of the information perceived through television

is lower than with reading. Long periods of TV viewing as a child could predispose individuals to prefer kinesthetic learning as adults, possibly due to familiarity or ability to keep their attention. This study attempted to find a relationship between the amounts of TV watched as a child, preferred learning style as an adult, and impulse-control as an adult. In the study, each of the participants was asked to report the amount of TV watched as a child and to complete the VARK Learning Style Questionnaire along with the Abridged Big Five-Dimensional Circumplex on impulse-control and conscientiousness. The data reported a positive correlation between the amount of TV watched as a child and preference towards kinesthetic learning as an adult along with a significant negative correlation between the amounts of TV watched as a child and preference towards kinesthetic learning as an adult.

Published: *Momentum*, Volume 3, Issue 1, Spring 2013

Immigration Issues and Practical Reform

From a fiscal standpoint, many are concerned that illegal immigrants are putting a strain on this country's economic resources. Despite popular belief, several studies have recognized a positive relationship between immigration and the economy (legal as well as illegal immigration). The

Gerald Chichester

Political Science

American Dream of hard work, better standards of living, and possible movement up the social ladder has drawn many illegal aliens to come to the U.S. Obama's highly controversial bill, The Dream Act 2012, was created to allow hundreds of thousands of illegal immigrants who came to the U.S. as children to be safe from deportation and able to work and live in this country based on a certain educational or employment criteria. This Act is difficult to justify, because it rewards the undocumented workers in our country and may encourage more acts of illegal immigration. This proposed study will examine The Dream Act 2012, and propose a more realistic alternative that will incorporate legal immigration along with multiple outsourcing strategies that will provide corporations and schools with an opportunity to acquire skilled workers and gifted students from around the world.

Published: *Momentum*, Volume 3, Issue 1, Spring 2013

The Myth of Laissez Faire and the Contrivance of Capitalism

Alex Cole

*Faculty Mentor: Dr. Troy Vidal
Political Science*

There is a common assumption ubiquitous in the economic discourse that markets are a naturally occurring phenomena within any given society. On a prima facie level, this assumption seems to possess a great deal of explanatory power since important thinkers such as Adam Smith and John Locke argued that markets comprise the most natural form of human economic interaction because exchange and barter is a undeniable part of human nature. Moreover, they argued that a market

society enables man to freely exchange and barter on a mass scale – thus providing man with the tools necessary to lead the most happy, comfortable, and productive life thought humanly possible. However, is this the case? Evidence seems to suggest that capitalism and classical liberalism are the result of a “great transformation” from the agrarian, communally-based world of feudalism to the industrial individualism of capitalism and classical liberalism. Essentially, the enclosure of common land in early modern England at the insistence of lords and noblemen saw the rise of a new capitalist class, as well as a new conception of property as being the result of “labor-mixing” rather than title. However, what is seldom reported is that in reaction to the emergence of capitalism, the welfare state materialized in order to reign in the pratfalls of unchecked individual self-interest and to preserve the market system itself so that a “thick conception” of property could be maintained. The concept of a welfare state as a means to preserve the enabling social conditions for capitalism is so essential to a capitalist economy that the majority of classical liberal philosophers included a redistributive framework in their economic theories – including Smith and Locke.

Published: *Momentum*, Volume 3, Issue 1, Spring 2013

Fundamentalism in the Face of Modernization: A Literary Case Study of “The Lottery”

This work looks at fundamentalism in the face of progressivism. Shirley Jackson’s “The Lottery” will be compared to western and non-western cultures to look at traditionalism in the personal sphere and larger social dynamic, examining the way Jackson crafts a powerful message against

Ford Fourquarean

*Faculty Mentor: Dr. Cayce Van Horn
English Department*

ritualistic tradition through this work. The dangers of adherence to a fundamentalist policy can be seen within this work where an unnamed village carries out a yearly ritual that ultimately resulting in one person within the group to be stoned to death. Observing social dynamics within the village, the term Strategic Differentiation can be used examine how people conform and follow the ritual and the dangers of diverging opinion. Through the eye of this ambiguous village, Jackson uses “The Lottery” to highlight the dangers of extremism, fundamentalism, and conformity to unmovable doctrine, contrasting with other villages to compare traditionalism with modernism and progressive societal shifts..

Published: *Momentum*, Volume 3, Issue 1, Spring 2013

X-Ray Spectral Examination of Supernova Remnant DEM L241

*Matthew Perry,
Z.I. Edwards,
B. Furnish, T. Williams,
J. Hood,
C. McCarty, &
R. N. M. Williams*

*Faculty Mentor: Dr. Rosa Williams
Earth and Space Sciences*

Supernovae are responsible for input of gas and energy into their host galaxy. Therefore it is important to understand these Supernovae and their left over remnants. High energy astrophysics offers the ability to further understand Supernovae, Supernova Remnants (SNRs), and any associated compact objects with these events. SNR DEM L241 is a complex remnant in which we will investigate using high energy, X-ray, spectral analysis. DEM L241, located in the Large Magellanic

Cloud and is at a known distance, contains a bright internal X-ray source which has been previously interpreted as a Pulsar Wind Nebula (PWN). However, using data from the Chandra Space Telescope, it is will be shown that this is not the case. Also, analysis of spatially resolved spectra will aid in the understanding of the physical properties, evolution of the SNR, and its the SNR's with the interstellar medium..

Published: *Momentum*, Volume 3, Issue 1, Spring 2013

PRESENTED AT NATIONAL AND STATE CONFERENCES

Preparation, Characterization and Activity Studies of Palladium Catalysts on Alumina and Silica Supports

Palladium catalysts were prepared by dry impregnation and wet incipient methods of metal nitrate solutions being added to slurry of alumina and silica supports separately; this was finalized by drying in an air oven and calcination in a tube furnace at 600C for two hours.

Michael Anderson

*Faculty Mentor: Dr. Anil Banerjee
Chemistry*

Characterization of the catalysts involved several techniques including a) pulse chemisorption; b) Brunauer-Emmett-Teller (BET) method of physical adsorption to measure total surface area; c) Temperature Programmed Oxidation (TPO); and d) Temperature Programmed Desorption (TPD) to determine active sites of the catalysts. Pulse, TPO/TPD studies were conducted with Micromeritics 2705 Chemisorb equipment. Dispersion of Pd on alumina was 20%, TPD of this catalyst showed hydrogen desorption at 300-550C indicating hydrogen was absorbed even at high temperature. Activity studies are being done using CO oxidation (1% CO and oxygen) on selective catalysts. The data on catalytic properties as well activity studies will be presented.

Awarded: Best Presentation (Tower Day 2013)

Presented: American Chemical Society National Conference, Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$600) , CSU Department Funds (\$600)

Preparation and characterization of Platinum catalyst on silica and alumina supports

Melita Boykin

*Faculty Mentor: Dr. Anil Banerjee
Chemistry*

Platinum catalyst (1% loading) on alumina support was prepared by incipient wetness method. A solution of tetraamine platinum (II) nitrate was added to the dry support (alumina) to make dough and then converted into pellets. The pellets were dried in an air oven at 1200C for 24hr, followed by calcination in air in a tube furnace at 500C for 2hr. The catalyst was characterized by pulse chemisorption (Micromeritics, Chemisorb 2705) equipment to determine % dispersion of Pt on alumina support. The dispersion of platinum was 14.8%. Hydrogen TPD data showed continuous TCD signals indicating evolution of hydrogen gas at higher temperature range (500-9000C). The preparation of the platinum catalyst in silica support, characterization and activity studies have been conducted using slurry, incipient wetness and wet impregnation methods.

Presented: American Chemical Society National Conference, April 2013

Funded: CSU S-RACE Grant (\$300)

Characterization of Bioreducible Poly(β -amino Ester) Nanoparticles for siRNA Delivery

Glioblastoma multiforme (GBM) is one of the most malignant brain tumors affecting adults. It is characterized by necrotic tissue and abnormal vasculature, making it highly resistant to current cancer treatments. A promising alternative to standard cancer therapeutics is the use of drug delivery systems such as polymeric nanoparticles (NP) that deliver silencing RNA

(siRNA) exclusively to tumor cells for gene knockdown. Presently, nonviral delivery vectors, such as poly(β -amino ester) (PBAE) NP, are beneficial delivery systems because they are less immunogenic and easier to chemically modify than vectors delivered by viruses. Although current formulations of PBAEs allow cargo release via hydrolytic degradation, the ideal delivery vector should have an environmentally triggered siRNA release system to increase safety and transfection efficacy. We hypothesized that the addition of disulfides to the main backbone of PBAE NPs would reduce cytotoxicity and increase siRNA transfection efficacy. Glutathione, a reducing agent present in the cytosol, can reduce a disulfide bond into two thiols and thus increase NP degradability for safety and immediate siRNA release. In this study, we characterized the binding, physical, and siRNA delivery properties of reducible PBAE NP. Polymer-siRNA binding strength was analyzed by gel retardation and fluorescence competition assays. NP size and zeta potential were measured using NanoSight and zetasizer instruments, respectively. siRNA transfection efficiency was assessed by the amount of green fluorescent protein detected in GBM cells using a fluorescence plate reader. This study revealed that the addition of disulfide groups to PBAEs increased their siRNA binding strength, lowered cytotoxicity, and increased siRNA transfection efficiency. The best polymer showed 76% GFP knockdown while maintaining high cell viability twenty days following transfection. This novel class of polymers can serve as improved nonviral delivery vectors for a wide array of RNA interference (RNAi) targets, including those associated with malignant tumors.

Bolivia Hurtado De Mendoza

*Faculty Mentor: Dr. Monica Frazier
Biology*

Awarded: First Prize Winner in the Best Paper and Best Poster Competition (Georgia Collegiate Honors Council), Best Poster (Tower Day 2013)

Presented: Annual Biomedical Research Conference for Minority Students, Georgia Undergraduate Research Conference (February 2013), Georgia Collegiate Honors Council, Tower Day (April 2013)
Funded: CSU S-RACE Grant (\$400), John Hopkins University School of Medicine (\$3000)

Barcoding the Mississippi and Alabama Black Belt Prairie Flora Using the *rbcL*+*matK* Gene Regions

Robert Futrell

*Faculty Mentor: Dr. Kevin Burgess
Biology*

Species identification is an often difficult, yet vitally important process for the study of biological systems. DNA barcoding is a recent molecular tool that can be used for plants to identify them to the species level. The recent agreement to use the *rbcL*+*matK*

chloroplast gene regions as the standard DNA barcode for plants has resulted in numerous efforts to barcode local floras and establish plant DNA barcode databases for future ecological applications. We examined how effective these regions were for a complex flora with many polytypic genera. This study tested 190 samples from the threatened Black Belt prairies of Mississippi and Alabama. Both regions, *rbcL* and *matK*, were recovered in 92.6% of the samples. The identification success was lower than comparable studies at 56.4%. Monotypic genera in this study had a higher proportion of resolution (100%) than polytypic genera (66.7%). The study demonstrated a strong negative correlation between species per genera and resolution (Spearman's $\rho = -0.817$, $P < 0.001$). These results suggest that *rbcL* and *matK* have lower discriminatory rates in more complex floras.

Presented: Georgia Undergraduate Research Conference (February 2013), Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$345), Beta Beta Beta (\$596)

Groundwater water level and temperature fluctuations at the type locality for the endangered, Piedmont Blue Burrower crayfish

Climate change models predict shifts in the hydrology of aquatic systems.

Jess Gilmer

Freshwater species must adjust to these changes in order to persist. To predict how species will respond to these hydrologic alterations we need to understand niche boundaries particularly for imperiled species. Crayfish are the

*Faculty Mentor: Dr. Troy A Keller
Earth & Space Science*

second most imperiled aquatic taxonomic group. Many of these are burrowing species that have a limited geographic range and weak dispersal capabilities. *Cambarus harti* is a state-listed, endangered burrowing crayfish, whose known distribution is confined to springs and seeps in one county in Georgia. This paper characterizes groundwater dynamics in a habitat with a known population of *C. harti*. Groundwater levels and temperature were recorded every 15 min for 505 days at the type locality. Groundwater fluctuated from 1.3 to 18.6 cm below the ground surface and ranged in temperature from -9.8 to 36.6 C. Maximum rate of water level change was 5.6 cm/hr. Thus groundwater conditions are variable and require burrowing taxa to adjust rapidly to shifts in water level and temperature.

Presented: Society of Freshwater Science (May 2013)

Windows Thumbnail Database Forensics Research

LaQuarius Lesley

*Faculty Mentor: Dr. Lydia Ray
TSYS School of Computer Science*

My research focus is on finding out if it is possible for Windows XP, Windows Vista, or Windows 7 thumbnail cache files to be populated with pictures that the user did not view. In order to determine if this is possible, I will have to 1) create a folder on a separate system that contains 2 JPEG, 2 bitmap, and 2 PNG files 2) put this folder on a flash drive 3) create a new folder on the system I will use to populate the thumb cache files on 4) drag the first set of pictures to the new folder and delete them out of the folder using command prompt 5) do step 4 for the next set of pictures 6) use EnCase to view the thumb cache files to see if they were populated with the 3 set of pictures I deleted from the new folder. This procedure will be carried out on each of the operating systems so results can be compared between them.

My research will also test to see if viewing the thumbnail pictures on the flash drive have any effect on the population of these thumbnail pictures in the thumb cache files on each of these operating systems. Moreover the difference between the thumb cache databases for each operating system will also be researched. Currently I have discovered that Windows XP will store thumbnails viewed locally in a thumbs.db file inside the same folder where the pictures were viewed using thumbnails (large icon mode). Windows Vista and Windows 7 on the other hand store their thumbnail cache in a central location on the system with a file that contains the index to locate each file in the thumb cache.db file with sizes 32 KB, 96 KB, 256 , and 1024 KB.

Presented: Georgia Undergraduate Research Conference (February 2013),
Tower Day (April 2013)

Determination of Lead in Commercial Wine Samples Using Graphite Furnace Atomic Absorption Spectroscopy

A method has been developed for direct determination of lead in wine by graphite furnace atomic absorption spectrometry (GFAAS) with Zeeman-effect background correction. The pyrolysis and atomization temperatures were optimized with and without matrix modifiers. The analytical procedure was

Matthew Mireles

*Faculty Mentor: Dr. Samuel Abegaz
Chemistry*

validated using certified reference material and the results were in good agreement with the certified values. The proposed method was applied for analysis of several commercial wine samples from different regions of the world. The ranges of lead concentration were 12.5 – 35.0 µg/L and 12.4 – 23.1 µg/L for red and white wines, respectively. One red wine Sample from Spain and one white wine sample from California exceeded the limit set by the International Association of Vine and Wine, 15 ppb. The precision was better than 5% for 99% of the samples.

Presented: American Chemical Society National Meeting, Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$300), CSU Department Funds

HPLC Analysis of Synephrine Content in Bitter orange (Citrus Aurantium L.) Dietary Supplements

Martha Newell

*Faculty Mentor: Dr. Jennifer Newbrey
Biology*

Many Americans are currently taking, or have taken, non-prescription dietary supplements. These supplements claim to help prevent or relieve any number of ailments, but are not regulated by any governing body. One common use of dietary supplements is to aid in weight loss. Synephrine, the most abundant active component in bitter orange (Citrus

aurantium L.) extract, became a regular ingredient in weight loss supplements after the 2004 ephedra ban. I am using reverse phase high performance liquid chromatography to determine the synephrine content of four dietary supplements and comparing my quantified concentrations with those reported on the supplement labels. Two of the supplements I am analyzing claim to be less than 98% pure synephrine, another reports 6% synephrine, and the last does not report synephrine content. To improve the precision of my quantitative analysis of synephrine content I am using 4-(dimethylamino)pyridine as my internal standard and all samples are being run in duplicate with ten replicates per supplement. Data will be analyzed using t-tests to compare my quantified synephrine content with the reported percentage to determine if the supplements are accurately labeled. I will also use one-way analysis of variance to compare synephrine content across supplements.

Presented: Beta Beta Beta District Convention, Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$600), Flora M. Clark Fund for Improving Biology (\$500),
Beta Beta Beta (\$500)

Preparation and Characterization of Ruthenium Catalysts

Ruthenium catalysts (1% metal loading) were prepared by dry impregnation and wet incipient methods. A solution of ruthenium nitrosyl nitrate or ruthenium chloride was added to alumina and silica supports separately followed by drying and calcination. Characterization of the catalysts was performed by BET,

hydrogen and carbon monoxide pulse chemisorption, and temperature programmed desorption methods. With ruthenium chloride as a precursor, the catalyst gave a metal dispersion of 2-8%. The total surface area by BET method was 93.2 m²/g. There were some findings that Ruthenium Chloride gives a lower dispersion. Using ruthenium nitrosyl nitrate as precursor and slurry method, the catalyst gave a dispersion of 3.19%. Using the ruthenium chloride, the catalyst gave a dispersion of 5%. TPD of H₂ gas showed a peak at 600°C. CO desorbed around the same temperature.

Lakesha Richardson

*Faculty Mentor: Dr. Anil Banerjee
Chemistry*

Presented: American Chemical Society National Conference, April 2013

Funded: CSU S-RACE Grant (\$600)

Testing the Regulatory Role of Pseudophosphatase (Oca2p) in *S. cerevisiae*

Chelsea Severin

Faculty Mentor: Dr. Nin Dingra
Chemistry

Protein phosphorylation is a mechanism that regulates most aspects of cell life. Tyrosine phosphorylation is determined by the opposing actions of two classes of enzymes: protein tyrosine phosphatases and protein tyrosine kinases. Pseudophosphatase proteins are catalytically inactive protein tyrosine phosphatases. These proteins lack the

functional cysteine residue in the active site essential for catalysis. Although they are catalytically inactive, pseudophosphatases appear to have an important cellular function since they are associated with many diseases. Our research objective is to elucidate how a pseudo-phosphatase (Oca2p) protein from *S. cerevisiae* regulates the phosphatase activity of its catalytically active counterparts (Oca1p and Oca3p). In order to test our hypothesis, we have created the double knockout strains, OCA1 Δ OCA2 Δ and OCA2 Δ OCA3 Δ to test the effect of these individual genes in the cell and what effect deleting the OCA2 gene would have on the phosphatases, Oca1p and Oca3p. When the cells of *S. cerevisiae* are exposed to stresses such as nutrient limitation or DNA damaging agents they arrest in the G1 phase of the cell cycle in an unbudded state to survive adverse conditions. Lipid peroxidation affects cellular lipid containing structures such as membranes and in yeast OCA1p and OCA3p are reported to be responsible for G1 arrest upon treatment with linoleic acid hydroperoxide (LoaOOH). Exploiting this property, the effect of OCA2p on OCA1p and OCA3p was analyzed and it was determined whether OCA2p accelerates or decreases the activity of its active counterparts. Furthermore, it has been reported that yeast strains with OCA1 Δ and OCA3 Δ knockouts show decreased glycogen accumulation when they are starved of nutrients. Utilizing this property, the effect of OCA2p on the glycogen accumulation function of OCA1p and OCA3p was illustrated by quantitatively determining the concentration of glycogen in cells with OCA1 Δ OCA2 Δ and OCA2 Δ OCA3 Δ double knockout strains. Double knockout strains are tested for stored glycogen content and compared with the wild-type strain to analyze any effects caused by deleting the genes.

Presented: Georgia Undergraduate Research Conference (February 2013), Tower Day (April 2013)

Funded: CSU S-RACE Grant, CSU Department Funds, (\$300)

Documenting the Biodiversity of Fall Line Sandhill Wetland Flora Using Plant DNA Barcodes.

The Sandhill flora of Southwest Georgia holds a vast number of rare and endangered plant species. For this reason many organizations are attempting to preserve and restore these fragile areas. DNA barcode libraries, while still relatively new, are fast becoming a necessity in such efforts, especially in floras where taxonomic complexity confounds identification of rare taxa based on morphology alone. Currently a number of wetland habitats associated with the Sandhill flora near Fort Benning, Georgia are of conservation concern, although genetic confirmation of previously collected samples has not been accomplished. Here, I conducted DNA barcode sequencing using the *rbcL* gene region of chloroplast genome. Sequences were base-called and edited in Condon Code Aligner and alignments of contiguous sequences were visualized in Geneious Pro. Preliminary results based on all-to-all BLASTn analysis indicate that species resolution was 78% for this relatively diverse flora ~ 55% of the genera were monotypic. This study not only evaluates the effectiveness of using plant DNA barcodes in this locally, rare habitat but also contributes to the development of a DNA sequence library that will be of immediate use to conservation biologists working directly with this rare flora.

Scott Silvis

*Faculty Mentor: Dr. Kevin Burgess
Biology*

Awarded: Georgia Undergraduate Research Conference, 3rd

Presented: Georgia Undergraduate Research Conference (February 2013), Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$500), George Stanton Biology Grant(\$250)

A Test of The Multiplicative Risk Model Using A Freshwater Food-Web Fragment

Samantha Worthy

Faculty Mentor: Dr. Clifton Ruehl
Biology

Interactions between multiple predators result in risk reduction or risk enhancement for prey. Predators that interfere with each other slow predator-prey encounter rates that reduce the risk of predation for prey. Conversely, prey may shift habitat use in response to one predator, which enhances their risk of predation by making them more vulnerable to another predator. We tested the multiplicative risk model for emergent multiple predator effects on the mortality of freshwater pulmonate snails (*Physa acuta*) using giant water bugs (*Belostoma flumineum*) and crayfish (*Procambarus zonangulus*) as predators in an experiment with three treatments. Treatments consisted of one giant water bug, one crayfish, or an individual of each predator. We found that snail mortality was 76% in tanks with crayfish, 98% in tanks with water bugs, but 95% in tanks with both predators. Analyses revealed that snail mortality in crayfish tanks was different than in water bug tanks and mortality in combined predator treatments was intermediate. A multiplicative risk model predicted 99% mortality in combined predator treatments based on mortality in single treatments. Therefore, combining predators resulted in either no effect or risk reduction for snails likely from interference competition between giant water bugs and crayfish, but evidence for risk enhancement.

Awarded: Best Presentation (Tower Day 2013)

Presented: 2013 Annual Meeting of the Georgia Academy of Science, Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$150)

Discriminating Woody Plant Species in a Warm-Temperate Flora Using Plant DNA Barcodes

The *rbcL*+*matK* gene region of the chloroplast genome has recently proven effective for the establishment of DNA barcode libraries and discerning species in a temperate flora typified by a high proportion of monotypic taxa of moderate phylogenetic dispersion. To date, the efficacy of this barcoding region in a warm-temperate flora typified by relatively higher proportions of invasive and more taxonomically complex taxa has not been tested. The goal of this study is to 1) establish a barcode library and

Sydney Worthy

*Faculty Mentor: Dr. Kevin Burgess
Biology*

2) test the efficacy of the *rbcL*+*matK* barcode for species discrimination in the woody flora of Oxbow Meadows Environmental Learning Center, Columbus, Georgia. As a first step in this process, I collated, synthesized and analyzed previously collected *rbcL* barcode data for 62 woody plant samples to evaluate rates of species resolution. Of the 31 species analyzed, species resolution was 87% based on an all-to-all BLASTn analysis using this gene region. Furthermore there was a weak relation between the number of species per genus and % species resolution. Collectively, results indicate that species resolution is relatively high in warm-temperate floras that contain a high proportion of monotypic taxa, although rates for polytypic taxa are substantially lower.

Awarded: Best Poster (Tower Day 2013)

Presented: Beta Beta Beta District Convention, Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$344)

FUNDED PROJECTS

The following abstracts feature undergraduates who have received competitive research grants that provide critical support for their projects. Several of our undergraduates have also benefited from larger research grants awarded to the institution as well as those provided by the generosity of community partners. In addition, Columbus State University has offered a competitive grant program to support and promote the research, scholarly and creative efforts of our undergraduate students. The Student Research and Creative Endeavors (S-RACE) Grants, but are often supplemented by departmental funds. We have included those that have been awarded funds during the current academic year.

Funding provides critical support often needed to complete projects. Undergraduates engaging in research have submitted proposals that enabled the purchase of items such as artistic supplies, photography and audio recording equipment, and scientific apparatus. In addition, grants have supported travel that enabled undergraduates to conduct sociological interviews, collect water samples, and disseminate research findings. The undergraduate researchers in this section are recognized for writing successful grant proposals as well as presenting their findings.

Lithological and Geochemical Analysis of the Kowaliga Gneiss and Zana Granite in Eastern Alabama

The Ashland-Wedowee-Emuckfaw belt of Alabama makes up a portion of the Blue Ridge and Piedmont provinces of the southern Appalachians. Plutonic bodies including the Elkahatchee quartz diorite gneiss, Rockford granite, Bluff Springs granite, Blakes Ferry granite, Almond trondhjemite, Kowaliga augen gneiss, and the Zana granite which intrude metasedimentary rocks of the Ashland Supergroup and Wedowee and Emuckfaw Groups within this belt. Conventional rubidium-strontium whole rock dating and uranium-lead multi-grain zircon analyses constrain three main bodies of rock within the vicinity of Alexander City, AL to the following ages: ca. 490 Ma for the Elkahatchee quartz diorite and ca. 460 Ma for the Zana granite and Kowaliga augen gneiss. Recent single grain ion microprobe uranium-lead ages, however, suggest these original Rb-Sr and U-Pb ages may have been affected by Pb-loss or xenocrystic components and that these rocks may not represent simple cogenetic plutons. In this case, laser ablation ICP-MS analyses of three different zircon populations from the Elkahatchee quartz diorite gneiss suggest a crystallization age of ca. 371 Ma. Our research project, in collaboration with researchers from the University of Florida, focuses on the Zana granite and Kowaliga augen gneiss in the vicinity of Lake Martin in eastern Alabama. The Kowaliga augen gneiss has been lithologically described as a feldspar augen gneiss with both a strong linear and planar metamorphic fabric. Unlike the relatively homogenous Kowaliga, the Zana granite has been reported to be a more diverse sequence of granodioritic to granitic rocks with a distinct metamorphic fabric. As part of an attempt to more clearly define and date these plutons, the goal of our project is to more precisely classify these units using modal mineralogy and textural character in the context of granitoid classification schemes (QAP diagrams). In addition to this, we hope to enhance existing geologic maps of these plutons and their host country rock by improving on previous work done within the region. In addition to field mapping of these plutons, and petrologic examination of individual rock unites via thin-section analysis, additional geochemical and isotopic age analyses will be completed at the University of Florida in the summer of 2013.

*Daniel Black,
Austin Sagul*

*Faculty Mentor: Dr. Clinton Barineau
Earth & Space Science*

Presented: Tower Day (April 2013)

Funded: National Science Foundation

Synthesis and Characterization of Encapsulated Polystyrene Chains

Matthew Blackmon

*Faculty Mentor: Dr. Wade Holley
Chemistry*

Microemulsions of styrene and methyl methacrylate in water will be prepared with dodecyltrimethyl-ammonium bromide. Crosslinking polymers are then used to encapsulate the polymer chains. The characteristics of the polymer chains grown in encapsulation and open conditions are subsequently observed and compared. The reaction conditions will be varied to observe effects and optimize yield. We are varying concentrations of initiator, surfactant, and monomer, as well as changing the type of initiator from the less polar AIBN (Azo-bis-isobutyronitrile) to the more polar KPS (Potassium Persulfate). We are also varying the crosslink density of the particle to observe the confinement effects on the chains. The polymer chains are examined by size exclusion chromatography, viscometry, and differential scanning calorimetry. The characterizations are partly observed here at CSU, using instruments within the department, and partly at Oak Ridge National Labs in Knoxville TN. The glass transition temperature, molecular weight and polydispersity index will be the primary characteristics used for observations.

Presented: Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$600)

Synthesis and Characterization of a Series of Novel Polynuclear Nickel(II) Schiff-Base Transition Metal Complexes

The spectroscopic and magnetic properties of four polynuclear nickel(II) Schiff-base complexes are reported. The complexes are prepared from the reaction of nickel(II) nitrate hexahydrate and triethoxymethane (TEM) with bis(N-ethyl-3-methoxysalicylaldimino)nickel(II), bis(N-methyl-3-methoxysalicylaldimino)nickel(II), bis(N-ethyl-5-bromo-3-methoxysalicylaldimino)nickel(II) or bis(N-methyl-5-bromo-3-methoxysalicylaldimino)nickel(II) in a one to four methanol:chloroform mixture. Each nickel atom in the complexes is 6-coordinated and is bridged by the phenolic oxygen atoms whereby magnetic exchange is revealed across through the bridging atoms. Infrared spectra are presented to reveal the bridging oxygen atoms. The UV-Vis spectra suggest that the nickel atoms are symmetry equivalent and the ligands are also symmetry equivalent. As a result of the magnetic exchange, intramolecular ferromagnetic interactions are proposed. The reaction may proceed in other solvents, e.g. ethanol and dichloromethane, but the product is difficult to control because water and solvent compete for the sixth ligand site on the metal.

Amber Bolen

*Faculty Mentor: Dr. Floyd Jackson
Chemistry*

Presented: Senior Seminar presentation, Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$300)

Exploration of Identity through photography & Video

Sarah Fancellas

Faculty Mentor: Mr. Rylan Steele

Art

Self-presentation, Identity, and Self-obsession are current themes that are present in my work. I am interested in the biology of the individual and the ability of the individual to transform. This transformation can occur by the individual's exposure to their environment and can cause changes in their behavior. I am also interested in the human desire to organize as a way to simplify and make sense of their environment and of their life.

I have digitally photographed and organized my clothing and material possessions and used these images to create a self-portrait in the form of paper dolls. The paper doll series is meant to cause the viewer to think about how the items we possess and the clothing we wear can become an extension of our identity and how we can manipulate the way we are perceived by others. The series is also about how we sometimes have multiple groups of people who we identify with, and how we express that through our clothing. With this work I wanted to create a visual autobiography that is both playful and that reflects an exploration of my own identity as a 23 year old college student living in Columbus, Georgia.

Funded: CSU S-RACE Grant (\$300)

Physicochemical Effects of Damming in Small, Urban Streams

Many of the Earth's ecosystems have been drastically transformed by urbanization. Aquatic ecosystems have been physically modified by these urbanized effects, which has indirect effects the biota living within. In the United States, 2.6 million artificial lakes have been created by the damming of

Jess Gilmer

*Faculty Mentor: Dr. Troy A Keller
Earth & Space Science*

streams, a majority of these residing in the southeast. Dams can alter morphologic and physicochemical characteristics of a stream. Immediately upstream from dams, streams evolve into artificial lakes, while portions downstream from dams experience chemical changes and become sediment starve. To quantify physical and chemical changes that dammed streams endure, two physicochemical parameters – dissolved oxygen and temperature – were assessed upstream from dams, within artificial lakes, and downstream from dams for five artificial lakes in Columbus, Georgia. No significant differences in dissolved oxygen concentrations and temperature were found across upstream, downstream, and within artificial lakes, but results that may significantly influence stream biota were found. By recognizing the effects that damming has on streams morphologic, chemical, and physical characteristics we can better understand how stream biota is affected by these changes.

Funded: CSU S-RACE Grant (\$300)

Coca-Cola Space Science Center Mars Rover Project

*Gain Holmes,
John Johnson, Frank Martinez*

*Faculty Mentor: Mr. Irving
Rodriguez
Earth & Space Science*

As a kid, we have all yearned to experience the reality that lies beyond our atmosphere -- space. Of course, the complexity in accomplishing such a task is often realized with age, and thus this curiosity inevitably transmogrifies into a fantasy. With this collaboration between CSU's Robotics Engineering team and The Coca Cola Space and

Science Center, we aim to grasp that curiosity and mold it into an unyielding motivation for the prospect of future astronauts and astronomers. The project we were tasked with called for the development of a realistic rover designed for traversing the surface of mars. While traversing the surface, the rover would also have to complete a simulated exploration mission encompassing these tasks: Testing soil deposits to determine chemical composition, Analyzing rock samples via laser transmission to determine rock composition, Extracting rock samples for later deposition.

In order to make this possible, we analyzed each element of the mission and determined the necessary physical components required for a successful exploration, that was the first step. The next step would require conceptualization of the platform, which we did in collaboration with CCSSC through successive presentations. The result was a cost efficient vehicle requiring little maintenance. The opportunity presented to us through this project was one of admiration. The individuals who will take part in the exploration will hopefully have a wonderful experience, and the information we retained from this is invaluable.

Presented: Tower Day (April 2013)

Funded: CSU Department Funds (\$1000)

Local adaptation and Hybrid Breakdown of *C. americanum*

Campanulastrum americanum, the American Bellflower, is a herbaceous plant that occupies a variety of habitats within eastern North America and exhibits diverse life history traits.

Across the range of *C. americanum*, environmental variation may result in

genetically distinct populations that are equipped with variety of traits/behaviors that maximize survivorship. I am interested in investigating the potential role of environment in shaping the genetic structure of populations of American Bellflowers, evidence of selective pressures exerted by environments. More specifically, I would like to determine if differences in life history traits can be attributed to genetic differences that exist between populations across the range of *C. americanum*. Furthermore, I plan to determine if the magnitude of genetic differences that exists among populations influences whether hybrid breakdown occurs, a form of genetic incompatibility that arises in the offspring. Presently, germination is being monitored in plots located at the northern and southern edge of the *C. americanum* range. Extensive genetic sequencing and analysis with larger sample sizes needs to be completed to address the objectives of this study.

Marisa Naciuk

Faculty Mentor: Dr. Kevin Burgess
Environmental Science

Funded: CSU S-RACE Grant (\$1070)

Assessing Intraspecific Genetic Variation Across the Range of Red Mulberry (*Morus rubra* L.) for the *rbcL* Plant Barcode Gene Region

Martha Newell

*Faculty Mentor: Dr. Kevin Burgess
Biology*

Red mulberry (*Morus rubra* L.) is native to eastern North America, extending from Canada to the southeastern United States and west to the Nebraska. Currently this species is suspected to be hybridizing with the introduced white mulberry (*Morus alba* L.), which has escaped cultivation and is threatening red mulberry with local extinction. As a first step in determining extinction rates throughout the range, confirmation of the genetic identity of parental taxa is needed. While plant DNA barcodes may be useful for this, potential intraspecific variation for the *rbcL* gene region of the chloroplast genome may confound future analysis of localized hybrid zones. The goal of this project is to collate and synthesize previously collected barcode data to evaluate variation in the *rbcL* gene region to detect sequence polymorphisms among mulberry taxa in North America. Specifically, I created a database that includes DNA barcode sequences for red and white mulberry from Indiana, Kentucky, Georgia and Ontario, Canada. DNA sequences were base-called, edited and assembled using CodonCode Aligner. Alignments were constructed and visualized using Geneious software. While cpDNA haplotypes varied between *M. rubra* and *M. alba*, intraspecific variation was negligible highlighting that selection may be relatively conserved for the *rbcL* gene region across the range of red mulberry. Collectively, these results indicate that this barcode region may not only provide a valuable tool for the genetic confirmation of red and white mulberry and hybrid parentage but also for hybridization studies in other long-lived perennial plant species.

Presented: Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$344)

Internet Security

In 2012, there were three reported teen suicides (Canada, New York, and Minnesota). The main cause of these suicides was cyber bullying and bullying. When the parents were being interviewed, they repeated several times “Could there

have been something to have prevented this from happening?” Based upon that statement, I have designed an application that prevents cyber bullying and these types of suicides from happening. Using browser and web programming technologies, I have designed an application to store data (using sessions and cookies) to prevent teens from faking their age and gaining access to websites that are not meant for them. Preventing teens from faking their age prevents them from posting things on blogs and social networking sites where cyber bullying is likely to occur.

Rodrigo Obando

*Faculty Mentor: Dr. Christopher Whitehead
TSYS School of Computer Science*

Presented: Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$300), CSU Department Funds

Provenance of Detrital Sand of the Eutaw Formation in Alabama and Western Georgia: Implications for Late Cretaceous Paleogeography

Donald Osborne

*Faculty Mentor: Dr. William Frazier
Earth & Space Science*

The Eutaw Formation is a Santonian to Campanian age (~87.5 -83 Ma) stratigraphic unit of the eastern Gulf Coastal Plain, occurring from eastern Mississippi to western Georgia. In western Georgia and central Alabama the Eutaw is divided into the upper Tombigbee Sand Member, and a lower unnamed member. The unnamed lower member of the Eutaw Formation within the study area of eastern Alabama and western Georgia is significantly different in mineralogy and depositional environment than that of the western Alabama upper Tombigbee Member, and is used to differentiate the two. Sedimentary analysis of the lower member of the Eutaw Formation also suggests the strong possibility of multiple terranes as the provenance for these sediments. The variance in the modal mineralogy of metamorphic grains and changes in sedimentary characteristics along the strike of the lower member show that there is a possibility of different transport processes and protoliths for the sediments. This variance in mineralogy also provides possible insight to paleogeography during the time, and paleocurrents at work along the marine facies. This difference provides the impetus to further research which could determine if the lower member is sufficiently different lithologically to identify to warrant possible reevaluation of the lower member.

Presented: Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$300)

Enriching the Columbus Community Through Inquiry-based STEM Education: Renovation of Columbus State University's Coca-Cola Space Science Center's Mead Observatory

Columbus State University's (CSU) Coca-Cola Space Science Center (CCSSC) has been a community leader in public outreach and undergraduate research in astronomy since its opening in 1996. In 2010, the CCSSC redirected its mission in order to inspire ongoing

Matthew Perry

*Faculty Mentor: Dr. Rosa Williams
Earth & Space Science*

exploration and discovery as the regions premiere location for hands-on, inquiry-based Science, Technology, Engineering, and Mathematics (STEM) education by providing accessible, innovative and dynamic experiences to school children, university students, and the general public. Throughout the next two years and utilizing funds from the Institute of Museum and Library Services Grant MA-04-12-0116-12, the CCSSC as well as the CCSSC's Mead Observatory will see major renovations; transforming the Mead Observatory into a state-of-the-art research facility. With the first year nearly completed, we present the work in progress to include: removal of the 16" Mead Telescope and mount, implementation of temporary equipment to enable student-based solar observing to continue, designing and programming brand new software which would enable the Mead Observatory to be remotely accessed, and preparing for the arrival of the brand new 24" CDK Plane-Wave telescope and mount which is slotted for delivery at the end of April.

Presented: Tower Day (April 2013)

Funded: Institute of Museum and Library Services Grant

Using SunSPOT Wireless Sensor Network Technology to Study Mesh Network Protocols

Geoffrey Platta

*Faculty Mentor: Dr. Lydia Ray
TSYS School of Computer Science*

Sun Microsystems has launched the Sun Small Programmable Object Technology (SunSPOT) Development Kit, enabling developers to embed tiny sensing computers into the Internet and program these computers to accomplish a variety of tasks.

The goal of this project is to use SunSpots to connect multiple computers each to multiple networks simultaneously. Currently, connecting one PC to multiple wireless networks is a challenging task and requires complex configuration techniques. Even if the connections can be made, communicating over multiple networks at the same time may cause difficulties. Hosts connected to multiple networks may have multiple IP addresses, causing all received packets to be duplicated; however, allowing packets to stream across multiple networks into a single host improves the usage of wireless networking devices significantly, bringing their efficiency more in line with their modern capabilities. Wireless mesh networking is a solution which can allow mesh clients to utilize the resources of multiple networks. The proposed project aims at connecting a computer to multiple networks concurrently with the SunSPOTs, modeling wireless mesh networking protocols, and inspecting the behavior of mesh networks using various wireless mesh networking protocols under different network loads and sizes and collecting information about these packets, in order to statistically analyze the effectiveness of the protocols.

Presented: Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$335)

Diet analysis using DNA Barcoding

There is a population decline of Gopher Tortoises in the Southeastern United States. The species is dangerously close to being labeled as threatened. Understanding the dietary needs of the tortoise will help recover the population. Gopher tortoises are foraging herbivores.

Elicia Walker

*Faculty Mentor: Dr. Kevin Burgess
Biology*

DNA barcoding can be used to accurately identify which species of plants the tortoises are consuming. There has been great success in identifying species of plants in a local flora using the *rbcL* and *matK* gene region. Fragments of plants retrieved from the feces of the tortoise can be identified using *rbcL* and *matK*. The purpose of this study is to determine if species of plants can be successfully identified from the feces of Gopher Tortoises through DNA barcoding. Additionally, if this can be proved, the diet of Gopher Tortoises in nature can be analyzed. Ultimately, this project will aid in gaining a better understanding of the dietary needs of the tortoise, thus aiding in its overall recovery towards a more stable population.

Funded: CSU S-RACE Grant

Analysis of Contributing Factors to Obesity in Children and Adolescents in Southwest Georgia

Sydney Worthy

*Faculty Mentor: Dr. Kathleen Hughes
Biology*

Today more than 23 million U.S. children and adolescents are either obese or overweight. Hospital costs from obesity-related diseases in youth have increased from \$35 million (0.43% of total hospital costs) during 1979 to 1981 to \$127 million (1.79% of

total costs) during 1997 to 1999. During the Pathway to Med School program, I collaborated with three other students to develop a research project on childhood and adolescent obesity. We conducted surveys at nine different primary care clinics in the southwest Georgia area. Approval was sought by the Institutional Review Board of Phoebe Putney Memorial Health System and Albany Area Primary Health Care. A total of 71 children and adolescents ages two to 18 were surveyed. I analyzed the data using chi-square and 1-way ANOVA testing for significant relationships between body mass index and daily screen time, daily physical activity, and other variables. A relationship and significant difference was found in comparing body mass index between males and females. The males had a significantly higher BMI than the females. No relationship was found between daily screen time and body mass index, daily physical activity and body mass index, or perception of weight between males and females. There was no significant difference between the body mass index of children and adolescents surveyed who have insurance and those who do not have insurance, and the body mass index was not significantly affected by the healthy foods eaten weekly. The results indicated that a relationship does exist between sex and body mass index.

Presented: Tower Day (April 2013)

Funded: CSU S-RACE Grant (\$120)

COMMUNITY PRESENTATIONS

Individualization of Frequency of Vital Sign Measurement

Measurement of vital signs is an accurate surveillance of a patient's condition and directs the nurse's plan of care. Since time management is a key factor of a nurse's employment experience, the necessity of following established vital sign frequency policies is constantly questioned. Most facilities require that vital signs are taken every four hours daily. The research shows that an average length of stay for patients whose vitals were taken every four hours was 5.75 days (SD=3.4). This was not statistically different from patients whose vitals were assessed every twelve hours and stayed an average of 4.89 days (P=0.14, SD=3.5). Other research shows that a small modification in hospital routine, especially in the timing of vital signs and routine medication, can significantly reduce sedative use in hospitalized patients. The intervention of an 8 hour quiet time decreased the proportion of patients reporting pain from 42% to 26%, a 38% reduction (P=0.009, a 95% confidence interval (CI: 0.0452-0.2765). The most reliable evidence based practice data of vital signs assessment was obtained through National Institutes of Mental Health, National Guideline Clearinghouse, and Galileo. The results of these searches produced a Level II Randomized Control Trial, that categorized patients into two groups: Those receiving "routine" vital sign measurement every four hours and those receiving vital sign measurements every eight hours. A Level II Systematic Literature Review of 14 previously published research articles utilizing a Critical Appraisal Skills Program tool, and a blinded interventional trial with an eight item questionnaire that measured the necessity of nighttime sedative use that decreased proportionally with nighttime interruptions. All compiled evidence recommends that further investigation be done on a larger population and diversity of units. The individualization of frequency of vital sign measurement is supported and depends upon patient stability.

*Carolyn Aldridge,
Arisa Evans, Derrick
Mobley,
Elizabeth Smith,
Ebony Watkins*

*Faculty Mentor:
Dr. Elizabeth Frander
School of Nursing*

Presented: Columbus Regional Medical Center (November 2012), Tower Day (April 2013)

Nutritional Support for the Healing of Pressure Ulcers in Geriatric Patients

*Crystal Cornett, Meagan Armstrong, Becca
Aszman, Devan Fleming,
Tonya Gilmartin, Meagen Reason*

*Faculty Mentor: Dr. Latonya Santo
School of Nursing*

In geriatric patients, the incidence of pressure ulcers is much greater due to the coexistence of malnutrition and the lack of physical mobility. While there are external options to reduce the healing time of pressure in geriatric patients, healing begins from the inside out. When approaching research, the question was asked, what

is the best practice in nutritional support for the healing of pressure ulcers and skin breakdown in geriatric patients? A data search was performed using CINAHL via GALILEO as the database and the key terms searched were pressure ulcer, nutrition, and geriatric. Data was collected from three current randomized controlled trials and critical appraisals were performed verifying all evidence to be significant, valid, and reliable. The results of these trials state best practice measures to follow in order to ensure an overall decrease in pressure ulcer healing time with the proper nutrition. An increase of caloric and protein intake above the standard requirements was associated with a more rapid rate of pressure ulcer healing. The implementation of micronutrients such as, arginine, vitamin C, zinc, and Omega-3 were shown to enhance the healing process while also decreasing the healing time of pressure ulcers in the geriatric population. The findings of this research can be easily incorporated into the nursing practice and ultimately result in a reduction in the cost of pressure ulcer care, increased revenue for hospitals, and most importantly improved patient outcomes.

Presented: Columbus Regional Medical Center (November 2012), Tower Day (April 2013)

Implementing “STAMP” Assessment Tool to Prevent Violence Against Nurses

The U.S. Bureau of Labor Statistics reported that nearly sixty percent of all non-fatal assaults and violent acts occurred in the healthcare industry with nearly three-quarters of these assaults by healthcare patients or residents of healthcare facilities. Awareness of the risk of violence in healthcare is a concern to employees, patients and bystanders. Many factors can contribute to violent acts committed in the healthcare workplace. Researching how to assess and potentially avoid these events is not simply a precaution, but a way to prevent injuries and save lives. The purpose of this research is to examine the implementation of a violence assessment tool, whether it could predict violence and reduce the risk of these outbursts. Evidence based research was first conducted through medically reputable databases for existing guidelines. The research was further expanded to include review of meta-analysis studies, qualitative and quantitative studies, case studies, nursing journal articles and surveys regarding use of aggression assessment tools. Currently, there is no standardized aggression assessment tool used in practice today. Extensive review was given to the STAMP violence assessment tool, which looked at staring, tone and volume of voice, anxiety, mumbling and pacing as predictors of violent behavior. The STAMP aggression tool, along with similar tools, is in its early stages of trial. Extensive study on specific violence assessment tools is limited but there are overwhelming studies on violence in healthcare. Efforts to further research and develop one widely accepted standard aggression assessment tool are important to reducing the incidence of violence in healthcare settings. In the interim, it is important that healthcare facilities implement a method such as the STAMP aggression tool to predict potentially violent patients as a means to provide healthcare workers a safe working environment.

Joelyn Cruz, Melissa Drawdy, Jenny Dryden, Tara Lundy, Sean McManus

*Faculty Mentor: Dr. Elizabeth Frander
School of Nursing*

Presented: St. Francis Hospital (November 2012), Tower Day (April 2013)

Therapeutic Effects of Yoga and Exercise on Pregnancy

*Melissa Kruse, Kelsey Mcgee, Elizabeth Bates,
Chandria Jones, Anna Putnam*

*Faculty Mentor: Dr. Elizabeth Frander
School of Nursing*

The intention is to provide evidence for the efficacy of participating in exercise and yoga during pregnancy in order to enhance positive outcomes. A literary search of major search engines such as JSTOR and CINAHL were conducted. Several current randomized controlled trials were found, which provided evidence to support positive outcomes on pregnancy. Each study explained the benefits that can be attained through yoga and exercise. The evidence suggests that participating in yoga and exercise decreases anxiety, stress and blood pressure, while also decreasing the risk for postpartum depression and labor pains. It also suggests that women who take part in exercise and yoga have a better perceived pregnancy compared to women that do not. Yoga and exercise also provide comfort measures to women that are pregnant with breathing exercises and relaxation techniques. Most women believe that exercise during pregnancy is discouraged so education and further research should be conducted in order to encourage women to be involved in a non strenuous exercise regimen. Education is required to provide the knowledge in order to exercise with the proper technique and which moves should be avoided so as not to risk any complications from the exercise. For the best possible outcomes during pregnancy, participation in yoga and exercise throughout the pregnancy is preferable. It is the goal to encourage exercise through education to have the best experience and encourage a healthy pregnancy.

Presented: Columbus Regional Medical Center (November 2012), Tower Day (April 2013)

Routine Newborn Male Circumcision

The American Academy of Pediatrics (AAP) defines male circumcision as a surgical procedure that involves the removal of foreskin from the penis. The research question presented is: does routine circumcision provide health benefits for newborn males? In 2012, the AAP revised their previous recommendations and stated that routine circumcision reduces the risk of acquiring STI, UTI, penile cancer, phimosis, and transmitting HPV; thereby reducing cases of cervical cancer in women. Because the AAP Task Force concluded that the health benefits of routine male circumcision far outweighed the risks, the research group developed a guideline for performing circumcisions based on recent evidence. This presentation examined several peer reviewed randomized controlled trials, systematic reviews, and meta-analysis published in pediatric medical journals within the last five years. The best practice techniques discussed in the research included: best method, effective pain management and best after care practices. The best method for performing routine circumcision suggests that each patient meet minimal age and health requirements. In addition, the circumcision procedure has the best outcome when performed by a trained professional utilizing sterile technique with the Gomco Clamp or Plastibell device. The best pain management included the application of topical lidocaine or using dorsal penile nerve block (DPNB) injections in conjunction with non-pharmacological methods, such as, giving the newborn a sucrose nipple or swaddling for comfort. Best after care is practiced by the nurse and includes patient teaching, monitoring for bleeding, infection, and pain management. In conclusion, it is essential to educate families in order to increase awareness of the risks and benefits associated with circumcision and to provide the best practice techniques to improve patient outcomes.

*Adriana Lopez, Yasha Blount,
Michael Powell, Robert Richardson,
Jean Snow, Justin Steele*

*Faculty Mentor: Dr. Cheryl Smith
School of Nursing*

Presented: Columbus Regional Medical Center (November 2012), Tower Day (April 2013)

Prenatal Care in Patients With Increased BMI's.

*Caroline Reinke, Nida Reynolds,
Rachael Rozier, Tabitha Taylor, Alex
Willis*

*Faculty Mentor: Dr. Elizabeth Frander
School of Nursing*

The significance of this research was to identify the importance of dietary maintenance, prenatal care, and patient education, to improve patient outcomes in pregnant women with a body mass index (BMI) greater than 30. Obesity is an epidemic throughout the nation and the risks associated with obesity significantly increase for both the mother and the fetus during the prenatal period. Data was collected from peer reviewed, randomized control trials found in current, valid, and scholarly databases such as Galileo and EBSCOhost. According to the evidence-based research, prenatal care should include routine consultations with a trained dietician throughout the pregnancy. The studies showed that diet regimens and food journals are important tools in maintaining ideal weight gain during the prenatal period. Patients who were weighed on arrival and had a visit with a nutritionist consistently had a decreased risk of gestational diabetes, overall dietary improvement, and a decrease in gestational weight gain. Also when clients followed a dietary regimen in addition to regular consultations, clients consistently had lower glucose levels, lower weight, and a lower rate of large-for-gestational-age births. Lastly, research showed that maintaining a diary of intake in addition to following a diet plan resulted in a decrease in gestational hypertension. Patients who didn't follow the recommended plan had an increased risk of gestational diabetes, preeclampsia, caesarian section and labor induction. Maternal and fetal outcomes would improve in pregnant patients with increased BMI's if the following interventions were implemented in nursing practice: frequent dietary monitoring and dietary consultations during pregnancy.

Presented: Columbus Regional Medical Center (November 2012), Tower Day (April 2013)

What is the best protocol for the management of migraines in the pediatric population?

The primary purpose of this study is to evaluate the best treatment to manage pediatric migraines. Migraine attacks are treated currently with pharmacological therapy. Research was conducted to determine if conservative therapy is more beneficial than pharmacological therapy. Evidence was gathered from a systematic review, randomized-

controlled trial, and 3 peer-reviewed studies that observed the treatment for pediatric migraines. The populations observed in these studies were children between the ages of 3 and 18. The data was analyzed by utilizing the rapid critical appraisal method in order to determine the clinical significance and the results of the studies. The evidence states that an incorporation of non-pharmacological measures showed a decrease in mean occurrences of migraine attacks in children. Migraine diaries, caffeine-free diets, and proper sleep hygiene are non-pharmacological treatments that were found to be effective. The proposed treatment plan utilizes conservative therapies as a prophylactic treatment to reduce the occurrence of migraines in children. However, in the midst of an acute migraine attack, drug therapy will be necessary for relief of symptoms. Topiramate, flunarizine, and sumatriptan are the most common drugs used in the treatment of migraines. Patients and family members should be informed of the possible conservative therapies before using medications as a primary treatment. By implementing these changes, pediatric patients will experience a reduced number of acute migraine attacks.

Haley Seifert, Miranda Bauers, Michelle Echevers, Julia Knight, Char'Niece Smith

*Faculty Mentor: Dr. Latonya Santo
School of Nursing*

Presented: Columbus Regional Medical Center (November 2012), Tower Day (April 2013)

Best Evidence Based Practices to Prevent Pressure Ulcers

Andrea Speed, Julie Sweeney, Kelsey Gaston, Victoria Jones, Sierra Anderson

*Faculty Mentor: Dr. Cheryl Smith
School of Nursing*

Pressure ulcers continue to intensify hospitals' financial stressors and also exist as a risk for unwanted complications among patients during their hospital stay. Although pressure ulcers pose a significant tribulation to healthcare professionals and patients, the important point to remember is that they are preventable. The group searched for current evidence-based random controlled trials and

peer reviewed scholarly articles in the CINAHL database to determine the best practices for preventing the development of pressure ulcers in at-risk adult and geriatric populations. After applying the rapid critical appraisal method to these studies, we obtained valid, reliable, and statistically significant results to support our research question. The results concluded that placing the patients in an alternating thirty degree lateral position every two to three hours relieved the most interface pressure, as opposed to repositioning the patient every six hours using a ninety degree lateral position. Turning the patient at a more frequent time interval and positioning the patient at a lesser degree therefore reduced the occurrence of pressure ulcers. The timing, positioning, and degree in which patients are turned are key factors in decreasing the amount of pressure on the surface of the skin. The recommendations provided in the guideline will help to greatly reduce the number of pressure ulcers that develop; consequently, the overall treatment time for the patients will decrease and the costs that the hospitals incur when insurance companies do not cover hospital-acquired injuries will be lessened. Applying this concept to nursing can greatly improve patient centered care and provide patients with positive outcomes.

Presented: St. Francis Hospital (November 2012), Tower Day (April 2013)

PROJECTS PRESENTED AT TOWER DAY

Tower Day is an annual showcase for undergraduate research and creative endeavors sponsored by the Columbus State University's Honors Program. Undergraduates from all disciplines were invited to submit their proposals for presentations, posters and panel discussions. Those selected were invited to the day-long colloquium on April 16, 2013, which hosted 154 researchers presenting to an estimated audience of over 300.

During the event, undergraduate presenters were judged by a panel of faculty and honors students. Ten projects, including five presentations and five posters, were selected to receive Outstanding Research & Creative Scholarship Awards and recognized for their achievement at the annual Scholastic Honors Convocation. Those who have granted permission to print their abstracts are included in this publication.

Attitudes about Homosexuality in Relation to Education and Religious Background

Angela Adams, R. Andrew Zimmerman

*Faculty Mentor: Dr. Diana Riser
Psychology*

Attitudes towards homosexuality were examined based on participants' highest education level completed and their religious background. Highest education level completed had no significant correlation pertaining to attitudes towards homosexuality. However, religiosity did have a significant correlation pertaining to attitudes towards homosexuals. When statistical analyses were run using both our sample from participants recruited online and Columbus State

University participants, we found that majority of people were not practicing organized religion, but were practicing personal religiosity. In turn, participants that practiced personal religiosity had a more accepting attitude towards homosexuals. Most participants expressed strong internalized religion rather than organized religion so this may explain why they expressed more openness in their attitudes towards homosexuals. We hypothesized that people who practice more internalized religion or spirituality tend to have more open attitudes towards homosexuality as opposed to those who practice organized religion. We later ran analyses just with our Columbus State University sample and found different results. Among CSU students specifically, subscales of religion, such as organized religion and private practice were found to be significant in determining attitudes towards homosexuality.

Awarded: Best Poster (Tower Day 2013)

Presented: Tower Day (April 2013)

Early Ambulation of Critically Ill Patients

It is a widely known fact throughout the medical community that ambulation of patients improves overall patient outcome. In one study conducted by Chiang et al, "...results show[ed] that a 6-week physical training program may improve functional status in patients requiring prolonged mechanical ventilation by improving limb muscle strength and ventilator-free time"(2006). However, declining patient functional status and poor outcomes at hospital discharge suggest that it is not being effectively utilized by medical staff to benefit patients. Specifically, ICU acquired weakness frequently occurs in patients in the Intensive Care Unit setting due to the little emphasis put on neuromuscular status. Therefore, it is important for healthcare providers to incorporate interventions that work to both decrease the occurrence of degeneration and protect patients' existing levels of neuromuscular function. The primary purpose of this study was to identify proven methods and develop guidelines for implementing early ambulation based on those methods. Multiple randomized controlled trials and one systematic review were analyzed to determine the most important methods and procedures which achieved the most desirable outcome for patients. These studies compared early ambulation to standard care in the critical care population by looking at factors such as number of ventilator-free days, duration of delirium, and functional outcome at hospital discharge. The results concluded that patients had improved functionality at hospital discharge, reduced delirium, and more ventilator-free days when ambulation and mobility were incorporated into their plan of care. Since the results showed that ambulation greatly improved patient outcomes, it is recommended that patients be mobilized as early as possible according to the standard set of guidelines identified through the research.

*Kristal Bryant, Vickie Boggess,
Traci Howell, Christine Meredith,
Michelle Wright*

*Faculty Mentor: Dr. LaTonya
Santo
Health & Physical Education and
Exercise Science*

Awarded: Best Poster (Tower Day 2013)

Presented: Tower Day (April 2013)

An Analysis of Tchaikovsky's Symphony No. 4 in F Minor, Op. 36, Mvt II

Stephanie Erdman

*Faculty Mentor: Dr. Kristen Hansen
Schwab School of Music*

The second movement of Tchaikovsky's Symphony No. 4 in F Minor, Op. 36 presents a problem as it does not follow any conventional form, thus making analysis and performance difficult. I found that this particular movement can be viewed through two different lenses in regards to form. It has many elements of a sonata form; it has a double exposition with a principal and secondary theme, a development, a recapitulation, and a coda. However, a rondo form is also present as the secondary theme is in the wrong key, and the development has completely new motivic material. I will demonstrate this through a formal analysis, diagrams, and musical examples in order to underline my findings about this piece. A thoughtful analysis of key centers, motivic relationships, and orchestration choices allows the analyst to consider both views of the form in this piece.

Awarded: Best Presentation (Tower Day 2013)

Presented: Tower Day (April 2013)

Woman Thou art Loosed: T.D. Jakes Combating Sexism in the Church

The purpose of this paper is to analyze the rhetoric of well-known African American Pastor Bishop T.D Jakes' ministry "Woman Thou Art Loosed" (WTAL). Starting from a simple Sunday school message, Jakes was able to transform this into a (to date) twenty-year rhetorical campaign that has

Alexis Jarrett

*Faculty Mentor: Dr. Mariko Izumi
Communication*

touched the lives of millions of women around the world, and further build his worldwide ministry. The message of hope and encouragement to women who have been victims of abuse, poor self-image, marital issues, drug use, etc is the suspected audience of Bishop Jakes. This paper will show how Jakes' used this ministry that widely appeals to women, as a means to model gender relationships in the church. This paper will show how feminist speech and black preaching overlaps in themes, and how Jakes uses that and female centered hermeneutics to create a sense of authority with women. The conclusion of this paper is that Jakes' WTAL campaign is in fact using women as the vessel in which to speak to the audience of men in the church that hold sexist attitudes toward women.

Awarded: Best Presentation (Tower Day 2013)

Presented: Tower Day (April 2013)

Raeann Kraft

*Faculty Mentor: Dr. Danna Gibson
Communication*

Learning the fundamentals of linguistics may be an obvious barrier for persons of different languages, but many do not notice the linguistic barrier which exists between persons of the same language. When researching Muted Group theory, particularly concerning the linguistic differences in gender, one would find there to be an obscure barrier when researching the formations of the dialects used. The roles of each gender have been subconsciously identified through power, with the male gender holding a dominant role over the female gender's dependent role. The following paper, combined with reflections of personal experience gleaned from working in a domestic violence shelter, supports that through the rise of technology and communication the linguistic barrier is becoming less obscure and women's muted voices are beginning to be heard.

Awarded: Best Presentation (Tower Day 2013)

Presented: Tower Day (April 2013)

Gender Differences in Emotional Intelligence

University students (N = 182) completed Reuven Bar-On's EQ-i:S, a five factor measure of Emotional Intelligence (EI). Means were higher for females than for males on the five EQ-i:S facet scores as well as on total score. Between groups t tests indicated a highly significant difference on the interpersonal scale, with difference on the stress management scale approaching significance. Results were generally similar to those reported by other researchers.

Kayla Short

Faculty Mentor: Dr. Harvey Richman
Psychology

Awarded: Best Poster (Tower Day 2013)

Presented: Tower Day (April 2013)

The Origins and Significance of Jazz

Lindsey Baker

*Faculty Mentor: Dr. Gary
Sprayberry
History & Geography*

Jazz is a musical genre that has only increased in popularity since its emergence in the early 20th century. Artists like Ella Fitzgerald, Louis Armstrong, and Duke Ellington made jazz one of the most beloved genres in the world. Jazz played a significant role in the lives of African Americans during periods like the Harlem Renaissance. Born in New Orleans, Louisiana, jazz was something people did to express their feelings.

From the early days of American history, African Americans had found themselves oppressed. To remedy this feeling, they turned to music. This tradition of expressing oneself through music was passed down from African slaves, who longed to be free. Through jazz music, African American culture was able to survive in a world blacks saw as unjust. African Americans felt their music was something they could control, since they had to follow so many rigid rules of society. They felt they could be free in their music. They used techniques such as improvisation and syncopated rhythms to demonstrate their freedom and control over something they had created. During the Harlem Renaissance, African Americans felt like they should dictate who they were, not white people. As this new confidence rose over a young, vibrant African American community, not only did the music change -- all of the arts were transformed. It was a cultural revival for African Americans. This piqued the interest of many white Americans, who opened various clubs, like the Cotton Club, to showcase this new artistic expression. Jazz music has a past full of rich and enchanting stories of oppression, freedom, and happiness.

Presented: Tower Day (April 2013)

Measuring Human Facial Beauty: A Computed Approach

Human facial beauty has often been measured through qualified judges, human beings who subjectively evaluate what is typically considered a non-quantifiable perception of human characteristics. Scientifically measuring beauty requires exploring what beauty is, finding a standard that works as a basis for computation, and creating a method of analyzing a human's face using such a method.

Ian Blake-Knox

*Faculty Mentor: Dr. Christopher
Whitehead
TSYS School of Computer Science*

The research process has involved examining work previously done in facial recognition, beauty standardization and modeling software. Part of the research performed based on previous work has been on measuring the Golden Ratio, which is a number that has been deemed ideal, and that by obtaining this ratio, provides the ideal ratio between points on an object, ranging from architecture to human faces. Our research has taken an approach that attempts to remove subjective variations by focusing initially on evaluating the facial characteristics, including the Golden Ratio, of computer generated faces.

The purpose behind our research is to provide a better understanding of how humans perceive human facial beauty and to provide tools that are able to quantify this perception by using algorithms to measure beauty and provide a resulting numerical rating. Future work will potentially include variable algorithms, based on differing standards of beauty, including gender and racial differences.

Presented: Tower Day (April 2013)

Epidural Initiation During the Latent Phase of Labor

*Tracy Bruce, Kristen Burns,
Joni Brawner, Jennifer Terry,
Christine James*

*Faculty Mentor: Dr. Cheryl
Smith
School of Nursing*

Pain is a major concern for women during the labor process. Epidural analgesia is considered the most effective method of pharmacologic pain relief available at this time. As a result, epidural analgesia is the most commonly used method of relieving pain during labor in the United States. These facts led to considering the question, "In laboring patients, does administering epidural analgesia during the latent phase of labor prolong the duration of labor and/or increase the risk of cesarean section?" After searching multiple databases, articles were found in Ebscohost-Medline. A systematic review and peer-reviewed randomized control trials were examined using the rapid critical appraisal checklist. After compiling the findings from these articles, the research concluded that administering epidural analgesia during the latent phase of labor did not prolong the duration of labor nor did it increase a woman's risk of cesarean section. Based on the evidence provided in the systematic review, further research is needed. While the evidence shows that adverse effects cannot be directly related to epidural analgesia, they cannot be ruled out either. However, epidural analgesia has been shown to be an effective pain relief method and has shown a considerable amount of satisfaction among laboring women without any associated risks. Based on the information gathered, the suggestion for change in nursing practice is to educate the patient regarding epidural analgesia beginning in the obstetrician's office prior to the onset of labor and changing the timing of when the laboring patient is offered an epidural for pain relief. Once educated the decision to use epidural analgesia should be left to the patient.

Presented: Tower Day (April 2013)

Media Usage and Learning Style Preference

Research has shown that children have higher recall of story lines presented in audiovisual or interactive format, such as television (Ricci & Beal, 2002). Others have revealed both children and adults perceive television to be easier than reading when taking in new

information (Salomon, 1984). Both could be possibilities of why children are introduced at an early age to learning from TV. However, other studies have suggested that even though television seems easier to understand, accuracy of the information perceived through television is lower than with reading (Austin & Strange, 2012). Long periods of TV viewing as a child could predispose individuals to prefer kinesthetic learning as adults, possibly due to familiarity or ability to keep their attention. This study attempted to find a relationship between the amounts of TV watched as a child, preferred learning style as an adult, and impulse-control as an adult. In the study, each of the participants was asked to report the amount of TV watched as a child and to complete the VARK Learning Style Questionnaire along with the Abridged Big Five-Dimensional Circumplex on impulse-control and conscientiousness. The data reported a positive correlation between the amount of TV watched as a child and preference towards kinesthetic learning as an adult along with a significant negative correlation between the amounts of TV watched as a child and preference towards kinesthetic learning as an adult. These were important findings because even though those who watched high amounts of TV have a preference for kinesthetic learning, a preference does not limit someone to a particular style but is instead a desired method of learning. The students must develop the self-control needed to master other learning styles in order to become well-rounded scholars.

Carla Burton

*Faculty Mentor: Dr. Rose Danek
Psychology*

Presented: Tower Day (April 2013)

Evidence Based Proposal for Change of Shift Nurse Report at the Bedside

*William Carson, Lindsey Koon,
Stephanie Kernan, Andrea Owen,
Lindsey Schmidt*

*Faculty Mentor: Dr. Noreen
McDonough
School of Nursing*

Communication during nursing change of shift report is crucial in maintaining patient safety and achieving improved patient outcomes. The Joint Commission recommends a standardized change of shift reporting process but does not offer any guidelines for implementation. The Joint Commission does, however, list several National Patient Safety Goals established to improve the practices of accredited organizations. These goals include improving the

accuracy of patient identification, improving the effectiveness of communication among caregivers and encouraging patient's active involvement in their plan of care. The purpose of the research was to investigate if bedside change of shift report was more inclusive of vital information and more beneficial to nurses than the traditional report at the nurses' station. The students examined numerous peer-reviewed research articles including a systematic review of over 20 studies focusing on nursing change of shift reports in the United States. Evidence based research reveals that, regardless of where change of shift report is given, patient satisfaction increased with patients reporting having felt better informed of their plan of care. Nurse satisfaction also improved with enhanced perception of nurse-to-nurse accountability and a heightened ability to convey vital information with physicians about patient care. They also found that the number of overtime hours per month for a given nurse was significantly higher ($p < 0.0001$) before implementation than for the period after implementation of bedside reporting. In addition, the findings recommend that certain supplemental aspects be included to strengthen the change of shift report, such as a standardized process, use of technology, and use of effective communication techniques. Though the research revealed that the location of change of shift report is not as vital as the structure and arrangement of the process, reporting at the patient's bedside promotes the implementation of the Joint Commission's National Patient Safety Goals.

Presented: Tower Day (April 2013)

Effect of Fresh Garlic Extract in MDA-MB-231 Cells

Breast cancer is one of the most malignant cancers affecting women. Although it can occur in both sexes, it primarily affects more women than men. Current treatments include chemotherapy, radiation therapy, and invasive surgery. Each treatment option induces harmful side effects to patients.

A promising alternative to standard breast cancer therapeutics is the anti-proliferative effects of fresh garlic extract. We hypothesized that fresh garlic extract will inhibit the proliferation of MDA-MB-231 breast cancer cells. In this study, we cultured MDA-MB-231 cells, grinded and filtered fresh garlic cloves to create the extract, and then applied the extract to the cells. The results showed that MDA-MB-231 cells treated with the highest garlic extract concentration showed the lowest live and total cell counts. This suggests that higher concentrations of garlic extract induce apoptosis in MDA-MB-231 cells. Fresh garlic extract can serve as a potential breast cancer therapeutic.

*Bolivia Hurtado De Mendoza,
Emily Husted*

*Faculty Mentor: Dr. Monica Frazier
Biology*

Presented: Tower Day (April 2013)

Effect of Fresh Garlic Extract in MDA-MB-468 Human Breast Cancer Cells

Jackie Ellis, Devan Ellis

*Faculty Mentor: Dr. Monica Frazier
Biology*

Breast cancer continues to be a leading cause of cancer related death. The purpose of this study was to examine whether there is a significant difference in cell total counts and living cell counts of MDA-MB-468 breast cancer cells when exposed to different concentrations of garlic in the media. Garlic has been shown to cause apoptosis and even stunt cell growth of cancer cells. The overall hypothesis for this experiment is when MDA-MB-468 cells in media with higher concentrations of garlic extract will have a higher rate of cell death. The Cells were placed in wells and varying concentrations of garlic extract were mixed in with the media (0, 1.25, 2.5 and 5 mg/ml). The cells were inoculated for one hour to three hours and cells were counted using a cell counter. The results of a 1-way ANOVA test showed that there was a significant difference across the different concentrations of garlic extract. These results indicate garlic extract has an effect on the survival rate of MDA-MB-468 breast cancer cells.

Presented: Tower Day (April 2013)

Debussy's Premiere Rhapsody: a Motivic and Structural Analysis

This presentation offers comprehensive analysis of Claude Debussy's Premiere Rhapsody, examining the motivic relationships and how they relate to the work's larger structure. Debussy's music does not lend itself to classification easily, and while there are four main motives throughout the piece that are strongly connected and linked together, the overall structure does not lend itself to a traditional form. With the return of the a and b in measure 149, an argument can be made for a loose ternary form but the plus anime at m. 165 remains with the d motive so long that a ternary form is not a practical description. Other practical descriptions from earlier Baroque, Classical, and Romantic era forms also do not accurately classify the ambiguous structure.

Ford Fourquarean

*Faculty Mentor: Dr. Kristen Hansen
Schwab School of Music*

Debussy's real structural ideas reside in his connection of the four motives. While they are separate ideas, the a and b motives are closely related with similar slow tempos and more placid, atmospheric rhythmic qualities. While both in the faster scherzo tempos, c and d have less connection with the majority of c's development derived from the short scherzando passage around measure twenty-eight. The d section does tie in with b in the juxtaposition of motives between 93 and 149. Most of the motives are also structurally connected through the use of seconds and thirds. Through this insight, the musician can understand the musical idea that Debussy conveys through the composition and apply these theoretical ideas of structure to practical performance.

Presented: Tower Day (April 2013)

An Investigation of the Incidence of PTSD in Patients with Diabetes and Metabolic Syndrome

Jordan Greene

*Faculty Mentor: Dr. Diana Riser
Psychology*

The purpose of this archival study is to investigate the incidence of posttraumatic stress disorder (PTSD) in patients who have Type I, Type II Diabetes, or Metabolic Syndrome who have been seen at Endocrine Consultants over the last 10 years. Participants were collected by pulling medical records of all the patients 18 and older with diabetes or metabolic syndrome who were seen by the clinical psychologist at Endocrine Consultants between 2004 and 2012. Medical charts were reviewed to collect demographic data, medical diagnoses, hemoglobin A1C (HbA1C), and presence or absence of PTSD. Medical diagnoses were the basis for inclusion in the study and examining the relationship between the diagnosis and PTSD. The hypothesis was that the incidence of PTSD is higher in this population than the general public; which may serve to reveal a link between traumatic events, and consequently PTSD, and the development of endocrine disorders later in life.

Presented: Tower Day (April 2013)

Emoticons: An invention of Encrypted language in Non-Verbal Communication

The process of this research will explore how people perceive using emotional icons, which are referred to as emoticons throughout the conduct of this study. Emoticons are used around the world and printed in different ways. Emoticons had been defined as “punctuation marks that viewed sideways resemble facial expression. Sometimes call Emoticons” (Krohn 322). This definition seems to be out of date as of now, since there are many new symbols being created and encrypted to express feeling replace for the traditional spoken and written language.

Tracy Greenfield, Sheila Renfro

*Faculty Mentor: Ms. Gaylene Heileman
English*

We seek the answers for the research questions to reveal a pattern of frequency in using emoticon between genders and age groups in communicating via handwritten letters, notes, and cell phone texts. These answers should also show our participants’ opinion about when it is appropriate to use emoticons to express emotions in nonverbal communication and how much they value emoticon as a vehicle to express their emotion. The result of this research will conclude either we can accept or reject our follow hypothesis: There are differences between genders and age groups in the frequency of using emoticons. People believe that using emoticons can fully express their emotion as using words.

Presented: Tower Day (April 2013)

Ludovica Tornabuoni as the Sacred Woman: Femininity, Religiosity, and Virtue in Italian Renaissance Art

Katherine Hinzman

*Faculty Mentor: Dr. Claire McCoy
Art*

Prestigious Florentine Giovanni Tornabuoni commissioned a cycle of frescos for the choir of Santa Maria Novella from artist Ghirlandaio. Completed around 1490, the vibrant work recounted various scenes from the life of the Virgin. His Birth of the Virgin fresco included the standard canonized imagery associated with the first bath of the Virgin baby. However, this particular work was individual because it had a unique addition of characters to its traditional cast: Ghirlandaio painted prominent women into the important event as witnesses. Ludovica, the only daughter of the Tournabuoni family, stood as the dominate figure in an elaborate Renaissance chamber. She serenely looked upon the Virgin's birth, hands folded, leading the other women in their reverence. Of all the grandiose elements in the fresco, the viewer's eye is purposefully drawn to her. She differs from the other figures in posture, and draws the attention of many others in the scene. When one compares this fresco to other images that include a newly born Virgin, one observes that the eyes of most onlookers watch either the infant or her mother. Thus, the attention of others directly incorporates Ludovica into the sacred narrative and deems her the most significant image in the painting. The Birth of the Virgin story is framed around her rather than around the newly born Virgin. Therefore, Ludovica Tornabuoni was painted to be recognized and appreciated as the daughter of the commissioner and as a powerful symbol meaningful to all who were to see her. This central appearance in the sacred Catholic scene not only showcased model femininity but served to relate the essential bond between the religious and the secular in the age of the Florentine Renaissance.

Presented: Tower Day (April 2013)

Physa Acuta Phenotypically Plastic Behavioral Traits Responses to Specific and Conspecific Kariomones Cues

Predators produce behaviorally-mediated responses in their prey that enhance prey survivorship. We tested for the particular cue the snail, *Physa acuta* uses to detect their crayfish predator, *Procambarus zonangulus* that causes snails to crawl out of the water with a series of five treatments designed to isolate the mechanism of response with a replicated experiment. All tanks contained fifteen snails. Six tanks contained crayfish housed in plastic boxes with screened windows and were either fed live snails (3 tanks) or crushed snails (3 tanks) to determine if crayfish needed to consume snails to elicit a response. Six other tanks received an aliquot of water every other day from separate aquaria that held a crayfish that was fed live snails (3 tanks) or a crayfish that was fed algae (3 tanks) to test for snail responses to waterborne crayfish chemical cues that had consumed snails. We compared the behavioral responses in these treatments to those of control tanks (3 replicates) that only contained snails. Snails responded most strongly to tanks with crayfish that were fed live or crushed snails and exhibited an intermediate response to water from tanks with crayfish fed snails. We found no difference in the response of snails to control tanks and those receiving water from tanks with crayfish fed algae. These results indicate that snails showed a graduated response to increasing threats of predation and to effectively test for non-lethal crayfish effects, crayfish should be kept in an enclosure within the same tank as experimental snails and fed either crushed or live snails.

Bryan Holloman

*Faculty Mentor: Dr. Clifton Ruehl
Biology*

Presented: Tower Day (April 2013)

Never Event: Wrong Site Surgery

*Mary-Frances Hutchinson,
Ray Daughtey, Elisica Harris,
Jamilla Harris, Stephanie Schandera*

*Faculty Mentor: Dr. Noreen
McDonough
School of Nursing*

Wrong site surgery is a problem that continues to exist although many measures are implemented to terminate the incidence. Data from The Joint Commission (TJC) reveals that as many as 40 wrong site surgeries occur every week in clinical facilities across the nation (TJC, 2011). Research examining wrong site surgery identifies contributing factors; however, no interventions exist that eliminate these events. The research question addressed in this project was will the implementation of a

comprehensive checklist and iodine-based skin preparation solutions eliminate the occurrence of wrong site surgery? Interventions to prevent wrong site surgery, such as a comprehensive checklist and surgical site markings, were researched and analyzed via databases, which provided, scholarly, peer-reviewed articles with statistically significant results. The research findings indicate that both preservation of the marking on the surgical site and integration of a comprehensive checklist into the surgical process demonstrate an increase in the prevention of wrong site surgery. For example, antiseptic solutions such as iodine, maintain proper infection control and integrity of the surgical site marking while other antiseptic solutions cause the surgical site marking to smudge and erase. Future research should be directed in finding alternative methods of surgical site preparation, as well as, integration and utilization of a comprehensive checklist.

Presented: Tower Day (April 2013)

Studying the Work of Carson McCullers and Richard Wright

Our panel will present various analyses on Carson McCullers and Richard Wright's fiction ranging from Carson McCullers's treatment of "freaks" and psychological issues with gender, race, and class to how Wright and McCullers dare to defy stereotypical martyr figures in their writing. The topics which will be presented were developed largely

under cultural and psychological lenses, taking into consideration the roles of gender, race, religion, and economics during the 1940s time period—the time during which McCullers and Wright were publishing their most highly acclaimed work.

Candice Lawrence, Elizabeth Lockhart, Taylor Bradshaw

*Faculty Mentor: Dr. Courtney George
English*

Presented: Tower Day (April 2013)

The Experiences of the Vietnam Journalists

Amanda Morris, Valerie Evermon

*Faculty Mentor: Dr. Mariko Izumi &
Dr. Gina Sheeks
Communication*

This project combines both visual and audio elements to describe the stories and emotions of the journalists and reporters of the Vietnam War. The purpose of the video is to reveal the experiences and outlooks of both local and global journalists of the war. We chose this particular research topic because of the limited amount of research available regarding the journalists of the war. Through contextual inquiries, we developed a research narrative and used this narrative to explain the experiences and sentiments of the journalists. After completing and analyzing the inquiries, overarching themes emerged from the stories of the journalists. The viewer will hear excerpts of stories from two of the journalists interviewed over the course of this project. The first journalist interviewed was Joe Galloway, an international war correspondent who spent many years in Vietnam alongside soldiers, capturing the war first hand. He is also the co-author of the popular novel, *We Were Soldiers Once...and Young*. The second journalist is Dick McMichael, an iconic news anchor in the local Columbus area. Dick McMichael interviewed numerous soldiers in Fort Benning over the course of the war, and relayed their stories through both print and audio news outlets. Throughout the research, the opinions and experiences of the journalists will be compared and contrasted. Together, their experiences reveal the difficulties and struggles of being a journalist or reporter in the Vietnam War. The significance of this research is to provide the public with a direct view of how they dealt with the obstacles they faced during this time of turmoil.

Presented: Tower Day (April 2013)

Linking Atmospheric, Hydrologic and Lithospheric Processes: Correlation of Earthquakes and El Niño-Southern Oscillation Cycles along the Middle America Trench

Since the 1980's, a growing body of evidence suggests a connection may exist between atmospheric-oceanic processes and seismic activity at tectonic plate boundaries. More specifically, interplay between the El Niño-Southern Oscillation (ENSO) cycle and seismicity of the East Pacific Rise (EPR) has been studied, where submarine volcanism is thought to influence the ENSO

through the dispersal of thermal energy. More recently, Poisson Regression modeling showed that a rise in the Southern Oscillation Index (SOI) correlated with an increase of seismic activity along the EPR associated with changes in pore pressure along faults within permeable oceanic crust. To the east of the EPR, the Middle America Trench (MAT) is a seismically active convergent plate boundary where earthquakes occur primarily from compressive stresses associated with subduction of the Cocos plate beneath Central America. Using data from 1973-2011 concerning the East Pacific Southern Oscillation Index (EPSOI) as a proxy for sea surface pressure, El Niño 1.2 Index (N12I) as a proxy for sea surface height/temperature, and delineating seismic activity by magnitude bands, Poisson Regression modeling used in this study suggests a possible correlation between ENSO-related changes and seismic activity along the MAT. A number of mechanisms – including changes in effective stresses across faults due to pore fluids, plate loading due to changes in sea level, and atmospheric loading of topographic barriers – could explain ENSO driven variation in seismicity at this plate boundary.

Matthew Perry

*Faculty Mentor: Dr. Clinton
Barineau
Earth & Space Science*

Presented: Tower Day (April 2013)

Auditioning: An Actor's Business Card

Michelle Pokopac

*Faculty Mentor: Mr. Lawrence McDonald
Theatre*

Have you ever wondered what all goes into auditioning in the theatre world? Auditioning: An Actor's Business Card is an insight into my audition experiences (during One-Acts in the Theatre Department and Southeastern Theatre Conference professional auditions). After learning specific techniques and tips from Seminar in Auditions with Professor Lawrence McDonald, an Honors 3000 Enrichment Course: Performance Anxiety with Dr. Susan Tomkiewicz, and from past experiences, I have documented and recorded how useful they are in both of my auditions. After I went through both of the auditions, I have drawn conclusions as to what techniques and tips proved effective and which ones have not. The different aspects that go into consideration for my audition packages range from selecting audition material in acting and singing, slating, attire, resume, headshot, callback preparations, etc. Through this, I will benefit by keeping a documented archive of what techniques and tips work for future auditions throughout my career that will land me a job, and I will know what I can improve on. My experiences will allow me to share what I have learned with my peers and professors. It can also become useful material to hold future workshops and seminars for theatre conferences.

Presented: Tower Day (April 2013)

Patient Outcomes in Magnet Hospitals

Question: In Magnet designated hospitals, do patient outcomes improve and rate of complications decrease when compared to Non-Magnet hospitals?

Whittney Ryals, Beth Anne Conner, Melanie Fowler, Hannah Grigg, Shea McCarty

*Faculty Mentor: Dr. Latonya Santo
School of Nursing*

Hospitals are acknowledged and awarded Magnet status by the American Nurses Credentialing Center for the delivery of quality patient care, nursing excellence, and superb professional nursing practices. After researching and critically appraising articles within the Ovid Medical Journal database, nursing students confirmed the validity in several qualitative analysis articles which were written within the past five years. These studies address the benefits that Magnet hospitals provide along with the improvements in patient care including: lower rates of mortality, pressure ulcers, falls, pneumonia, urinary tract infections, and central nervous system disorders. The studies were conducted by presenting surveys to patients and staff at both Magnet and Non-Magnet hospitals to determine the overall patient and employee satisfaction, as well as examining patient databases upon discharge. The results concluded that following Magnet guidelines (i.e. having at least 60% of the nurses obtain a baccalaureate degree in nursing) is associated with a 5% decrease in mortality following surgical procedures. Decreasing complications and improving patient outcomes is a common goal throughout the medical profession. Therefore, hospitals should continue to strive in making improvements to their facilities to achieve Magnet designation in order to provide patients with the highest standards of care.

Presented: Tower Day (April 2013)

The True Obscenity

Alayna Slaton

Faculty Mentor: Dr. Daniel Ross

English

In many parts of the world, what we see as a basic human right—education—is denied to half the population, and it should come as no surprise that the group making up that half of the population is women. In my research paper, “The True Obscenity,” I analyze the main causes of the discrepancy between male education and that of females. I will focus mostly on women in impoverished countries or in countries where religion is the main force behind keeping women uneducated—especially as this relates to the recent assassination attempt by the Taliban on Malala Yousafzai, a fifteen year old girl who was shot in the head and neck on the way to school—and put forth some suggestions as to how this traditional, and sometimes seemingly religiously-endorsed, subversion of women can be overcome and even why it’s important to do so.

Presented: Tower Day (April 2013)

Writing for the Orchestra; A Contemporary Look at Student Composition

As a composer, this project was invaluable to my development as a composer and musician. Writing for orchestra is one of the ways that many people hear and understand a composer's music and is one of his most public ways of output. It is not often that young composers have the chance to

Andrew Smith

*Faculty Mentor: Dr. Alfred Cohen
Schwab School of Music*

compose a piece for large orchestra and actually hear the end result. Giving my music to real musicians and hearing the results of their translation of my ideas is a huge step in understanding how to be a clear and effective communicator as a composer and musician and gives me insight into the ways that I could improve my future compositions. Through this project, I have explored the nature of contemporary composition, which includes expressing complex and powerful emotional ideas while concurrently embracing the ideas of beauty in architecture, form, and effective writing. In my paper, I highlight both the principal theoretical and formal structural materials and the principal thematic, motivic, and programmatic materials as well as their relationship to the execution of the piece and how they shaped one another through the process of composing the piece. I will also discuss the reading itself and the knowledge that is gained from hearing a live performance of the music as a composer.

Presented: Tower Day (April 2013)

Ghosts with Knives and Furious Eyes: The Role of Violence and Murder in the Executions at the Salem Witch Trials

Kevin Stanford

*Faculty Mentor: Dr. Ilaria Scaglia
History & Geography*

A crisis occurred in the New England colony of Massachusetts in 1692. Witchcraft accusations resulted in approximately 150 people imprisoned. 20 of those imprisoned were executed. This event in American history is known as "The Salem Witch Trials." Over the years, historians have attempted to answer the questions of why so many people were

accused of witchcraft, imprisoned, and executed within the year of 1692. This paper builds on the work of past historians to offer a new explanation for the reasons behind the executions, arguing that the accused witches were put to death due to a rising atmosphere of fear and political instability caused by wars fought in the late seventeenth century. All of the accused witches that received the death penalty were claimed to be extremely violent and some were accused of being political threats to the English colonies. From the examination of arrest warrants, hand-written accounts of interrogations, written confessions, and previous historical research, this paper argues that these testimonies of violence influenced the judges' decision to execute convicted witches. These testimonies need to be considered in order to more fully understand the actions of the judges and magistrates in seventeenth-century Salem.

Presented: Tower Day (April 2013)

The Link Between Traumatic Life Experiences and Dissociative Behavior

This research study explored the relation between traumatic events and one's display of dissociative behavior. An investigation was made to determine whether the number of traumatic events, as well as the type of event that the participant has experienced, would have an association with participants' rates of dissociative behavior. The participants were students of Columbus State University (n=68). The Curious Experiences Survey (CES) and the Life Events Checklist (LEC) were used to assess the participants' trauma experience and dissociative behavior. A Pearson's r correlation test and a regression analysis were administered to measure the relation between traumatic experience and whether or not trauma predicted one's display of dissociative behavior. Because a correlation was found between one's cumulative traumatic experience, particularly physical assault, and displays of dissociative behaviors, this study could indicate that treatment and prevention measures should be taken in order to relieve maladaptive dissociative symptoms.

Tia Tolbert

*Faculty Mentor: Dr. Diana Riser
Psychology*

Presented: Tower Day (April 2013)

The Development of the Modern Valved Horn: A Hunting Instrument Gone Solo

Johan Warburton

*Faculty Mentor: Ms. Anna M. Dodd
Schwab School of Music*

This paper traces the development of the modern horn from its origins as a call to the hunt to its current role as a prominent orchestral and solo instrument. It explores the influence of the instrument's roots on contemporary horn compositions, specifically works by Eugène Bozza, Olivier Messiaen, and Paul Dukas, whose compositions utilize sounds and styles that are reminiscent of the early incarnations of the horn.

Presented: Tower Day (April 2013)

A Doomed Journey: The Impact of the Major Modifications in Wilfred Owen's Four Drafts of "Anthem for Doomed Youth"

This paper examines a literary and textual analysis of the major differences in the four drafts of Wilfred Owen's "Anthem for Doomed Youth" and the significant impact of those changes on the final draft of the poem. Beginning with his first draft to the fourth and final

Amanda Woodruff

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English*

version of the poem, Owen makes several powerful changes, and he uses a wide scope of literary devices and techniques, such as the combination of two sonnet forms and imagery and word choices, all of which play a significant role in underscoring the inhumanity of war in "Anthem for Doomed Youth," a World War I poem. The paper begins with a brief explanation of Owen's motivation for writing the poem, as well as a summary of the poem's content, and the supporting paragraphs trace and reveal the major modifications and revisions that Owen consciously created during his production of the four drafts of the poem, inevitably impacting the overall meaning and effect of the final draft of "Anthem for Doomed Youth."

Presented: Tower Day (April 2013)

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Submission to *Abstracts 2014*

Undergraduates at Columbus State University who engage in research, critique and scholarship during the academic year of 2013-14 are invited to publish an abstract of their work in next year's annual. Abstracts from all disciplines which have been published or presented at local, regional, national or international conferences during the Summer 2013, Fall 2013, and Spring 2014 will be included.

Abstracts that are approved by faculty mentors may be submitted electronically at <http://honors.columbusstate.edu/abstracts.php>. Interested students are encouraged to visit the site to review the full list of information required when submitting their abstracts.

Introduction to Chemistry 101

The study of chemistry is a branch of science that deals with the composition, properties, and reactions of matter. It is a fundamental science that provides the basis for understanding the natural world. Chemistry is a dynamic field that constantly evolves as new discoveries are made. The study of chemistry is essential for understanding the world around us and for developing new technologies and materials. In this course, we will explore the basic principles of chemistry and their applications in various fields.

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