



ABSTRACTS

Highlights of Student Research and Creative Endeavors

2015

Abstracts 2015: Highlights of Student Research and Creative Endeavors

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What follows is a collection of abstracts summarizing the scholarship conducted by undergraduates at Columbus State University during the 2014-2015 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 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 at the RiverCenter for the Performing Arts, or at Columbus State University's Tower Day held in April 2015.

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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PRESENTED AT NATIONAL AND STATE CONFERENCES

Art, She is His Lover: Ruskin, Whistler and the Female Face of Art

Technology and industry completely revolutionized the human experience in nineteenth-century Europe; the explosion of business and manufacture, wealth and commerce overturned social structures and establishments older than antiquity. The historical complexity of this era comes to the first and fullest fruition in Victorian Britain: almost every element and standard of prior life is challenged; every person felt and reacted to this radical societal uprooting in vastly different ways, asking questions still pondered today. To begin illuminating and examining this period, I throw light on the great “institutions” of Art and Gender, and look to see how these elements are intrinsically intertwined and debated. I focus on the contrasting theories of John Ruskin and James McNeill Whistler, both prominent figures on the late nineteenth century British art and social scene. I relate their rhetoric to depictions of and attitudes towards perceptively ‘modern’ women, ultimately touching upon greater themes of beauty in art and its true meaning to different people in a rapidly changing British society.

*Katherine
Hinzman*

*Faculty Mentor:
Professor Michele
McCrillis
Art*

Beyond Road Maps and Routing: Using Google Earth as a Scientific Tool in Field Studies

Kenneth Roop-Eckart

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

Over the past several decades, use of geographic information systems (GIS) has become the primary method of representing and analyzing geographic information. Coupled with the ability to rapidly collect spatial data using a Global Positioning System (GPS), these systems are quickly replacing the use of “pen and paper” mapping in field-based studies. One drawback, however, to GIS software (e.g., ArcGIS and Autocad Civil 3D), is the significant cost of the programs themselves, the need for significant computer processing power, and the significant time investment need to develop a basic proficiency in the software. Although lacking in the more advanced functions of a GIS program (e.g., querying datasets), Google Earth is able to work with both existing spatial datasets and new data via user input, is significantly less demanding on computer processing power, is comparatively easy to learn, and is available at no cost. Coupled with a free conversion software package (Earth Point), we have developed a process for incorporating a wide variety of spatial data into the Google Earth software environment, allowing us to quickly plot and access database information in both a field and office setting and rapidly convert data in any table format (e.g., Excel) to point data in Google Earth (*.kml file). Inserted point data can include a wide variety of “station” information accessible in the Google Earth environment, can be linked with web based data, and can be used to create both line and polygon features in the software. This process makes Google Earth a free, portable, and easy to learn method of sharing and analyzing geographic information. When coupled with an internet connection – often as simple as a tethered smart phone or wireless hot spot – and a GPS device, Google Earth on a laptop or tablet computer can be used as a real-time field tool facilitating instant input of spatial data and access to high quality geospatial imagery. Although used primarily in this research as a geologic mapping tool, minor modifications to this process would allow for use in environmental science, field biology, geography or any field in which spatial data is utilized.

Funded: National Science Foundation EAR-1220540 to C.I. Barineau and U.S. Geological Survey (USGS)
National Cooperative Mapping Program assistance award G11AC20184 to C.I. Barineau
Presented: Georgia Collegiate Honors Council Conference and National Council on Undergraduate Research

Characterizing Critical Habitat for The Endangered Piedmont Blue Burrower Crayfish

Global climate threatens the viability of wetlands throughout the Southeastern US. Regional climate models predict decreased precipitation and groundwater recharge which will accelerate wetland loss in the southeast. The State of Georgia has been at the epicenter of these climate fluctuations, having just experienced a series of devastating droughts. Meriwether County is rural area rich in natural springs and associated wetlands. Inhabiting some of these riparian wetlands is the Piedmont Blue Burrower Crayfish (*Cambarus harti*), a state-listed endangered primary burrowing crayfish. In order to protect *C. harti* from future harms, it is imperative to understand the hydrology of wetland groundwater on which this species depends. For this research groundwater fluctuation patterns were assessed at 4 *C. harti* localities (> 3 miles apart). We installed two shallow wells (~1.5m) at each site: one well installed among active *C. harti* burrows (test wells) and a second in close proximity (< 100m) where no active burrows have been observed (control wells). Solinst Leveloggers were deployed in each well to record groundwater level and temperature fluctuations every 30 minutes from June 2013 to January 2014. Groundwater co-varied between control and test wells, however groundwater levels were closer to the ground surface in test wells compared to control wells. Groundwater levels were highest during winter and lowest during late summer-early autumn. Differences in depth to groundwater between test and control wells suggest that groundwater level may dictate the extent of *C. harti* populations. Effective wetland conservation strategies need to account for how groundwater fluctuations influence subterranean obligate wetland species such as *C. harti*.

Jess Gilmer II

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

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)

Presented: Society for Freshwater Science Annual Meeting

Determining the effects of herbivory on an herbaceous plant, American Bellflower (*Campanulastrum americanum* L.)

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Faculty Mentor:
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Biology

Other Mentors:
Dr. Holly Prendeville
and
Dr. Laura Galloway

Plants subjected to herbivory tend to suffer from reductions in fitness. Herbivory may also delay reproduction, which can negatively affect life history traits. Deer are overabundant and are dramatically affecting herbaceous plants through herbivory, possibly leading to selection for tolerance. We used the model organism American Bellflower (*Campanulastrum americanum*) to investigate whether plants have evolved to tolerate deer herbivory through delays in reproduction and if this tolerance varies among source populations. Specifically, in a common garden experiment we evaluated whether the differences in phenology between populations results from a response to herbivory by using three clipping treatments 1) plants clipped at the same calendar date, 2) plants clipped at a similar phenological stage, and 3) controls (unclipped). Additional plants open to natural deer herbivory were also observed, and the fitness components of these plants were compared to those kept from natural herbivory. The reproductive fitness of plants was compared among treatments using one-way ANOVA. Plants clipped at similar phenological stages showed a significant increase in biomass production indicating a strong response to herbivory compared to non-clipped treatments. These results suggest that the performance of *C. americanum* may be influenced by deer herbivory.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), Flora Clark Research Scholarship,
and National Science Foundation

Presented: Georgia Undergraduate Research Conference Georgia Southern University Statesboro, GA,
Georgia Collegiate Honors Council Georgia Southwestern State University Americus, GA, Tower Day 2015

Developing a Creative Story Teller Agent Using ConceptNet

This presentation focuses on the idea and implementation of a commonsense knowledge based storytelling agent that creates new stories by altering existing ones in a subtle manner. For example, when a story is told on one occasion, certain words may be replaced—namely nouns, in such a way that the reader may be oblivious to in the beginning, but combined with a multi-branch functionality can produce a considerably different story. The project implementation can be seen as a two-part entity: a mind, and a body.

The “mind” is a commonsense knowledge base known as ConceptNet — a hyper graph consists of a series of nodes and edges (For instance, if given the sentence: “Bob is a boy”, “Bob” is a node connected by the edge: “is a”, which connects with another node: “boy”). The “body” is a system that was crafted within the integrated development environment (IDE) of Xcode—the IDE designed by Apple Inc. When combined, the mind and body can produce the storytelling engine that is able to create dynamic tales. The next part of the paper discusses how ConceptNet plays an integral role in shaping this architecture. By coordinating these two parts together, the storytelling agent is able to complete its objective. In the long run, the goal of the agent is to be able to not only change nouns, but to alter the entire sentence.

Dominique Tillman

*Faculty Mentor:
Dr. Rania Hodhod
TSYS School of
Computer Science*

Effect of fluoxetine on proliferation and viability of cardiomyoblasts

Rebecca Moody

Faculty Mentors:

Dr. Glenn Stokes,

Dr. Kathleen Hughes,

and

Mrs. Elizabeth Klar

Biology

Serotonin has been shown to play a role within cellular division and differentiation during early heart development. Prenatal exposure to fluoxetine (Prozac), a selective serotonin re-uptake inhibitor that readily crosses the placenta during pregnancy, acts on nerve synapses by inhibiting the uptake of serotonin from the cleft. Disruption to early serotonin levels has been shown to result in decreased myocyte proliferation, decreased ventricle size, and myocellular disorganization; with dilated cardiomyopathy and an increase in postnatal mortality rates being consequences to this interruption. The effects of exposing *Rattus norvegicus* cardiomyoblasts to fluoxetine on the proliferation and viability of early heart muscle cells were examined. We hypothesized that exposure to fluoxetine would inhibit proper cellular development and result in a decrease in cellular proliferation and cellular viability. Cultured cardiomyoblasts were exposed to 0.3, 0.6, and 0.8 mg/L of fluoxetine once every two days for a week and assessed for viability and growth rate. There were no significant differences in cellular proliferation among the three exposure levels. Furthermore, cellular viability did not differ significantly across treatments. Average percentages of viable cells across the treatments (0.3, 0.6, and 0.8 mg/L, and the control) were 50.74, 65.97, 62.01, and 47.03, respectively.

Awarded: Brooks Award, Honorable Mention

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), Biology Departmental Funds

Presented: Association of Southeastern Biologists Conference

The Effect of Topamax on the Amyloid Beta Protein of Astrocytes

Topamax, an anti-epileptic drug, has been shown to effectively reduce the number of monthly migraines in patients. Topamax blocks the voltage-dependent sodium channels and enhances GABA activity at a nonbenzodiazepine site on the GABA(A) receptor. When GABA(A) is activated by Topamax, chloride ions enter and hyperpolarize the membrane preventing an action potential. The amyloid beta protein, whose accumulation is a hallmark of Alzheimer's Disease, is directly inhibited by the activation of the GABA(A) receptor in neurons. This experiment tested the amyloid beta protein levels following Topamax treatment of mouse astrocytes in vitro. The hypothesis was that increasing Topamax concentrations would be associated with a decrease in the amyloid beta protein levels. C8-D1A astrocytes 1X610 cells/ml were treated with Topamax (0.005mg/ml, 0.01mg/ml, 0.02mg/ml, or 0.04mg/ml) for either 24 or 48 hours. An ELISA was used to determine the amyloid beta protein concentration using a spectrophotometer. A two-way ANOVA and a Tukey's post hoc test revealed that there was a significant increase in the amyloid beta protein following the highest Topamax treatment ($p=0.039$). These results differ from studies in cortical slices where an increase in GABA(A) activity results in a decrease in amyloid beta protein. This implies results are a function of cell type.

Elizabeth Lamberth

*Faculty Mentors:
Dr. Kathleen Hughes
Biology*

*Dr. Kenneth Smith
Chemistry*

Awarded: Johnson Award at Beta Beta Beta Southeastern Region Meeting

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), Tri-Beta Research Grant, and Biology Departmental Funds

Presented: Beta Beta Beta Southeastern Region Meeting

The Effects of Curcumin on the Expression of p53 and Bcl-2 Proteins in the Human Breast Carcinoma Cell Line MDA-MB 468

Angelin Shajan

*Faculty Mentor:
Dr. Monica Frazier
Biology*

Introduction: Anti-cancer efficacy of curcumin has been tested in pre-clinical studies that have reported promising results in curcumin's ability to inhibit human cancer cell proliferation and tumorigenesis. Both in vitro and in vivo studies have shown that curcumin and its analogs target critical genes associated with angiogenesis, apoptosis, cell cycle, and metastasis (Nagaraju et al., 2012).

Apoptosis is often evaded in cancer cells via overexpression of anti-apoptotic Bcl-2 family proteins. The Bcl-2 family members bind pro-apoptotic proteins to prevent apoptosis mediated by the intrinsic apoptotic pathway (Adams and Cory, 2007). In addition to the Bcl-2 family members, the tumor suppressor gene p53 is required for checkpoint control during cell cycle progression (Meikrantz and Schlegel, 1995). The checkpoint controlling entry into S phase prevents cells from replicating damaged DNA and is mediated through the p53 protein, which induces either cell cycle arrest in G1 or apoptosis.

The purpose of this experiment was to explore the anti-proliferative and apoptotic effects of curcumin on breast cancer cells. We also wanted to evaluate of the effects of curcumin on the indirect expression of p53 tumor suppressor and Bcl-2 anti-apoptotic proteins. We predict a dose-dependent increase in p53 expression, and a dose-dependent decrease in Bcl-2, viability and proliferation after the curcumin treatment.

Methods: Cell proliferation, viability and flow cytometric assays were performed on the MDA-MB-468 cells. Briefly, cells were treated with 0, 25, 50 and 100 μ M curcumin for 24 hrs. After treatment, Annexin V and Dead cell Kit protocols were followed to determine cell proliferation and viability. Similarly, protocols as per the Multi-Color DNA Damage Kit and Bcl-2 Activation Dual Detection Kit were followed to determine expressions of p53 and Bcl-2 proteins, respectively.

Results: Our data suggested a curcumin-induced dose-dependent increase in proliferation and death of MDA-MB 468 cells. Results also suggested a dose-dependent increase in p53 expression via the activation of H2A.X protein that detects DNA double-strand breaks. Furthermore, curcumin also caused an increase in Bcl-2 inactivation.

Awarded: Best Poster at Tower Day 2015

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), Tri-Beta Research Grant, and Flora Clark Research Grant

Presented: Association of Southeastern Biologists Conference, Tower Day 2015

Examining the glass transition temperature of polystyrene nanospheres cross-linked with divinylbenzene via fluorescence spectroscopy

The glass transition temperature (T_g) of a polymer is one of its most significant characteristics and the ability to adjust T_g is of obvious interest. Polystyrene nanospheres cross-linked with varying mol% of divinylbenzene (DVB) display unique morphologies and these morphologies lead to differing physical properties. The particular cross-link densities of the particles are expected to lead to diverse glass transition temperatures. By using temperature-varied fluorescence spectroscopy, the glass transition temperature of anthracene-labeled PS nanospheres cross-linked with different concentrations will be examined. T_g of the bulk samples will also be studied by differential scanning calorimetry (DSC).

*Nicole Sikes and
Rubicelys Torres
Guzman*

*Faculty Mentor:
Dr. D. Wade Holley
Chemistry*

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), and CSU Honors Educational Activity Grant

Presented: Southeast Regional Meeting of the American Chemical Society

An Experiment on Phenotypic Plasticity on Snail Shell Morphology: A Comparison of *Physa acuta* from either a Pond or Stream Environment

Tatyana Foster

Faculty Mentor:
Dr. Clifton Ruehl
Biology

Biotic interactions seem to be the center of focus in increasing research on how predator effects seem to induce genetic polymorphism and phenotypic plasticity in order to increase species diversity. However, more research needs to focus on how abiotic factors can strongly impact species diversity through phenotypic plasticity and genetic polymorphism as well. This study focuses on genetic polymorphism and phenotypic plasticity arising from the effects of abiotic factors. In support of potential adaptation in response to a particular environment, I had to observe the physiological basis of the snail species *Physa acuta* and test the differences between shell morphology in these species through geometric morphometrics, a multivariate statistical model used to test morphological differences in general. Analyses of this contemporary model were used including TPSDIGS2, TPSUtil, TPSRegr, TPSRelw and Procrustes analysis. These analyses were used on samples of the *P. acuta* from the pond (n=36) and *P. acuta* from the stream (n=31). Comparison of these snails from different areas of the same environment allowed me to observe clear differences between the physical features of the shells from each habitat. After the geometric morphometrics analyses and multivariate test from ANOVA, it expressed that the *P. acuta* from the pond had a smaller sized and thin shell compared to the *P. acuta* from the stream with its streamlined and greater sized shell due to the great impact of hydraulic pressure from the stream environment. Therefore, based on ANOVA results, there was a significance of shell variation between these sources, and the source (abiotic factor) effects on shell morphology. Although these results generally support the phenotypic plasticity and possibly the genetic polymorphism concept, some modifications may be required, possibly by increasing the number of individuals from the species *Physa acuta*. My findings and utilization of geometric morphometrics supported the concept of phenotypic plasticity.

Awarded: 2nd Place Natural Sciences, Middle Georgia State College
Funded: CSU's Honors Educational Activity Grant
Presented: Georgia Collegiate Honors Council

Factors that Relate to Decision Making: A Look at Stress, Age, Personality and Peer Pressure

The purpose of this study was to explore the effects that stress and peer pressure have on decision making. This study also examined the relationships between age, personality, and decision making. The hypotheses were as follows: high stress would lead to poor decision making; individuals 24 years of age and older make more responsible decisions than those that are below the age of 24; individuals scoring moderate to high in extroversion and low in neuroticism would make more responsible decisions; and peer pressure would have an effect on decision making. One hundred participants (26 men and 74 women) from the ages of 18-61 took a scenario questionnaire and personality survey in order to measure these factors. An independent samples t-test revealed that older individuals made more responsible decisions than younger individuals, $t(1, 98) = 5.50, p = .021$. A factorial ANOVA analysis indicated non-significant results for the factors of stress, personality, and peer pressure. Overall, these results show age may be a strong predictor of responsible decision making. While the other factors of stress, personality, and peer pressure were unrelated to decision making in study, further investigation in these areas would be beneficial for future research.

Cammillia Kelly

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Psychology*

Implementation of the Advanced Encryption Standard Using Field Programmable Gate Arrays

Joshua Staples

*Faculty Mentor:
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Kongmunvattana
TSYS School of
Computer Science*

This presentation discusses the prototyping process of a circuit board designed to carry out the calculations specified by the Advanced Encryption Standard(AES). This Standard is an encryption algorithm that is widely used by the information security industry which uses the Rijndael cipher to scramble information in order to keep it secure. AES has four transformations: SubBytes, ShiftRows, MixColumns, and AddRoundKey. Ordinarily, encryption is done using software implementations of the cipher. However, a hardware implementation is ideal when one desires a more efficient use of computing resources and an improved speed of the encryption process. For this project, I designed a circuit that performs AES utilizing a prototyping board with a field programmable gate array (FPGA) prototyping board from Terasic and the Altera Quartus circuit design software. A FPGA is a device that can have its logic configured by an end user to carry out any chosen operation. The project is in the final stages of design with vector waveform testing of accuracy on all four operations being successful.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)
Presented: Georgia Undergraduate Research Conference, Tower Day 2015

Interdisciplinary Research And Development Of Computer Games In Education

Two Early Childhood Education (ECE) and two Computer Science (CS) undergraduate students collaborated on this project to develop an adaptive educational video game to develop mathematical thinking skills in elementary school children (4-5th grades). Using video games can become an efficient means to help educate students in subjects where they are deficient. Students will be given tools and guidance through video games to support and motivate them to learn. The presentation will cover how the different aspects of games such as sights, sounds and interactions can be effective in engaging and educating students, in addition to tracking the student's performance and provide an adaptive learning process to individual students. To achieve this objective, the ECE students researched teaching pedagogies, stages of cognitive development, constructing knowledge, and the use of authentic tasks in the classroom. Elementary school children were informally surveyed for their interests, challenges in mathematics, and preferences for computer technology. Based on the literature research and informal children survey results, the ECE students created tasks reflecting theoretical research of how children learn math related concepts. After that the CS students created a background story that includes those tasks as teaching moments. Finally, the CS students designed and developed a virtual video game world that incorporates the background story and the teaching moments. The interdisciplinary collaboration between the ECE and CS students was an ongoing learning experience with a cross-disciplinary discourse and feedback.

Ian Jensen, Jordan Harrelson, Jacquelyn DeLauder, and Shytara Fields

*Faculty Mentors:
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TSYS School of
Computer Science*

*Dr. Ekaterina
Strekalova-Hughes
Early Childhood
Education*

Awarded: Best Presentation, Big South

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)

Presented: Big South Undergraduate Research Symposium, Tower Day 2015

Molecular genetic analysis of a *Saccharomyces cerevisiae* mutant that grows brown in the presence of copper

Joshua May

*Faculty Mentor:
Dr. Brian Schwartz
Biology*

Mutations in certain genes of *Saccharomyces cerevisiae* produce brown colonies in the presence of copper sulfate, while the normal lab strain produces white colonies. One such gene was designated previously as BRN1. Whole genome sequence analysis of pooled brown and white segregants from a BRN1/brn1 diploid suggests that a mutation in SAM2 is responsible for the brown phenotype. SAM2 encodes an enzyme that catalyzes the formation of S-adenosylmethionine, an important cofactor in cellular transmethylation reactions. The goal of the research reported here was to confirm that the mutation in SAM2 results in brown growth on copper sulfate. First, we determined the DNA sequence of the relevant portion of the SAM2 gene in 20 to 30 brown and white segregants and confirmed that the brown phenotype segregates with the mutation, as was expected. Second, we used PCR-mediated gene disruption to knock out the SAM2 gene to determine if elimination of SAM2 activity produces the brown phenotype. The results showed that the knockout unexpectedly produces a white phenotype. We believe that SAM1, a sister gene to SAM2, provides sufficient function in the absence of SAM2 to produce a normal phenotype.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), Biology Departmental Funds
Presented: Georgia Academy of Science

Petrography, geochemistry and map relationships of the Coley Creek Orthogneiss, eastern Blue Ridge of Alabama

The eastern Blue Ridge of Alabama consists of Neoproterozoic to Ordovician metasedimentary rocks of the Ashland-Wedowee-Emuckfaw belt, intruded by Ordovician to Carboniferous-aged granitic plutons. The bulk of this lithotectonic terrane consists of metavolcanic-metasedimentary sequences of the Wedowee-Emuckfaw-Dahlongega back-arc basin, including the Early-Middle Ordovician-aged Wedowee and Emuckfaw Groups. The stratigraphically and structurally uppermost Emuckfaw Group consists primarily of interlayered variably graphitic and garnetiferous metapelites, fine-grained biotite paragneiss (metagreywacke), and orthoamphibolites, and is intruded by two batholiths of Ordovician age; the Zana Granite and Kowaliga Gneiss. A third, poorly understood body of megacrystic orthogneiss consists of up to 10 cm long, microcline megacrysts within a fine grained matrix (1-5mm grains) dominated by microcline and subordinate quartz, with lesser amounts of biotite and muscovite (<30%). In our type section for this megacrystic unit, referred to herein as the Coley Creek Orthogneiss, it lies structurally below a metagranitoid composed predominantly of 1-2mm subequal microcline and quartz and subordinate muscovite and biotite. This metagranitoid mineralogically resembles the Zana Granite and is, therefore, mapped as such due to its proximity to other mapped bodies of Zana Granite in the area. We compare and contrast the Coley Creek Orthogneiss with the Zana Granite and use petrography, geochemistry, and map relationships to determine whether the Coley Creek is genetically related to the larger Zana batholith or should be considered a distinct pluton.

Ridge Smenner

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

Funded: National Science Foundation EAR-1220540 to C.I. Barineau
Presented: Geological Society of America, Southeastern Section 2014, Tower Day 2015

A Theater for Royalty: Hampton Court Palace and the English Monarchy

Katherine Hinzman

*Faculty Mentor:
Dr. Claire McCoy
Art*

The luxury and scandal; the pleasures and pains of royalty have continually constructed and reconstructed the turrets and pillars seen today at England's Hampton Court Palace. In the sixteenth century, Henry VIII creates a playground of medieval chivalry; a theatre where his costumed wives enter and exit the stage, each leaving their mark architecturally. The emblem of Anne Boleyn is entwined with the English roses on the Great Hall ceiling Henry commissions for her in 1533 – they are later to be removed when she is tragically convicted and beheaded. In this presentation, I am exploring the ontological notion of royal palaces through an analysis of Hampton Court Palace's metamorphosis through the changing monarchs of ages passed. This structure represents both a personal and national reflection of English monarchs as individuals and, furthermore, English monarchy as an institution changing and unique from any in Europe. I focus on the two major stages of expansion and/or reconstruction: alterations during the reigns of Henry VIII in the sixteenth century and joint monarchs William III and Mary II in the early eighteenth. I emphasize analysis of the latter construction period under William and Mary as to show and argue that the qualities of palatial architecture are things that are both stable and flexible through the eras; that while the essential principles of a royal palace may remain the same overtime, they conform necessarily to contemporary needs. Therefore, examination of the earlier Tudor building is necessary to chart the transformation of architectural styles as it correlates to the foundational concepts of royalty and their respective structural monuments that nevertheless remain constant.

Awarded: Outstanding Student Research Honorable Mention
Presented: Georgia Undergraduate Research Conference

What's On Your Plate?

"What's on Your Plate" is a Columbus State University (CSU) peer health mentorship project with a local high school within a zip code with high rates of obesity. Two undergraduate health science students mentored a freshman high school student throughout a sixteen week course. The methods included the development and implementation of peer surveys on nutrition knowledge conducted by the high school student and a culminating research expo that educated all students from the school on survey outcomes as well as nutritional education. Specific education included distinguishing between whole bread vs. white bread, 100% juice concentrate vs. 0% juice, daily meal caloric intake, and daily water consumption. Students were able to calculate their BMI with information on height and weight. An N of 78 high school students completed the survey. Results indicate 32% of students listed soda as their primary daily beverage. Seventy-one percent of students reported eating white bread instead of whole grain bread. Fifty-eight percent of students drank less than three cups of water per day. Self-reported frequency of the type of food indicated fast food as the primary meal type. Approximately half of the students participating in the BMI activity resulted in the overweight or obese range. This project allowed the CSU students to implement a community based intervention that enhanced their own applied research experience. After completing this project, the high school students were able to meet the grade level health standards for nutrition. This combined benefit is easily replicable and beneficial both academically and personally.

*Hadiye Clinkscales
and Allie Van de
Voorde*

*Faculty Mentors:
Dr. Tara Underwood
and Dr. Joy Thomas
Health, Physical
Education, &
Exercise Science*

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), Health, Physical Education, & Exercise Science Departmental Funds

Presented: Society of Public Health Educators Conference in Baltimore, Tower Day 2015

When the Yankees Came Back to Columbus

Hart Mizell

*Faculty Mentors:
Dr. Gary Sprayberry
and
Dr. Dan Crosswell
History &
Geography*

In the mid-1960s, the New York Yankees established a minor league baseball team in Columbus, Georgia: the Confederate Yankees. The team was the source of social and political issues that divided the community, such as arguments over alcohol sales and the use of Confederate flag patches and terminology. Research showed that the use of Confederate terminology and iconography by the team was motivated by Civil War centennial celebrations in the community. Research was conducted by first forming a narrative using Columbus Ledger-Enquirer articles and then using city council records and official city documents pertaining to the team such as permits, resolutions, and protests from the community, interviews with Richard Hyatt, a Columbus sportswriter, and Ricky Steele, the son of the team's owner (and bat boy), and oral histories, articles from various publications, and archival material from CSU to determine why the team name and flag patch were used.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)
Presented: Society for American Baseball Research, Senior Seminar Presentations, History and Geography
Department, Tower Day 2015

FUNDED PROJECTS

Affordable 3D motion capturing

One of the biggest problems that come with 3D animation is that it is traditionally a very time consuming and tedious process. An animator would have to spend more time in storyboarding, reposing the character, key framing, and adjusting nuances than the amount of time motion capture would take. Motion Capture or “Mocap” is the process of recording of the movement of object or people. Motion capture only requires an actor and a depth information camera, and the movements are saved in a mocap file that can be used for analysis or rapid character animation. AAA studios such as Rockstar games make use of motion capturing equipment to streamline the animation process and shorten the time spent on production. However, the costs for accurate motion capturing software and equipment are around thousands of dollars. Smaller game developers and animators do not have the budget or resources to acquire such equipment. More affordable alternatives such as ipisoft Motion capture and motion capture equipment such as the Microsoft Kinect aims to cater to the needs of smaller game developer groups and animation studios. Iposoft motion capture studio costs approximately under \$1000 and Microsoft Kinects can be acquired for less than \$100. Compared this to a professional setup created by OptiTrack where the minimum equipment and software that cost runs at least \$7,000(OptiTrack). It is of these qualities that this software and equipment have been selected for research in affordable motion capturing.

*Syedali Nabi and
Cedric Searcy*

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Dr. Rodrigo Obando
TSYS School of
Computer Science*

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)

Center Pivot Irrigation and Upper Lethal Temperature for Freshwater Mussels

Haley Lane

*Faculty Mentor:
Dr. Clifton Ruehl
Biology*

Center pivot irrigation is used to boost agricultural production, but can reduce stream discharge and lead to increased pooling and water temperatures that threaten many stream organisms including freshwater mussels. These problems are exacerbated during droughts. I first established the impact of center pivot irrigation on stream discharge with an analysis of a 75-year time series of precipitation and stream discharge that spanned the initiation of center pivot irrigation. Second, I conducted an experiment to better understand the impact of reduced stream discharge on *Eliptio crassidens*, a common mussel in the basin, by monitoring survivorship at three different temperatures that were either held constant or were varied on a 48-hour cycle. We found that precipitation increased during the time series, but stream discharge declined after the start of center pivot irrigation. These results suggest that center pivot irrigation reduced stream discharge leading to greater chances of pooling and higher stream temperatures. Experimental results indicated mussel survivorship was much lower in tanks that reached 37°C compared to all other temperatures. Varying temperature did not alter survivorship. Therefore, mussel mortality will likely increase in streams that reach 37°C that could reduce mussel diversity and abundance.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), George Stanton Foundation, and Tri-Beta Research Grant

Presented: Fall 2014 Senior Research Presentations, Tower Day 2015

A Comparison of Hydraulic Sorting Techniques Useful for Concentration of Zircon

Zircon ($ZrSiO_4$) is one of the more useful minerals for analysis of geologic systems. Substitution of uranium for zirconium in the zircon crystal lattice makes it ideal for U-Pb radiometric dating, while its high closure temperature ($>900^\circ C$) and resistance to chemical alteration in a wide range of pressure-temperature conditions tends to minimize diffusion of radiogenic parent-daughter isotopes. In igneous systems, geochemical analysis of trace elements (e.g. Nd and Hf) allows for an understanding of melt history and tectonic setting, while detrital zircon in sedimentary rocks can provide constraints on depositional age and the provenance of source terranes. However, because zircon is an accessory mineral, most rock compositions contain at most a small fraction ($<1\%$ volume). Extraction of zircon from those rocks in which it is present is time consuming, expensive, and labor intensive. Since most isotopic analyses require 50-100 grains per sample analyzed, the facilities required for processing is generally limited to research institutions able to acquire the requisite equipment and personnel trained in these separation techniques. It is the purpose of this project to critically assess the effectiveness of different hydraulic sorting techniques and to optimize those techniques to more effectively concentrate zircon grains from a sample. Preliminary work using an inexpensive spiral panning machine has shown promising results in artificial samples. These results are compared to results from a traditional water shake table which, when modified for this particular use, also effectively concentrates zircon from a prepared sample. Refinement of separation techniques should make it possible to extract useful zircon populations from rock samples with low zircon concentrations and dramatically expand the range of rocks which can be geochemically analyzed.

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Funded: National Science Foundation EAR-1220540 to C.I. Barineau, the Department of Earth and Space Sciences, and CSU's Student Research and Creative Endeavors Grant (SRACE)
Presented: Tower Day 2015

Confinement and the Glass Transition Temperature of Polystyrene Nanospheres

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The temperature at which a polymer undergoes a change from a brittle, glassy state to a rubbery, elastic state is known as the glass transition temperature (T_g). The glass transition temperature is one of the most important characteristics of a polymer. Confinement can be described as either being 'hard' or 'soft', however, it is a theoretically complex concept. The effects that various types of confinement have on the glass transition temperature of nanoparticles are poorly understood. Using temperature-varied fluorescence spectroscopy the glass transition temperature of polystyrene nanoparticles was determined. Particles were placed under 'hard' confinement by addition of surfactant, while 'soft' confinement was produced by dialysis. This project focuses on both the theoretically underpinnings of confinement and the practical effects confinement has on altering T_g.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Honors Educational Activity Grant
Presented: Tower Day 2015

The effect of caffeine on PINK1 protein accumulation in astrocytes before and after treatment with MPTP

Parkinson's disease (PD) is a neurodegenerative disorder that affects more than 4% of the world's populations by the age of 85. It causes loss of motor function due to dopaminergic neuron degeneration in the substantia nigra pars compacta of the brain. The PINK1 gene is of extreme importance. Mutations of this gene lead to similar signs of PD, and the PINK1 protein protects cells from damage-mediated mitochondrial dysfunction, cell apoptosis, and oxidative stress. MPTP is a chemical whose metabolite MPP⁺ damages mitochondria, produces reactive oxygen species, and causes Parkinson's disease. A chemical that has been shown to prevent this damage is caffeine. It prevents Parkinson's disease by reducing neuron degeneration, even when MPP⁺ is present. In this experiment, I treated astrocytes with caffeine (0.1 mM, 1 mM, and 10 mM) and 20 µg/mL of MPTP to test caffeine's ability to protect and/or recover astrocytes from MPTP exposure. Protein from four trials was collected for Western Blot analysis, and Quantity One software measured the amount of PINK1 protein in the astrocytes. Data was analyzed using a two-way ANOVA. I found that the level of MPTP used did not seem very effective, but caffeine alone increased PINK1 protein levels above normal. This may suggest that caffeine is involved in activating the PINK1 protein and it may also interact with MPTP if present in cells.

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Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), Flora M. Clark Foundation
Presented: Tower Day 2015

Effects of Ethanol and EUK-134 on Zebrafish (*Danio rerio*)

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This research project aims to study the effects of the synthetic compound EUK-134 on embryos of zebrafish, *Danio rerio*, that have been exposed to ethanol. Due to its ubiquitous nature in human society and its severe developmental effects, ethanol is considered one of the most important teratogens. Embryos exposed to ethanol show developmental disruptions in the central nervous system and other organ systems. EUK-134 is a synthetic compound that has shown promise in reducing the severity of ethanol-mediated developmental disruption in vertebrates. This research addresses the following questions: 1) Can EUK-134 mitigate ethanol-mediated damage in zebrafish? 2) Does EUK-134 have a negative impact on zebrafish development? Zebrafish embryos were exposed to 2% ethanol, which is known to produce developmental disruptions. We added EUK-134 at concentrations ranging from 0 (control) up to 20 µg/ml. Whole embryos were examined under a dissecting scope, and embryos were collected at various times for a more detailed histological analysis.

Funded: Biology Department Funds
Presented: Tower Day 2015

Effects of Fumonisin B1 Mycotoxin on Neural Tube Development in Zebrafish (*Danio rerio*)

Fumonisin B-1 (FB1) is a mycotoxin that is produced by *Fusarium*, a mold commonly found on corn and in corn products. Consumption of contaminated corn products during pregnancy is associated with fetal neural tube defects in humans. The major goal of this research is to assess the utility of zebrafish as a model system for studying the effects of FB1 on neural tube development. Preliminary results indicate that FB1 increases embryonic mortality and significantly delays hatching compared to controls. FB1-exposed and control embryos collected at various times before and after hatching were examined histologically for evidence of neural tube defects.

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Funded: The Flora M. Clark Foundation
Presented: Tower Day 2015

The Effects of Metformin on the Spread of MDA-MB-468 cells

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Cancer is a disease in the body that causes cells to change and grow out of control. Breast cancer is one of the leading causes of cancer death among women around the world. Breast cancer is diagnosed and treated based on stage and severity of the disease. If there is a way to keep the cancer cells from spreading, metastasizing, this would make treatment much easier. Previous studies have shown that high blood sugar will accelerate the growth of cancer cells. We hypothesize that the effects of Metformin, a drug commonly known for its ability to control blood sugar, will stop or slow the proliferation and migration of breast cancer cells via the glycolytic pathway. This experiment was performed by treating MDA-MB-468 cancer cells with metformin. We observed and measured the proliferation of cells using the Bio-Rad cell counter. Inhibition of cellular proliferation was studied using the scratch assay. Data showed a decrease in viability, However, it was not significantly different (1-wy ANOVA, $F_{5,14} = 1.06$, $P < 0.40$). Metformin had a dose dependent anti-proliferative effect on the breast cancer cells (1-wy ANOVA, $F_{5,14} = 5.06$, $P < 0.05$). Scratch plates supported the lack of proliferation of MDA-MB-468 cells.

Funded: Biology Department Funds
Presented: Tower Day 2015

Look But Don't Touch: The Woman's Relationship within the Home

I believe a woman's relationship within the home is the most valuable experience for the female gender. Growing up I was shown two different views of the female role. My grandmothers, who raised me and my twin, had strong willed beliefs in religion, family and identity. One being a housewife and the other a schoolteacher working a nine to five job, they both embodied the role that I want to become. These roles shaped a longing for how I should be in my own home.

In history, the home is looked at as an object of representation that has stereotyped women to be naturally maternal and domesticated. The concept in my work conveys a strong emotional content that's based on my perception, expectations and experiences from my past. The use of materials I choose are usually found objects or items I possess. The abundance of items I obtain revolves into layers of meanings that I wish to be contemplated. The use of old and new elements in my work represents the obsessions, personal stories, and philosophy of my experiences. Through mixed media and installations, I explore issues of gender, play, and the imaginative and experimental potential of "homely" structures.

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Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)
Presented: Senior Thesis Exhibition: Collective Imagination, Tower Day 2015

Mary and Margaret: A Medieval Matron and Her Book of Hours

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The main focus of this study will be an illuminated fifteenth-century French Book of Hours currently housed in the archive of Hill Museum and Manuscript Library in Collegeville, Minnesota. This book features an extensive, unusual series of Virgin and Child images, and in several instances, features women including the patroness, in prominent positions. By comparing this book to others similar in period, origin, style, and content, this essay examines how separate female commissions produced images that, in their similarities, reflect broad trends within medieval female patronage, and, in their differences reveal the more personal needs and desires of particular fifteenth-century French women. Ultimately, it can be seen that emphasis on the patroness, the Virgin Mary, and St. Margaret in the Hill manuscript corresponds with the individual power of the patroness and her personal concern for the sacred ideas of motherhood. Although the identity of this woman is not known, the manuscript's illuminations allow us to ponder her identity and social position, as well as her desires, hopes, and fears. Such direct experience of a document like the Hill manuscript allows the modern viewer to, seemingly transcend time and connect with the manuscript's owner in a very powerful way.

Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), CSU Honors Educational Activity Grant, Art Department Funds
Presented: Tower Day 2015

One Fish, Two Fish, Red Fish, Blue Fish

The Sibun River travels from the mountains to the coast of Belize. We examined fish abundance at three different reaches of the river and in the mangroves that border the Belizean coast where the Sibun River empties into the Gulf of Mexico. We hypothesized that fish abundance would increase as we moved farther down the river and would peak in the mangroves. At each site, we measured the width of the river and then swam across the river while using a Go Pro camera along 10 transects. The resulting video was used to quantify the average number of fish at each site along the river. In the mangroves, the researcher with the Go Pro and snorkeling equipment conducted three five minute swims along the margin of mangrove forests. The number of fish were counted and recorded. In conclusion, the largest fish distribution was seen at the higher parts of the Sibun River and the smallest fish distribution was seen at the second site along the river. Overall, the mangroves had a lower number of fish than the river. These results may have been influenced by the weather conditions, farming and gravel debris in the river, surrounding activity, and width of the river. More studies should be done to provide more information on fish abundance, which is important for fishing, learning effects of pollution on the river, and studying behavior of certain types of fish.

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Funded: Biology Department Funds, CSU Study Abroad Grant
Presented: Tower Day 2015

Orbit Refinement of Asteroids and Comets using a Robotic Telescope Network

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Humanity has discovered over 680,000 asteroids in our Solar System, with about 10,000 new ones discovered every month. But over one-third of known objects have poorly-characterized orbits, due largely to physical interactions and lack of observations, which could pose a certain threat to the humanity that observes them. In this project, astrophysics students are observing Near-Earth Objects, main-belt asteroids, and long period comets using both remote observatories (through the Skynet Robotic Telescope Network) and CSU's own MeadWestvaco Observatory. This data is used to calculate not only the orbits of the bodies, but also the uncertainties in those orbital parameters. The astrometry software Astrometrica and the orbit determination software Find_Orb were used to make measurements and create a statistical framework from which we could analyze our results and model our outcomes. We are able to demonstrate the degree to which we have improved these orbits, through both numerical and visualization techniques. In addition to the research experience gained and the newly published data that benefits the scientific community, the MeadWestvaco Observatory housed at the Coca-Cola Space Science Center has obtained a Minor Planet Center Observatory Code, making it an official planetary observatory.

Funded: NASA Space Grant
Presented: Tower Day 2015

Photo-activity of Bis-azocrown ethers and azatrianglenium salts

The general idea of our laboratory is to use organic photochemistry to address two problems: energy production and selective molecular switches. Photoactive crown compounds have applications as molecular sensors in medicine and water purification. Azatrianglenium salts have potential to be used as water splitting catalysts. The hydrogen gas produced by these catalysts can be used as an alternative source of energy. We used photochemical methods to investigate the electronic nature of the synthesized compounds such as UV/Vis spectroscopy. In the case of the Azatrianglenium salts we observed a significant shift of absorption maxima, while in the crown ethers this change was not observed. The structure characterizations of selected compounds were carried out by Infrared spectroscopy(IR), Nuclear Magnetic Resonance(NMR), and Mass spectroscopy.

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Funded: CSU's Student Research and Creative Endeavors Grant (SRACE)
Presented: Tower Day 2015

Replacement of the Sharp-nosed crayfish (*Procambarus acutissimus*) by the non-indigenous Red Swamp crayfish (*P. clarkii*) in a disturbed wetland

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Of the nearly 600 crayfish species worldwide, more than half are native to North America, and the southeastern U.S. is the epicenter of global crayfish species richness. There is concern about the current conservation status of many crayfish species and the viability of their populations. *Procambarus acutissimus* is a surface dwelling crayfish that is native in Mississippi and Alabama and has isolated populations in west Georgia. Its limited distribution in Georgia prompted this re-assessment of a previously surveyed population in a burrow pond-wetland complex near Columbus, Georgia. To assess the population status of *P. acutissimus*, we use baited Gee minnow traps to survey crayfish in the Spring of 2014 following protocols similar to those used in a 1994 survey. Trap catches shifted from 100% *P. acutissimus* (1994) to less than 10% in 2014. *Procambarus clarkii* (a non-indigenous species) accounted for 90% of the 2014 catch. *P. acutissimus* was captured in a single woodland depression but not in any of the other 4 woodland depressions or 5 burrow pond sample locations. Woodland depressions had significantly greater ammonium and phosphate concentrations than burrow ponds, however these differences do not explain the species replacement observed over the last 20 years. Our results suggest that *P. clarkii* is replacing *P. acutissimus* in this wetland complex. Given that *P. clarkii* has been widely introduced across the world, there is reason to be concerned that it could influence the viability of other crayfishes, particularly those such as *P. acutissimus* that share its wetland habitat preferences.

Funded: Earth & Space Science Department Funds
Presented: Tower Day 2015

A Test of Delayed Stimulus Control and Renewal in Pigeons

This study evaluated delayed stimulus control and renewal in three pigeons. For each pigeon, handling by one researcher indicated reinforcement was available on a variable-interval schedule for key pecking during sessions; handling by another researcher indicated no reinforcement was available for key pecking during sessions. Differences between researchers were enhanced artificially (e.g., different color lab coats, lighting conditions), creating a set of pre-session stimuli that signaled specific contingencies effected during upcoming experimental sessions. (All stimuli during sessions remained constant, such that no external information regarding reinforcement contingencies was available during sessions.) After differential response rates occurred as a function of pre-session stimuli, a neutral third researcher was introduced who conducted all experimental sessions where no reinforcement was delivered. Following elimination of responding, renewal of key pecking was tested by reintroducing the original contexts (i.e., pre-session discriminative stimuli). Discriminative control of key pecking by the pre-session stimuli was evident during the initial variable-interval extinction schedule for all three pigeons; however, control by the stimuli was mixed across pigeons in the renewal tests. Implications of these findings for understanding distal relations between antecedents and behavior, remembering, and the role of researchers in the experimental context are discussed.

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Funded: CSU's Student Research and Creative Endeavors Grant (SRACE), Psychology Department Funds
Presented: Tower Day 2015

Using petrography and geochemistry to assess the Zana and Kowaliga plutons of the eastern Blue Ridge, Alabama

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The Alabama eastern Blue Ridge includes three prominent batholiths: the Zana Granite, Kowaliga Gneiss, and Elkahatchee Quartz Diorite Gneiss. Although initially considered to be latest Cambrian in age (ca. 490 Ma), modern geochronological studies suggest the Elkahatchee to be Late Devonian (ca. 370 Ma) in age. Similarly, both the Zana and Kowaliga plutons, initially interpreted as Middle Ordovician (ca. 460 Ma), are likely Late Ordovician to Early Silurian (450-430 Ma) in age. Proximity and similarities in the age of the Zana and Kowaliga plutons suggest they may have originated in the same tectonic setting. Petrographic analysis of samples from the Zana and Kowaliga plutons, as well as geochemical analyses performed at the University of Florida's Center for Isotope Geoscience, is used to compare and contrast these orthogneiss bodies. Preliminary data suggests wider variability in the petrography and chemical character of the Zana than that observed for the Kowaliga.

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Presented: Tower Day 2015

COMMUNITY PRESENTATIONS

Alternative Restraints in the Geriatric Population

With the gradual aging of the baby boomer population, there has been a steady increase in the number of geriatric patients who seek healthcare and this number is expected to rise substantially in the upcoming decades. A significant problem for this patient subset is related to the excessive use of restraints, with prevalence rates of restrained geriatric patients reported as high as 50% in some nursing homes. In order to address this problem we must ask ourselves; what alternatives to restraints among these patients are feasible and effective? Research conducted on the subject was analyzed through the use of a randomized controlled trial, clustered randomized control trial, and a meta-analysis of research. Data gathered from each article was verified for validity, reliability, and significance. These studies examined the use of physical devices such as bed alarms, motion sensors, and video monitoring systems as well as utilization of increased nurse to patient staffing ratios and one-on-one supervision. One method gaining national attention is that of restraint minimization programs for staff members working directly with elderly patients that includes education, teaching, and training related to methods intended to reduce the incidence and prevalence of restraint application. Results of these three studies were found to be inconclusive related to decreasing restraint utilization among geriatric patients. The fact that no solution has been discovered to this rampant problem among this ever increasing patient population necessitates an urgent effort to further research into this matter.

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Best Practice to Promote Tobacco Use Cessation

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More than 16 million Americans suffer from a disease caused by smoking. Smoking causes many different types of health issues such as cancer and lung disorders. While conducting research, we found six studies that included a randomized controlled trial and several literature reviews that promoted using electronic cigarettes to help the smoking cessation process. Based on the research found, a multi-step approach was identified as the most beneficial plan in helping motivate a smoker to stop smoking. The multi-step approach can not only be applied to heavy smokers but to light smokers as well. The process involved developing a plan tailored to each individual's needs, review the plan with the individual, and start the cessation program. After a plan is developed, monthly counseling meetings will be utilized. There will be follow up meetings scheduled at three months, six months, and twelve months with a smokerlyzer to determine compliance. We believe that with this approach, the path to complete smoking cessation can be reached and maintained.

Best Practice to Support Breastfeeding Post Discharge

Breastfeeding has been identified as the most advantageous form of nutrition for infants. Despite the benefits of breastfeeding, a low number of women exclusively breastfeed their infants in the United States. The Healthy People 2020 goal for exclusive breastfeeding at six months is 25.5%. In 2009, only 16.2% of women exclusively breastfed their babies for the first 6 months of life. A review of studies was conducted to compare methods to promote breastfeeding post discharge.

After analyzing five randomized control trials and systematic reviews related to the promotion of breastfeeding, it was determined that an admission to a baby-friendly hospital along with antenatal and postpartum education increases the likelihood of breastfeeding. A baby-friendly hospital promotes breastfeeding after discharge by implementing ten steps, including such things as rooming in, encouraging breastfeeding on demand, and fostering the establishment of breastfeeding support groups and referring mothers to them upon discharge from the hospital. Further research concluded that maternal support has been found to be the most impactful method to increase breastfeeding rates after discharge. In theory, the implementation of Baby-Friendly Hospital Initiative as well as postpartum education and support increases breastfeeding rates. The promotion of breastfeeding is an important concept for healthcare professionals to consider in order improving the overall health of the patient population. Overall, evidence has shown that continued support combined with continued education after discharge for new mothers improves the duration of exclusive breastfeeding.

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Color Safe IV Connections

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Tubing misconnections are frequent, preventable errors that pose a significant risk to patient safety and can result in devastating outcomes. Color coding is the systematic, standard application of color to aid in classification and identification by allowing people to memorize a color and matching it to its function. The purpose of this investigative report is to develop a nursing model that will facilitate patient safety by reducing the risk of medication errors through the use of a color coded system as compared to a system without color coding for patients with intravenous access. Our data search was performed using EBSCO via GALILEO as the database and the key terms searched were color safe intravenous line mix-ups. We performed a literature review of various articles involving randomized controlled trials of the second level of evidence. The labeling of high risk drug infusion and lines is a well-recognized safety strategy for the prevention of medication errors. The use of distinct colors for each type of fluid: blood transfusion, fluid replacement, enteral feed, and medication are to help prevent intravenous medication errors. A color-coded labelling system in a simulated environment significantly improved the promptness and accuracy of finding the correct fluid from multiple infusing continuous fluids of a critically ill patient scenario. Our recommendation is that further investigation be done because of the limited empirical literature regarding color-coded labels and patient safety.

Effective Communication in ICU Families: Conducting Family Meetings

Ineffective communication between healthcare team members and families of intensive care unit (ICU) patients may lead to high levels of stress and concern, lack of understanding, increased length of stay, and poor patient prognosis. The objective is to increase understanding of patient prognosis, reduce stress levels, and enhance overall patient care by improving communication between multidisciplinary teams and patients' families. Three literature reviews were conducted to help address the problem statement. The first study reviewed barriers that are commonly encountered within the ICU such as lack of time, multiple caregivers, ill-defined goals, as well as limited space. The second literature review presented the idea of implementing a structured communication protocol. Families were more receptive in the meetings with discussing patient quality of life and treatment limitations. The third review consisted of a study that provided a questionnaire prior to and following family meetings to determine if family concerns were addressed and if prognosis was understood. Family anxiety was reduced and facilitated better patient care. During the meeting, multidisciplinary team members should include patient prognosis, care plans, medications, and address any questions or concerns with the patient and family members. The use of a communication protocol in the ICU will benefit the hospital by standardizing the practice of effective communication. Structured family meetings will have a positive effect on overall family morale, understanding of patient condition, and may decrease family stress or concern.

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Effective Health Care Communication with Lesbian, Gay, Bisexual, Transgender Adults

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There are a plethora of health disparities among the Lesbian, Gay, Bisexual, and Transgender (LGBT) community. LGBT individuals are two to three times more likely to attempt suicide, lesbians are less likely to receive preventative services for cancer such as pap smears and mammograms, and gay men are at a higher risk for HIV and other sexually transmitted diseases. It is also reported that this population has the highest rates of tobacco, alcohol, and other drug use coupled with a higher prevalence of mental health issues. In order to approach this issue facing health care today, research focused on the question: “How can health care professionals promote effective health care communication with the Lesbian, Gay, Bisexual, and Transgender (LGBT) community?” Research data was gathered from three randomized controlled trials, one systematic review, the Healthy People 2020 initiative, and Joint Commission guidelines. The research revealed that decreasing health disparities amongst the LGBT community is a vital task which can be accomplished by improving communication, providing ongoing training to health care providers, creating a welcoming environment, and by providing culturally competent care in the health care setting.

Implementation of the Decolonization of Methicillin-Resistant Staphylococcus Aureus in Intensive Care Units

In Intensive Care Units (ICU), the colonization of Methicillin-Resistant Staphylococcus Aureus (MRSA) is greater due to failure to screen and isolate patients that have tested positive for MRSA, not utilizing standard precautions, and not bathing the patients with chlorhexidine cloths. At the time of the research, the question was, "What are some interventions that could be implemented to increase the decolonization of MRSA in the ICU setting?" Data examined 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 stated that using standard precautions on all patients has been proven to be the most effective in decreasing the spread of infection. Along with the standard precautions, all patients must be screened for MRSA. If the patient has tested positive in the past, they should be automatically placed in isolation and contact precaution. While standard precautions and isolation of the patient are important aspects in decreasing the spread of MRSA, bathing the patients with chlorhexidine cloths has proven to have a positive outcome in decreasing the spread of the infection as well. The recommendation suggested findings of the research can be easily incorporated into nursing practice and ultimately result in the decolonization of MRSA, decreasing the time patients are spending in the hospital.

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Implementing a Standardized Preoperative Smoking Cessation Plan

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Cessation of smoking in preoperative patients is a single influential factor that can control the outcome of a patient undergoing a surgical procedure. Patients who choose to abstain from smoking prior to surgery see increased health benefits, along with reduced healthcare expenditure and decreased instances of readmission. The goal of the research was to determine the best practice to promote smoking cessation in preoperative patients. This problem was addressed by providing education, awareness, and research information to medical professionals and demonstrating that a multi-strategic approach to smoking cessation is the best practice. The multi-strategic approach intervention was for a duration of 8 weeks before surgery, it was noted that perioperative complications were reduce by 18%, while those who continued smoking had a complication rate of 52%. The resources used to choose the best smoking cessation method were counseling with a medical professional, computerized counseling, nicotine replacement therapy (such as patches and gum), and carbon dioxide detection monitoring before surgery. The time frame consisted of relevant studies, including 5 randomized control trials (RCT), 3 systemic reviews, and 1 cohort study from 2009-2012. Recommendations included studies should be conducted to determine both if the healthcare professionals implemented the cessation program, as well as the cessation rate of the surgical patients, also the rate of surgical complications both preoperatively and postoperatively. Additional recommendations would be to collect data for those who abstained from smoking and should be compared to the complication rate of patients who continued to smoke prior to surgery. The movement toward a multi-strategic approach plan will ensure that all patients receive the best care and have the greatest chance at cessation from smoking both prior to surgery, as well as throughout the rest of their life.

Reducing Nursing Students' Medication Errors

This study was conducted as a literature review for the best practice of reducing nursing medication errors. Strategies to reduce medication errors were researched and reviewed in several different hospital settings. Medication errors can be costly to healthcare facilities and detrimental to patient outcomes. The reduction of medication errors is imperative for patient safety. Interruptions and distractions are also the leading cause of medication errors. If nurses experience a distraction, the nurse should inform them that medications are being given and there should be no distractions. Quiet zones and red taped areas are a reliable way to help identify nurses who are in the process of administering medications. These interventions help nurses keep focus during each part of the medication administration process. Nurses also struggle with basic math skills and the calculation competencies it takes to give medications. Nurses who have been in practice greater than three years struggle more with IV flow rate calculations compared to those nurses who have recently graduated nursing school. Calculation competency exams should in turn be given throughout the time of employment to continuously evaluate the skills of the nurse. Nursing medication errors therefore should be reduced to help effectively promote patient safety and decrease the incidence of nursing medication errors. Our sources included randomized controlled trials, pilot studies, and literature reviews.

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Preoperative Fasting Time in Pediatric Patients

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Preoperative fasting in children is the most effective method used to prevent pulmonary aspiration of stomach contents during general anesthesia. The focus of the research was to determine the necessary period for fasting. We used three different studies including prospective randomized intervention study, cross-sectional study, and a randomized control study. The findings supported the practice in pediatric fasting times should be clear liquids up to 2 hours before surgery and a light meal up to 6 hours before surgery. Recommendations include implementation of the changes in patient education should start in the doctor's office and reiterated through a follow-up call the day before surgery. The findings suggest shorter preoperative fasting times will provide increased comfort level to the patient without increasing the risk of aspiration during surgery. Patient satisfaction and safety should be of the highest priority when considering the preoperative fasting times in children. Pediatric patients should be allowed to drink clear liquids up to 2 hours before surgery and have a light meal up to 6 hours before surgery. This will be beneficial to the patient by increasing comfort, hunger, and thirst levels while decreasing irritability.

Preventing Workplace Incivility Involving Newly Graduated Nurses

Incivility in the workplace is responsible for causing many new-to-practice nurses to leave their first professional position within six months with some nurses leaving the profession forever. Nurse turnover rates, related to incivility, cost facilities thousands of dollars to train a new nurse as a replacement. A literature review was conducted on ways to prevent incivility towards newly graduated nurses in an effort to increase comradery, job satisfaction, patient outcomes, decrease burnout, and to empower new nurses. Critical appraisal was conducted on articles that studied the effects of incivility on nurses as well as interventions that were implemented to decrease incivility. Such studies included a cross-sectional study, a study adapted from a larger quasi-experiment, and a non-experimental design. One article focused on the development of an intervention called C.R.E.W., Civility, Respect, Engagement at Work, which was found to be successful at improving nurse relationships and decreasing incivility. C.R.E.W was implemented into a set of guidelines to be utilized by nursing facilities where incivility was an issue. The guidelines include creating and using a survey to assess incivility, training managerial staff how to empower nurses through resonant leadership, initiating a kick-off event, scheduling meetings with staff to resolve incivility issues, and organizing a wrap up meeting. We recommend the use of these guidelines for units that experience incivility toward new graduates or any incivility between staff members. The research used to construct the guidelines are supported with significant statistical data and with successful implementation of these guidelines, the hope is to produce increased self-esteem, job satisfaction, and patient outcomes while decreasing workplace incivility, absenteeism, stress, and costs spent to replace nurses that leave.

*Brittney Francis,
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Reduced Preoperative Fasting Times in Adult Patients

*KaMara Riley, Jabari
Dobson, Sonja
Morgenstern, and
Jemiya Wright*

*Faculty Mentor:
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In preoperative patients who adhered to the standard NPO after midnight, the incidence of complaints about hunger and comfort levels were much greater than those who fasted two hours prior to surgery. While conducting research, this question was formed “Are shorter preoperative fasting times better for the patients undergoing surgery the next morning rather than using the standard fasting times?” Valuable data was retrieved from four current randomized controlled trial studies. All evidence was proven to be valid, significant and reliable based on the evidence/synthesis tables that were produced on each study. The results of each trial supported the best practice methods to shorten preoperative fasting times while improving hunger and comfort levels of patients. Each trial also proved that shorter preoperative fasting times did not pose any increased risk for aspiration, which was the main concern with the patients. Implementing various nutritional supplements, such as a carbohydrate-rich beverage or a Hypercaloric clear liquid containing carbohydrates, pea-derived proteins, and sodium, increased the comfort, safety, and quality of the patients. The conclusions of this research can easily be integrated into current nursing practice and eventually result in improved patient outcomes without jeopardizing their safety.

Reducing Compassion Fatigue Among ICU Nurses

The following studies include: Burnout Levels in Neonatal Intensive Care Nurses and its Effects on Their Quality of Life, When Caring Hurts: A Pilot Study Supporting Compassion Fatigued Pediatric Critical Care Nurses, The Factors Associated with The Burnout Syndrome and Fatigue in Cypriot Nurses: A Census Report, The Relationship Between Fixed, Rotating Shifts with Job Burnout in Nurses Working in Critical Care Areas, A Comparison of Burnout Among Oncology Nurses Working in Adult and Pediatric Inpatient and Outpatient Settings and Certified Pediatric Nurses' Perceptions of Job Satisfaction, which were all used to investigate the problems that nurses face throughout each workday that increases their risk for compassion fatigue. The overall goal was to help nurses that work in high stress environments to recognize and eliminate contributing stressors as early as possible. Throughout the research findings, methods were discovered that nurses in the ICU setting can use to reduce the chances of them experiencing compassion fatigue. Some effective strategies include enhancing coworker support from the community leads to increase in work productivity, identifying specific stressors that lead to burnout within the workplace, having structure within the unit nurses are able to access support organizations and resources as well as taking breaks during the shift while performing self evaluations prior to and between shifts. To conduct this study, researchers used a descriptive questionnaire to uncover specific characteristics about the nurses in the study. A total of 80 nurses from five different hospitals, in five different cities were then surveyed and followed for six months. Over these six months they were expected to experience high levels of compassion fatigue. After the survey was conducted, results depicted that nurses have moderate levels of compassion fatigue as expected via Maslach Burnout Inventory (MBI). Stress reduction mechanisms were then introduced to the nurses, after another 6 months the levels were down, however they were later to elevate again. Recommended suggestions were to find long term effects that would help bring a permanent solution to the nurses in that work in high stress units.

*Alexandria Jackson,
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Use of Reflexology in Patients with Multiple Sclerosis

*James Hixson, Leslie
Barnes, Kendall
Fellerman, Anna
Brown, and Asia
Russell*

*Faculty Mentor:
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The primary purpose of the study was to evaluate whether or not reflexology is effective in the treatment of symptoms associated with multiple sclerosis. Data were collected from three peer reviewed, randomized control trials found in current, valid, and scholarly databases. One study was a pilot single blind randomized control trial. Another piece of evidence was a double-blind randomized sham-controlled clinical trial. Lastly, a systematic review of randomized controlled trials brought together 18 randomized controlled trials and compared their outcomes regarding the efficacy of reflexology in the management medical conditions. The evidence-based research demonstrated reflexology decreases symptoms of multiple sclerosis such as pain, fatigue, spasms, and depression. In addition it improved the patient's quality of life by helping them rest and relax which is essential to living with multiple sclerosis. The research demonstrated that reflexology stimulated nerve endings in the feet which conducted impulses to the spinal cord. The impulses help release endorphins causing the body to relax. The research established that reflexology has the potential to improve pain relief in patients with multiple sclerosis. Evaluating new techniques and applying them to practice was recommended as the single most important factor nurses can apply to improve patients' symptoms of pain as part of nursing practice.

The Use of Short Messaging Service (SMS) Reminders to Improve Medication Adherence

Medication adherence is imperative to the overall health of patients in both chronic and acute disease processes. Many patients face difficulty remembering to take their medication on time. The aim of this research was to determine if the utilization of short messaging service (SMS) would be beneficial in helping patients adhere to their prescribed medications. Data collected from 3 randomized control trials were considered valid, reliable, and cost effective. After reviewing the research it was found that the use of SMS was beneficial to patients as long as the reason for noncompliance was forgetting to take the medication. Owning a phone capable of receiving SMS and knowledge of the use of the phone were both needed for the intervention to be successful. These findings can be included in the nursing practice to increase patient health, decrease incidence of hospitalizations related to complications of the disease process, and decrease in overall costs of patient treatment.

*Tessa McEwen,
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Courtney Dickens,
and Christyn West*

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PROJECTS PRESENTED AT TOWER DAY

Ambassador Emma Watson's 2014 HeforShe Campaign Speech

The battle for gender equality has been a long one. Emma Watson's HeforShe campaign seeks to encourage both males and females to join in the efforts to promote such equality. For the following presentation, I chose to look at her speech through the feminist approach. Watson's speech touches directly on the subject of feminism, and it discusses power and emotion in relation to elements of gender. It also advances community values such as morality, progress, and peace. The following paper demonstrates how Watson's stance on feminism supports her argument for change.

Danielle Davis

*Faculty Mentor:
Dr. Joseph McCallus
English*

Applying Traditional Malware Detection Methods to Detect Metamorphic, Mobile Android Malware

Jacob Mobbs

Faculty Mentor:

Dr. Radhouane

Chouchane

*TSYS School of
Computer Science*

Taking ideas from program identification methods, we have come to a conclusion of more successful, quick, and efficient methods in identifying metamorphic, Android malware than the traditional malware signature-based scanners. We will look at how a simple metamorphic malware engine works, and demonstrate how the malware detection program we are developing identifies these variants. Our main goal is to provide a mathematical model that can be used to identify the different types of metamorphic, Android malware using Authorship Analysis.

Presented: Tower Day 2015

Belize Study Abroad 2014- An UnBelizeable Adventure

From tropical rainforests to crystal clear coral reefs, a group of CSU students explored the extraordinary central American country of Belize during a fourteen day study abroad trip. The local tour guides led multi-day excursions to sites such as the Xunantunich Mayan Ruins, Big Rock Falls in the Mountain Pine Ridge region, a 3-day canoe trip on the Sibun River, and the coral reefs surrounding Tobacco Caye. During the trip, students conducted research on the diverse fauna and flora of Belize. We were interested in conducting a survey of the medicinal plants and their various uses by local communities and generating a handbook of medicinal plants in Belize. With the assistance from the tour guides, we collected information on 42 native plants surrounding the Monkey Bay Wildlife Sanctuary, along the Sibun River, in the Mountain Pine Ridge, and on Tobacco Caye. Our "Medicinal Handbook of Belize" includes pictures of the indigenous plants as well as their common name, scientific name, brief description of appearance, and medicinal uses. We hope to have this handbook printed and shipped back to Monkey Bay Wildlife Sanctuary so that future students studying abroad in Belize can use this as a valuable resource to learn about the medicinal uses of the local flora.

*Angelin Shajan and
Tatyana Foster*

*Faculty Mentors:
Dr. Kevin Burgess
and
Dr. Clifton Ruehl
Biology*

Bluetooth Security

*Ramon Johnson and
Ryan McCrudden*

*Faculty Mentor:
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TSYS School of
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Today's cellphones allow users to lock their phones in multiple ways whether through pin number or pattern matching. These tools provide your phone with a line of defense from unwanted eyes from viewing your data. To aid in the security of securing data on cellphones, using a Bluetooth enabled device at home as a key to unlock sensitive data stored on your phone can protect your data when your phone is not in proximity of the Bluetooth device. I created an android application that will use a Bluetooth device as a key to protect text messages when the phone is not in proximity of the device or connected to the device. When the user is not in range of the device the text messages in the app can not be accessed. The app will turn itself off until the right Bluetooth connection is made so it won't be easily unlocked by using another Bluetooth device. The user would have to set the default text messaging service to the app so that future communications can be secure and safe from attacks.

Presented: Tower Day 2015

Counter-monument Proposal: Faraday: A Scientific Revolution

What is a counter-monument? Contrary to popular beliefs on memorial and monument building, ostentatious is not always better, nor suitable for certain memories. This is where the idea of the counter-monument comes from – an idea that the monument disappears instead of overtaking the landscape; that the memorial is built into the ground instead of rising above it. It does not offer the viewer a sense of relief or redemption, which many tend to look for when viewing memorials dedicated to the Holocaust and other significant events in history that evoke international shame. As such, memorials crafted in this image must be carefully planned and executed in order to achieve the desired effect – be it obvious or not. In physics and chemistry, we have a concept known as a Faraday cage. In both fields, this concept is applied to effectively creating an electromagnetic black hole that allows us to block communication, essentially keeping everything but the elements from encroaching upon the space. Looking back, the Holocaust was like a Faraday cage, and the remembrance of today reflects this notion. In order to truly memorialize something to the extent that people actually look and take notice, the memorial must be something that causes the viewer to stop and stare, to ponder the choices not only made by the architect, but their own reflections as well. To this extent, we must allow the counter-monument to speak for itself, and allow individuals to take from the memorial what they will.

Julie Wilson

*Faculty Mentor:
Dr. Carmen Skaggs
English*

Digital Storytelling: Remembering the Past

Alexander Medina

*Faculty Mentor:
Dr. Mariko Izumi
Communication*

The Holocaust is a difficult topic to remember. There is no one correct story, as there are many different perspectives on this time period. Some of these stories are widely known, some are left untold. In Berlin, there were many monuments that were created to commemorate the Holocaust but each had their own purpose. A person could not learn the entire history of the Holocaust at just one of these museums. There would be countless other stories that would wind up forgotten, gone from history if the Holocaust was to be remembered this way. To illustrate this hole in history, I created a video presentation. The objective of the video is to raise awareness of the fact that there is more to the Holocaust than just the one story told to us, but there are other stories left untold for you to learn about and to keep in our collective memory or history of the Holocaust.

Presented: Tower Day 2015

Digital Storytelling: Remembrance and Observation

How are we to remember? As a post-Holocaust generation, this is a question that is often pondered when studying the horrendous events of World War II and the actions of Germany under Hitler's Nazi regime. At the seventieth anniversary of the liberation of Auschwitz in January of 2015, Mr. Roman Kent answered this question. He says that "to remember is not enough...it is our mutual obligation, that of survivors and that of national leaders, to install in current and future generations the understanding of what happens when virulent prejudice and hatred are allowed to flourish." But this obligation does not simply extend to global leaders and survivors – it extends to us as well. We all have a duty to remember the past so as to not allow it to repeat itself in the future. Remembrance must be active, it cannot be silent, and it cannot simply fall on the German people, survivors, and national leaders to keep this remembrance alive. We all must play our part in ensuring a future free of such a devastating occurrence. We cannot let memory falter and fade as it did in the years following the war. And so it is up to us, the newest generation of ambassadors of the truth, to ensure that these memories stay prevalent and that these men and women and children did not die for a preconceived notion of asinine hatred and nothing else. In order to truly remember, we must first never forget.

Julie Wilson

*Faculty Mentor:
Dr. Mariko Izumi
Communication*

Digital Storytelling: The Relationship between Zoo Animals and Holocaust Victims

B. Kameron Griffin

*Faculty Mentor:
Dr. Mariko Izumi
Communication*

This past Spring Break, I participated in a study abroad course that took us to Berlin, Germany; the object of the course was to explore the Holocaust in great detail. As the course's final project, we made videos discussing what the Holocaust meant to us, and what we learned during our excursions. This presentation will explore the connection between animals in zoos and Holocaust victims. This connection will also be expanded to the idea that dehumanization is the main way that the National Socialist Party was able to treat people in such an inhumane way. The presentation includes a digital storytelling project video that relates these ideas in combination to several photos that I took while in Germany. My presentation attempts to relate the idea that in order to not repeat Germany's dark history we must be sure to avoid our potential to dehumanize others.

Presented: Tower Day 2015

Educational Gaming for Children

Children often struggle with the concepts of fractions and algorithmic thinking skills. Introducing the concept of algorithmic thinking earlier in a child's development would allow them to grasp it easier and therefore grow not only the computer science field but every field that benefits from these skills. We are using two different learning methods for children who learn differently. The first approach is guided discovery, in which the child is given vague hints and allowed to discover the answers on their own. The other approach is cognitive apprenticeship, where the child is treated as an apprentice and shown a way to do it and then allow them to take control. Our game would use a pedagogical agent to first assess the child's way of learning and then guide them through the learning process. The way the pedagogical agent interacts with the child is based on the initial assessment of the child as well as tracking the child's performance in the game. The agent will then change the problems and difficulty level where appropriate based on the child's current skills to help the child learn the material and concepts better.

*Brandon Molyneaux
and Kristen Wright*

*Faculty Mentor:
Dr. Rania Hodhod
TSYS School of
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A Feminist Analysis of “Lena Dunham and White Liberal Feminism: Is Sex Abuse Okay When a Rich White Woman Does It?”

Priscilla E. Brigham

*Faculty Mentor:
Dr. Joseph McCallus
English*

This essay is a feminist analysis of an article written by Victoria Brownworth titled “Lena Dunham and White Liberal Feminism: Is Sex Abuse Okay When a Rich White Woman does it?” The paper is written about Lena Dunham and the controversy surrounding her autobiographical collection of essays titled “Not That Kind of Girl.” The most controversy comes from the parts that describe Dunham’s decade-long sexual abuse of her little sister. Brownworth’s article aims to raise awareness of a double standard between men and women, as well as the intersectionality within feminism. I use the cultural feminist approach to demonstrate how Brownworth’s article highlights the ways women are treated differently in our society. I discuss several elements of power related to gender, such as gender stereotypes, the inequality between genders during sex abuse scandals with reference to men and women celebrities, the intersectionality within feminism, and finally women’s sexuality in regards to orientation and the rape culture. I conclude the essay by describing Brownworth as a symbolic authority figure who devalues the difference between genders and wants Dunham to be held to the same standard as men.

Presented: Tower Day 2015

Food For Thought

Body image dysphoria, or dissatisfaction with one's appearance, impacts people on a global scale crossing the boundaries of race, gender, social status, and culture. However, is this state of dysphoria the same cross-culturally? How are body image concerns portrayed in such popular culture media as film, magazines, or theatre and how do different cultures perceive these issues? Using research collected through scholarly articles, journals, reviews, and criticism this project will explore how body image is reflected in popular culture, and more specifically theatre, in the United States, England, Argentina, Nigeria, and China.

William Hart

*Faculty Mentor:
Dr. Becky Becker
International Studies
Certificate/Theatre*

The Forgotten Homeless

*Tyler Davidson,
Kaity Howard, and
Christina Shively*

*Faculty Mentor:
Dr. Mariko Izumi
Communication*

Our research discusses how being homeless has affected the elderly population. Discussing certain trials and tribulations they must face on a day to day basis including the search to find food, water, and shelter; the basics to human survival. We interviewed four volunteers, listened to their stories, heard their voices, and have diligently tried to represent them in our presentations. This presentation in a mere snap shot into the lives of a demographic that has less than a book of study published about their situation. These men and women struggle not to feel invisible and continually search for ways in which to better themselves and their situations. Furthermore these men and women work to maintain the health of their families and enrich the lives of the younger generation of homeless men and women who may not have the same knowledge as their elders. In helping their fellow man these elders become mentors, showing the younger generation that there is hope and they can come out of their dark corner to rise above this situation.

Presented: Tower Day 2015

From Books to Ashes: Counter-monument Design and Proposal

This past Spring Break, I participated in a study abroad course that took us to Berlin, Germany; the object of the course was to learn how to memorialize the Holocaust. This resulted in a project that explores traditional forms of monuments in regards to memorializing the Holocaust, including the ways that it may be problematic to use these traditional forms in Holocaust representation. This presentation stands to provide information about counter-monuments, and will include a proposal for a Holocaust counter-monument to be placed in Columbus, Georgia. The presentation will include the counter-monument's design in detail and will also explore the potential problems involved with placing a monument, including location and resonance.

B. Kameron Griffin

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Dr. Carmen Skaggs
English*

The Golden Polyphemus

Katherine Holmes

*Faculty Mentor:
Dr. Andrew Zohn
Music*

The different artistic disciplines have always been closely linked, and after the 1800s, literature, specifically poetry, and music were especially close to each other. The tradition of programmatic music (the use of literary works as "programs" or background for pieces of music) has carried over from the Romantic period to the modern day. Reginald Smith-Brindle's solo guitar piece "El Polifemo de Oro" has as its program two poems by Federico Garcia Lorca about the guitar, and Garcia Lorca wrote other poems that were based around music and used in music by other composers. I will show the ties between music and poetry, specifically between Garcia Lorca and Smith-Brindle, and especially the similarities that arise between Spanish poetry and the Spanish heritage of the classical guitar.

Presented: Tower Day 2015

Impact of Barriers on Spatial Distribution of Fishes and the Ratio of Eastern Mosquitofish (*Gambusia holbrooki*) to Predators in Lindsey Creek, Columbus, Ga

Habitat fragmentation is common in urban areas; however, the repercussions on local fish populations remain relatively unexplored. I studied the effects of habitat fragmentation on species richness, while this study examined, specifically, the effects of fragmentation on the ratio of *G. holbrooki* to predators in three key areas: north and south of the Columbus Municipal Airport (separated into two areas by a 983 foot long culvert) and the Columbus State University campus. These three areas are separated by at least one type of physical perceptual barrier. Samples collected from these areas via electrofishing showed the ratio of Eastern Mosquitofish to predators per minute is highest north of the airport (0.50 ± 0.2), followed by south of the airport (0.13 ± 0.1), and CSU Campus (0.072 ± 0.06): Kruskal-Wallis, $n = 14$, test statistic = 5.843, d.f. = 2, $p = 0.054$. Thus, there is a marginally-significant difference in the ratio of *G. holbrooki* to predators among the three regions sampled, suggesting that habitat fragmentation presents a barrier to the passage of Eastern Mosquitofish or its predators.

Catrina Dygert

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Dr. Michael Newbrey
Biology*

Lean on Me: Influences of the 1960s in David Lean's Films *Lawrence of Arabia* and *Doctor Zhivago*

Marlena Cameron

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

The tumultuous 1960s brought with it great social change for America, ranging from the Civil Rights Movement to the counterculture, and affected all aspects of society, including film. Though *Lawrence of Arabia* (1962) and *Doctor Zhivago* (1965) were not direct responses to the 60s, the period still exerted a strong influence on them. *Lawrence of Arabia* was set in the Middle East during World War I, while *Doctor Zhivago* dealt with Russia during the 1919 Revolution and its aftermath. *Lawrence* centered on the historical figure T.E. Lawrence, a British officer who helped the Arab forces defeat the Turks, and chronicled his efforts to unite the different tribes, his leading them to several victories, and his attempt to bring them independence. *Doctor Zhivago*, meanwhile, drew from a Russian novel of the same name, focusing on doctor and poet Yuri Andreyevich Zhivago and his eventual romance with Larissa "Lara" Antipov amidst the chaotic backdrop of the transition from tsarist to Communist Russia. Although seemingly unrelated to the 1960s, the films contained many aspects of the Civil Rights movement, class tensions, the sexual revolution and the questioning of gender roles, the counterculture, and the Cold War. The exploration of these themes in both movies demonstrates the pervasive impact of the present in the creation of primary sources—in this case, the films—as well as the usefulness of film analysis to historical studies.

Presented: Tower Day 2015

Literature Review of Solid State Drive Analysis

Solid-state hard drives have introduced new challenges to the field of computer forensics. Unlike traditional hard drives that store information on magnetic discs, solid-state drives store all of their information on microchips. While microchips make reading and writing processes on an SSD hard drive much faster and reliable than a traditional hard drive, they pose extraordinary challenges for forensic investigators. These microchips tend to wear away if data is repeatedly written on them. Also, some operating systems may use a TRIM command to make a block of SSD ready for rewriting. Extensive research is going on to understand data read/write processes of an SSD in various contexts. Researchers at the Carnegie Mellon University and the Auckland University of Technology, state that the TRIM process makes recovering data from a TRIM-enabled hard drive essentially impossible. Recent research performed by the forensics software company Belkasoft has shown that due to the complexity of SSDs, firmware developers are not always implementing proper uses of TRIM, which leaves data to be obtained through conventional recovery methods. The goals of this project were to perform an extensive and analytical survey of research work that has been done on solid state drive's data read and write procedure till date and to find future research directions on forensic investigation of solid state drives.

Joshua Staples

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A Narrative Analysis of President Obama's Immigration Speech

Gerald Williams

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Dr. Joseph McCallus
English*

The purpose of this narrative analysis of President Obama's immigration speech is to fully comprehend the elements that make up the discourse and their rhetorical intent. The role of narrator, plot, and characters are all examined. In particular, the paper looks at how the President uses testimonials from and examples of hard working emigrants to appeal to the American pathos. These rhetorical devices reveal that the President's use of narrative construction was a driving force behind his public policy.

Presented: Tower Day 2015

A Narrative Analysis of the Convocation Speech by Dr. Christopher C. Beyrer

Dr. Christopher C. Beyrer, a graduate from Hobart and William Smith Colleges, was chosen to give the convocation speech for 2014's incoming freshmen. His speech contained four narratives in total. The first is a welcoming introduction for the group, which introduces himself to the students and showcases the school's ability to make great leaders from hard workers. Dr. Beyrer transitions into the second narrative by discussing his HIV/AIDS research and the crisis the disease has caused in other countries. The third narrative links HIV/AIDS in foreign countries and a human rights issue faced by many college students: rape. He gives the students a hard warning about how dangerous student life can be, as he knows Hobart and William Smith Colleges has a high rate of sexual assault. In his fourth story, Dr. Beyrer returns to more lighthearted subject matter in order to encourage the students in the audience. These narratives show that Dr. Beyrer is not only a high-quality graduate from the schools, but he is also still concerned with his former college's issues, as he attempts to not only encourage students to be good scholars, but he asks them to consider harder subjects like sexual coercion and rape as well.

Crystal Waldrip

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Dr. Joseph McCallus
English*

Performance Analysis of Internet Protocols

Corey Greer

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TSYS School of
Computer Science*

Every day, millions of people send data over the internet in the form of pictures, messages, files, etc. In order to ensure that the data is delivered to its destination successfully, a member of the Internet protocol suite must be used. We have examined the two most common protocols (which were developed in the early 80's) Transfer Control Protocol and User Datagram Protocol. Following this examination, we compared the performance of the two protocols from an efficiency perspective by transmitting different numbers of files over different Autonomous Systems, which are entities that define routing over the internet (like your Internet service provider).

Presented: Tower Day 2015

Permutations of Input and Substitution Tables for DES S-boxes

DES is a type of encryption used in computers. Although computers now use a newer type of encryption called AES, DES is still a good alternative for applications where space and computational power is limited such as RFID tags. DES uses binary numbers, which is a series of 0s and 1s that represent letters, numbers, and other characters. A bit is a single 0 or 1. DES encrypts blocks of 64 bits at a time. Each 64 bit block is broken down into 8 segments of 6 bits and then fed into one of 8 S-boxes. The S-box is an integral part of DES and must satisfy certain criteria. One of the criteria is that the first and last bit of the 6 bit input will determine which row to use and the middle 4 bits will determine the column to use. In this study we will examine what happens when there is a change to a single S-box. The change can be one of the following:

- How the bits are fed into the S-box e.g. what happens if instead of using the first and last bits as the row and the middle four bits for the column, the first and second bits are used for the row and the last four bits for the column.
- Rearranging the entries in the S-box

We'll investigate if the criteria is still met with these changes and if so, if the changes satisfy more stringent criteria.

Cherie Corning

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*Dr. Yesem Kurt-Peker
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Preventing Violence against Emergency Department Nurses

*Kathryn Grimsley,
Latrivia Turner,
Brina Smith,
Tangeneka Bryant-
Wood, Kaycee
Meeks, and
Svenette
Prince-Frazier*

*Faculty Mentor:
Dr. Dell Miller
School of Nursing*

Violence such as physical assault and verbal abuse against emergency department (ED) nurses has increased tremendously over the years. Systematic reviews and randomized controlled trials from databases including Galileo, the Emergency Nurses Association, National Institute of Health, and Medline at EBSCOhost have shown that health care workers account for almost half of all non-fatal injuries from acts of violence and workplace assaults. At least 25% of ED nurses described experiencing both physical and verbal acts of violence multiple times over the course of a year. This information led to the consideration of the question, "In the emergency department, do medications or restraints reduce violence more effectively than seclusion or the use of security guards?" Our research findings concluded that security guards are an effective way to reduce or prevent the incidence of violence. Furthermore, seclusion rooms should be used before any type of restraint is attempted in order to promote the least invasive technique. Hospitals should also be required to have a violence prevention program in place as an effort to reduce the number of violent incidences perpetrated by patients and/or visitors against ED nurses. Evidence shows that further research needs to be conducted and new methods should be implemented in order to reduce the climbing incidence of violence against emergency department nurses. From our research we gathered that recommendations for practice could include the effective use of security guards as well as training and the implementation of a violence prevention program to ensure a safer work environment for the Emergency Department nurses as well as other staff members.

Presented: Tower Day 2015

Reactions to Globalization: John Ruskin, James McNeill Whistler, and the Art of Victorian Britain

This project will open with a broad description of Globalization, the foundational concept of any International Studies course. To connect the project to the Art History discipline, I will examine the phenomenon of globalization in the Victorian context, analyzing contrasting reactions to high levels of cross-cultural exchange through the institution of Art. The two “reactors” within my study are John Ruskin and James McNeill Whistler – very different men both highly influential to the late nineteenth-century art scene of Britain and Europe. It is through their views that I will show how art was and for them continued to be connected to a national identity, as well as how “Globalization” challenged that identity in their time. Several of Ruskin’s and Whistler’s art pieces will be spotlighted and contrasted in my study, allowing the viewer an introductory understanding of two very different views of nineteenth-century cross-culturalism: one that is more insular and nationalistic; another that it is more cosmopolitan and less concerned with the connection of art and patriotic morale. The visual dynamism of both men’s art are significant and influential threads of thought in their own day and days to follow.

Katherine Hinzman

Faculty Mentors:

Dr. Becky Becker

International Studies

Certificate/Art History

Dr. Claire McCoy and

Professor Michele

McCrillis

Art

Reducing Compassion Fatigue Amongst Oncology Nurses

*Anisha Biggers,
Rayana Karpen,
Kendra King,
Nyambura Kuria, and
Tiara Turner*

*Faculty Mentor:
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Compassion fatigue can impact the mental and physical capabilities of nurses by affecting job performance. Lack of interventions lead to high turn-over rates which impact patients' outcomes negatively such as an increase in medication errors and a decrease in patient safety. The research question consisted of; what interventions can be used to reduce the effects of compassion fatigue among oncology nurses? Research demonstrated when dealing with compassion fatigue primary prevention is the optimum goal. Interventions can also be altered and used on a tertiary level to help with nurses that have already developed compassion fatigue. Pastoral care, retreats, journaling, meditation, and peer support are examples of available interventions. During examination of research six relevant studies: a systematic review, three randomized control trials, and two qualitative studies were consulted. Research findings suggested if the patient used interventions such as retreats, pastoral care, self-compassion, and professional assistance. Overall the research indicates the evidence is valid and reliable because it is consistent with interventions that reduce compassion fatigue among oncology nurses. The interventions were cost effective because the amount of patient errors, medication errors, and job turnovers reduced with a reduction in compassion fatigue.

Presented: Tower Day 2015

Solving a Whodunit Ages Old: Causes of Pleistocene Megafauna Extinctions

Although dinosaurs and mammoths only coexisted in comic books and action figure sets, these extinct creatures have long captured the public's attention. Extinction events have occurred throughout Earth's history, the most famous of which ended with the Cretaceous period. Extinctions also marked the end of the Pleistocene, the epoch prior to the current Holocene. Numerous species of megafauna in Europe, the Americas, and Australia—including the mammoth—died out. Like previous, larger extinction events, the Pleistocene event has generated much debate within the scientific community in regard to its causes. This article provides a brief literature review of the major theories related to terminal Pleistocene extinction. It draws especially from Todd Brahe and Jon Erlandson's "Human Acceleration of Animal and Plant Extinctions: A Late Pleistocene, Holocene, and Anthropocene Continuum" (2013), Dartmouth College's "Humans and the Extinction of Megafauna in the Americas" (2009), Gifford Miller et al.'s "Ecosystem Collapse in Pleistocene Australia and a Human Role in Megafaunal Extinction" (2005), Anthony Barnosky et al.'s "Assessing the Causes of Late Pleistocene Extinctions on the Continents" (2004), Kathleen Lyons, Felisa Smith, and James Brown's "Of Mice, Mastodons and Men: Human-mediated Extinctions of Four Continents" (2004), and Donald Grayson and David Meltzer's "Clovis Hunting and Large Mammal Extinction: A Critical Review of the Evidence" (2002).

Two kinds of interpretations characterize arguments on Pleistocene extinctions: natural, climate-induced extinctions, and those advocating an anthropogenic causes. Climate hypotheses examine changes in climate and concurrent changes in environmental characteristics, such as fluctuations in carrying capacity, transitions to different types of biomes, and disruptions to food webs within ecosystems. Anthropogenic hypotheses, meanwhile, focus on both direct and indirect human impacts. While there are valid points in both perspectives, the most effective way to understand the disappearance of the megafauna is by studying both angles in conjunction with one another.

Presented: Tower Day 2015

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The Stigma of Racial Hue: Skin Tone and Anonymity

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Previous conflicts in society have had an effect on how we see our many differences within race. The current study examines how skin tone and anonymity affect how we rate attractiveness in women. Research suggests that darker skinned African-American women are seen as less attractive or uneducated, along with other negative connotations (Thomas & Keith, 2001). It was hypothesized that women with darker skin would be rated lower than women with a lighter skin (or fair skin), but only when participants were anonymous. A total of 59 Columbus State University students participated in the study. Participants rated images of black and white women on perceived attractiveness, an estimate of their age, and also their facial expression. Each group of participants was randomly placed in an anonymous or non-anonymous condition during the study. While anonymity did not have an effect on ratings of attractiveness, skin tone did. Women with lighter skin received higher attractiveness ratings than women with darker skin. Somewhat unexpectedly, women with darker skin received higher attractiveness ratings than women with fair skin. This research suggests that skin tone affects how we perceive physical attractiveness in different ethnicities.

Presented: Tower Day 2015

A Study of Soft Computing Methodologies Applied to the Traveling Salesman Problem

The Traveling Salesman Problem(TSP) is one of the most well-known problems in computer science because it is easy to state but hard to solve. The goal of this problem is to find the shortest round-trip route to visit all cities given in the problem. The number of possible routes is $(n-1)! / 2$, where n is the number of cities. Except for small values of n , $(n-1)! / 2$ routes are too many to calculate even for the fastest computers. There are algorithmic solutions to this problem, but these are not efficient. To solve this problem more efficiently, computer scientists have tried to use soft computing methodologies. In addition, researchers have also found that humans can solve this problem more efficiently than we think. Among lots of soft computing methodologies I chose Genetic Algorithm(GA) and Ant Colony Optimization(ACO) to solve the TSP. The purpose of my research is to review and compare the performances of algorithmic solutions, soft computing methodologies including GA and ACO, and human performance for solving the TSP.

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Thermal History and the Glass Transition

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The glass transition temperature is the temperature at which a polymer changes from a brittle, glassy state to an elastic, rubber-like state. One factor that alters the glass transition temperature of a sample is its thermal history. A polymer's thermal history affects its microstructure and thus can have important effects on its glass transition temperature. Specifically of interest here are the effects of heating and cooling cycles on polymer samples. This study includes a comprehensive literature review and theoretical predications as to how the thermal history of a sample will alter the glass transition temperature of polystyrene nanoparticles suspended in an aqueous matrix.

Presented: Tower Day 2015

The U-Center: A Countermonument Design

According to James Young (1993), when interacting with a counter-monument, it is important for visitors to use reasoning, interpretation, prior knowledge, life experiences and traditions. Those interpersonal characteristics will shape individuals' experience throughout their journey through the U-Center. The U-Center Counter-monument memorializing the Holocaust explores the relationship of the past and the present. The U-Center will force visitors who experience it to be physically located in the center of the past and the present. The purpose of physically standing between the past and present is to require individuals to create a bridge of understanding from Holocaust tragedies to present day tragedies. The atmosphere surrounding the U-Center is designed to be emotionally uncomfortable and physically unbalancing. All three exterior walls are purposely different sizes and stand at different angles. This counter-monument was inspired by two famous architects: Moshe Safdie and Peter Eisenman. The U-Center is built on three concepts: free-structured thinking, unanswered questions, and impermanent locations.

Jason Summerville

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Use of Aromatherapy Massage to Reduce Agitation in Patients with Dementia

*Faith Gould, Angela
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Dementia is a progressive disease that impacts not only the patient's behavior but also their families, friends, and caregivers. According to The Centers for Disease Control and Prevention (CDC, 2009), "by 2050, the number is expected to more than double due to the aging of the population." In patients with dementia, what is the effect of aromatherapy massage on agitation compared with restraints and medication? In order to adequately answer the question our team analyzed three random control trial articles based on the findings being valid and reliable. The researchers performed experiments regarding aromatherapy massage and its effects on dementia patients by conducting trials using placebo oil and lavender oil that the nurse massaged on agitated patient's hands or forearms for 20 minutes. Evidence indicates that lavender aromatherapy massage was effective but the results were not significant enough to add to nursing protocol for dementia patients. According to the findings, aromatherapy massage has positive effects on patients; however, it needs to be individualized based on the patient's response to the different therapies.

Presented: Tower Day 2015

Submissions for *Abstracts 2016*

Undergraduates at Columbus State University who engage in research, critique and scholarship during the academic year of 2015-16 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 2015, Fall 2015, and Spring 2016 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.

Cover Art

When considering a symbol to represent student research here at Columbus State University, I kept coming back to the idea of a globe. It represents the vast topics students write about that extend to issues going on all over the world. Sometimes students even get a chance to travel and research in situ thanks to CSU's Center for International Education program. Most importantly, I chose the globe to show that one student from CSU can have an impact on the world with their research and endeavors.

Julianna Wells
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HONORS COLLEGE

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