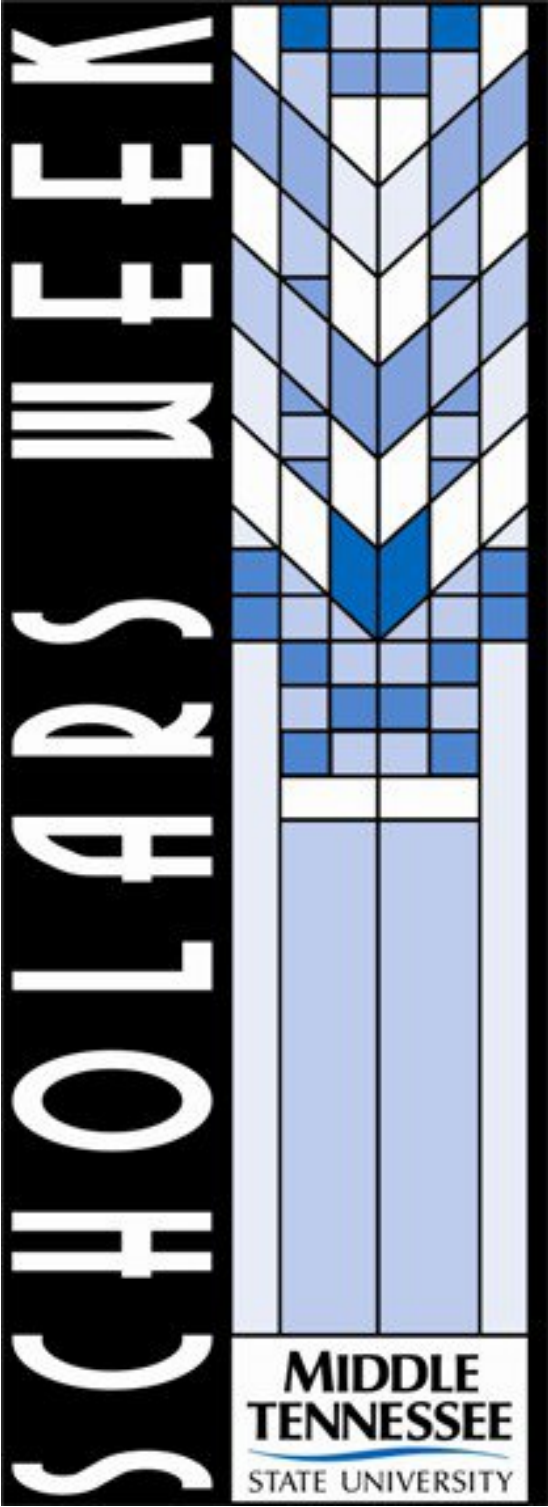


# Undergraduate Abstracts



2011

U1

## BUILDING A RESEARCH PARTNERSHIP IN A SENCER TENNESSEE SCIENCE AND HISTORY LEARNING COMMUNITY

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A new learning community consisting of two required general education classes, Tennessee History and Tennessee Science, is being offered for the first time at Middle Tennessee State University. This collaboration is catching the interests of non-major students who are sometimes nervous about taking a required science class and companion laboratory. The learning community also provides an opportunity for a pre-service teacher to conduct a science education research project. This project includes a series of collaborative and laboratory exercises which focus on Tennessee science such as earthquakes and industrial pollution, agriculture and food production, and energy from coal, hydro and nuclear processes. Additional topics include the making, drinking of, and the use of alcohols as fuels, evolution, and country music. Hands-on activities, case studies, experiential learning and debates are used to encourage and assist non-majors in the learning of Tennessee science, as well as Tennessee history. The development of the Tennessee Science course is a new product of the three year NSF grant (2008-2010) which focused on the SENCER, Science Education for New Civic Engagements and Responsibilities, philosophy for teaching STEM (science, technology, engineering, math) content

**U2**

## **AN ANALYSIS OF THE FACTORS THAT CONTRIBUTE TO INTELLECTUAL PROPERTY THEFT**

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Piracy of intellectual property is costly and one of the most highly destructive illegal activities facing creative industries in the United States and abroad. For every \$100 of legitimate software sold globally, another \$69 is pirated. To help analyze this problem, a survey was developed asking a range of questions that relate actual and future piracy factors that may influence an individual to illegally download digital files. The purpose is to find significant factors that contribute to computer and media piracy in students at Middle Tennessee State University. Business college students took the surveys and the results were analyzed using regression. The findings suggest that knowledge of methods of piracy and daily computer use were significant factors in actual piracy activity, with knowledge of the methods of piracy also a significant factor in future piracy activity. In addition, actual piracy activity correlated significantly to future piracy activity.

**U3**

## **THE EFFECTS OF EMOTIONAL PICTURES ON SHORT TERM MEMORY**

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Emotional stimuli may engage cognitive resources in order to interpret the emotional experience. Allocation of resources toward emotional stimuli would then leave the person with fewer resources, or less attention to devote to other tasks, like memory. In the present study, we showed participants four types of pictures: neutral, positive, negative, and arousing ambiguous. Then, a memory task was given, and accuracy was compared across the different types of pictures. The memory task was a reverse digit-span recall test. Participants watched four digits appear one at a time on the screen, and then were asked to type them in reverse order that they appeared. Following the digits and preceding the recall, the picture would flash onto the screen. We expected that the arousing ambiguous photos would have the greatest effect on memory because they elicited an emotional response, but participants would be unclear on what the emotion should be. So, the observer is left with the task of interpreting and classifying his or her emotion. Conversely, the un-arousing neutral photos would have the smallest effect.

U4

## THE EFFECTS OF VARIOUS WARM-UP PROTOCOLS ON ACUTE VERTICAL JUMP PERFORMANCE

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Vertical jump is an efficient method for testing lower extremity muscular power. Several researchers have concluded that weighted-dynamic warm-ups take precedence over non-weighted dynamic warm-ups in enhancing power production. These values range from 0% to 20% of an individual's body mass; however, conclusions have not connected weighted vests exceeding 10% with an increase in vertical jump performance. This study will analyze acute vertical jump height, using a Vertec, directly following a dynamic warm-up. The individual performs the dynamic warm-up on four separate days and, in random order, either wears no weighted vest or a vest loaded with 2%, 5%, or 10% of the individual's body weight. The population for the study includes 4 male and 4 female division 1 collegiate athletes ( $21 \pm 3$  years of age) in addition to 4 male and 4 female collegiate non-athlete students ( $21 \pm 3$  years of age).

U5

## IS POROUS SILICA A SUPERIOR MEDIUM FOR SENSING PROTEIN-ANTIBODY BINDING EVENTS?

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Biosensors can detect natural and man-made biological threats in applications such as food safety, water quality, and medical diagnostics. In a new optical biosensor, a multilayered photonic band gap material (PBGM) detects a measurable shift in surface waves as the amount of biomaterial at the PBGM surface changes. The purpose of the work described here was to test the effect of exchanging the final layer of the PBGM for a porous silica layer. Synthesized using a polyether template (F-127) within a thin silica film, the porous layer formed organized pores in the film under controlled drying conditions. The films were treated with 3-aminopropyl triethoxysilane in order to make the surface reactive with biomolecules. A fluorescently labeled protein, bovine serum albumin (BSA-Cy5), was covalently bound to the film surfaces, and the non-bound regions were blocked. The concentration of protein solution was varied to minimum and optimum detection limits. Then, the samples were exposed to FITC-labeled BSA antibody solutions of varying concentration. The detection limit of BSA-antibody on the porous surfaces was compared with the BSA-antibody binding on 3-aminopropyl triethoxysilane-coated slides. Ultimately, the detection of these binding events will be compared to label-free sensing using the optical biosensor device.

## U6

### EMPOWERING COMMUNITIES IN NEED THROUGH EDUCATION AND INNOVATION

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Humans in Crisis has partnered with the Foundation for the Solidarity and Development of Women in Nepal (or Women's Foundation of Nepal) to assist with three programs. First is with the Maheela cooperative production center to help strengthen and increase the capacity of its Maheela cooperative production center. The mission of the Women's Foundation of Nepal is to help women and children equally, regardless of caste, religion or race. Second, Humans in Crisis is providing one-time financial assistance to the Women's Foundation for the creation of a sustainable counseling and skills training program for women during 2011. Third, Humans in Crisis is supporting efforts by the Women's Foundation of Nepal to create a new training program to encourage and prepare women, especially from rural areas, for public service and widen women's access to positions in the public service. Additionally, Humans in Crisis is involved with the education Chepang initiative project and the School to School project. Humans in Crisis envisions a world actively reducing poverty, and in which access to universal education and resources for sustainable self-development improve quality of life for the human community. Ours is a grassroots mission empowering communities in need through education and innovation. To achieve our mission over the next 2 years, our work will specifically impact the cross-cutting focal areas of education to empower disadvantaged communities and reduce poverty. We partnered with a non-governmental organization, the Women's Foundation (WF), that shares our goals in Nepal.

U7

## DOES PRICE REFLECT QUALITY? AN ANALYSIS OF RETAIL ICE CREAM PRICES

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The quality and price of ice cream can vary dramatically both across and within brands. The typical consumer is unaware of the quality standards used in the dairy industry. Consumers must rely on product packaging to determine the quality of ice cream. This leads to a situation where ice cream manufacturers can capitalize on hidden information by labeling products using terms that convey high quality, and eliciting a higher price from consumers. We seek to understand the relationship between retail price, quality, labeling and product marketing. Samples of retail vanilla ice cream were collected and evaluated by a trained expert who scored the flavor and body of the samples. Then, using a regression model, we estimated the relationship between price and quality, controlling for product labeling and branding. Our goal is to determine if the price is a reflection of quality, or of other factors such as product labeling or advertised health benefits. Preliminary results indicate that a higher price is a signal of higher quality, however premium label store brands appear to provide the best quality to price ratio. It is important to remember that we can only establish correlation between price and quality.



U8

## THERMAL BEHAVIOR OF 1,6-DI-*TERT*-BUTYLHYDROQUINONE.

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A sample of 1,6-di-*tert*-butylhydroquinone, which was prepared by the catalytic hydrogenation of an ethanol solution of its quinone over 5% palladium-on-carbon, exhibited a corrected melting point of 103.5 °C after four recrystallizations from refluxing hexanes. Although several other groups have observed melting points near 103 °C, higher values from 109 to 118 °C are often reported in the chemical literature. Consequently, a differential scanning calorimetry (DSC) study of a purified sample of 1,6-di-*tert*-butylhydroquinone under an inert atmosphere of nitrogen gas was undertaken with a TA Instruments DSC 2920 in an attempt to resolve the diverse and contradictory reports of its thermal behavior. The DSC instrument was calibrated using the melting point of indium and was, in turn, used to measure the melting point of seven triple-point standards that were employed to calibrate the thermometer of the Thomas Hoover oil-immersion melting-point apparatus.

**SEED SOURCE LOCATION AND CAPTAN TREATMENTS INFLUENCE GERMINATION BEHAVIOR IN *RHODODENDRON CALENDULACEUM***

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*Rhododendron calendulaceum*, a species native to the Eastern U.S., has a high degree of horticultural value. In the wild, this species has a considerable amount of inter- and intra-population variation in morphological and physiological characteristics. These inherent differences suggest that variations in germination behavior may exist in wild collected seeds. Furthermore, wild collected seeds are often prone to fungal contamination in their germination environment. Our objectives were twofold: 1) to test for variation in germination behavior among seed lots, and 2) to investigate the effects of Captan on the germination of *R. calendulaceum*. Germination characteristics were evaluated in three separate collections of *R. calendulaceum* seeds in the absence or presence of Captan at concentrations from 0.0 g/L to 3.6g/L. Germination was recorded daily. Significant differences in germination percentages (39-74%) existed among collections. Captan prevented fungal growth at levels of 0.9 g/L and higher. Though there was a trend for decreases in seed germination percentages as Captan concentrations increased, it was statistically non-significant. However, the onset of germination was observed to be delayed by the use of Captan, with T1 values ranging from 9.2 d without Captan to 11.2 d with 3.6 g/L of Captan. The rate and uniformity of seed germination was largely unaffected by Captan, evidenced by the lack of trends in the T50 and T10-90 values. Based on our findings, we would recommend that propagators of *R. calendulaceum* use Captan during germination as the demonstrated reduction in fungal contamination outweighs the negative effects of Captan on germination.

**U10**

## **ADMIXTURES**

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The American Concrete Institute (ACI) defines admixtures as, “a material other than water, aggregates, hydraulic cement, and fiber reinforcement that is used as an ingredient of concrete or mortar and is added to the batch immediately before or during its mixing.” Our lab experiment explored the effects of commonly used admixtures on a standard mix design. We compared slump, air content, temperature, and strength tests at 24 hr, 48 hr, 7 day, 14 day, and 28 day intervals. These measurements tell us important properties of the concrete both while in plastic (liquid) state as well as hardened properties. Slump tells us how difficult or easy the plastic mix is to place in forms. Air content gives us an idea of the freeze thaw resistance of the hardened concrete. Temperature tells us how long it will take the mix to set up. Finally, the strength tests tell us, not only what the final strength will be, but also when the mixes will reach the desired strengths.

U11

## INDIVIDUAL DIFFERENCES IN SELF-TALK FREQUENCY

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In three studies, we examined how several demographic or individual difference variables relate to the frequency with which people report talking to themselves. Using a standardized measure of self-talk frequency, we collected information about participants' age, gender, family configuration (e.g., only child versus non-only child), and whether or not they had an imaginary friend in childhood. In Study 1, as expected, students who were older reported significantly greater self-talk than younger students. In Study 2, we hypothesized that only children would report higher levels of self-talk than non-only children. This was confirmed. In Study 3, students who reported having had an imaginary friend in childhood reported significantly more self-talk than students who had not had an imaginary friend, as we expected. More detailed analyses of specific categories of self-talk will be presented. The results will be discussed in terms of the self-regulatory roles that self-talk plays. Implications for future research will also be presented.

U12

## NOW YOU TASTE IT, NOW YOU DON'T: CONFIRMATION BIASES IN TASTE PERCEPTION

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Researchers have found that consumers dislike beer spiked with vinegar if they learn about the vinegar before tasting the beer, suggesting ingredient information influences taste experiences “in the moment.” Such information could create expectations that direct consumers’ search for, and interpretation of, flavors and textures - leading consumers to taste what they expect to taste – a phenomenon called sensory confirmation bias. To test these assertions, 173 undergraduates consumed dark chocolate that either did or did not contain sea salt. Beforehand, participants were shown the product’s packaging. Participants in the accurate information condition were shown the original wrapper. For salt chocolate, the wrapper said “sea salt” and had an image of salt. For participants in the misinformation condition, the product packaging was switched. While eating the chocolate, participants wrote down adjectives they felt described its flavor and texture. Next, participants rated the chocolate on six flavor dimensions (e.g., salty) and four texture dimensions (e.g., crunchy) provided to them. Results supported a sensory confirmation bias. Among participants who sampled salt chocolate, those given product misinformation were less likely to include the terms “salty” (26%) and “crunchy/gritty” (7%) in their descriptions than participants given accurate information (85% and 32%, respectively),  $ps < .05$ . The former also rated the chocolate as less salty ( $M = 3.36$ ) than did the latter ( $M = 5.37$ ),  $p < .01$ . Misinformation hindered participants’ ability to detect flavors and textures associated with salt. Among those who sampled the regular chocolate, product misinformation heightened expectation-consistent flavor experiences. Compared to those given accurate product information, those who believed the chocolate contained salt were more likely to use words such as “salty” (6% and 37%, respectively) and rated the chocolate as more salty ( $M = 1.86$  and  $3.38$ , respectively),  $ps < .01$ .

U13

## PRELIMINARY FINDINGS OF ZOOARCHAEOLOGICAL RESEARCH AND FOOD PROCESSING TECHNIQUES AT THE FEWKES SITE

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The Fewkes site is a Mississippian complex of five mounds dating to A. D. 1050-1250. It was likely the seat of power for a Mississippian chiefdom, consisting of platform and burial mounds, stone box graves, a palisade wall, and a village with a highly stratified society. Faunal remains from the site have been examined for evidence of a variety of food processing techniques; here the focus is on spiral fractures that indicate bone marrow extraction and cut marks that indicate butchery. The possibility of pot polish, bone grease rendering, and digestion of bone is also addressed. Bone marrow extraction is interpreted as a standard part of processing animals for food, instead of the traditional interpretation of bone marrow extraction as evidence of nutritional stress. Large mammals, especially deer (*Odocoileus virginianus*) and bear (*Ursus americanus*) as well as large avians, namely turkey (*Meleagris gallopavo*) are analyzed for cut marks that show evidence of skinning, disarticulation, or defleshing. The frequency and location of faunal elements that show evidence of marrow extraction or cut marks will be analyzed to estimate patterns of butchery and transportation. Data is gathered by reanalyzing previously identified as well as unidentified faunal remains from the Fewkes site, and photographing cut marks for study.

**U14**

**THE IMPACT OF SOCIAL MEDIA: A CASE STUDY OF TRANSPORTATION SECURITY AGENCY'S ONLINE REPUTATION MANAGEMENT**

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Social media has the ability to impact an organization's reputation, positively or negatively, almost immediately. Recent studies have found that engaging in two-way communication between an organization and its publics via social media outlets, such as blogging, Twitter and Facebook, develop audience participation in crisis communication and can help the organization maintain its positive reputation or repair damage done because of a crisis. This case study will examine how the Transportation Security Administration (TSA) used social media to respond to and engage with its publics regarding the full-body pat-downs or body scan option. The researcher will look at the TSA's blog and Twitter and will evaluate the responses and the effectiveness of its communication strategy. Using reputation management as the foundation, this study will not only assess the steps taken by the TSA regarding its portrayal online, but also make recommendations for reputation management using social media for future similar situations.

**U15**

## **EFFECTS OF PREFERRED / NON-PREFERRED MUSIC ON WINGATE ANAEROBIC PERFORMANCE**

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Music's effect on aerobic performance has been studied in various ways. However, limited research has studied the effects of music on anaerobic performance. **PURPOSE:** The purpose of this study was to examine the effects of preferred and non-preferred music on untrained individuals during a Wingate Anaerobic Test (WAnT). **METHODS:** Participants included students attending a southeastern university ( $N = 10$ , 5 males, 5 females) ranging in age of 18 years to 26 years. Each participant had a fatigue index of greater than 45 percent obtained during Trial 1 indicating their untrained status. Using a with-in participant design, participants completed 3 trials of the 30 second WAnT. Trial 1 did not involve music in order to determine if the individual was untrained. Trials 2 and 3 consisted of either preferred or non-preferred music at 150 beats per minute. The participants were randomly assigned the music condition during Trial 2 and the treatment was reversed in Trial 3 for a counterbalanced design. During each trial the participants' heart rate, blood pressure, height, and weight were taken. Each trial consisted of resting measurements (heart rate, blood pressure, height, and weight), a 3-5 minute warm-up where the participant began to listen to music, the 30 second WAnT followed by a 3-5 minute cool down where heart rate and blood pressure were recorded post-test. **RESULTS:** A dependent t test will be used to analyze how music selection affects anaerobic performance assessed by the WAnT. **CONCLUSIONS:** If a difference is found, it will provide evidence that music has an effect on anaerobic performance.



**U16**

**DESIGNING, PREPARING, AND TESTING SAMPLE CONCRETE MIXTURES: UTILIZING THE ABSOLUTE VOLUME METHOD IN DETERMINING MIX PROPORTIONS FOR ACHIEVING TARGETED PROPERTIES**

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The objective of concrete mixture design is to establish the proper quantity of ingredients necessary to produce the volume desired, and to determine the most economical and practical combination of available materials with respect to the performance requirements under particular conditions of use. To fulfill this objective, a properly proportioned concrete mixture should achieve acceptable workability, durability, strength, and uniform appearance. In addition to the mixture constituents themselves, the design characteristics are also influenced by the proportions used, placement conditions, finishing techniques, curing practices, and the service environment. In order to determine materials and their proportions for the mix, it is necessary to analyze the given specifications: required workability, necessary water-to-cement ratio for strength or durability, specified compressive or flexural strength, environmental exposure, necessary air content, heat of hydration, type of structure, any other specific requirement, such as proportions for cementitious materials. After thorough analysis of targeted specifications, the approximate mix design proportions can be determined from the Absolute Volume Method (ACI 211.1)

**U17**

## **FLUORESCENT AND BIOSENSOR DETECTION OF ANTHRAX-SIMULATING SPORES**

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In light of the 2001 American anthrax attacks, the prospect of another intentional release of anthrax spores is a plausible and intimidating possibility. Anthrax is particularly menacing because of its ability to quickly spread over long distances, as well as its ambiguous symptoms followed by rapid decline and death. This swiftness necessitates a quick, precise method of detecting anthrax spores. The purpose of these experiments was to compare the capabilities of fluorescent detection, a current method, with those of a flow cell biosensor, using anthrax-simulating spores. This biosensor utilizes the tracking of electromagnetic waves that travel across the surface of photonic band gap material-covered slides. When antibody binds to its target spore, a wave shift occurs, which reveals the spore's identity without the use of fluorescent markers. Detection of spores was achieved, both with fluorescent antibodies and the biosensor, and the minimum number of spores required for detection is comparable for the two methods. This biosensor could be a viable alternative to older, more time-consuming methods of detection, and, by virtue of its speed, give victims of an anthrax attack a better chance of survival.

**U18**

**FROM RED TO GREEN: THE PROGRESSION OF INDIAN AGRICULTURE FROM INDEPENDENCE TO THE GREEN REVOLUTION**

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My research examined the factors that affected economic decision-making in India from 1947-1967, as well as the political contexts in which agricultural decisions were made. My research particularly focused on the Green Revolution in the 60s and examined why the Indian government implemented Green Revolution methods, which was a marked departure from their previous agricultural methods. This decision was the result of considerable U.S. pressure at a time of crisis in Indian food stability. This Green Revolution is still debated today with proponents and detractors around the world. The methods used by the U.S. also had ramifications for U.S. Indian relations for years to come.

**U19**

## **THE EFFECTS OF THE SECONDARY TICKET MARKET**

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Recently, there has been much debate over ticket scalping, i.e. buying multiple event tickets for face value from the official venue and then reselling them to other consumers for a profit. The controversy arises from claims that, first, this practice harms fans by forcing some of them to pay higher prices than they would otherwise, and second, that the venues themselves are harmed by the loss of customers at the events. For our project, we wanted to analyze the effect of the secondary ticket market (both organized and private) for sporting and/or musical events. We hope to determine if there is a net benefit or loss to society from these practices being legal, and therefore, whether or not laws should be created to prevent them. Furthermore, if ticket scalping does prove to be harmful, we would like to examine what types of laws will be most effective in correcting the harm. Many of the people currently against scalping itself, are afraid that proposed legislation would cause more harm than good. This poses an interesting dilemma that could help us with our study.

U20

## FERMENTATIVE CONVERSION OF GLUCOSE DERIVED FROM KENAF PULP INTO ETHANOL

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The goal of this study is to evaluate the possibility of converting the sugar precursors derived from cellulase digestion of kenaf pulp for the production of ethanol for use as biofuel additives. In order to convert the crystalline cellulosic form to the amorphous form amenable to the enzymatic hydrolysis of the glycosidic bond, kenaf pulp samples were subjected to different base pre-treatment processes. The pulp samples that were subjected to microwave-assisted pre-treatment with 2% and 5 % sodium hydroxide at temperature of 50 °C produced a significantly higher glucose yield when digested with cellulase from *Trichoderma reesei* compared to the pulp pre-treated with sodium hydroxide using conventional heating. Since the microwave-assisted base pre-treatment processes were more effective in the conversion of the crystalline cellulose to the amorphous form producing more sugar, the sugars from these samples were collected for fermentation. Two yeast strains, K1-V1116 YEBrL4 and K1-V1116 MGEt2, previously shown to produce and tolerate higher concentration of ethanol were used in this study. The ethanol produced from the fermentation of the sugar from kenaf was analyzed by a gas chromatograph with a flame ionization detector. Formation of ethanol is indicative that the yeast strains were not inhibited by the presences of any residual phenolic byproducts of the lignocellulosic digestion of kenaf pulp. Raman microscopy was used to study the structural changes in the kenaf fibers after the pre-treatment process as well as after the cellulase digestion.

U21

## SNOW WHITE: A CINEMATIC STUDY

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An intensive study of a well-known female coming of age fairy tale, *Snow White*, is presented. The changes in perceptions of sexuality and gender role expectations of young women from the earliest written versions to post-modern versions of this fairy tale in literature and recently, the modern media form of film are compared. The overall questions explored in this work are just exactly how profound is the shift from traditional fairy tales in comparison to the motif changes in modern and postmodern retellings and revisionings. The creative aspect is a story that explores the current issues facing young women in their transition from adolescence to adulthood as they attempt define themselves in a society that still has conservative roles and expectations for young women.

U22

## HOW THE FINANCIAL CRISIS AFFECTED HOUSEHOLD WEALTH

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Using data from the Panel Study of Income Dynamics, the time-series behavior of household wealth in the United States for the years 2003-2009 (pre/post financial crisis) is documented. The time-series behavior of wealth shows three main results. First, housing / real estate makes up the majority of household wealth; roughly 72%. Second, wealth has significantly fallen post-crisis. Regression analysis shows that real wealth fell by \$26,000. Finally, the post financial crisis wealth of economic young households (those ages 18-30) has not been significantly affected. Alternatively, the economically old-aged households (those ages 56 and up) comprised the largest wealth reductions. Presumably, the old have been affected the most due to their deeper investment in housing and larger amount of total wealth.

**U23**

**INDUSTRY / UNIVERSITY STUDY ON APPLYING COLLOIDAL SILICATES TO IMPROVE CONCRETE PROPERTIES**

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This study began by a student developing a relationship with a material distributor that recently acquired a new product; the company sought MTSU's CIM laboratory to help determine the validity of many tests both past and future. The study follows American Society for Testing and Materials and German Institute for Standardization testing specifications to determine the effects of colloidal silicate applied topically to freshly poured concrete in order to provide data for a more detailed insight into their products and its various applications. Eight different concrete mix designs were developed to simulate different concrete environments in which the product would be applied. Each mix design was then tested for abrasion resistance, compressive strength, rapid chloride permeability, water penetration, moisture vapor transmission rate, relative humidity, dry shrinkage, plastic shrinkage, water retention, and microscopic penetration analysis. The data will be interpreted to understand the amount of which the colloidal silicate can penetrate, densify, harden, cure, block vapor transmission, strengthen, mitigate cracking and prevent dusting.



U24

## MOVEMENT OF GROUNDWATER ALONG FOLD HINGES IN CENTRAL RUTHERFORD COUNTY, TN

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The investigators measured 305 bedding plane attitudes and the strike of 408 joints in the gently folded carbonates of central Tennessee during the summer of 2010. They measured most bedding attitudes and joint orientations at outcrops along the West Fork of the Stones River and Lytle Creek in and near the western part of the City of Murfreesboro. The bedding plane attitudes define 20 high-order fold hinges, with 4 hinges trending  $305\pm 15^\circ$  and seven hinges trending  $035\pm 15^\circ$ . These high-order folds define a low-order synclinal hinge with a bearing of  $310^\circ$  and a plunge of less than  $1^\circ$ . The synclinal hinge intersects the West Fork of the Stones River at 3 locations, and the hinge runs along the western edge of the Stones River Mall in western Murfreesboro. Many of the measured joints strike  $305\pm 15^\circ$ , and dye trace data and a sinkhole map both indicate northwestward movement of groundwater within joints concentrated in the hinges of the low-order syncline and a high-order anticline.

U25

## THE EFFECTS OF PROPRIOCEPTIVE NEUROMUSCULAR FACILITATION STRETCHING ON VERTICAL JUMP PERFORMANCE

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Proprioceptive neuromuscular facilitation (PNF) stretching has previously focused on rehabilitation. Recently PNF has been used for training purposes however, there is inconclusive research regarding the effect of PNF stretching on athletic performance. **PURPOSE:** The purpose of this study was to examine the acute effects of three different PNF stretching methods: hold-relax, contract-relax, and hold-relax with agonist contraction on vertical jump performance. **METHODS:** Using a within-participant counterbalance design, female collegiate club volleyball players ( $N = 9$ ) completed four trials of a maximal effort countermovement vertical jump with 48 hours of rest between each trial. Prior to the vertical jump trials, the participants completed a 5-minute jog as a warm-up. Trial 1 was the control trial with no stretching. Trials 2-4 were the treatment trials with the participant randomly assigned to one of the PNF stretching methods. For each stretch, the participant's range of motion (ROM) was recorded using a goniometer and the participants' best vertical jump was determined using a Vertec. All data was collected within a 3-week time period. **RESULTS:** A repeated measures analysis of variance (RMANOVA) will be used to determine significant differences between vertical jump results. **CONCLUSIONS:** If the results show a significant increase in vertical jump performance with PNF stretching, it should be incorporated more often in the warm-up before athletic competition.

U26

## THE EFFECT OF CAFFEINE ON VERTICAL JUMP PERFORMANCE.

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Caffeine has been shown to improve aerobic performance. However, few studies have examined the effects of caffeine on anaerobic performance. **PURPOSE:** The purpose of this study was to examine the effects of caffeine (200 mg) on vertical jump performance in habitual and caffeine naive recreational active participants. **METHODS:** Participants included recreationally active male college students (N=7) who attended a university in the southeastern United States and were classified as habitual or caffeine naive users assessed by a 7- day food diary. A randomized double-blind, repeated measures, counterbalanced design was used and each participant completed 3 trials of the vertical jump with the average of 3 jumps being recorded. Trial 1 was used to record height, weight, standing reach, and wingspan as well as completing a vertical jump test using a Vertec to establish a baseline measurement. Each participant received a treatment (caffeine or placebo) in Trial 2 and the opposite treatment was received in Trial 3 for the counterbalanced design. During the treatment trials, heart rate was measured pre-treatment, 60 minutes after the treatment was ingested, and post-test immediately following the 3 vertical jump test. A full week of recovery was allowed between each trial. **RESULTS:** "Pending Data Analysis". A dependent t-test will be used to determine the differences in performance between caffeine and placebo. **CONCLUSIONS:** It is anticipated that naïve participants that consume caffeine supplementation will have a significantly greater vertical jump than habitual users. Also, it is anticipated that caffeine supplementation will produce a significantly greater vertical jump for all participants when compared to placebo.

U27

## COMPARATIVE GENOMICS OF *NERODIA SIPEDON* POPULATIONS FROM OHIO AND TENNESSEE

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*Nerodia sipedon* is a common aquatic snake that has populations found in two differing ecological regions within the U.S.: the southeastern states and the Great Lakes. Because of known physiological differences between the populations, and the possibility of reproductive isolation, our research involves comparative chondriome genomics to determine if the two populations are members of the same species. We are comparing the relatedness between the two populations by sequencing the complete mitochondrial chondriomes of representative individuals from Tennessee and Ohio. PCR amplified fragments of the mitochondrial genome followed by DNA sequencing is being used for de novo production of the chondriome sequence for each individual. We plan to compare SNP's (single nucleotide polymorphisms) and indels (insertion/deletions) between the two chondriomes to determine relatedness. Preliminary analysis of completed portions of both chondriomes found 16 SNP and indel differences in 3463 compared bases for a variance/length (v/l) calculation of 0.0046. The most highly sequenced chondriome is from humans, which have a v/l of 0.02837. This is much higher than the estimate we calculated from the individuals from the two *N. sipedon* populations, suggesting that they are indeed the same species.

## THE EFFECTIVENESS OF 12-STEP PROGRAMS

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Motivation. The purpose of this research is to explore MTSU students' beliefs and attitudes on the effectiveness and availability of 12-step programs. The sample ( $N=95$ ) consisted mainly of students ranging from 18-21 (68%) in age. This research explores the relationship between two distinct treatment approaches to helping substance abusers. The two approaches examine and compare formal "addiction treatment or rehabilitation", to "12-step" programs. Students are asked to rank their beliefs and attitudes on the effectiveness of 12-step programs, differences and similarities between treatment in rehabilitation facilities and 12-step programs, and the visibility of 12-step programs in communities. The research also poses pertinent questions including, "Is a 12-step program needed on campus?", and "Should drug rehabilitation programs be free?" Participants ( $N=95$ ) were MTSU undergraduate students with a mean age between 21 and 22 ( $M = 1.45$ ,  $SD = .726$ ). Ethnic backgrounds were White/European-American (71.6%), African-American (20%), Latino (1.1%), and Native American (1.1%) Methods. Using a convenience sampling technique, participants were recruited from Peck Hall, Walker library courtyard, and the Business & Aerospace building. The instrument used to collect data was a survey questionnaire with 26 items. Results. Early findings suggest a majority of participants (88.4%) either strongly agreed or agreed that "every community should have a 12-step program". When asked if drug rehabilitation programs should be free, age appeared to influence participant's attitudes. Participants 25 years of age and older, responded "no" (23.1%) compared to participants ranging from 18-21 (12.3%) and those ranging from 22-24 (11.8%).

U29

## INTEROCEPTIVE AWARENESS AND EATING DISORDERS RISK AMONG FEMALE HIGH SCHOOL ATHLETES AND NON-ATHLETES

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Interoceptive awareness is the ability to identify feelings and bodily signals and to accurately interpret their connection. Research suggests that those individuals who are at high risk for eating disorders are more likely to be interoceptively deficient, meaning they have difficulty understanding their feelings and accurately interpreting their bodily signals such as stomach growling, rapid heartbeat, etc. Because high school females are a high-risk population for eating disorders risk, and adolescents are going through developmental changes both physically and emotionally, this age group was the focus of the current study. The primary purpose of this study was to assess the interoceptive deficiency (ID) of this group. A second goal was to evaluate the relationship of ID to specific eating disorders risk factors such as drive for thinness and body dissatisfaction. Sixty high school females participated in the study. Three groups of 20 girls participated: dance/cheerleaders, team athletes, and non-athletes. Each group was matched by age, year in school, ethnicity, and family structure. All girls completed the Eating Disorders Inventory-3, a demographic questionnaire, and an athletic participation survey. Results show about 20% of the girls indicate a moderate to high rate of interoceptive deficiency. Further, 30% indicate moderate to high risk on the Eating Disorders Risk composite score. Correlational analyses show ID was significantly correlated with the drive for thinness, body dissatisfaction, bulimia, and overall eating disorder risk subscales of the EDI-3, but was not significantly correlated with Body Mass Index. The pattern of correlations was similar for nonathletes and team athletes, but that pattern was not found for the dance team/cheerleaders group. Level of ID was not significant across the three athletic groups.

U30

## ARE MEMORIES FOR TASTE VULNERABLE TO A SENSORY CONFIRMATION BIAS?

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Knowledge of food ingredients can enhance or hinder (depending on the information) a consumer's ability to detect key flavors and textures. The present study explored whether such information also alters consumers' memory of taste sensations. Specifically, we examined whether consumers would be more likely to remember, and exaggerate the intensity of, expectation-consistent flavors and textures when recalling the taste of a previously consumed food item. To answer these questions, we asked 91 undergraduates to consume dark chocolate that either did or did not contain sea salt. Beforehand, participants were shown the product's packaging. For participants in the accurate information condition, the chocolate was presented in its original wrapper. The wrapper of the chocolate containing sea salt had an image of salt crystals next to chocolate squares and it listed the phrase "with added sea salt." The wrapper of the chocolate without salt was identical except that it did not include this image or phrase. For participants in the misinformation condition, the product packaging was switched. While eating the chocolate, participants listed adjectives that described its flavor and texture. Next, participants rated the chocolate on six flavor dimensions (e.g., salty) and four texture dimensions (e.g., gritty) provided by the experimenter. Then, after completing cognitive tasks unrelated to food, participants freely recalled (in writing) the flavors and textures of the chocolate they had previously consumed. Finally, relying on their memory of the chocolate's taste, participants provided intensity ratings for the flavor and texture dimensions provided earlier by the experimenter. Consistent with prior findings regarding a sensory confirmation bias in taste perception, ingredient information did affect participants' "in the moment" taste experience. However, participants were not especially likely to recall (or to subsequently exaggerate the intensity ratings of) expectation-consistent flavors and textures.

U31

## PH DEPENDENCE OF RAMAN SPECTRAL SIGNALS OF AMINOBIPHENYL ISOMERS ADSORBED ON GOLD OR SILVER COLLOIDAL NANOPARTICLES

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Preliminary studies have shown that 4-aminobiphenyl (4-ABP), a potent carcinogen found in tobacco smoke and implicated in its contribution to lung and bladder cancer, can be detected at very low concentrations using Surface enhanced Raman spectroscopy (SERS). The 4-ABP molecules adsorbed on the surfaces of colloidal silver or gold nanoparticles produce drastically enhanced Raman signals relative to 4-ABP samples without the silver or gold colloids. On the contrary, the structurally similar 3-aminobiphenyl and 2-aminobiphenyl can only be detected by SERS with significantly lower sensitivity. The SERS enhancement efficiencies of gold and silver colloids are compared for all the three aminobiphenyl isomers. The Raman spectral differences of the aminobiphenyl isomers are noted and discussed in terms of their chemisorptions characteristics. Due to the influence of the shape and size distribution of the nanoparticles, colloidal silver and gold nanoparticles have been characterized by transmission electron microscopy (TEM) in conjunction with image processing software in order to correlate the physical characteristics of particles to the degree of Raman signal enhancement. One mechanism of the SERS effect is the charge transfer associated with the adsorption of amino group in 4-ABP onto gold or silver surface. Due to pH dependence of the degree of protonation for the amino group in 4-ABP, Raman spectra of samples measured in different pH buffers are used to study the adsorption characteristics encountered in SERS phenomena. Specifically, the change in the positions and intensities of Raman peaks for 4-ABP at different sample pH values has been observed.



**U32**

## **EFFECTS OF DENSIFIERS ON CONCRETE PROPERTIES**

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Our Concrete Industry Management team will explain and present the effects of densifiers on concrete properties. Research on absorption by submerging and boiling techniques will allow us to measure the amount of absorption. Measurements in different states such as a natural state, oven dry state, a submerged and fully absorbed state and surface dry state will show exactly how much our properties and surfaces can and cannot absorb. Along with strength testing by compression, we can present these effects from densifiers. With densifiers, concrete properties should not allow as much absorption as those without densifiers. This will enable the concrete to withstand moisture related problems better.

**U33**

## **A STUDY OF DELAYED DISENGAGEMENT OF ATTENTION: PICTURES VERSUS WORDS**

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Emotional events can greatly shape our memory during and preceding the traumatizing moment. But what type of emotional stimuli capture and hold our attention the most? In this study we compared the effect of emotional pictures and words on individuals' memory of following neutral words. Sixty-four participants were shown twenty-eight sets of randomly paired stimuli. Each paired set contained either a picture followed by a word or a word followed by a word. The first stimulus was an emotional picture, emotional word, neutral picture, or a neutral word. The second stimulus was always a neutral target word. Participants were asked to rate each stimulus as either emotional or non-emotional as they appeared. Participants were then given a free recall task and asked to recall only the target words. They were then given a surprise recognition task, where they were asked to rate, on a scale of 1 to 5, how sure they were that a given target word was presented. Our recognition task data demonstrated that participants recognized more target words following neutral pictures than emotional pictures. It was also demonstrated that target words following emotional words were remembered more than target words following neutral words. This data proved our hypothesis correct, as emotional pictures clearly grabbed and retained participants' attention more than any other stimulus.

**U34**

## **VOCABULARY, MORPHOLOGY, AND PROSODY IN ENGLISH LANGUAGE LEARNERS**

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Reading comprehension is strongly influenced by both whole word knowledge and morphological skills. The current study was the first successful pilot test of two newly developed morphology and prosody measures. English language learners (ELLs) and native speakers of English in grades 2 through 5 completed three computer-based measurements that collected both accuracy and reaction time. While native English speakers were generally faster and more accurate than the ELLs on the reading tasks, the differences were not always significant which was possibly due to sample size. For all participants, in the prosody task, both accuracy and reaction time were significantly related to word recognition outcomes. In the morphology task, accuracy and reaction time were less strongly related to word recognition outcomes. Findings for the morphology task suggest that both the task itself and the word recognition outcome need to be improved before further testing with children is done.

**U35**

## **A COMPARISON OF THE ACUTE EFFECTS OF STATIC & PROIOCEPTIVE NEUROMUSCULAR FACILITATION STRETCHING ON THE HIP ADDUCTORS**

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Previous studies have compared the effects of Proprioceptive Neuromuscular Facilitation (PNF) and static stretching on the range of motion (ROM) of larger muscle groups, such as hamstrings and hip flexors. However, little research has focused on smaller muscle groups. **PURPOSE:** The purpose of this study was to examine the acute effects of static and PNF stretching on ROM in the hip adductor muscles. **METHODS:** The participants ( $N = 15$ , 7 male, 8 female) were from the southeastern United States ranging in ages from 19 to 26. Participants were required to lead a sedentary lifestyle (not performing resistance or cardiovascular exercise, and did not stretch on a daily basis) and had no history of hip injuries. Upon arrival to the testing facility, participants completed a standard 5-minute warm-up on a cycle ergometer followed by a pre-test to assess the participants' initial hip adductor ROM using a goniometer. Participants were randomly assigned into a stretching group (static or PNF) for trial 1. During trial 2, the treatment was reversed for a repeated measures counterbalance design. Each stretch was completed 3 times per trial and all testing was separated by 7 days. A post-test was performed on the participants to measure the amount of changes in their ROM following the two stretching protocols. **RESULTS:** A repeated measures analysis of variance will be used to test the differences in ROM with each stretch. **CONCLUSION:** If significant outcome is found, stretching protocols for not only sedentary individuals, but athletes alike, may be altered to decrease the chances of suffering an injury to the hip adductor muscle group.

U36

## A MORPHOLOGICAL AND MOLECULAR METHOD FOR ASSESSING THE EFFECTS OF POTENTIAL TOXINS ON ZEBRAFISH

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Toxicological studies are often designed to determine the toxicity and/or teratogenic properties of a compound, but may miss or inadequately measure more subtle effects. When developing embryos are subjected to a potential toxin, an effect on the overall rate of development is possible. To enable careful measurement of such an effect, a set of methods was developed for use with zebrafish (*Danio rerio*) embryos. The transparency of these embryos, as well as their rapid development, makes them an ideal choice as a model for vertebrate development. Time-lapse video microscopy was used to record morphological changes continuously throughout embryogenesis. Morphological “milestones” were chosen for their uniqueness in order to minimize ambiguity about the timing of their appearance. Plotting the appearance of these milestones over time yields a clear representation of developmental rate. As a second measure of rate that does not rely on morphology, reverse transcriptase polymerase chain reaction (RT-PCR) was performed on RNA extracted from embryos at specific times after fertilization to monitor the detectable onset of expression of the developmentally regulated genes *shh*, *sox2*, and *tnnt1* (as well as the control gene *ef1a*). These genes are expressed only at specific points in development and thus provide a set of molecular “milestones” that can be used to corroborate the morphological data. The utility of these methods was tested on embryos developing at either the preferred temperature of 28.5°C or at 24.5°C, a temperature known to slow development without causing abnormalities and are convenient for monitoring the rate of development. The methods will also be applied to embryos exposed to sublethal doses of silver nanoparticles, where the suggestion of developmental delay has been observed.

U37

## COLLEGE STUDENTS BELIEFS, ATTITUDES AND KNOWLEDGE CONCERNING HOSPICE CARE

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Previous research has shown that African Americans are less likely to know about and consider hospice services when compared to Caucasians. The purpose of this study is to explore students currently attending MTSU, on their attitudes, beliefs and knowledge about hospice service as it relates to gender, ethnicity and age. Research topics include past experience, current knowledge and personal end of life wishes. The sample ( $N=51$ ) was largely made up of Caucasians (37 or 72.5%), followed by African Americans (9 or 17.6%). There were more females (32 or 62.7%) than males (15 or 29.4%). Sample mean age was 25 ( $M = 25.62$ ,  $SD = 6.43$ ). A majority of participants were self-reported juniors (16 or 31.4%) or seniors (24 or 47.1%). Using a convenience sampling technique, participants were recruited from KUC, KOM, Peck Hall and LRC during a two week period. Data were collected using a survey questionnaire with 26 quantitative items and one qualitative. Data were analyzed using descriptive statistics. A majority of female participants (68.8%) "Strongly agreed" or "agreed" to "wanting hospice care", when compared to male participants which were less likely to agree (40%). More African Americans 77.8% reported knowing someone who had received hospice services, compared to 63.9% of Caucasian. Yet, only 33.3% of African Americans agreed to "wanting hospice care if they qualified" compared to 67.5% of Caucasians.

U38

## CREATING HIGHER REACTIVITY SLAG CEMENT UTILIZING WASTE LIMESTONE FINES

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The goal of the SlagCem study is to decide whether adding ground limestone to slag has a major effect on the heat of hydration or early compressive strength of concrete when added to the mixture. Slag is an after product of steel manufacturing, and is known to contribute to later compressive strengths when added as a supplementary cementitious material into a concrete mix. There are three grades of slag 80, 100, and 120. Grade 120 slag is the most reactive of the three grades, but is also the most expensive. Grade 120 is the most expensive because it is ground longer and therefore the manufacturing process of 120 grade slag takes longer and is more expensive. It is proposed that the addition of ground limestone to slag will enhance the properties of 80 and 100 grade slag, to react more like 120 grade slag. Research has been conducted to examine whether or not the addition of ground limestone to slag does actually enhance the properties of the combined product to give higher early compressive strengths and earlier set times visible by examining heat of hydration.

**U39**

**USING THECAMOEBIANS AS INDICATORS OF ENVIRONMENTAL CHANGE  
WITHIN TODDS LAKE, MURFREESBORO**

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Murfreesboro gets its drinking water from the Stones River watershed. Rapid urban growth in Rutherford County is thought to have impacted the watershed. Todds Lake, located beside Black Fox Elementary on S. Rutherford Blvd, is part of the Stones River Watershed and is possibly polluted by runoff from strip malls and a gas station. Using microscopic invertebrates, called the camoebians, we can study the water quality of a given area with little or no disturbance to the environment. The camoebians have shells that preserve easily, and have been around since the Early Jurassic, about 200 million years ago. Being benthic, living at or near the bottom of a body of water, these organisms are able to give a good indication of conditions at the bottom of a freshwater environment. They are very sensitive to changes in the environment and have been used as indicators of pollution in studies from Europe and North America. With shells that preserve readily they can be used to study ecological changes for decades to centuries. In this study we will collect the camoebians from Todds Lake. Both surface samples and core samples will be studied to examine the impact of urban growth on Todds Lake and the Stones River watershed.



U40

## **DETERMINING HIGH STRENGTH, LIGHT WEIGHT AND ENVIRONMENTAL PERFORMANCE FOR SOUTHEAST CONCRETE COMPETITION**

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Our senior lab group decided to compete in the ASCE concrete cube competition. The competition is scored in three categories: ultimate strength, strength-to-weight ratio, and percent of cement replacement. The goal of our team is to create mortar cube specimens that are composed of a unique composition of materials. These unique compositions have been used rarely, if at all, in the concrete industry and some of the materials have never been used in concrete. We think these materials will give us an upper hand in the competition. Our experiments with these materials could also provide data to promote new use of these materials in the concrete industry. The most difficult qualification for this competition is the weight standard of no more than 215 grams per cube. The aggregates we have selected are some of the most advanced lightweight aggregates known to man. The lightweight aggregates allow us to use a wide variety of cementitious materials to take advantage of the percent replacement scoring category. The lightweight aggregate allow us to use more of the heavy cementitious materials that will allow our cubes to reach higher strengths with a high cement replacement. Some of our mix designs will contain up to 80% cement replacement to take advantage of the percent of cement replacement scoring category. We believe the cement replacement category is the most heavily weighted scoring category for this competition. We will take full advantage of our cementitious materials knowledge to create a well-rounded mortar cube mix design. Our secret weapon is our steam curing method that promotes rapid strength gain.

**U41**

## **SYNTHESIS OF CYCLOPROPYL PEPTIDOMIMETICS AS POTENTIAL ALZHEIMER'S AND ANTIVIRAL DRUGS**

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An efficient synthesis of a cyclopropyl peptidomimetic core has been developed that allows access to a number of potential novel medicinal agents. Compounds are synthesized from commercially available protected amino acids to afford potential enzyme inhibitors with variations at the P1 site based on the amino acid side chain. Beta-secretase (BACE) is an enzyme involved in the production of amyloid beta protein, which is implicated in the progression of Alzheimer's disease. In the past ten years, a number of BACE inhibitors have progressed to clinical development and show potential as novel Alzheimer's drugs. The majority of these inhibitors are peptidomimetics with either an isobutyl or benzyl group in the P1 site. Presented here are potential inhibitors of BACE that have been prepared from CBz-leucine and have a cyclopropyl peptidomimetic backbone. Using a different amino acid, CBz-proline, the same backbone is being used to develop a series of potential antivirals targeting HSV NS3 protease.

**U42**

## **THE ELASTICITY OF MURINE RED BLOOD CELLS AND MURINE SICKLE CELL RED BLOOD CELLS**

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We have studied the elasticity of red blood cells (RBCs) extracted from normal mice and mice with sickle cell disorder (SCD) using the method of optical tweezers, which involves laser trapping of the cells. Blood samples from normal mice and mice with SCD were obtained from Dr. Derek Persons' research lab at Saint Jude Children's Research Hospital. The samples were diluted with Fetal Bovine Serum (FBS) and mounted on a nanostage, which can be moved back and forth on intervals as small as nanometers. The RBCs were then individually held by the laser trap as the nanostage was oscillated at various speeds, such that the FBS solution passing over the cells would induce a sheer deformation of the RBCs. Using a digital camera mounted to the microscope, we photographed the deformed cells; and using the program Image Pro Plus, we analyzed the % deformation for each cell. The results for the RBCs with SCD have revealed two fundamental and interesting properties. The first is that the cells have a wide range of sizes: 4-8  $\mu\text{m}$  in diameter. The second interesting property is that the various sizes correspond to varying magnitudes of % deformation for the same oscillation speed. The normal blood samples, however, typically exhibit uniform size  $\sim 4 \mu\text{m}$  in diameter; and, their response to deformations is generally consistent. But most importantly, the extrapolation of these measurements indicates that the deformation of the normal RBCs is significantly higher than the Sickle Cell RBCs – physical confirmation that Sickle Cell RBCs are indeed less elastic than normal cells.

**U43**

**SCIENCE-BASED EXPERIENTIAL LEARNING IN THE GREENHOUSE FOR SPECIAL NEEDS STUDENTS: LINKING SECONDARY TO COLLEGE**

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Horticulture therapy has been demonstrated to successfully enhance learning in many educational settings. Specifically, horticulture therapy has been integrated into curriculum aimed at teaching special needs students useful skills and knowledge. This paper describes a cooperative effort between a high school special education department and a plant and soil science program at the university level. Through addressing concepts and skills including problem solving, social skills, mental and muscular skills, and self-awareness, both the secondary and higher education units have benefited. This integration of horticulture therapy and service learning has produced initial positive results in all involved parties. This cooperation is being further developed to include resources for family members to participate with student's activities and aiding in the post-graduation transition. Although still in the early stages of development, we are encouraged by what has been achieved, and plan to continue to build upon this success with the motto; "don't focus on where we are...look at where we are going".

U44

## CELLULAR ONCOGENE EXPRESSION DURING *LEGIONELLA PNEUMOPHILA* INFECTION

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Oncogenes are mutated forms of normal cellular genes. They contribute to the development of cancer. Most oncogenes require additional steps such as mutations in other genes or environmental factors to cause cancer. Several species of bacteria are known to alter normal genes to become oncogenes. *Legionella pneumophila* might also possess this ability because it can enter and replicate inside the cells it infects, thus affecting cellular function. K-ras protein is a eukaryotic GTPase and controls many signal transduction pathways involved in cell differentiation and growth. Mutations in K-ras can result in tumor formation. An increase in K-ras oncogene expression is associated with lung adenocarcinomas. *L. pneumophila* causes infection of the lungs. Therefore, we made a two-hit hypothesis that a mutation in K-ras may not necessarily lead to cancer development, but a second “hit” or change to a cellular gene that controls cell growth, such as might occur with *L. pneumophila* infection, might also be required for cancer to develop. In our studies, *L. pneumophila* was expected to trigger an increase in K-ras in the human lung epithelial cell line A549. Since A549 cells possess the mutated form of K-ras, changes in the steady state level of RNA expression of the oncogene were measured. Giemsa staining showed *L. pneumophila* replicated within A549 cells, finally lysing and killing its host. Using qRT-PCR to quantitate RNA, *L. pneumophila* infected cells did not have more K-ras RNA than uninfected, implying that they did not make more K-ras protein. REST software confirmed the qRT-PCR results showing that there was no significant difference in RNA levels between treated and untreated cells. Therefore, our studies do not support our second “hit”, suggesting *L. pneumophila* does not have a role in the development of K-ras-associated lung cancer in patients who have been infected with the bacterium.

**U45**

## **EVALUATION OF MICROWAVE-ASSISTED SYNTHESIS FOR THE ESTERIFICATION OF GLYCEROL**

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Biodiesel production has seen an increase worldwide over the recent years due to the mounting concern over global warming and the environment. Glycerol, the main by-product of biodiesel, is a versatile chemical substance that can be utilized for a multitude of applications including its use as biofuel additives. However, due to the sharp increase of biodiesel production, the supply of glycerol has exceeded demands. Therefore, it has become imperative to find new glycerol applications and synthetic routes for producing other glycerol-derived chemicals. Using a microwave method is a particularly attractive for exploring strategies for converting glycerol into chemicals with broader applications. This project focuses on the preparation of fully acetylated triacetin as well as partially acetylated glycerols because of their potential application as fuel additives in gasoline and diesel products. Experimental variables including catalyst type, optimal reaction temperature and pressure, microwave duration, and reactant ratios were investigated in the microwave-assisted conversion of glycerol to mono-, di-, and tri-acetylated glycerol. The ratios of these products were measured by a gas chromatograph equipped with a Carbowax or polyethylene glycol-coated column and a flame ionization detector.

U46

## THE EFFECTS OF PASSIVE AND ACTIVE WARM-UPS ON SPRINT PERFORMANCE

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Warm-up activities are a vital part of any exercise regimen however; debate exists as to the most effective type of warm-up. **PURPOSE:** The purpose of this study was to examine the effects of passive and active warm-ups on 36-m sprint performance. **METHODS:** Participants in the study were males ( $N=21$ ) between the ages of 18 and 25 who completed cardiorespiratory exercise an average of 3-5 times per week. Using a within-participant design, participants completed 3 trials of a 36-m sprint test separated by one week, over a three week time period. Participants were randomly assigned to one of three conditions: no warm-up (control), active warm-up, or passive warm-up. **RESULTS and CONCLUSION.** It is believed that both warm-ups conditions will increase performance compared to the control condition and that the active warm-up condition will result in the greatest increase in sprint performance.

U47

## EFFICACY OF GENE THERAPY IN THE BERK SICKLE CELL MOUSE MODEL

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We have worked alongside Dr. Persons of St. Jude Research Hospital in order to test the efficacy of his gene therapy technique of alleviating sickle cell anemia in mice. During this study, we quantitatively measured the elasticity of mice erythrocytes (Red Blood Cells, or RBCs) using an optical tweezers setup. For the purpose of adequate dilution and decent stretching the cells were placed in an environment of fetal bovine serum. The RBC deformation is the product of a viscous drag force created by its environment oscillating upon a nanostage and countering the restoring force of the laser trap (or tweezers) that attempt to keep the cell in place. Calibration of the tweezers was done in order to relate the velocities of the oscillations to the force the trap exerts on the cell. The known viscosity of the fetal bovine serum was used to estimate the drag forces experienced by the RBCs. Data was then taken relating these velocities and forces to the total percent deformation of the RBCs. The cells studied included normal mice RBCs, RBCs of mice afflicted with sickle cell anemia, as well as previously sickle cell anemic treated mice RBCs. With Dr. Persons' treatment, we found that cured mice were devoid of sickle RBCs, but still contained a high percentage of other anemic cells. It is interesting to note, however, that we found that the elasticity of the normal RBCs found within the treated mice exceed that of the original healthy mice RBCs. Also, we found an intriguing size discrepancy between each of the "normal" RBCs in each of the different donor types.



U48

## SYNTHESIS OF LABELLED MEVALONOLACTONE

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Mevalonolactone is an early intermediate in steroid biosynthesis, and steroids are biomarkers in a number of organisms. Dinoflagellates in particular, produce an array of steroids, and their identification is useful in characterizing these organisms. Although some steroids can be identified by GC-MS techniques, the use of isotope-labeled analogs can be used to help to identify biosynthetic pathways active in the organisms. Access to mevalonolactone labeled on the methyl group would aid in the identification of the steroid biomarkers in dinoflagellates, however the only reported synthesis lacks reproducibility. Although there are a number of synthetic approaches to mevalonolactone reported in the literature, there are very few that are amenable to the synthesis of a methyl-labeled analog. A new approach to labeled mevalonolactone is reported here. Initial synthesis has been tested on the non-labeled material and synthesis of the labeled analog is in progress. Growth of dinoflagellates in the presence of the labeled material is expected to provide insight into the biosynthesis of steroids in the organism.

U49

## EFFECTIVENESS AND STABILITY OF AN ENZYMATIC ENDOSCOPE PRE-CLEANING SYSTEM

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Endoscopes are precision instruments that are used to look inside a hollow cavity of the body. These imaging devices are essential to the field of medicine and allow the examination of a person's body for the purpose of confirming a diagnosis, performing a biopsy, or surgery. After each use, these instruments must be carefully cleaned by flushing a disinfectant solution through its tube to remove gross contaminants, and then sterilized for the next medical procedure to avoid passing infections from one patient to another. Typically, enzymatic solutions that break down proteins and carbohydrates are used in a pre-cleaning phase. However, the enzymes can deteriorate over time leading to a decrease of enzymatic activity and increasing the risk of infection. The efficacy of one well-known cleaning solution studied was used as a test case. Methods were developed to quantify the ability of enzymatic cleaning solutions to breakdown proteins and carbohydrates. The shelf life of this cleaning solution was studied. An enzymatic assay using casein as a substrate was developed to measure the disinfectant's effectiveness in breaking down proteins. An assay to analyze the ability of the enzymatic cleaning solution to breakdown starch (carbohydrates) was also developed.

U50

## THE IMPACT OF THE RECENT GROWTH OF RUTHERFORD COUNTY ON THE ICHTHYOFAUNA OF THE STONES RIVER

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Rutherford County has grown 208% over the past 25 years, changing the land use throughout much of the Stones River watershed and potentially impacting the fish communities. The purpose of this study was to compare the composition of the ichthyofauna present within the river to the ichthyofauna documented in a 1986 survey. Sampling was conducted at six sites that had high biodiversity in the 1986 study. Each site was sampled during the fall of 2010 with a combination of 10 m beach seine, 3 m kick seine, and backpack electrofisher. All habitat types within the site were sampled. This survey found higher species richness at all six sample sites when compared to the previous study. This increased richness is mostly due to the presence of species that were found at other Stones River sites in the 1986 study but not at these six sites. However, some species were found during the current study that were not found in the past study, these were the shorthead redhorse (*Moxostoma macrolepidotum*), black redhorse (*Moxostoma duquesnei*), bedrock shiner (*Notropis rupestris*), bigeye chub (*Hybopsis amblops*), striped bass (*Morone saxatilis*), hybrid striped bass (*M. chrysops* x *M. saxatilis*), and yellow bullhead (*Ameiurus natalis*). Additionally, 5 species were found in the previous study that were not found in the current study for the same sites; tippecanoe darter (*Etheostoma tippecanoe*), slabrock darter (*Etheostoma smithi*), southern redbelly dace (*Phoxinus erythrogaster*), blacknose dace (*Rhinichthys atratulus*), and mimic shiner (*Notropis volucellus*). Three of these species; *E. smithi*, *P. erythrogaster*, and *R. atratulus*, are known to occur at other locations within the Stones River watershed. *N. volucellus* was found at multiple sites in the 1986 study, and not found at all in this study, while *H. amblops* was not found in the 1986 study, and was found in multiple sites in this study. Overall there seem to have been minimal changes in species composition within the watershed over the past 25 years, suggesting that population growth in Rutherford county has not drastically affected diversity of the Stones Rivers ichthyofauna.

U51

## OVERWEIGHT AND OBESITY: HYDROSTATIC WEIGHING VS. BMI

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Overweight status and obesity is an ever-growing concern here in the United States. The United States Department of Health and Human Services estimates that over 300,000 deaths per year can be attributed to obesity. With obesity rates and healthcare costs on the rise, more emphasis is being placed upon treatment of the overweight and obese. With all the new emphasis being placed on treatment, acceptable measures must be used to target correct populations. Most government data and statistics use BMI measures for results. Results from BMI calculations will be compared to Hydrostatic Weighing. Hydrostatic weighing is known as the gold standard for obtaining body composition. For this study conclusions will be drawn for comparison with government data using age, race, sex, exercise levels, and education levels. Currently data collection is in process and conclusions will be drawn using one way ANOVA with post-hoc analysis. Subjects' heights and weights will be taken for BMI index calculation ( $\text{kg} / \text{meters}^2$ ). Next a spirometer reading of forced vital capacity will be taken for entry into hydrostatic weighing program. Lastly subjects will enter hydrostatic weighing tank where underwater weight will be taken. The hydrostatic program allows for body fat percentages to be calculated using density. Proposed conclusions will include: that those with more education will have lower body fat percentages, that those with greater exercise numbers will have lower body fat percentages, that males will have higher body fat percentages, that as age and education level increase body fat percentages will decrease, that those of the black non-Hispanic race will have higher body fat percentages, and that BMI values greatly misrepresent the population at risk of health problems.

**U52**

**DEVELOPMENT AND TESTING OF A SENIOR LEVEL UNDERGRADUATE  
LABORATORY EXPERIMENT TO ANALYZE AMINO ACIDS**

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Acid-base chemistry is one of the most complex concepts in general chemistry, and one of the most difficult to teach. Students in Biochemistry must additionally grapple with the bi-functionality of amino acids, which have both an acidic chemical group and a basic amino group. This research is engaged to develop and test a laboratory experiment to help senior level Biochemistry students fully comprehend the multifaceted acid-base behavior of a simple, and a more complex amino acid. Beginning with a solution of the amino acid in the fully protonated form, a titration with sodium hydroxide is carried out to monitor the response of the amino acid to varying conditions of pH. A computer program is used to graph the data, and the student is challenged to explain the behavior at various points along the curve. By analyzing the inflection points, the student can identify the particular amino acid from molecular weight data and two or more acid dissociation constants. The experiment is being designed to utilize new, facile, rapid-response pH meters, which are being phased in to replace older technology. Students will first employ this experiment in the Fall 2011 Chem 4550 (Bioanalytical Chemistry) course.

**U53**

## **OPTIMIZING CONCRETE FLOOR TILES FOR SUSTAINABILITY AND LOADING PERFORMANCE**

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Tate Access Floors produce a concrete floor tile used in elevated office tile applications. MTSU Concrete Industry Management (CIM) is researching ways to improve the tiles for mix design sustainability and rolling load performance. Currently the mixture uses cement as its main binding material. The concrete industry has developed ways to use recycled byproducts in concrete other than cement that "greens" a mix for usage. This research looked at several byproducts for performance. Secondly, rolling load is an important in-service tile property. Mixtures in the past occasionally had a 90 day period of rolling load issues with small cracks forming within the tile. Fortunately no long term deflection problems were exhibited but Tate was interested in eliminating rolling load issues completely. Shrinkage and strength characteristics were varied by introducing a lightweight aggregate. This research will culminate with a cost effective, environmentally friendly, high performance concrete floor tile. Tate donated twenty floor tiles for the research. Ten were filled with the aggregate-free mix and ten were filled with the stalite mix. It is believed that the tiles filled with aggregate free mix are more susceptible to cracking at the beginning of the life cycle.

**U54**

## **SALARY CAPS AND COMPETITIVE BALANCE IN PROFESSIONAL SPORTS**

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This paper examines the effects of salary caps on competitive balance in professional sports leagues, specifically the National Basketball Association (NBA), National Hockey League (NHL), and National Football (NFL). It then uses these results to address the question of whether Major League Baseball (MLB) should adopt a salary cap. Data on win-loss records for each league was gathered, and then used to calculate competitive balance using methods featured in past studies on competitive balance. Statistical tests were then used to see if salary caps cause any statistically significant change in competitive balance. Empirical evidence from the study suggests that salary caps do not cause a change in competitive balance. The one exception is in the NBA, where competitive balance has decreased. This is a result of specific components of the NBA salary cap that differ from that of the NHL and NFL and allow teams to spend above the salary cap. This evidence would suggest that MLB would not benefit from adopting a salary cap.

U55

## ANALYSIS OF MUTANTS OF NUCLEOSIDE HYDROLASE FROM *E. COLI*

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Nucleoside hydrolase is an enzyme of the purine salvage pathway. Nucleoside hydrolase is a non-specific enzyme that catalyzes the hydrolysis of both purine and pyrimidine nucleosides in the turnover of nucleic acids. A recombinant form of the enzyme (rihC) has been cloned and a number of mutants have been prepared in which selected amino acids have been changed to determine the importance of these amino acids in the functioning of the enzyme. The original enzyme (wild-type) and the mutants have been purified by Ni resin affinity chromatography and the purity of the enzymes determined by sodium dodecyl sulfate-polyacrylamide gel electrophoresis. The Michaelis constant, which is a measure of the ability of a substrate to bind to an enzyme, was determined for the substrates inosine and uridine using the wild type enzyme. The Michaelis constant for the *E. coli* enzyme was compared to the Michaelis constant for nucleoside hydrolase isolated from other sources. The ability of the mutated enzymes to hydrolyze nucleosides was tested. One particularly important mutant was found to be the replacement of His244 with an alanine. In other nucleoside hydrolases, His244 is a critical residue that protonates the base of the target nucleoside. The same effect was observed in the *E. coli* enzyme. Replacement of His244 resulted in a large loss of activity when inosine, a purine, was used as the substrate. When the pyrimidine uridine was the substrate, a similar loss of activity was seen as that seen for purine. This is consistent with the proposed mechanism for the hydrolysis of pyrimidines being the same as that proposed for purines.



**U56**

## **RELIABILITY OF AU-SN AND SN-AG SOLDER JOINTS IN HIGH TEMPERATURE PACKAGING APPLICATIONS**

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Legislative and environmental pressures to ban lead in electronic devices has led to the development of new materials for power electronic packages and systems. Lead-free solders in these packages and systems can present a problem with the materials that surround them. Different coefficients of thermal expansion (CTE) for each material cause stresses to the mismatched interfaces as they reach their melting points. This research focuses on developing Au-Sn (gold-tin) and Sn-Ag (tin-silver) solder joints that can be used for automotive and electrical transmission applications that experience temperatures up to 200°C. The degradation of these solder joints under such operating conditions is imperative to better understand their reliability under peak conditions. To replicate such conditions the solder joints were attached between small silicon-based dies and direct bonded copper (DBC) substrates, and were then subjected to thermal cycling ranging from 5°C to 200°C. Analysis of the damage caused by thermal cycling was observed at regular intervals using high resolution X-ray radiography techniques, state-of-the-art Infrared imaging (IR), and high resolution microscopy. Using the data we were able to identify that voiding had occurred along the boundaries of the dies and solder joints during and after a 1000 thermal cycles. The stresses resulted from the loss in thermal properties and the presence of two different materials causing a mismatch in the CTE when temperature changes occurred during thermal cycling. This research suggests that Au-Sn and Sn-Ag solder joints are potential candidates for high temperature applications. Their ability to withstand temperatures up to 200°C indicates that these solders could be used in automotive applications. This research of lead-free solders is one of many ways to achieve a more environmentally sound partnership with modern technologies and demonstrates that these solders can perform just as well as their leaded counterparts in high temperature environments.

U57

## ISOLATION OF ADENOSINE DEAMINASE FROM ALASKA PEA SEEDS

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Adenosine deaminase, an inducible enzyme in animals and bacteria, catalyzes the conversion of adenosine to inosine by replacing an amino group with a hydroxyl group. A deficiency of this enzyme in humans results in severe combined immunodeficiency (SCID) resulting in susceptibility to infection often resulting in early death. The role of the enzyme in plants is not well understood, although it is believed to play a role in the turnover of nucleic acids. In this study, adenosine deaminase is being isolated from germinated Alaska pea seeds. Four days after germination, an initial extract was prepared by homogenizing seeds in 50 mM Tris pH 7.0 buffer. The extract was homogenized and adenosine deaminase precipitated by ammonium sulfate fractionation. The resulting precipitate was resuspended, dialyzed, and loaded onto a diethylaminoethyl cellulose Sephadex ion exchange column and eluted with a 0-1 M NaCl gradient. The resulting fractions containing adenosine deaminase activity were pooled, concentrated and loaded onto a Fast Protein Liquid chromatograph Mono Q ion exchange column which was also eluted with a 0-1 M NaCl. Fractions containing adenosine deaminase activity were pooled, concentrated and dialyzed to remove NaCl. Additional purification steps include gel filtration, aminohexyl chromatography, dye ligand chromatography, and hydrophobic interaction chromatography.

U58

**“DON'T ASK, DON'T TELL,” JUST LISTEN TO OUR SIDE**

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As homosexuality becomes a more accepted way of life in the United States, its place in the military remains a hot topic for the government and the people, especially those serving our country. The “Don’t Ask, Don’t Tell” policy, which restricts homosexual troops from revealing their sexual orientation, has been extensively covered in the news. This study, grounded in media framing theory, compares samples of “Don’t Ask, Don’t Tell” coverage in both *The New York Times* and *Fox News* and suggests that the two outlets treated the topic in strikingly different ways. By examining word frequency counts of the content of 15 articles from each news source, the study shows that *The New York Times* coverage referred to homosexuals using a range of terms, including “men,” “women,” “gays,” “lesbians,” and “people.” *Fox news*, by contrast, used only the term, “gay person.” The findings also demonstrate that *The New York Times* coverage of “Don’t Ask, Don’t Tell” remained neutral most of the time, while *Fox News* coverage of the policy tended to frame repeal of the policy negatively.

**U59**

## **DEVELOPMENT OF LABORATORY EXPERIMENTS FOR THE BIOCHEMICAL LABORATORY**

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Experience in the laboratory is central to the education of a biochemist or chemist. However laboratory teaching experiments operate under several constraints. The most important constraint is that the experiment must illustrate an important technique or principle. Almost as important are the time restrictions that are placed upon the experiment. One experiment under development is Western blotting of proteins, a widely used technique in the biochemistry research lab. In this experiment a complex mixture of proteins is separated by sodium dodecyl sulfate-polyacrylamide gel electrophoresis. However at this point the identity of the individual proteins on the gel cannot be determined solely on the distance they migrated on the gel. Additional analysis must be done to verify the identity of the proteins on the gel. One such technique is the Western Blot, in which proteins are transferred to a nitrocellulose membrane and treated with an antibody. Depending on the antibody used, it will bind to a specific protein allowing its identification. In this experiment, a mixture of muscle proteins from various fish species are used as the sample proteins. This project is designed to optimize the procedures of the Western blot technique to allow it to be done in a single laboratory period.

**U60**

## **THE RELATIONSHIP BETWEEN INTIMATE PARTNER VIOLENCE AND MENTAL HEALTH STATUS AMONG TENNESSEE HIGH SCHOOL STUDENTS**

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Purpose: Existing studies indicate that all forms of intimate partner violence (IPV) including physical forms causes mental distress. However, most research into IPV focus on adults. This study assessed the relationship between IPV and mental health status among high school students in Tennessee. Methods: Using data from the self-administered 2009 Tennessee Youth Risk Behavior Survey. Selected independent variable was IPV victimization. The dependent variables were; signs of depression, suicide ideation, suicide planning and, suicide attempt. Results: Odds ratios were calculated for each variable examined. Significant results included experiencing IPV and signs of depression, (OR= 3.28 [2.32-4.66]), IPV and suicide ideation, (OR= 3.17 [2.75-3.67]), IPV and suicide planning (OR= 3.52 [2.62-4.75]), IPV and suicide attempt (OR=4.42 [3.15-6.22]). Conclusions: The noteworthy relation between high school students who report IPV victimization and the selected mental health variables indicate a need for more in-depth study to better understand the issue among this population.

U61

## STUDENT PROBLEM SOLVING STRATEGIES: DOT-GRID AREA

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Maximizing the accuracy and usefulness of assessment tools in today's classrooms is vital to the success of measuring students' learning outcomes and teachers' performance. A thorough and descriptive analysis of students' mathematics problem solving skills can significantly influence the instructional practices of classroom teachers by guiding their cycle of teaching both pre- and post-assessment. However, many teachers do not have the time for the introspection required to develop a framework that articulates a student's problem solving strategies. This research created a framework to articulate the problem solving strategies incorporated by a particular group of 14 students trying to find the area of three enclosed regions within a dot-grid. The proposed framework describes the strategies in terms of two primary paths, a Formulaic Strategy (FS) and a Counting Squares Strategy (CS). Additionally, the researchers examined the relationships between the two strategies through transformations (the translation, reflection, rotation or shearing of a piece of the enclosed region to make a more familiar shape) and the paths leading to the correct answers, as well as the paths leading to incorrect answers. This study is part of a growing body of research in mathematics education and will serve two purposes: first, as a spring board for future research; and, second, as an immediate framework for assessing students' knowledge about finding the area of enclosed regions within a dot-grid.

U62

## PURIFICATION OF *E. COLI* WITH THYMIDINE PHOSPHORYLASE

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Thymidine phosphorylase is an important enzyme in the pyrimidine salvage pathway. In humans, its expression increases in a number of types of cancer cells and the level of thymidine phosphorylase has been correlated with the metastasis of the original tumor. As such it is an attractive drug target. Knowledge of the chemical mechanism of the enzyme would greatly help the development of a drug specifically targeting this enzyme. After growth in lysogeny broth media, *E. coli* cells were pelleted by centrifugation, resuspended and sonicated to break open the cells. The sonicated cells were subjected to ammonium sulfate fractionation and the 30-50% fraction was pelleted by centrifugation. The pellet was re-suspended and dialyzed to remove ammonium sulfate. The dialyzed solution was loaded onto a diethylaminoethyl cellulose ion exchange column washed with 50 mM Tris pH 7.0. The column was then washed with a 0-1M NaCl gradient to elute bound proteins. Fractions were collected, assayed for protein content and thymidine phosphorylase activity. Fractions containing the highest activity were pooled and loaded onto a gel filtration column. The column was eluted with 50 mM Tris pH 7.0 buffer and fractions assayed for protein content and activity. The purity of the enzyme was determined by sodium dodecyl sulfonate-polyacrylamide gel electrophoresis. Additional chromatography steps will be used depending on the purity of the enzyme. Purified enzyme will be used to determine the transition state of the enzyme.

**U63**

## **THE ASSOCIATION BETWEEN PHYSICAL FITNESS AND ACADEMIC ACHIEVEMENTS IN COLLEGE STUDENTS**

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Increased physical fitness levels have been shown to improve the academic achievements of elementary students and the reaction and processing times in the elderly. However, there is very little research on the effects of fitness on the academic performance of younger adults.

**PURPOSE:** The purpose of this study was to determine the relationship between college age students' fitness level and their academic achievement by comparing their FITNESSGRAM results to their overall grade point average (GPA). **METHODS:** Participants included (N=15) college students between 18 and 28 years of age with a minimum of 24 credit hours. GPA was recorded after viewing a copy of the participants' transcript. The participants' fitness level was assessed through the FITNESSGRAM protocol. The test battery consisted of anthropometric measurements, abdominal strength, upper body strength, back strength and endurance, flexibility, and aerobic capacity. All the testing was completed individually within a 3-week time period. **RESULTS:** The means and standard deviation for the variables (fitness level and GPA) will be computed to identify the differences between the physically fit and unfit participants. Data will be correlated using a Pearson's r statistical comparison. **CONCLUSION:** If an association is found between the participants' physical fitness level and GPA, the information could be used to prompt further research leading to improved physical education for young adults.



## SHARING TWO PAIRS OF ENTANGLED PHOTONS FOR HIGH FIDELITY QUANTUM TELEPORTATION

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For quantum teleportation several schemes have been proposed and some of these have also been tested experimentally. One scheme uses polarization of entangled twin photons produced from a single photon interacting with  $\alpha$  and  $\beta$  BaB<sub>2</sub>O<sub>4</sub> nonlinear crystal under the process known as Spontaneous Parametric Down Conversion (SPDC). The two photons (call them Alice and Bob) share these twin photons, and one (Alice) uses a third photon on which the information is encrypted. The faithful transmission of this information from Alice to Bob entirely depends on the degree of polarization entanglement of the twin photons. These photons also have spectral entanglement that affects the polarization entanglement, and this has a negative effect on the faithful transmission of the information. Here, we have studied the fidelity of the teleportation through a new scheme for quantum teleportation based on sharing two pairs of polarization and spectrally entangled photons produced by two independent SPDC processes. In this new scheme, Alice successively interferes the two photons that she shares with Bob, and a fifth photon on which the information to be teleported is encrypted, using 50/50 beam splitters. She then takes a measurement on the state of the three photons and sends the outcome of the measurement to Bob through a classical channel (e.g. using optical fibers). Bob performs two types of measurements, and the outcomes of these are used along with the measurement outcome he received from Alice to reconstruct the state of the fifth photon that carries the encrypted information. The first measurement involves interference of the two uncorrelated photons that he shares with Alice using a 50/50 beam splitter, and the second does not. For both of these measurement outcomes we have calculated the fidelity of the dual pair teleportation.

**U65**

**U66**

## **PURIFICATION OF URIDINE NUCLEOSIDASE FROM ALASKA PEA SEEDS**

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Uridine nucleosidase is a pyrimidine specific enzyme which hydrolyzes uridine to uracil and ribose. The enzyme is part of the nucleoside salvage pathway. While a number of purine metabolizing enzymes have been isolated from seeds from plant such as spinach, tomato, coffee, and artichoke, pyrimidine metabolizing enzymes have only been isolated from a single source, mung bean. In this study uridine nucleosidase was isolated from the commercially important pea seed. After germination and the preparation of an initial extract, the amount of ammonium sulfate needed to precipitate the enzyme was determined. It was found that the enzyme precipitated between 60 and 70% saturation of ammonium sulfate. After dialysis the resuspended enzyme was loaded onto a Sephacryl diethylaminoethyl cellulose ion exchange column. The column was washed and the enzyme eluted with a 0-1 M NaCl gradient. Fractions were analyzed for activity by high performance liquid chromatography using a reverse phase column that separated the starting nucleoside, uridine, from the product nitrogenous base, uracil. Those fractions that contained pyrimidine metabolizing enzyme were pooled and concentrated. Additional chromatography steps to purify the enzyme include hydroxyapatite chromatography, gel filtration, dye ligand chromatography, and hydrophobic interaction chromatography. Purity of the enzyme was determined by sodium dodecyl sulfate-polyacrylamide electrophoresis.

**U67**

**STEAL MUCH!**

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External theft is the theft of property from a retail establishment. This crime is one of the most common property crimes dealt with in court. With the correct knowledge of procedures, associates are trained on how to deal with these thefts. Included are statistics on who and what kind of person typically shoplifts and for what reasons. I also review trends in the boutique that I manage and personal experiences dealing with theft as well as what types of behavior are typical of thieves. Although theft is likely to happen at any time of the day, there are certain times when it is most common. Theft is nearly impossible to stop entirely, but there are many devices used to lower the number of thefts overall. After an overview, it is clearly evident that there are positive and negative aspects for each. To gain a better understanding of why theft happens, it is also important to be informed of legalities of the company and the state. There are many consequences of theft if caught, including a fine and jail time.

**U68**

## **SEXUALITY AND RELATIONSHIP QUALITY**

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Relationship quality is a concept that is defined by variations in satisfaction in the relationship and adjustment to the relationship. A survey was given to 250 MTSU undergraduate students. The survey asked about the respondent's satisfaction and adjustment in their relationships with their significant others to determine the quality of their relationships. Only undergraduate students who have been in a relationship for three or more months were included in this study. 204 of the respondents were in heterosexual relationships while 46 of the respondents were in homosexual relationships. This research study used these survey responses to compare the relationship quality of heterosexual couples with the relationship quality of homosexual couples. The quality of heterosexual relationships was compared with that of homosexual relationships in order to determine whether sexuality influences relationship quality. Findings suggest that sexuality does not determine quality of relationship. Heterosexual respondents were not found to have a better quality of relationship than were homosexual respondents.

**U69**

## **QUANTUM TELEPORTATION: THE MOST SECURE WAY TO FORWARD MAIL TO YOUR "X"**

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You and your X lived together for a couple of years a long time ago. You have since separated. In fact, your X has gone underground and you haven't spoken since you broke up. During your time together you shared two unusual objects. These dear objects are maximally entangled twin light particles (photons) commonly known as an Einstein–Podolsky–Rosen (EPR) pair. One belongs to you and the other to your X. Now suppose your X forgot to change her address when she left and you just received an important looking letter. Now you need to send her this information and yet retain her trust by not reading it. To accomplish this you encrypt the message on a third photon. Because the encryption is not in classical bits, but quantum bits (Qubits), there is no measurement you can make to decode the message. You also cannot deliver it through a classical channel such as optical fibers. Using quantum teleportation protocol, you can deliver the unknown message using the EPR pair that you shared with your X. However, the faithful transmission of this message, or quantum fidelity, depends on the entanglement of the twin photons. In this study, we have theoretically investigated the fidelity of the quantum teleportation when the twin photons are produced by a process known as Spontaneous Parametric Down Conversion (SPDC), which leads to spectral and polarization entanglement. Specifically, we have analyzed how the spectral entanglement influences the fidelity of the teleportation which is founded in polarization entanglement.

U70

## ROOTS TO RUNWAY

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This research focused on the investigation of two students' individual heritage and cultural "roots", and how that research could be used to influence their apparel designs and overall design philosophy. The two cultures investigated were Norwegian and Hmong in regards to their cultural history and identities in reference to ancestry and costume. The exploration focused on the explanation of dress and textiles deriving from habitat, lifestyles, and techniques of garment construction. Also investigated were the fiber arts and decorative arts of the regions and how they influenced dress. It was found that traditional costume was highly influenced from nature. Hmong people closely tie their personal identities with their culture and Norwegian people have a very strong national identity related to their costume. Students then evaluated the influences on their design philosophies and used this information to develop newly inspired garment designs. As a result of this research students learned about their heritage and further developed their design creativity.

U71

## ISOLATION OF ADENOSINE NUCLEOSIDASE FROM CORN

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Adenosine nucleosidase is a purine specific enzyme which hydrolyzes adenosine to adenine and ribose. The enzyme is part of the nucleoside salvage pathway, which recycles nitrogenous bases such as adenine for incorporation into DNA. A number of purine metabolizing enzymes have been isolated from seeds from plants such as spinach, tomato, coffee, and artichoke.

One of the most important grain crops produced in this country is corn. It is used both as a food crop and controversially as a starting material for ethanol for fuel. The enzyme adenosine nucleosidase was isolated from the seeds of corn. The seeds were allowed to germinate briefly, and an extract prepared, from which adenosine nucleosidase was then precipitated from an ammonium sulfate solution (30 to 60%). The enzyme was purified by dialysis and chromatography using a Sephacryl diethylaminoethyl ion exchange column with a 0 to 1 M NaCl gradient. All fractions were analyzed for activity. Additional purification was conducted using hydroxyapatite chromatography, gel filtration, dye ligand chromatography, and hydrophobic interaction chromatography. Finally the purity of the enzyme was confirmed by electrophoresis. The enzyme compares to similar enzymes from related plant sources.

**U72**

## **DEVELOPING A BUSINESS PLAN BASED ON THE PRINCIPLES OF EFFECTUATION**

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With only 7 out of 10 business surviving through their first 2 years of operation and even fewer surviving through 5 years, it is important for entrepreneurs to understand the factors that lead to a successful small business start up. Effectuation is an emerging entrepreneurship strategy. Based on my research on effectuation I developed a business plan based on the 5 principles of effectuation. These principles include steps to start a business using a low capital model to prevent catastrophic business losses in the event of a business failure. Effectuation does not replace traditional planning, rather it augments planning by leveraging contingencies and engaging stakeholders. I show how these principles can be integrated into any business plan. My presentation will show potential entrepreneurs how to implement these principles to reduce the likelihood and reduce the severity of a business failure. My research has been proven effective and I look forward to sharing it with others.



**U73**

## **CHRONOLOGICAL HISTORY OF MTSU ATHLETICS FROM 1911-2011**

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This presentation summarizes highlights of the one-hundred year history of Middle Tennessee State University Athletics. The poster will be formatted in chronological order starting with MTSU's first history of athletics in 1911 all the way up until March 2011. This poster will be MTSU colors, royal blue, and white, and will include accomplishments by various MTSU athletic teams, such as the football, volleyball, baseball, softball, tennis, men and women's track and field, men's and women's basketball, women's soccer, men's and women's tennis, men's and women's cross country, and men's and women's golf. For example, there will be something on the poster that displays the football team's outstanding forty-two to thirty-two victory over the University of Southern Mississippi in the 2009 R&L Carriers New Orleans Bowl and the women's basketball team making the National Collegiate Athletic Association Tournament the past four seasons. The poster will also show when each athletic team here at MTSU was created and a summary of the success of each athletic team since their establishment.

U74

## SPECTRAL AND POLARIZATION ENTANGLEMENT SWAPPING IN TWO PAIRS OF TWIN PHOTONS

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Quantum entanglement is a property of a quantum mechanical state of a system of two or more objects in which the quantum states of the constituting objects are linked together so that one object can no longer be adequately described without a full description of its counterpart --- even though the individual objects may be spatially separated. Properties as such are fundamental to the realization of super fast quantum computing and completely secure quantum communication. In some specially designed systems it is possible to generate particles of light (photons) which reveal quantum entanglement. An optical system made of a nonlinear crystal known as barium borate crystal and laser beam of light is common source of twin photons with strong quantum entanglement under the process know as Spontaneous Parametric Down Conversion (SPDC). In SPDC a photon interacts with the BBO crystal and down converted into two twin photons. At a given instant of time these twin photons show different kinds of quantum entanglement, which could affect one another in a positive or negative way. In this study we have conducted analytical investigation in the effect of spectral entanglement on polarization entanglement under two different cases. The first case we considered is when the twin photons come directly from a single SPDC source. The second case is when two photons originated from two independent SPDC sources and are allowed to interfere at a 50/50 beam splitter. We have made a comparative analysis between these two cases and have quantitatively investigated the degree of entanglement swapping that would take place when two uncorrelated photons are allowed to interfere at a 50/50 beam splitter. Support from URECA is gratefully acknowledged.

U75

## ROLE OF ACCENT

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Accentuation plays an important role in language comprehension. Especially, accents can be used to emphasize a word in a sentence in order to guide the listener toward the new and relevant information. In the present study, electroencephalography (EEG) is used to investigate the brain correlates for the online processing of accentuation. Participants' brain electrical activity was recorded while they listened to pairs of spoken instructions. The instructions asked participants to move an animal toy onto a specific shape drawn on a mat in front of them (e.g., "Put the horse on the circle. Now put the frog on the circle"). For half of these pairs, the instructions were given with the correct accentuation (e.g., "Put the horse on the circle. Now put the FROG on the circle" Capital letters indicate the accented word). In the other half, the second sentence of the pair was pronounced with an incorrect accentuation (e.g., "Put the horse on the circle. Now put the frog on the CIRCLE"). EEG signals recorded when participants listened to correctly accented words were compared to those recorded when listening to incorrectly accented words. The implications of the results for language acquisition and comprehension will be discussed. URECA support is gratefully acknowledged.

U76

## RICH IN PORES: SYNTHESIS, CHARACTERIZATION, AND DRUG DELIVERY APPLICATIONS OF MESOPOROUS SiO<sub>2</sub> FILMS

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Mesoporous silica (SiO<sub>2</sub>) can be made into films or powders with regular nanoscale pores. In this presentation, we will describe approaches used to develop materials suitable for sensing and drug delivery applications. Transparent films were synthesized using two literature sol-gel synthetic methods. Polyether block copolymer templates (P123 or F127) served as pore generators when thermally decomposed at 600 °C to form mesoporous silica. Pore arrangements and sizes were identified with transmission electron microscopy. Film thickness was measured using profilometry, and water contact angle goniometry demonstrated that the surfaces were hydrophilic. Sensor applications required relatively thick films (>500 nm). Spin-coating rotation rates and volume of sol-gel allowed limited control of thickness, while avoiding microscopic cracking, as characterized with scanning electron microscopy. The F127-templated materials were tested as matrices for delivery of propranolol, a well-known non-selective beta blocker and blood pressure regulator. Thus, mesoporous films and solids were treated with a 0.033 M methanol solution of propranolol for up to an hour. After drying, the matrix was extracted and the extracts were tested for drug concentration using UV spectroscopy. Experimental conditions for drug delivery continue to be optimized. Support from STEP-MT is gratefully acknowledged.

U77

## EATING DISORDERS RISK AND PERFECTIONISM AMONG HIGH SCHOOL ATHLETES AND NON-ATHLETES

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Empirical studies have identified elite athletes as a group at risk for developing eating disorders pathology. These studies have focused on those athletes competing at high levels and often on those in sports that involve body aesthetics (e.g., figure skating, gymnastics). Adolescents also are considered a high-risk group for developing eating disorders due to both physical and emotional changes associated with this developmental stage. The purpose of the current study was to evaluate eating disorder risk among a group of high school athletes and non-athletes. The association between perfectionism and eating disorders risk across three groups (team athletes, individual athletes, and non-athletes) also was investigated. Finally, gender differences in these relationships were evaluated. Two hundred one high school students participated in the study. Participants anonymously completed the Eating Disorders Inventory – 3 (EDI-3), a demographic form, a survey of their history of athletic participation in middle school and high school, and self reported height and weight. Analyses were conducted using 188 participants (65 males; 123 females) after excluding 13 participants with invalid EDI-3 profiles. Participants were divided into three groups: non-athletes ( $n = 106$ ), team athletes ( $n = 42$ ), and individual sport athletes ( $n = 40$ ). Perfectionism was significantly positively correlated with the Drive for Thinness and Bulimia subscales and with the Eating Disorders Risk Composite score from the EDI-3. Comparisons of perfectionism across the three athletic groups showed team and individual athletes to be similarly perfectionistic. Team athletes were, however, significantly more perfectionistic than were non-athletes. Non-athletes had significantly higher Bulimia subscale scores and higher Body Mass Index scores than both team and individual athletes. Regardless of athletic group, females had higher Eating Disorders Risk than did males.

U78

## THE PROGRESSION OF PROTEST: AN INVESTIGATION OF THE USE OF SOCIAL MEDIA IN THE RECENT EGYPTIAN UPRISING

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Social media has become one of the most significant forces in the 21st century when it comes to the exchange of information, this paper compares and contrasts the vast differences of how information is being conveyed in existing protests compared to that of previous movements. This research examines the effect that social media (i.e. Twitter, Facebook, etc.) has on social movements. A comparison of the methods of mobilization and expression, as well as a collaboration of past and present social movements and their use of various media helps to understand the changes that have come to exist. This research focuses primarily on the use of current social media in the revolution in Egypt, including but not limited to, the obstacles created by the Mubarak regime to prevent protesters from using, as well as their use of, social media. By looking at a progression of the use of media, more specifically social media, this research makes note of the effect that social networking has had on the movement of social protests.

**U79**

## **PERSPECTIVES OF REFUGEE RESETTLEMENT EXPERIENCES IN MIDDLE TENNESSEE**

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Each year the United States resettles tens of thousands of refugees from all over the world. Since the first refugee legislation was passed in 1948, policy and programming benefitting this population has improved. However, there remains a need for representation of refugee perspectives. Tennessee has recently become home to an increasing refugee population and the aim of this study is to identify their experiences within the resettlement process. Qualitative open-ended interviews allow for a closer look into the lives of refugees resettling in the middle Tennessee area. Focus is given to religion, cultural practices, education, employment, and family structure within daily activities and obligations. Explored within the findings are themes present in multiple interviewing sessions including similarities and differences among them. The individual perspective on resettlement is anticipated to aid in the development and restructuring of programs and services designed to benefit the refugee community of middle Tennessee. Often the voices of individual refugees are overlooked and their narratives, which are crucial to gaining a holistic understanding of the resettlement process, are lost. In fact, some refugees reveal they have not been asked their personal experiences with resettlement. Some attribute refugee's receipt of federal funding to a standard of acceptable experiences, but resettlement narratives range from extreme fear and dismay, to incredible integration, acceptance, and assistance. Whether positive or negative, the perspective and experience of the refugee is important. By speaking to refugees firsthand, the resettlement experience can be more fully understood. Support from the McNair Scholars Program is gratefully acknowledged.

U80

## A SURFACE ELECTROMAGNETIC WAVE BIOSENSOR FOR THE DETECTION AND STUDY OF BIOLOGICAL COMPOUNDS

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The MTSU biosensor is an optical sensor designed for use in the detection and study of biological compounds. The sensor uses a photonic band gap multilayer (PBG) composed of alternating SiO<sub>2</sub> / TiO<sub>2</sub> dielectric layers in order to allow for the creation of Surface Electromagnetic Waves (SEWs). On the PBGM surface, a thin film of amine- or epoxy-substituted organosiloxane provide a surface for protein attachment to allow for the targeted detection of biological compounds via antibody-antigen reactions. The sensitivity of the device has been experimentally determined based on index of refraction shifts with different ethanol / water and isopropanol / water concentrations. Biosensing of antigen / antibody binding was accomplished with Bovine Serum Albumin and selectively matched antibodies. Preliminary tests using slides with areas of different spore counts indicate detection at the same level as fluorescence sensing. In the future, we plan to study the protein reaction rates and attempt to detect spores at counts lower than are detectable using fluorescence. In this poster, experimental results on the sensitivity of SEWs in PBGMs, the detection of protein/antibody reactions, and the sensing of various spore levels are presented and discussed. We gratefully acknowledge funding from STEP-MT and SERRI.



U81

## INSIDE THE CRIMINAL MINDS OF HIGHLY INTELLIGENT FRAUDSTERS

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Fraudulent acts are being committed continuously throughout the world. Unethical acts are different in many ways, but similarities do exist between them. The purpose of this research was to learn the factors that were involved in the fraudulent acts of Frank W. Abagnale, a highly experienced con artist, thief, impersonator, and check swindler. In addition, Jeffrey Skilling, the Chief Executive Officer of Enron and Bernie Madoff, a stockbroker, investment advisor, and Non-Executive Chairman of NASDAQ stock market, were considered. The factors for each individual were used to construct a model, and similarities and differences were analyzed. The results revealed several notable similarities: all three were highly skilled, intelligent individuals who experienced unhappy childhoods, lacked positive role models, and were motivated by money and power. The differences outweighed the similarities due to differences in each crime committed, but the result of all the crimes were that millions of dollars were stolen and many innocent people got hurt in the process.

**U82**

**EXPERIENTIAL INTERIOR DESIGN STUDIO: HOSPITALITY PROJECTS FOR  
TENNESSEE STATE PARKS**

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In February 2010, MTSU Interior Design program was asked to provide design services for the Henry Horton State Park located 32 miles southwest of campus. Students in IDES 4770 applied the design process to identify problems and propose design solutions to the Skeet Lodge and Restaurant in addition to their scheduled studio assignments. The professor assessed the project and class members selected peers for specific tasks reflecting their three year cohort group knowledge of skills and strengths. The process included research and field documentation of the sites, suggestions for lighting and furniture, and two design proposals presented to a local "Friends of Henry Horton", and State Park Director and Assistant Commissioner. A proposal outlined opportunities to improve the restaurant interior over a three year period. This information was presented at recent budget hearings on the State Parks. During Spring 2011 semester, five students are enrolled in an independent study to expand the Henry Horton proposal to include customer surveys, restroom design, and manager offices. In addition, they will be submitting a proposal on Montgomery Bell State Park. These experiences provide students with real world experience and promote MTSU and Interior Design program to an expanding audience.

U83

## INVESTIGATING THE USE OF A NEW METAKAOLIN FOR THE CONCRETE MARKET

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Metakaolin and Silica Fume are the leading cement replacements in the production of high performance concrete. A recent discovery of a new metakaolin source in the Southeast prompted the ceramics industry to look at this source for use in cement replacement. There are currently two metakaolins and one silica fume used in high performance concrete on the market that were used as a comparison set of data throughout the study. The MTSU senior lab project goal was to compare the new metakaolin to products on the market today called Norchem Silica fume, Optipozz Metakaolin, and Powerpozz Metakaolin. Plastic and hardened properties were characterized including air content, density, compressive strength, permeability, shrinkage and alkali resistance. A total of 19 mixes were cast with results being monitored for 56 days. These results will be used to determine the viability of bringing this new metakaolin into the market and recommendations will be made to the sponsor company.

U84

## QUANTUM-DOT SENSITIZED SOLAR CELLS USING COPPER (I) OXIDE AS THE HOLE TRANSPORT LAYER

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There has been a large push in recent years to increase the competitiveness of solar cells with traditional fossil fuel based forms of electricity production. While the price of solar-produced electricity continues to drop, it has not yet reached a point where it is commercially viable. Two ways to drop the cost of solar electricity are to (1) decrease the price of production of the solar panels, and (2) increase their efficiency. In this work we present results of our efforts to increase the efficiency of quantum-dot sensitized solar cells (QDSSC). In a QDSSC, very small semiconductor nanocrystals - in our case, CdSe crystals approximately 4 nm in diameter - generate mobile electrons and holes (positive charges) when they absorb incident light. The electrons and holes are then removed from the nanocrystal, and the electrons move through an external electrical circuit before returning to the other side of the solar cell and recombining with the holes. One of the performance limiting aspects of QDSSCs has been the inefficient transport of the holes through the so-called hole transport layer from the nanocrystal to the edge of the solar cell. Often, a conductive polymer is used as the hole transport layer, resulting in solar cells with efficiencies of a few percent. We will report on our progress with the use of copper (I) oxide as the hole transport layer, a material that is known to act as a solar cell in its own right. We anticipate that its intrinsic photovoltaic activity, as well as its hole transport properties, will result in more efficient QDSSCs.

**U85**

## **SUBSTANCE USE IN RELATION TO SIGNS OF DEPRESSION AMONG HIGH SCHOOL STUDENTS IN TENNESSEE**

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**Introduction:** Existing research indicates that negative mental health outcomes are associated with drug use. This study examines the relationship between drug use and signs of depression among Tennessee high school students and the prevalence of those activities.

**Methods:** For the purpose of this study, we utilized the 2007 Tennessee Youth Risk Behavior Survey. We analyzed questions dealing with drug use and its association with signs of depression among Tennessee high school students using EpiInfo complex sample tables.

**Results:** Odds ratios were calculated for each variable examined. Significant results included experiencing signs of depression and cocaine use, (OR = 2.57 [1.40-4.7]), signs of depression and alcohol use, (OR = 2.31 [2.04-2.61]), signs of depression and ecstasy use (OR = 2.78 [1.01-7.67]), signs of depression and meth use (OR = 3.27 [2,13-5.04]). **Conclusion:** The results show significant associations between drug usage and signs of depression among Tennessee's high school students. Due to the cross-sectional nature of the 2007 Tennessee Youth Risk Behavior Survey, further investigation in this matter is suggested.

**U86**

## **THE NASHVILLE FLOOD: COMPARING AND CONTRASTING LOCAL AND NATIONAL COVERAGE**

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Nashville, Tennessee was devastated by flood May 1, 2010. Shortly after the rains began, local television stations began live streaming coverage of the damage. One of the most memorable images of the day was of a brick portable floating down Interstate 24 in the Antioch area, getting hung up under the Blue Hole Road overpass, then collapsing upon itself after being clipped by a floating black Ford Ranger truck. It appeared that local coverage of the flood and subsequent damage was prolific. Nashville's plight didn't seem to be reported at all nationally until several days after the flood, and then only minimally. Research, however, revealed a different picture. After comparing the coverage of local newspapers, national newspapers, and national television networks during the week of May 1 through May 8, 2010, it was discovered that local newspapers did begin covering the flood the soonest of the three mediums examined. However, it wasn't long before national TV and newspapers were sharing the story, as well. The research also showed that the peaks of national coverage of the Nashville flood May 1 through May 8, both TV and newspaper, matched or exceeded that of local newspaper coverage of the flood during the same week.

U87

## FRUIT JUICE SOLAR CELLS

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Dye sensitized solar cells (DSSCs) are an exciting new class of solar cell in which light is absorbed by a dye molecule. While the most advanced DSSCs use sophisticated and difficult to prepare dyes, a simple DSSC can be made using materials that for the most part can be purchased over the counter, and with a natural dye obtained from blackberries. In fact, a "blackberry" powered solar cell is often used as a hands-on demonstration of how to build and test DSSCs for high and middle school students. In this project, we have tested the natural dyes from a number of different fruits and vegetables in DSSCs, to see if any perform as well as blackberry juice. We were also interested in the use of "over-the-counter" artificial dyes, such as those found in food colors. The efficiencies of solar cells made using different dyes will be compared to a reference blackberry juice solar cell. We also hope to elucidate what type of fruit family (berries, citrus, etc) give the best over-all performance in solar cell efficiency.

U88

## RELATIONSHIP BETWEEN WEIGHT STATUS AND PHYSICAL ACTIVITY AMONG HIGH SCHOOL STUDENTS IN TENNESSEE

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Purpose: Existing studies indicate a relationship between being overweight or obese and poor physical activity habits. This study examined the relationship between weight status and various physical activity indicators among high school students in Tennessee. Methods: We used data from the 2009 Tennessee Youth Risk Behavior Survey and examined the association between weight status and select physical activity variables using Epi Info complex sample tables. Results: Students who are obese are significantly less likely to report exercising at least 60 minutes per day for five days out in the preceding 7 days (OR = 1.40 [1.19-1.6]). In addition, obese students are significantly more likely to report watching TV more than 3 hours a day, (OR = 1.57 [1.34-1.84]) and play video games more than 3 hours per day (OR = 1.38 [1.20-1.58]). There was no significant association between being overweight and the selected physical activity variables. Conclusion: Current studies indicate a positive impact of increased physical activity on obesity. The significant associations shown in the analysis indicates a need for programs in Tennessee to help increase the levels of physical activity among obese high school students.



U89

## THE EFFECTS OF IMMIGRATION ON FAMILY DEVELOPMENT IN THE UNITED STATES

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In immigrating to the United States, families face specific struggles regarding the dynamics in familial role changes, achieving education, and the cultural norms of society. Through this process the immigrant children or first generation American children of these immigrant parents may face hardships that psychologically and emotionally influence their development differently than that of a second-generation American child growing up in the states. The child may learn the English language, the American culture, and the method of the education system before the parent. This difference between parent and child may create an imbalance because the child learns to teach the parent the American way of life, which can shift the roles of the family. Rather than the old saying, "Mother knows best." now it is child knows it all. In this research, participants will be given surveys that provide specific background information regarding their path of immigration and their family life. Then, the participants will reflect on the survey in a focus group in which they may interact and share their experiences. The differences and similarities among the participants will provide significant information for multicultural counselors, parents of immigrant and/or first generation American children, and educators to apply in helping these children. The design of the study is qualitative and the participants are volunteers. The research will expand the knowledge concerning immigrant family development in the United States.

**U90**

## **A NEW TRANSMISSION-LINE MATRIX APPROACH FOR MODELING METAMATERIALS**

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Within the last decade, the development of metamaterials has taken center stage in the area of materials science. Many exotic structures have been produced in hopes of manipulating the properties of electromagnetic and acoustic waves. The race to create the most fantastic design has caused a large portion of the research community to pass over the wealth of information that can be gleaned from the study of simpler metamaterials. Transmission-line matrix (TLM) modeling provides a good method for investigating the metamaterialistic properties of fundamental structures. We used a freeware TLM program called MEFiSTo to simulate the interaction of electromagnetic waves with perfectly reflecting side-loaded waveguides with varying numbers of side-arms. We found that a straight waveguide with resonant side-arms causes attenuation through destructive interference and standing waves in the microwave region. Simulations involving additional resonant side-arms showed the widening of these band gaps. Analysis of the phase angle data for these systems revealed narrow regions of negative group velocity. These results show that side-loaded waveguides display characteristics of metamaterials and can serve as effective filters. We plan to continue investigating these structures by designing our own TLM program that will allow us to scale simulations to be effective in different regions of the electromagnetic spectrum.

U?\*

## **EXPANDING YOUR HORIZONS PROGRAM: ENCOURAGING YOUNG WOMEN TO BE FUTURE LEADERS IN MATH AND SCIENCE**

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The Expanding Your Horizons Conference (EYH), first held in 1976, provides a hands-on approach to introducing young women to careers in Science and Mathematics. The goals of EYH are to: “encourage young women to pursue science, technology, engineering, and mathematics (STEM) careers...[and] motivate girls to become innovative and creative thinkers ready to meet 21st century challenges.” Middle Tennessee State University is the home of the first EYH Conference in Tennessee held in 1997, with over 300 middle school girls in attendance. A high school EYH was offered in 2007 through the NSF-funded Girls Raised in Tennessee Science (GRITS) project, which has motivated over 150 high school girls to attend MTSU EYH. We administer in-depth pre-conference and post-conference evaluations to the girls in order to gather data about their EYH experience. We will present results obtained from our analysis of the evaluations and our conclusions based on these data from EYH Conferences held in the past four years. We will also present the history of EYH and the overall impact of Chemistry workshops held at the MTSU EYH.

**U91\***

## **SAFETY MANAGEMENT SYSTEMS: THE PERSPECTIVE OF TENNESSEE AIRPORTS**

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Safety Management Systems (SMS), which is the proactive, formalized approach to managing risk and enhancing safety, is not yet mandatory within the aviation industry in the United States. Two pilot SMS studies were conducted at a handful of airports nationwide by the Federal Aviation Administration (FAA), which examined the feasibility of implementing SMS at airports. Although SMS is not yet mandatory in this country, many in the industry feel it will become mandatory in the near future. This research investigates via a brief, online questionnaire with two additional follow-ups, data analysis, and aggregate reporting of data, the degree to which Tennessee airports support SMS adoption. The majority of Tennessee airports responding to the survey are not too familiar with SMS; currently have a proactive safety plan in place other than SMS; support a mandatory SMS for Part 139 airports; may consider implementing an SMS if it remains voluntary; would expect some resistance from airport employees, tenants, and users if implementing an SMS; and would anticipate needing additional funding to properly develop and implement an SMS.

**U92\***

## **HOME! SWEET HOME!: MUSIC'S ROLE IN THE CIVIL WAR AND BEYOND**

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Produced as a part of Dr. Lorne McWatters' Topics in American History course on documentary filmmaking, "Home! Sweet Home!: Music's Role in the Civil War and Beyond" is a short documentary exploring the positive effects music can have on the morale of soldiers, through the lens of both the Civil War and modern war. By delving into issues of neurology, psychology, humor as a coping mechanism, and music as a powerful conduit of nostalgia, student filmmaker Michael Finch offers some hypotheses about the role music played in the Civil War, and the ways that role has grown and changed since. Through the expert insight and historical knowledge of MTSU Center for Popular Music Interim Director Dale Cockrell, juxtaposed with humorous, and at times heart-rending, footage of American soldiers on the ground in Iraq and Afghanistan, Finch shows that music always has been, and probably always will be, an integral part of war.

**U93\***

## **DANISH MAME: INSPIRATION AND PRESENTATION**

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The purpose of this project was to develop a design program and propose a design concept for the renovation of our client's foyer, stair and living areas. The design solution was based on an interpretation of the historic style, Danish Modern, as researched and seen in the 1958 movie version of Auntie Mame starring Rosalind Russell. For the solution, the areas of No. 3 Beekman Place, Auntie Mame's New York apartment, are inspired by contemporary style, objects found in nature and in the sleek rounded form of Danish Modern furniture. The color scheme is a brown-based neutral with accents of blue and yellow and consists of a burnt orange wall color with a cream trim, a light blue sofa, chocolate brown draperies, a tan "Egg" chair, a woven upholstered chair with a series of beiges, browns, and dark oranges and accents of yellow and blue throw pillows and wall hangings. Natural elements which are attributed to Danish Modern design are present in the choice of tiger stripe bamboo flooring, a faux wood design rug, rustic accessories, and in the light wood furniture pieces. The lighting has sleek spherical shapes to add a touch of modern. The wall art of abstract, grass adds a subtle pop of color and an organic, natural effect. The light wood and white staircase railings add a bold contrast against the burnt orange wall and accent the vertical movement of the curved stair.

**U94\***

## ORIENTAL MAME

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The purpose of this project was to develop a design program and propose a design concept for the renovation of our client's foyer, stair and living areas. The design solution was based on an interpretation of the historic style, Oriental Revival, as researched and seen in the 1958 movie version of Auntie Mame starring Rosalind Russell. For the solution, the areas of No. 3 Beekman Place, Auntie Mame's New York apartment, a combination of Oriental Revival and eclectic style were used to create a harmonious balance or Zen environment. The furniture is a mix of both contemporary and traditional Asian styles, allowing for the freshness of contemporary shapes to be grounded by tradition. The neutral color scheme with a gold -based background can be found in the shimmering metallic wall covering. Direct-complementary accents of red-orange and blue-green are found in the light fixtures, artwork and accessories. Dark stained bamboo flooring grounds the furniture while a *tansu* bamboo table with contrasting striations creates an edgy, geometric accent. Textures found in a cowhide rug and accent pillow provide juxtaposition against the simplicity of the daybed.

**U95\***

## **EXOTIC INDIAN REVIVAL: INSPIRATION AND SOLUTION**

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The purpose of this project was to develop a design program and propose a design concept for the renovation of our client's foyer, stair and living areas. The design solution was based on an interpretation of the Exotic Indian Revival style found in the 1930's and 40's as researched and seen in the 1958 movie version of Auntie Mame starring Rosalind Russell. For the solution, the living areas of No. 3 Beekman Place, Auntie Mame's New York apartment, are inspired by the exotic array of colors and elements found in the country of India. The color scheme is neutral with accents of luxurious jewel tones of blue, blue-violet, and red-violet enforced with bold metallics. The dark wood flooring and curved staircase provide a rich contrast against the light, creamy beige walls. The furniture is dark wood and heavy with detail to give an authentic Indian appeal. The coffee table and artwork is rich in color, shape and texture providing energetic splashes of vibrancy throughout the living area. The sofa is an off- white sectional and the draperies are a long and elegant gold reinforcing the relaxed yet lavish mood of Exotic Indian Revival style.



**U96\***

## **ART MODERNE FOR MAME**

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The purpose of this project was to develop a design program and propose a design concept for the renovation of our client's foyer, stair and living areas. The design solution was based on an interpretation of Art Moderne from the 1920's through the 1940's as researched and seen in the 1958 movie version of Auntie Mame starring Rosalind Russell. For the solution, the areas of No. 3 Beekman Place, Auntie Mame's New York apartment, have an achromatic color scheme with accents of turquoise. The dark gray, stained, wood floors contrast with the white area rug and turquoise ceiling. The metallic silver coffee table and end table reflect light. The black suede sectional sofa with geometric lines houses a series of detailed patterned pillows, and the abstract artwork ties the space together with the repetition of turquoise. The curved chrome rail, pale gray wall, and medium gray carpet runner found on the staircase create subtle movement and enhance the fluidity of the space. Natural light from the large pane windows provides a moving grid of shadow and light. The atmosphere is tranquil with sleek, horizontal lines and forms.

**U97\***

## **DANISH MODERN INSPIRED BY *AUNTIE MAME***

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The purpose of this project was to develop a design program and propose a design concept for the renovation of our client's foyer, stair and living areas. The design solution was based on an interpretation of Danish Modern style found from the late 1903's through the early 1960's as researched and seen in the 1958 movie version of *Auntie Mame* starring Rosalind Russell. For the solution, the areas of No. 3 Beekman Place, Auntie Mame's New York apartment, subtle curvilinear lines, color schemes, lighting fixtures, and teak woods portray the elements of this style. A neutral color scheme shown in the surface treatments and various teak woods used in the staircase, furniture, and accessories, is combined with vivid hues of complementary orange and blue. Sleek upholstery and sheer window treatments contrast with the texture in the leather chair and graining in woods. A neutral ceramic tile covers the entry floor while light teak wood flooring adorns the living area and wooden staircase. A dark teak handrail and balusters accent the staircase. Cubist paintings break up the neutral walls while a vivid blue organic sculpture provides a focal point in the foyer. Curvilinear lines are accentuated and harmony is established by using contrasting geometric patterns found in accent pillows, tiles, and rugs.

**U98\***

## **THE SOUTH AND THE MODERN WORLD: 15 PHOTOGRAPHS OF AN EVOLVING CULTURE**

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The experience of interacting with a physical object - the photographic print - amplifies the ideas and associations suggested by the photograph. But in an age of digital technologies and depiction, chromogenic prints (color dark room prints) represent a dying part of photographic practice. However they also carry with them the confidence of visual reality, since they cannot be easily manipulated like digital representations. Although such factuality is not a necessary component of communicating ideas, it's nonetheless a fundamental part of the uniqueness of the photographic process – distinguishing it from the likes of painting, drawing, writing, etc.

I've chosen to print my photographs this way because their impact is dependent on their believability. Also, I make my photographs with careful attention to color and light; and chromogenic prints are an exceptional medium for rendering the delicacy and intensity of light within a photograph. The prints are each 16x20 in., enlarged from 6x7 cm color negatives. They are interpretive documentary photographs, looking at the convoluted intersection of southern culture and modern sensibilities. They are the product of at least 6 months time photographing, several hundred dollars worth of paper and film, and countless hours in the darkroom.

**U99\***

## **CLAIMING FEMINISM IN THE NAME OF DANCE**

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Within a culture, a variety of gender roles and cultural traditions can be observed through dance. From a western feminist perspective, our research will explore how these roles have shaped the identity of women from the beginning of the 20th century to present day. Isadora Duncan and Ruth St. Denis, two pioneers of modern dance, challenged traditional female roles and gave women a platform to express their voice. Later, artists such as Mary Wigman, Josephine Baker, and Katherine Dunham followed in Duncan and Doris' footsteps and used dance to change the perspective of females in a male dominated society. Dance is considered to be a feminized art and/or sport which creates stereotypes such as all men who dance are gay and women who dance are sexual prey. Women dance artists and professionals have been aiming to change and challenge many of these perceptions through choreography, technology, and other dance related endeavors such as dance therapy. The field of dance offers us a dynamic perspective on how women's roles have been defined, challenged, and reevaluated throughout history. By examining a variety of dance-based fields, choreographers, historical figures, ideologies and stereotypes, we will expose how the study of dance is relevant to feminism and gender studies today.

**U100\***

## **SCENIC DESIGN**

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This exhibition is a theatrical scene design for Samuel Beckett's *Krapp's Last Tape* to be performed on MTSU's Tucker Stage. Utilizing the elements of design (line, color, texture, scale, form and movement), I have represented my interpretation of the playwright's overall underlying concepts. The play is simple in design with hectic and turmoil undertones. I used the inherent feeling of subdued but chaotic desperation to visually represent Krapp's longing for the past and desire for a time and emotion that he can no longer resurrect. I played on the emotional tone of the color by maintaining a darkness that surrounds his solitary light. This gives an overall illusion, both physically and emotionally, of isolation amongst the clutter. Krapp has trapped himself in his memories and isolated himself from the contemporary world, wrapped in sorrow. I have used the line design to create a feeling of man-made imprisonment to represent his emotional state on stage.

**U101\***

### ***KRAPP'S LAST TAPE SCENE DESIGN***

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I chose to submit a physical project exploring the subject of theater. Specifically, my entry looks at the design element of theater. I wanted to present an example of scene design through a quarter inch scale model. I read the play *Krapp's Last Tape* by Samuel Beckett, a story about a man who examines his life through a series of past recordings. Based on the physical objects he wrote about and the emotional connotations I felt while reading, I designed a set. Beginning with sketches, I developed the scene into a three-dimensional model using black mat-board and glue. I used the elements of design (e.g. shape, color, line, texture), and I combined them with the principles of design (e.g. balance and space) to make an understandable and aesthetically pleasing set. Ideally, I want my model to enable a person, unfamiliar with the play, to feel and understand what the play is all about.

**U102\***

***KRAPP'S LAST TAPE***

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This design includes all aspects of the play *Krapp's Last Tape*. By using the elements of design, line texture and movement, I believe that my design will appeal to all five senses, sight, touch, taste, smell, and sound.

**U103\***

**SCENE DESIGN FOR THE PLAY *KRAPP'S LAST TAPE***

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This exposition is an examination of the elements of scenic design (line, color, scale, form, and movement) through their implementation in my interpretation of the play *Krapp's Last Tape* written by Samuel Beckett. In the Scene Design class led by Scott Boyd, I was introduced to the practice of analyzing a play's overall idea and focus so that I may successfully convey them to an objective audience with the use of basic components of design. By harnessing the impressions I gathered as a designer through a deep study of the play's mood and tone, I was able to create a theatrical piece that parallel's the author's overall intent. After my readings of *Krapp's Last Tape*, I have determined that the feeling of this play is that of darkness, loneliness, broken nostalgia, and depression. I will use these words/ideas among many others to express to the audience my interpretations of the play's overall concept.



**U104\***

**SCENIC DESIGN FOR *KRAPP'S LAST TAPE***

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This project is a scenic design at MTSU's Tucker Theater for *Krapp's Last Tape* by Samuel Beckett. To accomplish this I used the elements of design, keenly line and color, put in place in consideration with the principles of design, such as balance and movement. I focused on the words of Samuel Beckett to better grasp the intent of the play and from there created a visual expression of the emotional "music" of the play, the beats and rhythms the playwright makes hidden within the text. I implemented the scenic design process required and created a design concept for this play and formatted it to fit within the structural parameters of the theater.

**U105\***

**SCENE DESIGN FOR *KRAPP'S LAST TAPE***

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This scenic design is for *Krapp's Last Tape*. Through the design principles of line, color, shape, form, light, and texture I shaped an atmosphere and mood solely for this production. When a man is in the present, cares nothing about the future, but constantly yearns to relive the past, he confirms that he has become the shell of a human. He listens to tapes of his life at various stages; rewinding and listening only to the pieces that have no value or contain any profound event, yet he fast-forwards through the tidbits of excellence and grandeur. I designed this scene on a 1/4" scale model of Tucker Theatre made from mat board and hot glue.

**U106\***

## **THE ART OF SCENIC DESIGN**

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The Scenic Design program introduces students to the concept of studying a play from the perspective of the author. Students then analyze the words chosen by the author in order to better understand the author's intent. The intent is then placed into the historical and social context of the play where designers are then able to visualize the elements of design (line, color, shape, texture, space) and incorporate them into a seamless and unified look for the production. The design begins to develop with the use of word lists that are intended to capture the emotion and feeling of the play. Next the designer visualizes the words by creating a representation in the form of a collage. Designers then create quick thumbnail sketches, which start to build an environment for the play and bring the words and emotions into context. A scale model is then used to place the play into the context of the actual theatre space. The final design is a culmination of all the elements and principles of design used strategically to best capture the playwright's original intent in a visual expression that captures the emotion and feeling of the play. The design displayed here is for the play *Krapp's Last Tape* by Samuel Beckett.

**U107\***

## **RESIDENTIAL DESIGN STUDIO SOLUTION FOR A GREEN AND UNIVERSAL HOUSE DESIGN**

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Interior designers create environmentally sound spaces using universal design practices in solutions for the health, safety, and welfare of the public. Here we describe a residence for a theoretical family, the Zebari's, who lost their home in the Nashville floods. The Zebari household includes a couple in their 50's and her mother. Green and universal design were guiding principles employed in the modern design of the Zebari residence. The floorplan was created based on consideration of energy efficiency, sustainability, the welfare of the residents, current and future health issues, and accessibility throughout. Spaces for a large extended family and private areas for the residents were critical. Sun studies were performed with Google SketchUp using a scaled site plan, complete with the existing coniferous and deciduous trees, to find the optimal layout of the home on the property. June 21st and December 21st were selected as reference dates for the study since these are markers when the sun is highest and lowest in the sky. The sun study conclusions helped to create rooflines, roof heights, overhangs, and the location of the outdoor area, while saving all existing trees on the property. Exterior features included Durisol blocks, glass panels, and a green living wall was used along the North façade to naturally insulate the home from the cold winter North winds. Interior environmentally conscious products included stained concrete floors, hardwood flooring, and interior doors using 82% post industrial recycled content. The furniture and lighting choices were sustainable as well. Universal design principles were critical in providing for the safety of current and future users. ADA provisions were used to create a mother-in-law suite complete with a walk-in-shower, grab bars, extended width doors, and 5 feet wheelchair turnaround radius.

**U108\***

**CONCRETE INDUSTRY MANAGEMENT SENIOR LAB CONCRETE SHRINKAGE AND STRENGTH GAIN**

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Dr. Yang's Senior Lab in the Concrete Industry Management program has measured changes that three different types of concrete mixes underwent after setting for 24 hours, 3 days, 7 days, and 28 days. The three types of mixes included different proportions of sand, water, type 3, and type k cement. All research that is done in Senior Lab will be presented to the Tennessee Department of Transportation in order to choose the best mix for the states roads and bridges. We will be showing our collected data on the strength gains, time it took the concrete to set, and the mixes used. We will also bring samples of concrete cubes that were mixed and broken in order to determine the psi (pounds per square inch) for each mix.

**U109\***

## **RAPID SET CEMENT FOR CONCRETE REPAIR**

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Our group has been conducting research for Rapid Set Cement for Concrete Bridge Repair for the Tennessee Department of Transportation. Concrete bridge repair demands immediate results for fast installation and performance. Rapid set cement is meant to provide high strength quickly without suffering severe plastic shrinkage effects. We conducted our research with the use of three mix designs consisting of differing water amounts in each mix while using the same quantities of the Rapid Set cement fine aggregates (sand). The three different testing methods used to conduct the required data were a strength (compression) test, a test that revealed the amount of plastic shrinkage that occurred, and a test that quantified the time required for ultimate setting or curing. We expect to have results that show a high level of compressive strength at 1-hours, 3-hours, 7-days, and 28-days, a low level of plastic shrinkage during the curing process, and a high level of time required for ultimate setting or curing.

**U110\***

**PROPERTIES OF TYPE III (HIGH EARLY STENGH CEMENT) + ALUMINUM  
(ADMIXTURE)**

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We are gathering research on the compressive strength, plastic shrinkage, and setting of type III cement plus varying proportions of Aluminum powder for the Tennessee Department of Transportation. Plastic shrinkage data was taken at one day intervals for the first week, every other day for the second week and at varying intervals after the first two weeks. Compressive strength was taken at one, three, seven, and twenty eight days respectively. Setting was taken from one hour after batching until the initial set of the cement. Three batches of cement were used with different proportions of cement and aluminum powder to determine the different effects that the differing proportions had on the cement. To determine plastic shrinkage we made four molds, two were cured in water and the other two were cured in a concrete curing chamber and then were measured using a length comparator. Compressive strength was taken using a concrete compression testing machine. Results will be determined and interpreted after the 28 day compressive test of the third batch of cement.

**U111\***

**TESTING THE CAPABILITIES OF LOW PERMEABILITY / QUICK SETTING CEMENT FOR BRIDGE REPAIR MATERIAL**

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For senior lab we have been testing the best bridge repair material for low permeability concrete. We have used many different mix designs. The concrete was tested for shrinkage and strength. The strength tests were done at 3 hours, 1 day, 7 days, and 28 days. The mix designs we used consisted of low permeability cement, sand, water, and entrained air. There was no coarse aggregate used, because the mix required a higher strength concrete with more surface area on the aggregate for the bond with the paste. The low permeability concrete had a faster setting time than regular concrete and this is ideal for concrete bridge repair. With the use of low permeability, fast setting concrete, bridge repair can be done faster without shutting down the path for traffic for extensive periods of time. For the strength test we made one dozen cubes and for the shrinkage test we used four concrete blocks.



**U112\***

**PHILIPPINES: A BROAD SURVEY OF PRE-COLONIAL TIMES**

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This presentation concerns the pre-colonial inhabitants of the Philippine islands and these inhabitants' cultures, religious beliefs, and social organization. The identity of Philippine people, the various native ethnolinguistic groups and those who have touched its shores and influenced these inhabitants will also be discussed. I will also present an overview of the cultural exchange between the Philippines and the Americas, particularly as the Spanish transported the native "indios" of the Philippines back and forth to the Americas during the Manila Galleons. Visual aids provided through cultural artifacts will be enhanced by other multi-media such as photographs, historical documents, and photographs. All of this will be used to convey the history of this region. McNair support is gratefully acknowledged.

**U113\***

**MEDEA: THEATRICAL DESIGN**

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This project was created in a theatrical design class. We were required to create a design for Euripides' Greek Tragedy: *Medea*. It was required for us to bring all the aspects of design that goes into making into a show for the theatre. In this design there is a design for sound, lighting, costumes, and sets. This project's aim was to take the classical tragedy and create a theme and run with it. Our group saw this as a dark and unnatural play, something that could be real, yet something that no one could quite comprehend in their own lives. Our theme was taken from the movie era where German expressionism ruled the screen. We took these sharp angles and strung them on the set, cast them with the lights, built them into the costumes, and sang them into the ears of our potential viewers.

**U114\***

**“MEDEA TURNS THE BRIGHT AIR BLACK AND DREAMS BACK TO NIGHTMARE”**

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My project is Medea meets Voodoo. The concept of Medea is that a woman scorned is susceptible to use anything in her powers for revenge. She can take all the bitterness, hurt, and disappointment and use it to avenge herself. Loyalty and trust from her can be great assets of a wife, but when misused they can turn into revenge-filled vendettas. In my design Medea uses voodoo to “in her mind” protect herself and inflict it upon her husband so that he sees the extent of his actions. The design concept is dark, dramatic, and mystical. It is meant to resemble the atmosphere of her confused and betrayed mentality. The texture is rough and organic. The line is curvilinear to represent no boundaries. The color is cold, yet bold. The space is hollow with feels of spirits and entities that tug and pull Medea's right from wrong. It has surrealistic elements that makes almost unbelievable, yet it entices your imagination to create this world of your own. There is a misty fog that overcasts the town with the form of smoke of surreal shapes of spirits. The design concept gives meaning to the mood and atmosphere because it creates the world that embodies the mood and atmosphere. The mood is eerie, creepy, and mysterious. The atmosphere is a hollow entity with the mystical elements that entangle Medea's revenge. The design concept sets the scene and invites the audience into this world of betrayal.

**U116\***

**A WORK IN PROGRESS**

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I made a very short film in the visiting Artist Seminar this semester with Claudia Barnett and Jesse Epstein. The theme of the seminar was non-fiction film making. Jesse Epstein assigned the theme of "work" to our non-fiction films. I am a photography major and have been doing a documentary project on the people who live in motels in our area. I thought about the people that live in the motels and what they do for work, why some of them do not work at all, and why some of them have been out of work for so long. I made a short film about these people, and allowed them to answer some of these questions on film. I also allowed them to answer the more interesting questions of "Why do you live in a hotel" or "Why are you here?"

**U117\***

## **1968, MTSU, AND THE DIXIE CONTROVERSY**

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1968 was an impactful year in American history. The assassinations of Martin Luther King Jr. and Robert Kennedy along with the war in Vietnam, student activism, and political instability forever changed American society. While universities like Columbia and Berkley are more generally associated with the turbulence of 1968, the events of that year impacted Middle Tennessee State University as hard as any other American university. Drawing from numerous Sidelines articles, personal accounts by MTSU alumni, and The Midlander, the film "1968, MTSU, and the Dixie Controversy" examines how a fundamental shift in racial relations at MTSU began in and as a result of 1968. By examining MTSU in 1968, this film demonstrates that the impact of 1968 was not limited to the larger cities and universities with which it is most commonly associated. Rather, it was far-reaching and affected places like MTSU in more subtle, but no less substantial, ways.

**U118\***

## **IRANIAN WOMEN'S STRUGGLE FOR AGENCY AND ITS ROLE IN THE FUTURE OF THE MIDDLE EAST**

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Middle and Near Eastern studies have experienced a revival in American universities over the past decade. In the second half of the 20th century the region entered the US consciousness primarily through two events: the oil embargo and the 1979 Iranian Revolution, followed by the Iranian hostage crisis. The themes of oil and radical Islam have remained dominant in the discourse of the greater Middle East. However, a third theme has long been present in the background—that of the roles of women in the Middle East. Women in Muslim societies have often been stereotyped as silent, oppressed, and uninvolved in the region's politics. While fundamentalist reforms have attempted to restrict their public visibility, women have had an increasingly acknowledged role in both fundamentalist and liberal movements. In the Islamic Revolution of 1979, Iranian women took to the streets in support of Khomeini's Islamic fundamentalist reforms; whereas within 2009's "Green Revolution," women were center-stage in the protests against the fraudulent election of President Mahmoud Ahmadinejad. While media studies have reexamined the Western portrayal of the Middle East in light of Orientalism, it is also important to examine how women have wrestled for their own agency by representing themselves. Recent protests in the Arab world and their use of social networking to topple autocracies owe a significant debt to the Green Revolution, which heralded an age in which governments are as endangered by the cell phone as the sword. This presentation discusses the representation and involvement of women during the 1979 and 2009 popular movements in Iran, as well as in the recent events in North Africa. These events are examined for the construction of women in media while addressing the themes of feminism and equality, public visibility and gender roles, and their centrality to the political movements.

**U119\*\***

***THUMP, THUMP***

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*Thump, thump.* His heart beats for the first time. *Thump, thump.* He just finished his first meal. *Thump, thump.* He's beating on a toy drum. *Thump, thump.* He's playing cops and robbers with his best friend. *Thump, Thump.* He's banging on a real drum for his first band recital. *Thump, thump.* He just had his first car wreck. *Thump, thump.* He's being tackled by the opposing football team. *Thump, thump.* The bass drum is pounding at graduation. *Thump, thump.* He's marching in line during basic training. *Thump, thump.* He's at war. *Thump, thump.* Two bullets just entered his chest. *Thump, thump.* His heart just stopped. *Thump, thump.* The chaplains are knocking on the door. *Thump, thump.* His mother's heart just stopped. *Thump, thump.* The back of the hearse doors are being closed. *Thump, thump.* The guns are being fired off at his funeral. *Thump, thump.* The first shovels of dirt are being thrown on his coffin. He's gone.

U120\*\*

*RIGHT HERE*

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Coping with a loss is understandably difficult. There are times, however, when the ability to cope is not difficult; it is simply impossible. Is it better, then, to reawaken one in grief to the reality of the void that is slowly consuming their being, or to indulge their efforts to ignore it? There is no easy answer; even professionals struggle to get it right. An excerpt from the ten minute play to be performed is given below.

ALEXANDER: What else is there?

JOLE: Alexander. She just had a miscarriage.

ALEXANDER: Well, she's not the only one who lost a child. I didn't turn into a bulimic.

JOLE: Your last movie wasn't the most successful, either.

ALEXANDER: I'm not the first actor to have a flop. It's not like we can't afford to live anymore.

JOLE: I understand that. And I know you're still dealing with your loss...

ALEXANDER: You already said the miscarriage.

JOLE: ...I was talking about Jole.



**U121\*\***

**LATE DIAGNOSIS: A TEN MINUTE PLAY**

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## U122

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Background: Music has long been thought to provide positive effects to the human body. When music is listened to while exercising, it has been shown to decrease boredom with repetitive exercises and distract from pain. Therefore, the purpose of this study was to identify the effect of music tempo on RPE (Rating of Perceived Exertion) and heart rate. Methods: Participants were asked to ride a cycle ergometer for 8 minutes while wearing a heart rate monitor and listening to an iPod. Participants were told to keep an RPM of 70 and resistance was set to 1.5 kp. Each minute, the participant's heart rate and RPE were recorded. There were 3 trials: no music, low tempo music, and high tempo music. A complex sample multinomial logistic regression in SPSS was used with a sample of 8 collegiate female soccer players to examine if exercising to different types of music altered heart rate and RPE. The control variable was no music. Results: Minutes 2 -7 were averaged for the study. The participant's average heart rate and RPE were calculated after each trial. The analyses revealed that the average heart rate for no music was 151 bpm and 12.6 RPE, for low tempo was 143 bpm and 11.8 RPE, and for high tempo was 130 bpm and 10.8 RPE. Conclusion: There was a significant difference between no music heart rate and high tempo music. Also there was a significant difference between low tempo and high tempo music. In order to achieve a lower heart rate during exercise, listen to high tempo musi

## U123

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Background: The DigiWalker and NL 2000 have already been validated by Crouter, Schneider, Karabulut, and Bassett (2003) in the article 'Validity of 10 Electronic Pedometers for Measuring Steps, Distance, and Energy Cost.' This study used inexpensive retail store pedometers and compared their validity to those already validated and used in labs. Methods: This study used college aged (18-25 years) students who volunteered to participate. Each walked on a treadmill wearing 1 of 5 pedometers for 2 minutes at a grade of 2.0% at 2.5mph. While walking, actual steps were counted by an investigator using a hand clicker. This was repeated for each pedometer with each participant and the collected values were recorded. Results: The analyses revealed that there was a correlation between all pedometers and their corresponding clicker. Only two pedometers, the NL 2000 pedometer and the Sportline Blue pedometer, were not significantly different from their clicker. Conclusion: For those individuals wanting an inexpensive pedometer but still want a valid measurement, the Sportline Blue pedometer is a very inexpensive pedometer that showed no significant difference between its measurements and the actual steps counted with the clicker.

**U124**

## **PURINE METABOLIZING ENZYMES ISOLATED FROM YELLOW LUPIN**

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Three different enzymes that cleave the glycosidic bond of purine nucleosides, resulting in a nitrogenous base and ribose, have been isolated from the seeds of the yellow lupin plant. These enzymes include adenosine nucleosidase, inosine nucleosidase, and calcium-stimulated guanosine-inosine nucleosidase. While the three enzymes differ in their substrate specificity, little is known about their structures or their chemical mechanisms. The purpose of this study is to isolate the three enzymes from yellow lupin and begin to determine their structures. An initial extract of yellow lupin seeds was prepared four days after germination. The initial extract was fractionated using ammonium sulfate. Resuspended pellets were subjected to a variety of types of chromatography to separate the various types of purine metabolizing enzymes. Modes of chromatography used include ion exchange, gel filtration, dye ligand chromatography, aminohexyl chromatography, adenosine-Sepharose chromatography, and hydroxyapatite chromatography. Upon completion of the purification, the structures will be studied using a variety of techniques including electrospray mass spectrometry, atomic absorption spectrometry, and tryptic digestion.

**U125**

## **NUCLEOSIDE METABOLIZING ENZYME ACTIVITIES IN GERMINATED SEEDS**

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Nucleosides are the building blocks of the nucleic acids DNA and RNA. For this reason the enzymes that break down and recycle nucleosides are extremely important in maintaining an organism. For example parasitic protozoans, the organisms that cause malaria and South American sleeping sickness, rely solely on these enzymes for their supply of nitrogenous bases to synthesize new nucleosides for incorporation into DNA and RNA. However, little information is available on the presence of these enzymes in plants or the role of these enzymes in plant metabolism. In this study the activity of a number of nucleoside metabolizing enzymes were measured in a germinating seeds. The activities determined in this study were for the enzymes cytosine deaminase, cytidine deaminase, adenine deaminase, adenosine deaminase, adenosine hydrolase, inosine hydrolase, guanosine hydrolase, xanthosine hydrolase, uridine hydrolase, cytidine hydrolase, adenosine phosphorylase, guanosine phosphorylase, and inosine phosphorylase. The seeds examined in this study were corn, Alaska pea, soybean, and yellow lupin. Seeds were germinated and an initial extract prepared four days after germination by homogenizing the seeds in a 50 mM Tris pH 7.0 buffer. The initial extract was added to a reaction mixture containing 1 mM nucleoside in either 50 mM Tris pH 7.0 buffer or 50 mM potassium phosphate pH 7.0 buffer. The product was separated from the starting material and quantified by high performance liquid chromatography using a HyperClone C18 reverse phase column eluted with a 98% ammonium acetate pH 5.2, 2% methanol. The amount of protein in each of the seed initial extracts was also determined.

## U126

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Our study compared metabolic equations that estimate a person's  $VO_2$  and compare them to the actual values of oxygen consumption using the MOXUS machine. The participants filled out an informed consent and a demographics page where they gave their weight, height, age and other factors. This information was used in the ACSM metabolic equations and estimate their  $VO_2$ . We obtained the measured  $VO_2$  by having the participants perform two exercise tests (arm/leg ergometer tests). Each test was set up in the same format. Each participant was briefed about the MOXUS machine before beginning their exercise test. Participants pedaled for a warm-up for two minutes with no resistance; then were asked to pedal for three minutes at the first workload of 300 kg/ml/min; then, were asked to pedal for three minutes at the second workload of 600 kg/ml/min. After the second workload they performed a cool down for two minutes. Each participant completed both tests at least a week apart so it would not affect results. The participants were recruited from the MTSU student body and were between the ages of 18 & 30 years old. The tests were randomized by flipping a coin and not done in a specific order.

## U127

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Expensive ergogenic aids and supplements are often used by athletes to enhance their performance and there is research available to confirm that their use will improve indicators such as  $VO_2$ max. Untrained individuals can also experience an increase in their athletic performance by utilizing supplements, which in turn not only produces greater results, but may make them more likely to begin or stick with an exercise program. If purchase price of the supplement is a concern for the non-athlete, they would be more likely to try a supplement, like B-complex, because they tend to be available at a much more affordable price. There is less research on the effects of B-complex on athletic performance as compared to other ergogenic aids and even less research on how these supplements will affect the performance of the non-athlete. We have two groups of seven participants. One of the groups is a control group and the other is an untrained research group. The study is set up for a single-stage  $VO_2$  submaximal test. The first run obtains a baseline reading for both groups of participants'  $VO_2$  submax on the single-stage treadmill and that data is recorded. Both the control group and untrained group is given a placebo for this base run. The second submax test performed by all of the untrained participants will be executed 3-4 weeks later and it officially documents the  $VO_2$  submax after they ingest a B-complex vitamin. The control groups' second test is performed after ingesting another placebo. Both groups are unaware of what they are consuming for each test. This is a double-blind study. Results are not available at this time. The study is ongoing.

U128

## ROUGH TERRAIN REMOTE CONTROLLED FORKLIFT

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The design of most forklift equipment usually calls for an operator inside the machine to perform all the controls necessary for the work required. In some situations, however, it would be beneficial to have the same capabilities without risking the safety and well being of an operator due to harsh environments. The purpose of this project is to design and build a 4-wheel drive radio controlled rough terrain forklift that can lift 50 lbs. This forklift will have two fully variable VAC motors that can safely be controlled within a 400 ft radius with the aid of an independent power source. The design will make use of both motors in such a way to provide maneuvering without the need of conventional steering. A reach of approximately 18 inches from the ground, with the ability to keep the load level during raising and lowering, will be accomplished with the aid of an independent pneumatic system. Although the potential and size of this endeavor are not that of any real world forklift capabilities, it will prove the concept of a remotely controlled forklift. This ability can allow for the operator to perform tasks in a harsh and undesirable environment, while from a safe distance.



