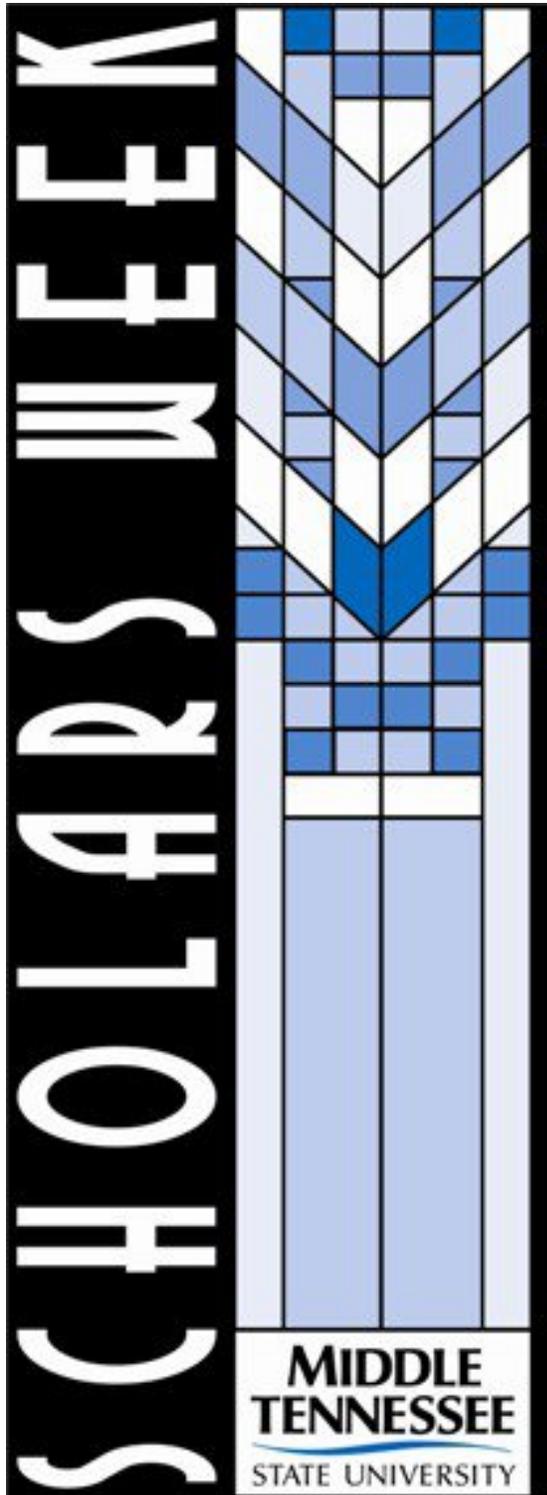


# Graduate Student Abstracts



2011

**G1**

**EXPERIMENTAL VEHICLES: INNOVATION AND CREATIVITY IN SCIENCE,  
TECHNOLOGY, ENGINEERING, AND MATHEMATICS**

Bahir Alkadhimi (graduate student)  
Engineering Technology  
[bjaz@mtmail.mtsu.edu](mailto:bjaz@mtmail.mtsu.edu)

Saeed Foroudastan (mentor)  
Engineering Technology / College of Basic and Applied Sciences  
[sforouda@mtsu.edu](mailto:sforouda@mtsu.edu)

The 2011 Experimental Vehicles Program (EVP) at MTSU is comprised of four continuing student engineering projects in the College of Basic and Applied Sciences. The four projects include SAE Formula One, SAE Mini Baja, Moonbuggy, and Solar Boat. The EVP began in 2004 to allow both undergraduate and graduate MTSU students from different majors to work on assigned projects for the academic year. These projects are tailored to provide students an opportunity to demonstrate what they have been learning from textbook theories as well as showcase their skills and talents. Every year, participants in the EVP and the university have garnered awards through their achievements in competitions in regard to safety in building and operating the vehicles as well as recognition in design and performance. Members of each team apply hypothetical concepts, based on lessons learned from previous competitions or new ideas, to manufacture and craft different types of materials by using various tools and machines. The EVP allows students to develop their technical skills and sharpen their expertise by using hands-on techniques. This privilege enables team members to have access to a variety of machines in the machine shop located in the Engineering Technology Department. The EVP not only deals with the technical engineering arena, but also provides knowledge and experience in the business arena. Students will become familiar with essential business skills such as setting management plans, meeting deadlines, writing reports, giving presentations, organizing work areas, procuring necessary materials and apparatuses, economizing budgets, improving quality, and complying with safety rules and procedures. By having both technical skills business savvy, team members become well-rounded individuals who can succeed in the global economy.

**G2**

## **THE EFFECTS OF ACUTE STATIC STRETCHING ON GLENOHUMERAL INTERNAL AND EXTERNAL ROTATION STRENGTH**

John Ursone (graduate student)  
Health and Human Performance/Exercise Science  
[jj2b@mtmail.mtsu.edu](mailto:jj2b@mtmail.mtsu.edu)

Richard Farley, John Coons (faculty)  
Health and Human Performance/Exercise Science

Jennifer Caputo (faculty, mentor)  
Health and Human Performance/Exercise Science  
[jcaputo@mtsu.edu](mailto:jcaputo@mtsu.edu)

The purpose of this study was to examine the effects of static stretch duration on the strength of the internal and external rotator muscle groups of the glenohumeral (GH) joint. Using a within-subject counter-balanced design, 14 male and 14 female collegiate student-athletes completed a control condition, a 15 second stretch condition, and a 30 second stretch condition following a generalized upper body warm-up. Following each condition, concentric and eccentric internal (IR) and external rotation (ER) shoulder strength was measured on a Biodex System III Isokinetic Dynamometer at 300 deg/sec. No statistical difference was found for concentric IR, concentric ER, eccentric IR, and eccentric ER among the three conditions. Static stretching did not impact strength of the GH joint musculature as measured, and therefore may not be detrimental prior to activity as has been shown in the lower extremity. However, other methods may prove better at measuring muscular strength and activation of the GH musculature.

**G3**

## **THE EFFECTS OF PERSONALITY TRAITS ON WAGES: A MATCHING APPROACH**

Robert Girtz (graduate student)  
Economics  
[reg2v@mtmail.mtsu.edu](mailto:reg2v@mtmail.mtsu.edu)

Charles Baum (mentor)  
Economics  
[cbaum@mtsu.edu](mailto:cbaum@mtsu.edu)

In this presentation, I blend the social science disciplines of economics and psychology to examine the effects of an individual's personality on wages. The specific traits I analyze are locus of control, a feeling of being control of one's outcomes and self-esteem, an assessment of self-worth. I use the National Longitudinal Survey of Youth 1979 (NLSY79) and implement the novel econometric approach of propensity score matching to address the question of whether these facets of personality as an adolescent predict adult wages. In accord with the existing literature, I find that self-esteem has a significant effect on wages. Individuals who have a high self-esteem as adolescents enjoy 8.5 to 9.2 percent higher wages than their counterparts with relatively lower self-esteem. I find no evidence that locus of control affects wages. The variation in wages attributed to variations in an individual's locus of control can be explained by more conventional economic variables, such as cognition and family background characteristics. This contrasts with other empirical findings in the literature. I conclude that while some dimensions of personality translate into job success, others do not. Human capital models that do not incorporate those dimensions of personality deemed as significant may suffer from omitted variable bias. Future research must identify which personality traits have significant effects on various economic outcomes.

**G4**

## **ESTIMATION OF A HEALTH PRODUCTION FUNCTION FOR EASTERN EUROPEAN COUNTRIES**

Anca Traian (graduate student)  
[at3b@mtmail.mtsu.edu](mailto:at3b@mtmail.mtsu.edu)

Bichaka Fayissa (faculty, mentor)  
[bfayissa@mtsu.edu](mailto:bfayissa@mtsu.edu)

The purpose of the paper is to estimate a health production function for the eleven East-European countries including Romania, Bulgaria, Hungary, Poland, Czech Republic, Slovakia, Belarus, Ukraine, Croatia, Macedonia, Slovenia, Lithuania, Latvia, and Estonia. Using a diverse array of economic, demographic, environmental, and lifestyles factors as inputs, we analyze a health production function at macro level in order to determine the most efficient way of allocating resources for improving the overall health status of countries in the sample. To control for individual country heterogeneity and time effects, we employ panel analytic methods of the fixed and random effects models. The results are useful, not only for serving as background for health care policy decisions, but also for a better understanding of the factors that affect the health condition.

**G5**

## **PARAMETRIC COST MODELING FOR SPACE TELESCOPES**

Todd Henrichs (graduate student)  
Mathematical Sciences  
[todd.henrichs@gmail.com](mailto:todd.henrichs@gmail.com)

Lisa Green (mentor)  
Mathematical Sciences  
[lbgreen@mtsu.edu](mailto:lbgreen@mtsu.edu)

Parametric cost modeling is used by NASA and the aerospace industry to analyze and predict cost for technically complex, state-of-the-art satellite instrumentation of all kinds. However, most cost models predict cost for the instrument package as a whole, not its individual subsystems. Many existing models are inconsistent and lack sufficient detail to perform trade-off analysis. Our continuing modeling efforts are aimed at creating cost models for the Optical Telescope Assembly (OTA) of space telescopes based on a database of forty-one OTAs. This undertaking has generated publications of single-variable mass- and diameter-driven models and analyses that have been presented to the optical system engineering and cost estimation communities. Currently we continue our analyses to find multivariate cost models with improved prediction capability. We present the methodology behind the data collection, variable selection, and model diagnosis used in our model development process. We address particular issues with the use of logarithmic regression in cost estimation.

## USING MULTIPLE-CHOICE VISUALS IN THE ASSESSMENT OF STUDENTS UNDERSTANDING OF THE DISSOLVING PROCESS

Basil Naah (graduate student)  
Chemistry  
[bm2g@mtmail.mtsu.edu](mailto:bm2g@mtmail.mtsu.edu)

Amy Phelps (faculty)  
Chemistry

Michael Sanger (faculty, mentor)  
Chemistry  
[mjsanger@mtsu.edu](mailto:mjsanger@mtsu.edu)

The multiple levels of representations in chemistry, thus, macroscopic, particulate and symbolic make the learning and understanding of chemistry difficult for most students. And for students to develop conceptual understanding and be able to explain chemical phenomena through the multiple views of representation it is necessary that students' understand the correlation between the three different representations. As a result, the goal of this study was to use multiple-choice visuals: animation, static pictures and chemical equations in the assessment of student understanding of ionic compounds dissolving in water. College students enrolled in an introductory general chemistry course were asked to participate in semi-structured interviews and pick answers for multiple-choice questions for ionic compounds dissolving in water. The answers to the multiple-choice questions were presented in chemical equations, animation and static pictures. This presentation will discuss the order effect, the motion effect, the representation effect and the interaction effect of the visuals and the consistency in student's selection of answers to these multiple-choice questions.

**G7**

**SUSTAINED SILENT READING AND ITS IMPACT ON READING  
COMPREHENSION SKILLS FOR ESL STUDENTS**

Daiva Berzinskas (graduate student)  
Educational Leadership  
[db3i@mtmail.mtsu.edu](mailto:db3i@mtmail.mtsu.edu)

Dorothy Valcarcel Craig (mentor)  
Educational Leadership  
[dvrcraig@mtsu.edu](mailto:dvrcraig@mtsu.edu)

This study examines the effects of a traditional sustained silent reading (SSR) program on the reading achievement of adult English as a Second Language (ESL) students in an academic English language center. The participants of this study were 14 intermediate/advanced ESL students enrolled in a full-time intensive academic English language immersion program. The study utilizes a qualitative approach following action research guidelines to describe the experiences, motivation, and achievement records of ESL students regarding reading comprehension and to study the effects of non-accountability on student achievement in the sustained silent reading period. Data sets included: student surveys, reflection logs, writing samples, grade books, and field notes. Data was organized and coded in relationship to a set of overarching questions in order to identify emerging patterns to establish categories and attributes. Findings indicated that a period of designated silent reading in regular classroom instruction, in correlation with a non-accountable atmosphere and student chosen texts, significantly increased ESL student motivation and reading comprehension skills in the English language. Findings will be shared with center staff in order to improve practice of ESL academic reading instruction.

**G8**

## **DOES WALKING OR RIDING A BIKE TO SCHOOL REDUCE OBESITY?**

Hussain Zakir (graduate student)  
Economics and Finance  
[hz2b@mtmail.mtsu.edu](mailto:hz2b@mtmail.mtsu.edu)

Joachim Zietz (mentor)  
Economics  
[jzietz@mtsu.edu](mailto:jzietz@mtsu.edu)

This presentation assesses whether walking or riding a bike to school reduces obesity. High school and college students who walk or ride a bike to school are compared to those students who could have walked or ridden a bike to school but did not. The analysis employs Propensity Score Matching (PSM). This methodology enables comparison between two otherwise very similar groups which vary only on the basis of one characteristic, in this case, walking or biking to school. The likelihood of an individual's decision to walk or bike to school, the propensity score, is determined on the basis of several observable characteristics which are available in the data. Using the National Longitudinal Survey of Youth (NLSY) 1979 cohort, a nationally representative survey, I find statistically significant evidence that students who walk or ride a bike to school have lower levels of BMI and obesity and are less overweight than those in the control group. When college students are included in the sample, the effect continues to remain consistent and statistically significant.

G9

**EFFECT OF MATERNALLY TRANSFERRED MEHGCL ON STRESS INDUCED CORTICOSTERONE IN *NERODIA SIPEDON* NEONATES**

Patrick Cusaac (graduate student)  
Biology  
[jpc3p@mtmail.mtsu.edu](mailto:jpc3p@mtmail.mtsu.edu)

Raymond Wright (graduate student)  
Biology

Frank Bailey (faculty, mentor)  
Biology  
[fcbaily@mtsu.edu](mailto:fcbaily@mtsu.edu)

Cassandra Henry (undergraduate)  
Biology

Stress responses in ectothermic organisms play a crucial role in their ability to survive. Cause and response interactions of stressors are relatively well studied, however studies showing the effects of heavy metal toxicity on stress are lacking, particularly in squamate reptiles. The purpose of this study was to show the effects of maternally transferred methyl mercury chloride on stress-induced plasma corticosterone (a hormone that normally increases in response to stress) levels in Northern Water Snake (*Nerodia sipedon*) neonates. The objective of this study was to determine if neonates from methyl mercury-dosed females exhibit a diminished increase in corticosterone in response to confinement stress when compared to controls. Gravid females were dosed with 0, 10, or 10,000 µg/kg methyl mercury (3, 3, and 4 each treatment, respectively). 10 neonates from each female were used for testing (5 baseline and 5 stressed). We found no significant difference in corticosterone levels between dosing treatments (ANOVA;  $F(2,8) = 1.046$ ;  $P = 0.395$ ). We therefore conclude that methyl mercury chloride has no effect on stress induced corticosterone levels in neonate *N. sipedon*.

**G10**

## **A NEW NONPARAMETRIC PHENOTYPIC CODING OF FAMILY-BASED ASSOCIATION TEST IN LATE-ONSET ANALYSIS**

Rong Lu (graduate student)  
Department of Mathematical Sciences  
[rl2n@mtmail.mtsu.edu](mailto:rl2n@mtmail.mtsu.edu)

Don Hong (faculty, mentor)  
Department of Mathematical Sciences  
[dhong@mtsu.edu](mailto:dhong@mtsu.edu)

Locating genes influencing quantitative traits in humans is needed to enhance our understanding of disease etiology and promote the proper conduct of research that evaluates genetic factors associated with the development of disease. Family-based association tests (FBATs) provide an opportunity to test for associations between a disease and genetic markers using family members' genetic data to compute the distribution of a suitable test statistic under the null hypothesis conditioning on the phenotypes. Such tests avoid false-positive results produced by population stratification. In this project, we present a new nonparametric phenotypic coding for the univariate FBAT statistic by applying the modified Peto-Prentice weighting function. When the data set shows a left-skewed time-to-onset distribution, this new approach, denoted by FBAT-PP, is more sensitive than commonly used methods in this study such as FBAT-logrank and more robust than the FBAT-Wilcoxon methods. When the sample allele frequency is low, the sample size is relatively small, or the pattern and percentage of censoring records is significantly different in each of the marker-score groups, the FBAT-PP test shows a significantly higher power than those two methods mentioned above. In the following simulation study, we compare the power of FBAT-logrank, FBAT-Wilcoxon, and FBAT-PP methods based on different allele frequency levels. We also analyzed a real Alzheimer's disease data set from the NIA public database. Results from both simulation and real data analysis indicate that the FBAT-PP performs better than the other two methods in such scenarios.

**G11**

**STUDENT ASSESSMENT AND GRADING PROCEDURES OF SECONDARY BAND  
AND CHORAL DIRECTORS IN TENNESSEE**

Beth Delk (graduate student)  
Music  
[jed4k@mtmail.mtsu.edu](mailto:jed4k@mtmail.mtsu.edu)

Jamila McWhirter (mentor)  
Music  
[jmcwhirt@mtsu.edu](mailto:jmcwhirt@mtsu.edu)

In education, researchers agree that assessing and grading student learning is a major responsibility of a teacher. With the increased importance of standardized test scores on teacher effectiveness, music educators of performing ensembles question what grading procedures will be most effective in assessing student learning. The purpose of this pilot study is to determine what student assessment and grading procedures are being used in the band and choral classrooms across Tennessee (grades 7-12). A review of the related literature will be used to formulate a survey instrument. Areas of examination will include: (a) a description of the school environment and class size as it relates to grading; (b) what formal assessment and grading procedures are utilized by secondary band and choral directors; (c) what other factors affect how individual teachers assess their students. Data will be reported as frequencies and percentages. Results of this pilot study will be used as a basis for further investigation and discussion of the effectiveness of grading procedures in ensembles as it relates to the evaluation of teacher effectiveness.

**G12**

## **THE ECONOMIC IMPACT OF EQUINE EVENTS AT ON-CAMPUS FACILITY**

Allison Armstrong (graduate student)  
Horse Science  
[aaa2u@mtmail.mtsu.edu](mailto:aaa2u@mtmail.mtsu.edu)

Justin Gardner (faculty)  
Agribusiness and Agriscience

Patrick Kayser (faculty, mentor)  
Horse Science  
[pkayser@mtsu.edu](mailto:pkayser@mtsu.edu)

The horse industry contributes \$39 billion annually to the United States economy. Seventy-two percent of the 9.2 million horses in the country are used for showing and recreation. Major equine events generate significant revenue across the nation. The goal of this project was to measure the economic impact of the Tennessee Miller Coliseum on the local economy. Paper surveys were administered to attendees of sixteen equine events at the facility in 2009. Data was collected regarding respondents' demographics, spending habits and preferences and then summarized based on percentages and averages. IMPLAN software was used to estimate the facility's total economic contributions. A total of 814 surveys were collected with an average of 51 per event. Sixty-six percent of the respondents were female. Each respondent brought an average of 3.1 people and 2.1 horses to each event. Event attendees spent an average of 3.07 nights per event. More than 65% purchased gasoline locally. Fifty-one percent of attendees ate at local restaurants. IMPLAN calculations projected that each horse generated \$282.34, and of that, \$118.20 remained in the community. In this study, 3,355 horses were stalled during the sixteen events. Using IMPLAN projections, gross economic activity equaled \$947,250.70 of revenue for the shows surveyed (not including direct expenditures of the facility). The data from this study supports additional efforts to attract private and public funds to sponsor events and increase the facilities at the Coliseum. Additional monies contributed to these kinds of events will increase the opportunities for show committees to reinvest those funds in promotions and marketing for their events, thereby attracting greater numbers of entries from across the region and increasing the revenue brought into the Tennessee economy.

**G13**

## **CULTURAL PERSPECTIVES REGARDING EDUCATIONAL TECHNOLOGY**

Angela Risto (graduate student)  
Educational Leadership  
[kdgyrat@yahoo.com](mailto:kdgyrat@yahoo.com)

Barbara Young (mentor)  
Educational Leadership  
[bayoung@mtsu.edu](mailto:bayoung@mtsu.edu)

The changing landscape of U.S. schools yields the necessity for research regarding students' perspectives regarding the use of technology. Over the last fifteen years, there has been a tremendous increase in the utilization of technology in schools. Some U.S. students have requested the implementation of additional forms of technology into schools. More recently, there has been a significant rise in the number of ethnic students including Hispanic students, Asian students, and Middle Eastern students. Studies prove that culture influences perspectives on technology. Most software companies research the correlation between technology use and culture to develop software specific to certain countries. Therefore, assessing how these new culturally diverse U.S. students feel about utilizing technology in schools based upon the values and beliefs of their cultures would be of intrinsic value to the educational system. Surveys, interviews, and observations include three groups of students using technology in schools: those born in foreign countries and first generation Americans, second generation Americans or greater with extensive international travel experience, and students that are second generation Americans or greater without international travel experience. The study will be qualitative in nature. The goals and student composition of the American education system are rapidly changing and evolving. Educators and curriculum designers are presented with new technology and a more diverse group of students to cater to. Discrepancies have been found regarding educational technology perceptions between nations. In order to serve all of our nation's students, it is imperative that further inquiry, the same type software companies employ to appeal to students in different nations, is utilized within our own student population. By understanding student perspectives regarding educational technology, educators and curriculum designers will be better equip to design technological programs, curriculum, and activities to enhance the education of all U.S. students.

**G14**

## **THE EFFECTS OF STATIC AND PNF STRETCHING ON AGILITY PERFORMANCE IN ELITE YOUTH SOCCER PLAYERS**

James Jordan (graduate student)  
Health and Human Performance / Exercise Science  
[jbj2m@mtmail.mtsu.edu](mailto:jbj2m@mtmail.mtsu.edu)

Ajit Korgaokar (graduate student)  
Health and Human Performance / Exercise Science

Richard Farley (faculty)  
Health and Human Performance / Exercise Science

Jennifer Caputo (faculty, mentor)  
Health and Human Performance / Exercise Science  
[icaputo@mtsu.edu](mailto:icaputo@mtsu.edu)

A warm-up is an important part of preparation for a soccer match. Stretching is typically part of the warm-up. However, debate exists as to the most appropriate type of stretching. The purpose of this study was to examine the effects of static and proprioceptive neuromuscular facilitation (PNF) stretching on soccer specific agility performance in 14 elite youth soccer players. Participants completed 4 trials of the Balsom agility test while dribbling a soccer ball. Height, age, and body mass were collected in Trials 1 and 2 and participants were accommodated to the agility test. Trials 3 and 4 were the static and PNF treatment trials that were administered after a standardized warm-up (control) in a randomized and counterbalanced manner. There were no significant differences between the difference scores of the static and PNF stretching on agility performance,  $F(1, 13) = .24$ ,  $MSE = 1.19$ ,  $H-F p = .66$ . The results indicate that neither stretch significantly affected agility performance. More research is needed to determine the effects of PNF stretching on agility performance.

**G15**

**STOCHASTIC MODELING OF THE MICHAELIS-MENTEN ENZYMATIC SYSTEM  
USING MILSTEIN HIGHER ORDER METHOD**

Richard Ewool (graduate student)  
Mathematical Sciences  
[rce2m@mtmail.mtsu.edu](mailto:rce2m@mtmail.mtsu.edu)

Abdul Khaliq (mentor)  
Mathematical Sciences  
[akhaliq@mts.edu](mailto:akhaliq@mts.edu)

The Michaelis-Menten mechanism, which is named after two researchers who developed the model, is the simplest chemical network, modeling the formation of a product from a substrate with the aid of an enzyme. In the scheme of Michaelis and Menten, an enzyme reacts with the substrate and reversibly forms an intermediate complex, which decays to form a product and subsequently the original enzyme. Traditionally reaction rate equations have been used to model this system to track the rate of product formation. However the reaction rate model does not take into account fluctuations that occur within the system. In order to deal with this shortcoming, we model the system using the Chemical Langevin Equation, which is a system of Stochastic Ordinary Differential Equations. This takes into account to some extent the fluctuations that occur within the system. We use the ODE15 solver of Matlab when simulating numerically the reaction rate equation and use the Milstein's Higher Order Method, a numerical method for stochastic differential equations when simulating the Chemical Langevin model and compare the results to that of the reaction rate model. Lastly we developed a Matlab GUI that allows users to switch between the various models we used to simulate the chemical reaction processes.

**G16**

## **ENGAGING HIGH SCHOOL STUDENTS IN ORIGINAL SCIENTIFIC RESEARCH**

Alison Carey (graduate student)  
Biology  
[alisoncarey4@gmail.com](mailto:alisoncarey4@gmail.com)

Tiffany Saul (graduate student)  
Biology

Nichol Vaden, Christina Nicholas (high school faculty)

E. Lewis, Myles, Biology, Tennessee State University; Kim Sadler, Biology; Anthony Farone, Biology (faculty)

Mary Farone (mentor)  
Biology  
[mfarone@mtsu.edu](mailto:mfarone@mtsu.edu)

Students in Middle Tennessee high schools are learning about scientific research first hand. NSF GK-12 TRIAD Fellows from a variety of scientific disciplines offered at Middle Tennessee State University and Tennessee State University are sharing their own research interests with students. The Fellows are using their own research experiences to mentor students of participating classes. Two TRIAD fellows whose research focuses on comparative studies of reptiles and comparative forensic anthropology are currently working with high school students in elective ecology and biology courses to develop research projects. Working in small groups, the students have selected topics, developed questions, researched literature, and collected data for their projects. Group projects include a variety of topics such as behavioral and environmental studies in the lab and the field. By being involved in the entire process, students have developed the ability to ask research questions, examine the research of others, and have a greater understanding of the scientific method. Research groups are currently learning how to present their experimental results in a written form and in a visual presentation. This research process, along with involvement from local biotechnology industry partners, has allowed the participating students a real-world look at science in application.

**G17**

**EFFECTS OF FOOD DEPRIVATION ON PLASMA CORTICOSTERONE AND NUTRIENT LEVELS IN *NERODIA SIPEDON***

Alison Carey (graduate student)  
Biology  
[alisoncarey4@gmail.com](mailto:alisoncarey4@gmail.com)

Matthew Klukowski (faculty)  
Biology

Food restriction has been shown to be stressful in a variety of vertebrates, but little work has been done in snakes. The purpose of this study was to determine if plasma corticosterone levels rose in response to a mild food deprivation in water snakes (*Nerodia sipedon*) and to determine the effects of food deprivation on plasma triglyceride, uric acid, glucose, and lactate levels. Snakes that were starved for 15 days lost body mass, had elevated baseline corticosterone and depressed levels of triglycerides and uric acid. Elevation of corticosterone levels would be expected to help snakes mobilize stored energy, such as fat and protein, to allow them to survive periods of restricted feeding. Depressed levels of triglycerides seem to be associated with mild starvation in snakes. Uric acid is the main excretory product of protein breakdown in reptiles. Low uric acid levels might also be a useful marker of starvation.

**G18**

## **FAMILY LITERACY**

Ashley Johnson (graduate student)  
College of Education  
[ashspur@gmail.com](mailto:ashspur@gmail.com)

Ashlee Price (graduate student)  
College of Education

Brianna Crowley (graduate student)  
College of Education

Beverly Boulware (mentor)  
Educational Leadership  
[boulware@mtsu.edu](mailto:boulware@mtsu.edu)

This presentation focuses on family literacy. Parents and the home literacy environment they create play a substantial role in the development of their child's literacy achievement skills. By participating in academic activities at home, parents are showing their children they value their education. When children see their parents placing importance on education, they will as well. We also understand that our society is a melting pot. Teachers need to embrace diversity and create a sense of unity between a child's home and school. Our display will highlight the importance of family involvement and offer practical, culturally relevant strategies and resources for parents. Most parents want to be involved in their child's education, but may not know how to go about doing so. As teachers it is our job to go beyond telling and show parents how to get involved in their child's academic success. Since many MTSU students are parents, Scholars Week is a great place to raise awareness.

**G19**

## **EFFECTS OF CORRELATION ON DIMENSIONALITY IN MULTIDIMENSIONAL ITEM RESPONSE THEORY**

Kyungtae Kim (graduate student)  
Psychology  
[pykim@mtsu.edu](mailto:pykim@mtsu.edu)

Jwa Kim (faculty)  
Psychology and Literacy Studies

A computer simulation study was conducted to investigate the effects of item correlation, general factor loading values, and sample size on dimensionality detection, parameter estimation, and model detection accuracy in item response theory (IRT). Multidimensional item response theory (MIRT) situations were assumed. The correlation coefficient values were manipulated to have the values of .00, .10, .30, .50, and .70, the general factor loadings were set to .30, .50, .70, and .90, and the sample sizes were fixed to 100, 500, and 1000. A 5 (correlations) X 4 (factor loadings) X 3 (sample sizes) factorial design was established. Data were generated and analyzed through the *Mplus* program. Three dependent variables were measured: Recovery of dimensionality of each data set, accuracy of parameter estimation, and detection of the between- and within-item models. The entire design was repeated in two different MIRT models: between-item model and within-item model. The results were discussed with respect to applications of the situations to areas in literacy and other social and behavioral sciences.

**G20**

## **FINDING PALIN: FOCUSING EVENTS, FRAMING, AND PUBLIC OPINION ON A PROMINENT POLITICAL FIGURE**

Audrey Weddington (graduate student)  
Journalism  
[aweddington@gmail.com](mailto:aweddington@gmail.com)

Jason Reineke (faculty, mentor)  
Journalism  
[jreineke@mtsu.edu](mailto:jreineke@mtsu.edu)

This presentation will analyze the impact of focusing events on the public's favorability ratings of former governor of Alaska and Republican vice presidential nominee Sarah Palin. Using data from over 100 poll results reported on the Web site Pollster.com, we tracked favorability ratings from Palin's national debut as John McCain's running mate in August of 2008 through June of 2010. Although multiple public appearances and news stories were considered, only a few were associated with significant shifts in public opinion. These events were 1) the announcement that Palin's teenage daughter, Bristol was pregnant immediately following the announcement Palin would be John McCain's running mate, 2) a tense interview with CBS's Katie Couric, 3) the "Troopergate" scandal, which brought Palin's ethics into question, and 4) the story that Palin had written notes on the palm of her hand for her keynote speech at the First Annual National Tea Party Convention.

**G21**

## **SEXUAL OBJECTIFICATION AND THE SUPER BOWL: A TEXTUAL ANALYSIS OF THE TOP 2010 ADVERTISEMENTS**

Audrey Weddington (graduate student)  
Journalism  
[aweddington@gmail.com](mailto:aweddington@gmail.com)

Tricia Farwell (mentor)  
Journalism  
[tfarwell@mtsu.edu](mailto:tfarwell@mtsu.edu)

Jan Quarles, Roger Heinrich (faculty)  
Electronic Media Communication

This paper will present analysis of sexual objectification and gender stereotyping during the 2010 Super Bowl advertisements. A total of 15 of the most popular ads from 2010 will be analyzed for examples of objectification via textual analysis. The commercials included for this analysis include 1) Doritos, 'House Rules,' 2) Snickers, 'You're Not You When You're Hungry,' featuring Betty White, 3) E\*Trade.com, 'Girlfriend,' 4) Google, 'Search On,' 5) Motorola featuring Megan Fox, 6) Coca-Cola, 'Hard Times,' featuring the cast from The Simpsons, 7) Audi, 'Green Car,' 8) Cars.com, 'Timothy Richman,' 9) Dodge Charger, 'Man's Last Stand,' 10) Kia, 'Joyride,' 11) Hyundai, '10 Years Strong,' featuring Brett Favre, 12) Hyundai, 'Painted Hyundai Sonata,' 13) Honda, 'Accord Crosstour 2010,' 14) GoDaddy.com, 'News,' and 15) Doritos, 'Underdog.'

Applying the theoretical framework of Jeane Kilbourne, Laura Mulvey, and Mark Tungate via triangulation, ads will be analyzed for how men and women are portrayed in the 2010 advertisements as well as how often sexual objectification occurs, if at all. There is a possibility that some commercials may not include any sort of sexual content. By organizing advertisements based on common theme, advertisements that do not show any signs of objectification will also be included in the analysis and observed for examples of humor, satire, or stereotyping.

**G22**

## **USING WEB-BASED DATA MINING TOOLS TO FIND SIMILARITIES IN VARIED GENETIC PREDICTORS FOR COLON CANCER**

John Ihrie (graduate student)  
Basic and Applied Sciences  
[idi2e@mtmail.mtsu.edu](mailto:idi2e@mtmail.mtsu.edu)

Don Hong (mentor)  
Mathematical Sciences  
[dhong@mtsu.edu](mailto:dhong@mtsu.edu)

Recently, prognosis predictors (PPs) based on gene sets have been proposed to supplement existing methods for predicting risk of recurrence in colon cancer patients. The ability to accurately predict risk of recurrence is vital for physicians to decide the best course of treatment based on a patient's specific risk category. Currently, clinical and pathologic staging systems are used to assess risk of recurrence in individual patients, but these systems often lack accuracy. Genetic PPs can improve risk assessment; however, different research teams obtain dissimilar gene sets. In this project, we explore similarities of these gene sets that are difficult to discern at a superficial level. PPs should be considered on three different levels: gene, pathway, and network. Public databases exist that contain genomic information for humans. Web-based data mining tools exist that can explore these databases and search for pathways and networks relevant to an uploaded gene set. We use the Web-based Gene Set Analysis Toolkit (WebGestalt) to perform functional enrichment analysis of our gene sets and identify statistically significant pathways. We also use Genes2Networks to search protein-protein interaction network databases for gene set commonalities that are discernible at the network level. Genes2Networks can also suggest the relative importance of each gene in a network and can identify other genes that might also be important. We use measures of similarity to compare the PPs at all three levels. Our results show that even though gene sets show little or no similarities at the gene level, similarities at the pathway level are slightly higher. Moreover, similarities at the network level are even higher than similarities at the pathway level.

**G23**

## **THE STATE AND THE SUPERNATURAL: SUPPORT FOR PROSOCIAL BEHAVIOR**

Christian Brown (graduate student)  
Economics and Finance  
[ccb3g@mtmail.mtsu.edu](mailto:ccb3g@mtmail.mtsu.edu)

E. Anthon Eff (faculty, mentor)  
Economics and Finance  
[eaeff@mtsu.edu](mailto:eaeff@mtsu.edu)

Using the Standard Cross-Cultural Sample, Roes and Raymond (2003) find that large societies are more likely to be located in resource-rich environments, engage in warfare, and hold beliefs in gods actively supporting human morality (“moralizing gods”). We revisit the Roes and Raymond study, using the methods presented in a series of papers by Dow and Eff. Our findings suggest that moralizing gods are less likely to be found in resource-rich environments or amongst societies frequently engaged in external warfare. We find that cultural transmission over geographic space is the most significant force in conditioning belief in moralizing gods; that moralizing gods are more likely to be found in pastoral societies; and that the relationship between society size and moralizing gods is non-linear, with both very large and very small societies less likely to have moralizing gods. We explain this non-linearity by arguing that the functions of moralizing gods can also be performed by the state, and we also argue that moralizing gods play an important role in stabilizing property rights.

**G24**

## QUANTITATIVE ANALYSIS OF TRANSCRIPT LINKAGE IN *ZEa MAYS*

Margaret Pitt (graduate student)  
Biology  
[mfp2h@mtmail.mtsu.edu](mailto:mfp2h@mtmail.mtsu.edu)

Scott Gillespie (graduate student)  
Mathematical Sciences

Bruce Cahoon (mentor)  
Biology  
[acahoon@mtsu.edu](mailto:acahoon@mtsu.edu)

Lisa Green  
Mathematical Sciences  
[lbgreen@mtsu.edu](mailto:lbgreen@mtsu.edu)

The plastid genes *rpoB*, *rpoC1*, and *rpoC2* of *Zea mays* are co-transcribed as a single transcript and then separated during mRNA processing. Preliminary data suggest that the quantity and linkage of each of these three transcripts vary during development. The objective of this preliminary study was to apply a quantitative model to determine the proportion of linked vs. separated transcripts. The model was developed and tested using mRNA from 35 maize seedlings ranging from 7-14 days old. A second set of genes (*psbk-psbl*), known to have a simpler processing pattern than the *rpo* operon, were analyzed as a test case using quantitative reverse-transcriptase real-time PCR. Estimation of the initial amount of each mRNA transcript was calculated using a common mathematical model. Parametric measures were carried out to find the average instance of linkage among the transcripts. Data involving the intergenic region was skew right and prompted the use for non-parametric analysis via the resampled median. Results using a 95% Confidence Interval indicate the transcripts process separately a large majority of the time relative to staying linked together. These results indicate the initial success of the mathematical model and potential future application to the *rpo* operon.

**G25**

## **EFFECT OF TEACHING EXPERIENCES ON PRE-SERVICE TEACHER CONCERNS: A META-ANALYSIS**

Elizabeth Sharp (graduate student)  
Health and Human Performance  
[eeb2y@mtmail.mtsu.edu](mailto:eeb2y@mtmail.mtsu.edu)

Minsoo Kang (mentor)  
Health and Human Performance  
[mkang@mtsu.edu](mailto:mkang@mtsu.edu)

Background/Purpose: Research has shown that pre-service teachers have many concerns as they progress through teacher education programs. Fuller (1969) categorized teaching concerns into three stages: self, task, and impact. Several studies have looked at the change in teacher concerns during field experiences; however, there was a disagreement in literature about influence of teaching experiences. The purpose of this study was to use the meta-analytic approach to evaluate the effect of teaching experiences on pre-service teacher concerns as measured by Fuller's Model. Method: Studies were identified using computer searches and effect sizes (ES) was computed using a mean difference from pre and post tests divided by pooled standard deviations. Results: A total of 45 ESs were calculated from 14 studies; 15 ESs for each of the three concern categories. Using a random model, the quantitative synthesis of the self-concern yielded a weighted mean ES of -0.02 (95% CI = -0.29, 0.25), for task concerns the mean ES was -0.44 (95% CI = -0.23, 0.14), and for impact concerns the mean ES was 0.01 (95% CI = -0.23, 0.26). The weighted mean ES was heterogeneous for self ( $Q = 412.03$ ,  $df = 14$ ,  $p < .000$ ), task ( $Q = 211.07$ ,  $df = 14$ ,  $p < .000$ ), and impact ( $Q = 332.37$ ,  $df = 14$ ,  $p < .000$ ) which supported an examination of moderator variables. The three moderator variables examined were level in the teaching program, declared major, and length of field experience and ES was not influenced by those moderator variables. Conclusions: Overall, pre-service teachers did not show a significant difference from pre to post tests for self, task, or impact concerns. Future studies should implement specific interventions to see if the teacher concerns change when they are being guided more towards one concern over others.

**G26**

## **STRESSED-OUT SKINKS: EFFECTS ON HORMONES AND WHITE BLOOD CELLS**

Ryan Seddon (graduate student)  
Biology  
[rs2r@mtmail.mtsu.edu](mailto:rs2r@mtmail.mtsu.edu)

Matthew Klukowski (faculty, mentor)  
Biology  
[mklukows@mtsu.edu](mailto:mklukows@mtsu.edu)

Levels of corticosterone (CORT), the major glucocorticoid in reptiles, increase during stress. While immunosuppressive effects of chronically elevated corticosterone are well known, acutely elevated CORT levels may actually enhance immunity. We tested for effects of a one hour acute confinement stress on plasma CORT, prostaglandin E2 levels (PGE2), and leukocyte numbers in male skinks. Corticosterone levels and eosinophil:lymphocyte ratios were significantly elevated in confined lizards, but confinement did not have a significant effect on plasma PGE2 levels. Since PGE2 may have a very short half-life, in experiment two we determined the effects of shorter periods of confinement. Male lizards subjected to 15 or 30 minutes of confinement had elevated CORT levels, but PGE2 levels were still unaffected. Results from a third experiment in which we tested the effects of a two hour confinement on plasma CORT, testosterone, and leukocyte ratios will also be discussed.

**G27**

## **POTENTIAL FIELDS GENERATED BY POINT SOURCES ON SHELLS OF REVOLUTION**

Volodymyr Borodin (graduate student)  
Department of Mathematical Sciences  
[vb2m@mtmail.mtsu.edu](mailto:vb2m@mtmail.mtsu.edu)

Yuri Melnikov (mentor)  
Department of Mathematical Sciences  
[ymelniko@mtsu.edu](mailto:ymelniko@mtsu.edu)

The influence of a point concentrated heat source on the temperature distribution in various fragments of a thin spherical shell is considered. Equation of the steady-heat conduction is written in geographical (spherical) coordinates introduced for the middle surface of the shell. This results in a boundary-value problem that can hardly be tackled by using analytical approach. That is why they were routinely solved by numerical methods. In the present study, the influence functions of a point concentrated heat source are obtained analytically for given boundary-value problems. Graphical illustrations are presented for a number of particular problem settings that differ by shapes of regions and boundary conditions imposed. Results of this study could be used by engineers who work in designing industries dealing with thin-walled structures. As a further expansion of the present work, our plans are to consider other shells of revolution such as conical, cylindrical, toroidal and so on. After analytical or computer-friendly semi-analytical representations of influence functions of a point source for those surfaces are obtained, they could be employed as a base for the development of some iterative algorithms to solve time-dependent problems. Another area of possible expansion of the present study results represents joint shell structures.

**G28**

## **FARMING AND FIGHTING**

Philip Routon (graduate student)  
Economics and Finance  
[pwr2b@mtmail.mtsu.edu](mailto:pwr2b@mtmail.mtsu.edu)

E. Anthon Eff (faculty, mentor)  
Economics and Finance  
[eaeff@mtsu.edu](mailto:eaeff@mtsu.edu)

Ecological-evolutionary theory maintains that subsistence technology is the most important single factor affecting the organization of and interaction among human societies (Nolan 2003). Warfare is one such type of interaction. Specifically, ecological-evolutionary theorists argue that a society characterized by more advanced subsistence technology (that is, say, an agrarian society relative to hunter/gatherers) is more likely to engage in warfare. Many also argue that population density is positively correlated with the frequency of war. Using the Standard cross-cultural sample, this paper empirically examines these arguments and develops a model for external warfare. The study finds evidence that agrarian societies are indeed more likely to engage in war (but perhaps not for the reasons claimed by ecological-evolutionary theorists) and that population density may in fact be negatively correlated with the incidence of warfare.

**G29**

## **INVESTIGATING THE CHARACTERISTICS OF MELAMINE-CYANURATE IN BLOOD PLASMA AND KIDNEY TISSUE**

Farhana Akhter (graduate student)  
Chemistry  
[fa2b@mtmail.mtsu.edu](mailto:fa2b@mtmail.mtsu.edu)

Beng Ooi (faculty, mentor)  
Chemistry  
[bgooi@mtsu.edu](mailto:bgooi@mtsu.edu)

Melamine and cyanuric acid have been implicated in the kidney-related disease in infants and in the death of a large number of cats and dogs that ingested tainted food containing melamine. Melamine and cyanuric acid can form extremely insoluble crystals that precipitate in the renal tubules, leading to progressive tubular blockage, degeneration, and acute renal failure. The U. S. Food and Drug Administration (FDA) reported that melamine is incorporated into melamine-formaldehyde resins for making food packaging materials, plastic tableware, and the coating of food tins but only residual amounts leach into food. Food and beverage have been found to contain melamine in the parts-per-million levels as a result of leaching from melamine-containing resins. Trace levels of cyanuric acid can be present in food and water from the use of dichloroisocyanurate in drinking water, swimming pools, and water used in food manufacturing. The goal of this study was to investigate the histomorphologic characteristics of the crystals observed at various concentrations and temperatures using scanning electron microscopy (SEM). The morphology, size, and distribution of the crystals formed at temperature of 4 °C, 25 °C, and 37 °C at initial melamine and cyanuric acid concentrations ranging from 50 ppm to 250 ppm were compared. Samples containing melamine-cyanurate formed in bovine blood plasma and in the kidney tissue of catfish that had been fed daily for 3 days with 200 milligram per day of melamine-cyanuric acid complex per kilogram of body weight were also analyzed by SEM and Raman microscopy.

**G30**

## **EFFECT OF USING COPING SKILLS AND EXERCISE ON CHANGES IN STRESS AND ENERGY AMONG POLICE OFFICERS**

Chris Dickson (graduate student)  
Health & Human Performance  
[cdd2z@mtmail.mtsu.edu](mailto:cdd2z@mtmail.mtsu.edu)

Thomas Brinthaup (faculty, mentor)  
Psychology  
[tbrintha@mtsu.edu](mailto:tbrintha@mtsu.edu)

Mark Anshel (faculty)  
Health & Human Performance

This study examined the effects of coping skills and exercise on changes in perceived stress and perceived energy among 11 unfit fulltime male and female police officers (ages 26 to 57 yrs.) from the southeastern U.S. Measures included perceived stress, coping style (approach and avoidance), perceived physical energy. Participants were randomly assigned to one of two groups, coping skills with exercise ( $n = 5$ ), and coping skills but no exercise ( $n = 6$ ). Both groups attended a 2-hour workshop where they learned to use coping skills in response to an array of acute stressors commonly experienced in police work. The treatment group, however, also experienced a 10-week exercise program, in which they received fitness coaching. A 2 (groups) x 2 (pre- and post-intervention) randomized control-group factorial with repeated measures on the second factor indicated a tendency toward reduced use of the approach coping style ( $p < .08$ ) at posttest, as compared to pretest. No significant changes were found for avoidance coping ( $p > .05$ ). Participants reported less stress at posttest than at pretest, although this difference did not reach statistical significance ( $p = .11$ ). Neither the group differences nor the group x pre-post interaction were significant, the exercise group showed a larger reduction on perceived stress scores than did the coping skills only group. Physical energy was significantly higher from pre- to posttest for the exercise group, as compared to the inactive group,  $p = .003$ . It was concluded that the combined coping skills and exercise program is more effective than coping skill alone in reducing stress and improving physical energy.

## MESOPOROUS SILICA: POTENTIAL SCAFFOLDING FOR BONE GROWTH

Mohammedali Gangardiwala (graduate student)  
Professional Science  
[maq4q@mtmail.mtsu.edu](mailto:maq4q@mtmail.mtsu.edu)

Joyce Miller (staff / administration)  
MTSU Interdisciplinary Microanalysis and Imaging Center

Andrienne Friedli (faculty, mentor)  
Chemistry  
[afriedli@mtsu.edu](mailto:afriedli@mtsu.edu)

Silica-based materials have been incorporated into potential bone and dental grafts as models for the natural bioregeneration process of the human body. Here we describe the synthesis of mesoporous silica ( $\text{SiO}_2$ ) modified with  $\text{CaO-P}_2\text{O}_5$  in the presence of large pore foam templates using literature methods. Polyurethane foams with pore sizes in the range of 300-700  $\mu\text{m}$  are reported to provide the potential for neovascularization and tissue ingrowth. In our experiments, rigid polyurethane foams with 300-400  $\mu\text{m}$  were immersed in the modified sol-gel to soak up the solution and allowed to dry. The process was repeated until the foam appeared to be saturated. Heat treatment at 700 °C for 5 hours yielded fragile scaffolds, which were analyzed by SEM. Experimental conditions that were varied in the search for a stable scaffold with suitable pore sizes included: type of template foam, soaking time, and drying conditions. In the current proof of principle study the porous scaffold will be treated with a silane coating agent to functionalize the pores and treated with simulated body fluids to determine potential for applications in bone tissue engineering.

**G32**

## **DEVELOPING A NEW ONLINE TOOL THAT SUPPORTS PROGRAM CODE REVIEW AMONG COMPUTER SCIENCE STUDENT PEERS**

Michael Chasteen (graduate student)  
Computer Science  
[mac5j@mtmail.mtsu.edu](mailto:mac5j@mtmail.mtsu.edu)

Cen Li (mentor)  
Computer Science  
[cli@mtsu.edu](mailto:cli@mtsu.edu)

Studies have revealed an unfortunate culture among students in introductory computer science (CS) courses that are characterized by combativeness towards the opinions of peers, unwillingness to support or aid others, disdain for working in groups, and a lack of motivation or persistence. As a result, high dropout and failure rates, sometimes as high as fifty percent, have been a common phenomenon in introductory CS courses nationwide. The goal of PeerSpace is to promote peer collaborative exercises within a friendly, peer-supportive online social network environment, and to facilitate the building of peer support networks that lasts beyond the introductory CS courses. PeerSpace was developed based on the open source Elgg social engine. Elgg provides tools such as a discussion forum and blog for students. In addition, several custom modules have been developed to promote learning of course material and social interaction among students. Results from CS pedagogy research shows that it is beneficial for the students to view, comment and critique fellow students' programs. Students can learn program style and logic directly from each other through their programs. Also, it is often easier for the students to accept the suggestions or critiques coming from their peers. This work focuses on the development of the peer code review module and the supporting program repository module. These newly developed features in PeerSpace allow the CS students to submit their programs and view the graded assignments electronically, and to assess each other's work by using a predefined set of rubric for the assignment.

**RIGHT CHOICES: SERVICE LEARNING BENEFITS STUDENTS AND COMMUNITY**

Lauren Ingram (graduate student)  
Human Sciences  
[lpc2g@mtmail.mtsu.edu](mailto:lpc2g@mtmail.mtsu.edu)

Sandra Poirier (faculty, mentor)  
Human Sciences  
[spoirier@mtsu.edu](mailto:spoirier@mtsu.edu)

Marcie Ramirez, Rebecca Corley, Hodan Dahir, Beth Daniel, Matthew Farris, Candra Gluckner, Kathleen Haynes, Stephanie Hood, Annie Mayoza, Ashley Melton, Katya Reed, Alyce Scrivner, Vonchelle Stembridge, Jamie Tudor, Clark Vanderpool, Shavon Ward (undergraduates)  
Human Sciences

Research shows that youth who participate in afterschool programs demonstrate significant improvement in feelings and attitude, considerable reduction in aggression and behavioral problems, and increased school and achievement test scores. Therefore, in an effort to enrich Murfreesboro's youth with positive growth activities, MTSU's Family and Consumer Sciences Education program, is collaborating with the Patterson Park Community Center (PPCC) to develop an afterschool service learning program, "Right Choices". PPCC is located in a limited resources area of Murfreesboro and within close proximity to several schools. While youth of all ages are welcomed into the program, the main focus is on high school students. "Right Choices" is established on an educational curriculum encouraging active participation that focuses on building personal strengths, developing social competences, managing emotions, improving peer relations, strengthening family relations, and encouraging healthy living. The need for an afterschool program, such as "Right Choices", is crucial to ensure that at-risk adolescents remain focused on academics and positive community involvement. For two years, pre-service teachers from MTSU's Education program have been providing service-learning activities for the "Right Choices" teen program. Evaluation of the pre/post survey data indicates positive behavior changes occurring in most youth participants. Considering Murfreesboro's rapid growth and budget cuts, the partnership between MTSU and PPCC is critical. "Right Choices" will provide pre-service teachers with education and training experience while enriching tomorrow's youth.

**THE CRANIAL AND PECTORAL OSTEOLOGY OF THE COMMON CARP,  
*CYPRINUS CARPIO LINNAEUS, 1758***

Michael Anderson (graduate student)  
Biology  
[maa3t@mtmail.mtsu.edu](mailto:maa3t@mtmail.mtsu.edu)

Eric Salmon (graduate student)  
Biology

George Benz (mentor)  
Biology  
[gbenz@mtsu.edu](mailto:gbenz@mtsu.edu)

The vertebrate cranium is an important apparatus that has been modified numerous times throughout the course of evolution. In addition to its primary function of exogenous feeding and prey capture, the cranium is serves as housing for the nervous, optic, otic, olfactory, and respiratory systems. Perhaps more important to biologists, phylogenetic relationships between groups of organisms can be elucidated by evaluating conserved regions of articulation, homologous bones, and the general arrangement of skeletal components. The fish syncranium, in particular, is useful in explicating the foregoing because of the presence of several contiguous bone families. With the intention of introducing young scientists to piscine cranial anatomy, we have created a guide to the cranial and pectoral osteology of the common carp, *Cyprinus carpio*. This manual not only includes a guide to cranial and pectoral girdle disarticulation and reconstruction, but also sections that give detailed explanations of how to efficiently use the manual and prepare the fish skull for dissection. In addition, we include a photographic atlas of all cranial and pectoral bones, arranged by bone families. However, because nearly 32,000 species of fish have been described, this manual should be used only in an introductory capacity. Nevertheless, the student who chooses to follow this manual closely and becomes familiar with basic piscine osteology and terminology will be well-suited to begin investigating the primary literature on the subject.

G35

**POPULATION SURVEY OF THE STREAMSIDE SALAMANDER, *AMBYSTOMA BARBOURI*, IN THE CENTRAL BASIN**

Michael Anderson (graduate student)  
Biology  
[maa3t@mtmail.mtsu.edu](mailto:maa3t@mtmail.mtsu.edu)

Joshua Campbell, Alison Carey, Derec Dodge, Ryan Johnston, Emily Mattison, Ryan Seddon,  
Nathan Singer (graduate students)  
Biology

Brian Miller (mentor)  
Biology  
[bmiller@mtsu.edu](mailto:bmiller@mtsu.edu)

The streamside salamander, *Ambystoma barbouri*, inhabits upland deciduous forests associated with ephemeral first- and second-order streams throughout Middle Tennessee. The geographic range of *A. barbouri* extends as far north as Indiana, and the isolated Middle Tennessee populations demarcate the southern range of the species. Recently published range extensions have been associated only with the southern Inner Nashville Basin (INB) ecological subregion of the Interior Plateau. Historically, within the Outer Nashville Basin (ONB) breeding populations have been found in Davidson County, and juveniles have been found in Jackson County. However, the current status of these populations remains unknown, with the former presumed extirpated as a result of urbanization of metropolitan Nashville. Furthermore, recent reports note an absence of individuals at some historic breeding sites in Rutherford County. These data may indicate a potentially subregion-wide decline in the Middle Tennessee population of the species. Still, eggs were recently found in a first-order stream in Cedars of Lebanon State Forest in Wilson County (northern INB). We are currently surveying first- and second-order streams in the northern INB and the western and eastern ONB to find new breeding localities of *A. barbouri* and to connect the recently discovered Wilson County population with the historic Jackson County population. Preliminary searches have resulted in discovering eggs and larvae in a second first-order stream in Wilson County.

**COUPLING OF POLY(3-HEXYLTHIOPHENE) AND FULLERENES FOR THE IMPROVEMENT OF ORGANIC SOLAR CELLS**

Benjamin King (graduate student)  
Chemistry  
[blk2d@mtmail.mtsu.edu](mailto:blk2d@mtmail.mtsu.edu)

Dwight Patterson (faculty, mentor)  
Chemistry  
[dpatters@mtsu.edu](mailto:dpatters@mtsu.edu)

Increasing world energy demands and the desire for clean energy production, has led to a need for alternative energy sources. Solar energy, theoretically limitless, is thought to be a great alternative energy source regardless of the success presently. Synthetic solar cells, designed to harness the sun's energy, have been created using inorganic and organic materials with inorganic materials being the more prevalent. Research in organic materials for solar cells, however, has increased due to attractive properties and higher power efficiencies achieved. Solar Cells with active layers of poly(3-hexylthiophene) (P3HT) dispersed in [6,6]-phenyl-C61-butyric acid methyl ester (PCBM) have shown the highest power conversion efficiency with efficiencies up to 5%. Thermal annealing of the material has been shown to increase the efficiency of the material due to increase in crystallinity and intermolecular interactions of poly(3-hexylthiophene). However, due to the increase in crystallinity there is a reduction in exciton transfer efficiency at the P3HT/PCBM interface. It has been theorized that by coupling the P3HT and PCBM materials before thermal annealing, the exciton transfer efficiency would increase while still achieving increases in crystallinity and intermolecular interactions. A procedure has been developed using reagents such as bipyridine, copper bromide, and copper to facilitate coupling between the fullerene and the polymer at the 2 position. The product was analyzed by UV/Vis, <sup>1</sup>H NMR, <sup>13</sup>C NMR, IR and SEM to determine the efficiency of the coupling process. The desired product should have one polymer chain per fullerene. If the desired coupling accomplished by the synthesis, a mixture of coupled and uncoupled polymer will undergo thermal annealing and then be compared to a fully uncoupled thermal annealed system.

**G37**

## **EXPERIMENTAL INVESTIGATION OF ENERGY DISSIPATION IN GRANULAR SEGREGATION**

Tewodros Gebrehiwot (graduate student)  
Engineering Technology  
[tedi.seyoum@gmail.com](mailto:tedi.seyoum@gmail.com)

Walter Boles (mentor)  
Engineering Technology  
[wwboles@mtsu.edu](mailto:wwboles@mtsu.edu)

Binary granules of different size or density segregate when they are subjected to rotation in a tumbler. When large and small sized granules are mixed and rotate at moderate speed, segregation will start immediately with the smaller sized granules concentrating at the center of the cylinder and the large size particles concentrating at the periphery known as radial segregation. After a few minutes, the radial segregation is followed by axial segregation where bands of small and large granules form depending on geometry of cylinder and physical characteristics of the granules. Experimental results for granular segregation using rice and black beans in a rotating drum. At constant power supply from the source, the energy dissipation, expressed in terms of torque, decreases continuously as segregation proceeds. Equal mass of rice and beans fills one- half the cylinder volume. Similar experiments using pure rice and black bean of the same mass show little or no decrease in dissipation energy. This observation, energy dissipation in the system correlating with segregation may provide a new basis to analyze the physical cause of axial segregation and provide data to develop mathematical models to simulate granular segregation.

## THE TOXIC EFFECTS OF METAL NANOPARTICLES DURING EARLY ZEBRAFISH (*DANIO RERIO*) DEVELOPMENT

Chris Bowman (graduate student)  
Biology  
[crb3k@mtmail.mtsu.edu](mailto:crb3k@mtmail.mtsu.edu)

Ryan Otter (faculty, mentor)  
Michael Morris, Holly Browning (undergraduates)  
Matthew Elrod-Erickson (faculty)  
Biology  
[rotter@mtsu.edu](mailto:rotter@mtsu.edu)

In recent times, nanotechnology has become a growing applied science, with the use of nanoparticles impacting nearly all areas of technology and industry (e.g., medicine, electronics, plastics, energy, and aerospace). With the emergence of such a booming technology, it is estimated that by 2012 the nanotechnology economy will be valued at over \$1 trillion. The prevalence of such a technology may increase the likelihood of these particles being exposed to the environment, through manufacturing, shipping, and disposal operations. Nanoparticles (NPs) are identified as particles with dimensions of 1-100 nanometers (nm). Traditionally, scientists have known that larger particles maintain relatively constant physical and chemical properties; NPs, however, have been shown to exhibit highly reactive and unpredictable behavior. Silver nanoparticles (Ag-NPs) have been classified as the most common engineered nanomaterial. In this study, zebrafish (*Danio rerio*) were chosen as model organisms to test the toxicological and possible developmental effects of Ag-NPs. Given that nanoparticle size may be a determinant in reactivity, several diameters of Ag-NPs (20, 50, and 110 nm) were chosen as experimental treatments. Mesosilver, a colloidal dispersion of Ag-NPs and marketed as a "natural" beverage, was also tested to determine mortality and developmental defects. Zebrafish mortality was observed in a dose-dependent manner for Ag-NP treatments. A larger percentage of control embryos hatched at an earlier time than did embryos in the experimental treatments. The treated embryos also exhibited anomalies of the heart, namely slower heart rates and pericardial edema. These results suggest that zebrafish embryos elicit physiological responses, in a dose dependent manner, when exposed to varying Ag-NP sizes and development may be hindered as a consequence. Preliminary experiments with nano-sized zinc have demonstrated similar results with zebrafish mortality occurring in a dose-dependent manner.

**G39**

## **DIFFERENCES IN HOW AGGRESSIVE AND PROSOCIAL STUDENTS INTERPRET TEACHER BEHAVIOR**

Lauren Bryant (graduate student)  
Psychology  
[bryant.m.lauren@gmail.com](mailto:bryant.m.lauren@gmail.com)

Monica Wallace (mentor)  
Psychology  
[mwallace@mtsu.edu](mailto:mwallace@mtsu.edu)

This study further investigated hostile attributional bias in aggressive children. Previous research indicated that children identified as aggressive often interpreted ambiguous social information when peers were involved as hostile. Previous research had not directly addressed ambiguous situations involving teachers. In the current study, children identified as aggressive and prosocial listened to scenarios in which the teacher's actions resulted in a negative outcome for the child. In each scenario, the teacher's intentions were hostile or ambiguous. The researcher predicted that the aggressive group would attribute the intentions of the teacher in the ambiguous scenarios to be hostile, indicating a hostile attributional bias. Results showed that the aggressive and prosocial groups did not differ on how they interpreted situations across all scenarios. In fact, both groups identified the teachers' intentions as benign more often than aggressive across both hostile and ambiguous scenarios.

**G40**

## **THE COGNITIVE PROCESSES INVOLVED IN MATH LEARNING DISABILITIES AND ADHD**

Jessica Horvath (graduate student)  
School Psychology  
[jrh6q@mtmail.mtsu.edu](mailto:jrh6q@mtmail.mtsu.edu)

Aimee Holt (mentor)  
School Psychology  
[aholt@mtsu.edu](mailto:aholt@mtsu.edu)

The current study investigated whether there were cognitive performance differences between participants in three diagnostic groups: (a) Attention Deficit Hyperactivity Disorder (ADHD); (b) Math Learning Disabilities (MLD); and (c) co-morbid ADHD / MLD. Archival data was collected from an outpatient neurology practice and a neuropsychological laboratory. There were 482 participants all below the age of 20. A MANCOVA controlling for age and a Discriminant Function Analysis (DA) were conducted to determine if there were differences in the three diagnostic groups. Additionally, univariate analyses and pairwise comparisons were examined. Significant differences were found among the cognitive profiles of the participants in the three groups. Findings are discussed in terms of differences based on the type of analysis performed as well as limitations and future directions.

**G41**

## **THE LINK BETWEEN ECONOMIC GROWTH AND FINANCIAL DEVELOPMENT: EVIDENCE FROM DISTRICTS OF BANGLADESH**

Mohammed Majumder (graduate student)  
Economics and Finance  
[mm4v@mtmail.mtsu.edu](mailto:mm4v@mtmail.mtsu.edu)

E. Anthon Eff (mentor)  
Economics and Finance  
[eaeff@mts.edu](mailto:eaeff@mts.edu)

Bangladesh, as a third world country, is much concerned about economic growth. Achieving the Millennium Development Goals (MDGs) within the stipulated 2015 will not be possible without tremendous growth momentum in the years ahead. Stakeholders especially policy makers have to know about all the factors affecting growth in order to drive the economy towards the right direction. The analysis of the link between financial development and economic growth can provide intuitions and various signals for the policy makers. Unfortunately studies on this subject focusing on regional aspects are hardly available while findings on the basis of regional statistics is important because they can provide a comprehensive picture of the subject under study, offering vary useful and broader set of implications for the related field. That is why we have intended to analyze in the present study the nexus between financial development and economic growth in Bangladesh with district-wise data set. An econometric estimation has been performed on the district level data with the help of R software considering economic growth as dependent variable and financial development and some others as independent variables. The data is yearly and covers all 64 districts of Bangladesh and a time period spanning from 1997 to 2000. The core finding reveals that the financial growth of Bangladesh does not have any positive impact on economic growth. Rather it seems to have been associated with the economic growth in such a way that it causes decrease in economic growth at an increasing rate. The possible reasons for negative impact of financial development on economic growth include unfair intervention of political forces and government on the activities of financial institutions and variety of market failures. Or may be data related problem is the sole cause for the full set of peculiar results. Against this backdrop, a couple of recommendations including rectifying political culture, taking care of market failure and strengthening data management process have been put forth.

## RATER VARIABILITY OF TGMD-2 IN CHILDREN WITH INTELLECTUAL DISABILITIES

Youngdeok Kim (graduate student)  
Health and Human Performance  
[yk2k@mtmail.mtsu.edu](mailto:yk2k@mtmail.mtsu.edu)

Peter Hart (graduate student)  
Health and Human Performance

Minsoo Kang (faculty, mentor)  
Health and Human Performance  
[mkang@mtsu.edu](mailto:mkang@mtsu.edu)

Ilhyeok Park, Seoul National University, Physical Education (faculty)

TGMD-2 is a well-known measurement tool in the field of Adapted Physical Activity (APA). However, considering that scoring strategy for each item in TGMD-2 depends on subjective views of raters and variability in motor development of children with intellectual disabilities, biases may be inherent in measurement scores. Purpose: The purpose of this study was to investigate the magnitude of error variances related to the raters within each of 12 subsets of TGMD-2 when applied to children with intellectual disabilities. Method: A total of 22 children with intellectual disabilities participated in this study. Children's performances of each of 12 subsets of TGMD-2 were recorded via video and scored by three APA specialists who have expertise in TGMD-2. A fully crossed design of Generalizability theory, which included participants (p), raters (r), trials (t), and items (i) facets, was applied to each of 12 subsets individually. The outcomes of interest were variance of universe score (p, true score) and error variances by raters (r: rater, pr: interaction with subjects, ir: interaction with items, and tr: interaction with trials). The effect of the raters on the measurement scores were considered significant if the sum of relative percentage (%) of the 4 rater-related variances was larger than the relative percentage of variance of the universe score. Results: The G-study results indicated that there were significant effects of raters in Kick (p: 7.9%, ir: 25.1%), Catch (p: 8.9%, r: 4.7%, pr: 17.9%, tr: 0.6%, and ir: 4.4%), and Leap (p: 18.9%, r: 14.5%, pr: 3.8%, and ir: 13.4%). The deficient reliability coefficients (phi) were found from Kick (.53), Catch (.37), and Leap (.59) subsets through the D-study; however, the others were fairly acceptable (>.70). Conclusion: There were significant discrepancies in agreement among raters in some subsets. Considering large error variances have affected reliability coefficients, efforts should be made to increase agreement among raters.

**G43**

## **SYNTHESIS OF CYCLOPROPYL PEPTIDOMIMETICS AS POTENTIAL HIV PROTEASE INHIBITORS**

Anuradha Pathirinage (graduate student)  
Chemistry  
[al2u@mtmail.mtsu.edu](mailto:al2u@mtmail.mtsu.edu)

Nikhil Reddy (undergraduate)  
Chemistry

Norma Dunlap (faculty, mentor)  
[ndunlap@mtsu.edu](mailto:ndunlap@mtsu.edu)

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. HIV protease is an enzyme involved in the progression of AIDS, and inhibitors of this enzyme have been proven to be an effective treatment. In fact, there are approximately eight to ten HIV protease inhibitors on the market. All are hydroxyethylene peptidomimetics, most of which have a benzyl group in the P1 position. Using CBz-phenylalanine as a starting material, potential inhibitors of HIV protease with a cyclopropyl backbone have been prepared. Issues involving the formation of stereoisomers in the course of the synthesis have been thoroughly investigated in this series of compounds.

## EXAMINING ALCOHOL CONSUMPTION BEHAVIORS AMONG STUDENTS

Poliala Mahoney-Dickson (graduate student)  
Health and Human Performance  
[pam2t@mtmail.mtsu.edu](mailto:pam2t@mtmail.mtsu.edu)

Samuel Sowah, Amanda Cole, Brittney Oliver (graduate students)  
Health and Human Performance

Andrew Owusu (faculty, mentor)  
Health and Human Performance  
[aowusu@mtsu.edu](mailto:aowusu@mtsu.edu)

Lisa Shrader, Health Promotion, (staff / administration)  
Dana Umscheid (faculty)  
Health and Human Performance

Introduction/Purpose: Binge drinking is a major public health concern on college campuses. The purpose of this study was to determine the relationship between alcohol use, frequency of binge drinking, and experience of negative consequences among students at MTSU. This relationship was further examined using a number of control variables such as gender, race, etc. Methods: Data from the Spring 2010 National College Health Assessment (NCHA) administered and collect by MTSU Health Promotion was analyzed to determine relationship between selected variables. Results: Reponses to the NCHA indicate that 74.9% of students have a history of alcohol consumption, 57.9% were current drinkers, and 23.9% had no history of alcohol consumption. There was a significant association between gender and frequency of binge drinking in the past two week ( $X^2= 11.1, df=1, p<.001$ ). The odds of binge drinking 1 or more times in the past two weeks were 1.9 times higher among males than females. A significant association was also observed between binge drinking one or more times in the last two weeks and the negative outcomes doing something that you later regretted as a result of drinking and forgetting where you were or what you did as a result of drinking ( $X^2= 20.0, df=1, p<.001$ ;  $X^2=28.8, df=1, p<.001$ ).The odds of doing something that you later regretted as a result of drinking and forgetting where you were or what you did as a result of drinking were 2.43 and 3.1 times, respectively, higher among those who binge drank than who did not binge drink. Conclusions: Significant associations between binge drinking and negative outcomes as a result of drinking highlight the need for further interventions in this population.

**G45**

**APOLACTOFERRIN BINDS THE HEMOPEXIN DOMAIN OF PRO-MATRIX METALLOPROTEINASE-2**

Hisham Abu-Taleb (graduate student)  
Biology  
[hga2c@mtmail.mtsu.edu](mailto:hga2c@mtmail.mtsu.edu)

Michael Thompson (faculty, mentor)  
Biology  
[mthomps@mtsu.edu](mailto:mthomps@mtsu.edu)

Matrix metalloproteinase-2 (MMP-2) is a zinc metallopeptidase that is responsible for degradation of gelatin and type IV collagen, and is elevated in many disease states, including cancer and arthritis. While recent studies indicate that a low molecular weight form of MMP-2 is inactivated by the anti-inflammatory protein apolactoferrin (ApoLTF), activation of MMP-2 by ApoLTF has been demonstrated in cell culture. Here, the direct binding of ApoLTF to the proenzyme (pro-MMP-2) is demonstrated. This binding is specific for ApoLTF, and appears to involve the hemopexin domain of the zymogen. ApoLTF binding to pro-MMP-2 does not stimulate conformational activation of the zymogen, demonstrating that the most likely mechanism is disruption of the pro-MMP-2 - TIMP-2 - MT1-MMP ternary complex in the pericellular compartment.

**G46**

**REGULATION OF MMP-2 AND PRO-MMP-2 BY THE COPPER-BINDING SERUM  
PROTEIN APOCERULOPLASMIN**

Hisham Abu-Taleb (graduate student)  
Biology  
[hga2c@mtmail.mtsu.edu](mailto:hga2c@mtmail.mtsu.edu)

Jon Johnson (graduate student)  
Biology

Michael Thompson (faculty, mentor)  
Biology  
[mthomps@mtsu.edu](mailto:mthomps@mtsu.edu)

Ceruloplasmin (CP) is a copper binding protein found in plasma with roles in copper and iron homeostasis; however, CP is also elevated in patients exhibiting rheumatoid arthritis (RA). In order to further investigate the role of CP in RA, the ability of CP to bind and alter the enzymatic activity of the inflammatory mediator matrix metalloproteinase-2 (MMP-2) and pro-MMP-2 *in vitro* was examined. ApoCP physically bound pro-MMP-2 and active MMP-2, as well as a lower molecular weight form of MMP-2 lacking the hemopexin domain (MMP-2 CD), thus demonstrating less specificity than ApoLTF. Furthermore, ApoCP inhibited the activity of the low molecular weight form of the enzyme. Although many mechanistic details remain to be determined, it is likely that CP is elevated in patients with RA as a way of mitigating widespread tissue damage instigated by RA.

**G47**

## HOW DO TECHNOLOGICAL ADVANCEMENTS INFLUENCE DEMOCRACY?

Abhradeep Maiti (graduate student)  
Economics and Finance  
[am4m@mtmail.mtsu.edu](mailto:am4m@mtmail.mtsu.edu)

E. Anton Eff (mentor)  
Economics and Finance  
[eaeff@mtsu.edu](mailto:eaeff@mtsu.edu)

This presentation explores how technological advances influence the extent of democracy in a society. There can be many channels through which technological breakthroughs can influence the level of democracy in a society. For example, as a society matures it develops methods to keep written records. This helps members to transmit ideas among themselves and as a consequence makes it easier for them to rise against an unpopular leader. However, technological advancements can also affect a society in a negative way. For example, if the newfound technological knowledge gets concentrated in the hands of the ruling section of the society, then the general public might experience diminished freedom of choice. Using Standard Cross Cultural Sample (SCCS) dataset, I find that technological advancements tend to make societies more democratic. To measure technological advancements I have created my own index using the dataset comprising of several variables of interest which can potentially give us a measure of the extent of technological progress a society has made. To measure democracy I use a variable measuring the 'checks a society has in place on leaders' power'. In this paper I find that technological advances actually tend to raise the level of democracy in a society. Another important result coming out of the paper is that the existence of food stress in a society reduces the level of democracy.

## ASSESSING BREADTH AND DEPTH OF VOCABULARY KNOWLEDGE: A COMPARISON OF FOUR VOCABULARY TASKS

Melissa Brock (graduate student)  
Literacy Studies  
[mlb4x@mtmail.mtsu.edu](mailto:mlb4x@mtmail.mtsu.edu)

Seokhee Cho, English; Amanda Brown, Literacy Studies (graduate students) Donna Shoults, Psychology; Dan Davis, English; Stefanie Price, Psychology (undergraduates)

Aleka Blackwell (faculty, mentor)  
English / Literacy Studies  
[ablackwe@mtsu.edu](mailto:ablackwe@mtsu.edu)

A significant piece of the literacy achievement puzzle is vocabulary aptitude. However, vocabulary acquisition and assessment in normally developing native English-speaking adolescents and young adults remain understudied. One reason is that breadth and depth of lexical knowledge is difficult to establish with existing individual vocabulary measures. We explored whether a combination of diverse vocabulary measures describes more fully a person's vocabulary aptitude. Working under the assumption that it is wise to test a hypothesis on young adults prior to testing children, we measured the vocabulary aptitude of 117 native English speakers (59 females, 58 males; Age Mdn = 18.5, M = 19.45, SD = 2.92) with four tests which assess different aspects of receptive vocabulary: the PPVT-III, the Yes/No Test, the Word Associates Test, and the Verb Subordinates Test. These tests were selected because we hypothesized they can provide in combination an in-depth measurement of vocabulary aptitude. The four tests vary along the following parameters: (i) two measure vocabulary breadth (i.e., recognition vocabulary) and two measure vocabulary depth (i.e., knowledge of lexical network and collocation relationships), (ii) two consist of items from different lexical categories (nouns, adjectives, and verbs) and two consist of items from a single lexical category (adjectives in the WAT; verbs in the VST), and (iii) two were designed for testing native English speakers whereas two have been developed for ESL vocabulary testing (an arena where English vocabulary testing has been more systematically researched). Given our hypothesis that vocabulary aptitude is complex, we predicted a weak or moderate correlation in performance on the four tests. Intercorrelations between these measures confirmed our prediction. We discuss the nature of vocabulary aptitude by reporting detailed results on individual tests and individual participants.

G49

## **PASSIFLORA INCARNATA: AN ALLELOPATHIC STUDY**

Adam Keasling (graduate student)  
Biology  
[awk2q@mtmail.mtsu.edu](mailto:awk2q@mtmail.mtsu.edu)

Frank Bailey (mentor)  
Biology  
[fcbailey@mtsu.edu](mailto:fcbailey@mtsu.edu)

Allelopathy is the inhibitory activity of plant-produced chemicals upon other plants. These allelochemicals are of interest because they represent potentially novel pharmacophores possessing herbicidal activity that may target undiscovered molecular receptor sites. The objective of this study was to test the allelopathic activity of *Passiflora incarnata* extracts against the monocotyledonous and dicotyledonous test species *Hordeum vulgare* and *Raphanus sativus*. Continuous exposure to total aqueous extracts of *P. incarnata* caused statistically significant germination inhibition at 10% and 5% w/v concentrations for *H. vulgare*, but only at the 10% w/v concentration for *R. sativus*. A 14-day growth assay showed that 24-hour pre-germination exposure to total aqueous extracts had no effect on either harvested dried weights or leaf-bleaching ratios of either test species, however 24-hour post-germination exposure showed significant leaf-bleaching in *H. vulgare*. Lastly, bioassay-guided sequential-solvent extractions (varying polarity) were performed to determine what effect fractionation has upon activity, with preliminary GC-MS analysis of extracts.

**G50**

## **IDENTIFYING TRAINING SETS FOR PERSONALIZED ARTICLE RETRIEVAL SYSTEM**

Sachintha Pitigala (graduate student)  
Computational Sciences  
[spp2k@mtmail.mtsu.edu](mailto:spp2k@mtmail.mtsu.edu)

Cen Li (faculty, mentor)  
Computer Science  
[cli@mtsu.edu](mailto:cli@mtsu.edu)

Many bioinformatics researchers use *PubMed* as their primary tool to retrieve published information relevant to their work. However, utilizing *PubMed* is a challenge, because this large database grows daily. Traditional keyword-based information retrieval approaches are not adequate for many researchers who have very specific information needs. These approaches often return too many citations, most of which are not directly related to the users' main interest. An important part of developing a personalized document retrieval system is to obtain an appropriate set of training data that can be used to build and test such systems. This work studies the feasibility of forming training datasets based on MeSH terms. In particular, articles belonging to leaf categories in the MeSH tree were experimentally studied. If the text classifiers resulting from training data are able to differentiate the categories from one another, then articles from MeSH major topics maybe good candidates for building and training personalized article retrieval systems. In this study, articles from five Mesh leaf categories under the Mesh Major topic "Genetic Processes" were chosen as sample classes in text classification. First, text pre-processing steps were used to transform the full text articles into TF-IDF vectors. Then, Support Vector Machine (SVM) text classification was used to learn the classifier based on articles from two of the five categories. Ten different experiments were conducted using the pair-wise MeSH leaf categories. Ten-fold cross-validation was applied to compute the average accuracies. According to the results, the classification accuracies are low (below 40%) across all 10 experiments. The initial conclusions based on the experimental results are that: (1) learning from small number of text documents is difficult; (2) the articles sorted into the leaf MeSH terms share too many similarities, making them hard to differentiate; (3) ranking the words and reducing dictionary size can slightly increase the classification accuracy.

**G51**

**TIMING INFLUENCES ON THE SPECIFICITY OF IMPLIED MOVEMENT INTERFERENCE EFFECTS**

Tyler Hubbard (graduate student)  
Psychology  
[tmh3w@mtmail.mtsu.edu](mailto:tmh3w@mtmail.mtsu.edu)

Alan Bisby, Andrew Jones (undergraduates)  
Psychology

Richard Tillman, Dallas Swindell (graduate students)  
Psychology

William Langston (mentor)  
Psychology  
[wlangsto@mtsu.edu](mailto:wlangsto@mtsu.edu)

Langston, Hubbard, and Emerson (2009) found that sentence–letter-movement interference effects were specific. For example, identifying moving letters was influenced by sentences describing movement in the same direction, but not by sentences describing words naming objects in static locations. One open question related to these results was whether the interaction between prime (sentence or word) and target movement would produce facilitation of target identification or inhibition of target identification. The purpose of the present studies was to manipulate the timing of events to determine whether shorter prime presentations would lead to facilitation (due to the prime and target integrating into a single event) and longer prime presentations would lead to inhibition (due to the prime and target being perceived as separate events). Reading speed was also measured as an important individual difference affecting the timing variable.

## ELUCIDATING THE CHEMICAL PROFILE OF THE SMOKE SAMPLES OF SYNTHETIC CANNABINOID SUBSTANCES

Vanessa Hobbs (graduate student)

Chemistry

[vh2d@mtmail.mtsu.edu](mailto:vh2d@mtmail.mtsu.edu)

Ngee Sing Chong (faculty, mentor)

Chemistry

[nchong@mtsu.edu](mailto:nchong@mtsu.edu)

The sale, use, and possession of synthetic cannabinoids have been banned in many states because of concerns regarding their toxicological effects. The abuse of these drugs can be partly attributed to the lack of a widely accepted protocol for analyzing the synthetic cannabinoid substances for enforcement purposes. It allows the drug users to get “high” or intoxicated while avoiding the detection of the metabolites of these synthetic cannabinoids in their urine samples subjected to the standard drug test for natural cannabinoids. The development of a method for analyzing the constituents of smoke samples produced from the herbal cigarettes containing synthetic cannabinoids will provide a realistic estimate of exposure to the specific cannabinoid or herbal toxicants generated during the cigarette burn. The herbal products sold under trade names like K2 or K3 were used for this study. The smoke samples were directly sampled into evacuated bottles for subsequent analysis of volatile organic compounds by gas chromatography-mass spectrometry (GC-MS) with preconcentration via Tenax trap and cryogenic focusing. The more polar and less volatile compounds were sampled using a cascade impactor for fractionating the different size fractions of inhalable particulate matter followed by the GC-MS analysis of the extracts of the impactor filters. The levels of low molecular weight compounds such as carbon monoxide, nitrogen oxides, methane, and ammonia were quantified by Fourier Transform infrared spectrometry (FTIR) using long path length gas cells. The implementation of software-based algorithm for accurate mass determination in GC-MS was used to demonstrate unambiguous identification of the cannabinoid constituents. The analytical results for the determination of the herbal smoke composition of K2 and K3 are potentially useful for forensic testing of these illegal cannabinoid samples and toxicological risk assessment of the cannabinoid compounds.

**READING THROUGH MATHEMATICS: EQUITY FOR ALL STUDENTS**

Anna Costa (graduate student)  
Elementary and Special Education  
[aec2y@mtmail.mtsu.edu](mailto:aec2y@mtmail.mtsu.edu)

Christina Davidson, Kristen Dye, Cori Greenholt (graduate students)  
Elementary and Special Education

Beverly Boulware (mentor)  
Elementary and Special Education  
[boulware@mtsu.edu](mailto:boulware@mtsu.edu)

This content examines equity in math literacy in the general education classroom from four different perspectives: English as a Second Language (ESL), Mathematics, Empowerment, and Literacy. Strategies are provided for choosing culturally relevant and developmentally appropriate materials to support students' academic achievement across Mathematics and Literacy. The poster evidences particular theories and philosophies supporting current beliefs about instruction for each area. The ESL section examines methods to aid regular education classroom teachers in adapting their lessons to meet the needs of second language learners. The section describing empowerment directs attention to equality and empowerment for all students regardless of race, gender, ethnicity, or socioeconomic status. A deeper look into traditional problem solving and literacy strategies are examined and alternative methods to increase student empowerment explained. Content identifies connections to student empowerment and language. The mathematics portion focuses on how to use culturally responsive pedagogy in teaching mathematics by discussing a sociocultural approach. A major emphasis is teaching for understanding by allowing students to engage in problem solving with alternative solutions, articulated thinking, and constructed knowledge in cooperative learning groups with a range of tools and technologies. For the literacy portion, items to be discussed include the importance of providing a context for mathematics problems through high-quality, multicultural literature. This approach allows all children to benefit from an integrated curriculum. Furthermore, when mathematics instruction is embedded in literacy activities, children gain access to a deeper understanding of both content areas.

## DETECTION AND DEGRADATION OF CHEMICAL WEAPONS MODELS USING MESOPOROUS TiO<sub>2</sub> FILMS

Peter Cothron (graduate student)  
Chemistry  
[petercothron@hotmail.com](mailto:petercothron@hotmail.com)

Andrienne Friedli (faculty, mentor)  
Chemistry

Titania (TiO<sub>2</sub>) powder catalyzes oxidization of organic compounds in the presence of light and is used in decomposition of environmental contaminants. In this project, mesoporous TiO<sub>2</sub> thin films were investigated as sensors for chemical warfare agent (CWA) models, with the intent that the CWAs could be decomposed after detection and the sensors reused. Mesoporous (TiO<sub>2</sub>) was synthesized according to a literature procedure using P123, a polyether block copolymer, as a pore-generator. After forming a titania sol-gel and spin-coating onto an appropriate substrate, the P123 was removed via calcification at 300 °C then 500 °C. Variations in experimental conditions for film formation included number of layers, spin-coating rate, heating rate, and decomposition temperature. Film morphology was characterized through thickness measurements (profilometry), water contact angle (goniometry), and transmission electron microscopy (TEM). Initial sensor investigations were performed with mustard gas simulant chloromethyl phenyl sulfide (CMPS) or nerve agent model dimethyl methyl phosphonate (DMMP) to find systems that could be monitored with available spectroscopic methods. After exposure to CWA model vapor, the films were examined with IR and Raman spectroscopies to determine whether binding or entrapment within the film occurred. Films with evidence of binding to CMPS were exposed to a medium pressure UV lamp for up to 30 min to photochemically decompose the compound. After the decomposition was complete, the film was re-exposed to CMPS and the process was repeated to determine efficiency.

**G55**

## **NONSUICIDAL SELF-INJURIOUS BEHAVIOR AND ITS RELATIONSHIP WITH PARTNER VIOLENCE**

Angel Simmons (graduate student)  
Psychology  
[ajsimmons07@aol.com](mailto:ajsimmons07@aol.com)

Katy Owen (graduate student)  
Psychology

Ryan Rattliff (undergraduate)  
Psychology

Mary Ellen Fromuth (mentor)  
Psychology  
[mfromuth@mtsu.edu](mailto:mfromuth@mtsu.edu)

This study explored nonsuicidal self-injury (NSSI) and its relationship with intimate partner violence. Participants were undergraduate college students (N = 156; 39% men, 61% women) recruited from a psychology research pool at a southeastern university. Most participants were 18-21 years old (87%) and identified themselves as Caucasian (56%). In small groups, participants completed surveys that included measures of intimate partner violence (The Multidimensional Measure of Emotional Abuse and The Severity of Violence Against Women/Men Scale) and self-harm (The Inventory of Statements about Self-Injury). Overall, 26% reported at least one incident of self-harm in the past year with the most frequent reported activities being banging or hitting self and interfering with wound healing. Consistent with previous research, the findings indicated a significant relationship between nonsuicidal self-injurious behavior and three different types of intimate partner violence (emotional, physical and sexual). Results are discussed in terms of the need for additional research on self-harm and its correlates.

**G56**

## **SCHOOL UNIFORMS**

Emily Casey (graduate student)  
Curriculum and Instruction  
[ec3c@mtmail.mtsu.edu](mailto:ec3c@mtmail.mtsu.edu)

Beverly Boulware (mentor)  
Elementary and Special Education  
[boulware@mtsu.edu](mailto:boulware@mtsu.edu)

This presentation explores the issues surrounding school uniforms, particularly looking at the pros and cons of school uniforms, safety issues regarding dress codes, costs of school uniforms, gang violence, and other matters associated with school uniforms in public and private schools. The research does not lean towards one side of the issue, but rather take a look at arguments presented by both supporters and opponents of school uniforms. Supporters of school uniforms argue that school uniforms help new students fit in to their environment, improve learning by eliminating distraction from “clothing issues”, promote pride in self and school, allow parents to save money otherwise spent on “fashionable” clothing, uniforms would cut down on teasing and bullying, uniforms would save parents and students time getting ready for school, and schools would immediately know if an intruder entered the school building. Opponents of school-mandated uniforms argue that uniforms ultimately cost more, uniforms take away students self expression, uniforms do not teach children how to deal with people who are different from themselves, it is impossible to prevent outside intrusion, and that uniforms do not help with academic achievement. While examining both sides of the issue, my research highlights several key points and will hopefully draw in discussion or debate regarding the matter in order to provide a proper learning environment for students today. “The aim of education should be to teach us rather how to think, than what to think - rather to improve our minds, so as to enable us to think for ourselves, than to load the memory with thoughts of other men.” -Bill Beattie

**G57**

## **PERCEIVED OVERWEIGHT OR OBESE BODY IMAGE AND WEIGHT-CONTROL BEHAVIORS AMONG ADOLESCENTS IN TENNESSEE**

Saori Ishikawa (graduate student)  
Health and Human Performance  
[si2p@mtmail.mtsu.edu](mailto:si2p@mtmail.mtsu.edu)

Joel Reece (graduate student)  
Health and Human Performance

Norman Weatherby (mentor)  
Health and Human Performance  
[weatherb@mtsu.edu](mailto:weatherb@mtsu.edu)

Background: Excess weight and obesity among adolescents are significant public health concerns in the United States. Adolescents who perceive themselves as overweight or obese may engage in weight-control behaviors (WCB), some of which are detrimental to health. Therefore, the purpose of this study was to identify the effect of perceived body image on WCB. Methods: This study analyzed data from the 2007 Youth Risk Behavior Survey of Tennessee high school students. A complex sample multinomial logistic regression in SPSS was used with a sample of 1,847 high school youth to examine if adolescents who perceived themselves as overweight or obese were more likely to engage in extreme WCB (i.e., fasting, use of diet pills, vomiting or taking laxatives) than adolescents who did not perceive themselves as overweight or obese. Control variables included age, sex, body mass index, physical activity level, and sedentary behaviors. Results: The analyses revealed that 29.5% (C.I. = 27.5, 31.7) of adolescents perceived themselves to be overweight or obese. They were more likely than other adolescents to engage in normal WCB (i.e., exercise, eating less) (O.R. = 2.027, C.I. = 1.377, 2.984,  $p = .001$ ) or extreme WCB (O.R. = 3.362, C.I. = 1.981, 5.707,  $p < .001$ ). High school girls were more likely than high school boys to use normal WCB (O.R. = 1.929,  $p < .001$ ) or extreme WCB (O.R. = 5.240,  $p < .001$ ). Normal WCB and extreme WCB were reported by 53.5% and 15.4% of the high school students, respectively. The model explained 18.4% of the variation in type of WCB, and 56.9% of the students' behavior was correctly classified. Conclusion: The observed extreme WCB explains the need for interventions addressing distorted body image and promoting healthy weight-control practices among adolescents, especially girls.

## THE IMPACT OF SAME-SEX MARRIAGE ON GAY AND LESBIAN WAGE DIFFERENTIALS

Joseph Kirby (graduate student)  
Economics & Finance  
[ilk4t@mtmail.mtsu.edu](mailto:ilk4t@mtmail.mtsu.edu)

Adam Rennhoff (mentor)  
Economics & Finance  
[rennhoff@mtsu.edu](mailto:rennhoff@mtsu.edu)

The purpose of this presentation is to examine the impact legal recognition of same-sex partnership has on gay and lesbian wage differentials. Previous research has shown that gay men tend to earn less than their heterosexual counterparts and lesbian women tend to earn more than their heterosexual counterparts. Conversely married men tend to earn more than unmarried men and married women tend to earn less than unmarried women. This presentation tests the hypothesis that a marriage premium or penalty exists for same-sex partners that live in states that legally recognize their union. Data comes from the 1990 and 2000 decennial Censuses and the 2001 to 2009 American Community Surveys (both performed by the U.S. Census). The paper attempts to identify whether the cause of any premium or penalty is the result of specialization in workforce production. Controls are also used to attempt to identify same-sex couples that would call themselves married if they lived in a state that recognized the partnership as well as same-sex marriage laws encouraging some couples to migrate. Early results suggest a marriage premium for gay men and a marriage penalty for lesbian women.

**G59**

**FECAL SAMPLES AS AN INDICATOR OF MERCURY ABSORPTION IN DOSED  
NORTHERN WATER SNAKES, *NERODIA SIPEDON***

Raymond Wright (graduate student)  
Biology  
[rcw3b@mtmail.mtsu.edu](mailto:rcw3b@mtmail.mtsu.edu)

Patrick Cusaac (graduate student)  
Biology

Cassandra Henry (undergraduate)  
Biology

Frank Bailey (faculty, mentor)  
Biology  
[fcbaily@mtsu.edu](mailto:fcbaily@mtsu.edu)

In ecotoxicology reptiles are underrepresented, with most studies focusing on the concentration of a contaminant found in an organism at a site. Little research has been conducted to see what happens to a contaminant once it is inside the animal or the effects it has. This study was part of a larger ongoing project looking at the effects of MeHgCl in northern water snakes. In the study 24 adult female northern water snakes were randomly assigned to one of three treatments: a control, 0.25mg/g, and 25 mg/g. This aspect of the project endeavored to see how much mercury was absorbed by each snake, by analyzing the amount that was shed in the feces. The results showed that in the .25mg/g treatment the amount of mercury that was excreted in the feces was between 4.2%-32% with a mean of 12.3%. The 25mg/g treatment was between 2.1%-6.6% with a mean of 4.3%.

**G60**

## **SYNTHESIS OF NON-HALOGENATED CRYSTALLINE PHOSPHORUS FLAME RETARDANTS FOR ENGINEERING RESINS**

Phillip Mnirajd (graduate student)  
Chemistry  
[pmm2m@mtmail.mtsu.edu](mailto:pmm2m@mtmail.mtsu.edu)

Dwight Patterson (faculty, mentor)  
Chemistry  
[dpatters@mtsu.edu](mailto:dpatters@mtsu.edu)

From computers, televisions, to automobiles, synthetic polymers are used in various applications in society. With the widespread use of synthetic polymers, certain physical properties are taken into account. One such property is the flammability of the polymer being used. Fire prevention and safety is an important issue, as fires lead to civilian deaths and large amounts of property loss. Many polymers are inherently flammable, therefore measures are taken to inhibit or decrease polymer combustion by the use of flame retardants (FRs). FRs work by disrupting the combustion cycle of the polymer. The most prevalent FR consists of halogenated compounds. However, current research has shown that halogenated FRs can have a detrimental effect to the environment. Because of the environmental concerns, government agencies have created stricter guidelines to legislate the use of halogenated FRs. Therefore the polymer industry has adapted to the changes in regulations by emphasizing the development of non-halogenated flame retardants. One such FR alternative is phosphorous based compounds. In this study, non-halogenated solid phosphorus FRs are developed, with the idea being to create a high molecular weight phosphorus compound to impart flame retardancy. The advantage of having a high molecular weight molecule is increased thermal stability, ease of handling, and less loading percentages to achieve flame retarding efficiency. Compounds were synthesized using trimesic acid and phosphate monomers to yield a brittle solid. To test for flame resistance, the product was incorporated in to a polycarbonate sample and tested using thermogravimetric analysis (TGA). Initial results show that the FR additive affects the degradation behavior of the polymer sample.

## RELIABILITY OF THE ROCKPORT WALK TEST IN 5-8 YEAR OLDS

Joshua Haley (graduate student)  
Health and Human Performance  
[jth3i@mtmail.mtsu.edu](mailto:jth3i@mtmail.mtsu.edu)

Helen Binkley (faculty)  
Health and Human Performance

Norman Weatherby (faculty, mentor)  
Health and Human Performance  
[weatherb@mtsu.edu](mailto:weatherb@mtsu.edu)

This study sought to determine the extent to which the Rockport Walk Test reliably predicted VO<sub>2</sub> max in 5-8 year old children by using test-retest reliability. If the Rockport Walk Test is a reliable test in the population, it can be used to safely and effectively track changes in cardiovascular fitness in children by using a submaximal test, which is safer in overweight and obese children. Two different measures of height, weight, and mile walk time were measured and recorded before being statistically analyzed using dependent T-test between each of the two trials. The measures from each of the two trials were then inserted into the VO<sub>2</sub> max prediction equation of the Rockport Walk Test formula of the American College of Sports Medicine (2008). The assumptions of regression were tested for both trials, and the interclass coefficient of correlation was calculated. Data collection has just been completed, and the researcher is in the process of analyzing the data. If this test is found to be reliable in this population, health professionals will have a new, safer tool to track the improvement of cardiovascular health of this population. The analysis of data will also help explain the error associated with anthropometric and exercise measurement in the 5-8 year old population.

**G62**

## **SEXUAL DIMORPHISM AND ITS ENERGETIC COST FOR OVERSIZED CHELIPEDS IN MALE FIDDLER CRABS**

Jacob Campbell (graduate student)  
Biology  
[jbcampbell21@gmail.com](mailto:jbcampbell21@gmail.com)

Vince Cobb (faculty, mentor)  
Biology  
[vcobb@mtsu.edu](mailto:vcobb@mtsu.edu)

Sexual dimorphism is the occurrence of morphological differences between the sexes that are not directly related to reproduction. Potential mates often use these traits in choosing “suitable” mates. In fiddler crabs, mate choice is accomplished on the basis of female choice, where females choose males based on the size of the cheliped. In this sexual dimorphism case, males with larger chelipeds are considered to be better mate choices. Males possess an oversized cheliped that can weigh up to 30% of the crab’s body mass; this extra mass has an added energetic cost that can aid in increasing fitness but may also produce a few disadvantages (i.e. locomotor performance and endurance). Oxygen consumption (i.e., an indicator of metabolic rate) was measured through stop-flow respirometry to determine if male and female fiddler crabs exhibit different levels of energy expenditure. The relationship between cheliped size and oxygen consumption for each sex was also tested using a simple regression. Analysis of covariance was used to identify differences between groups with cheliped size as a covariate. Testing and analysis are in the final stages.

**G63**

## **WHO IS IN CHARGE OF FOOD SAFETY? AN INTERNATIONAL COMPARISON**

Talal Alfurayh (graduate student)  
Agribusiness and Agriscience  
[taa2k@mtmail.mtsu.edu](mailto:taa2k@mtmail.mtsu.edu)

Justin Gardner (mentor)  
Agribusiness and Agriscience  
[jggardne@mtsu.edu](mailto:jggardne@mtsu.edu)

Food safety is a complex issue with many dimensions. With the recent passing of the Food Safety Modernization Act the Food and Drug Administration (FDA) has gained additional authority to inspect and recall food. However, the FDA is only one of four government agencies that are responsible for ensuring a safe food supply in the United States. Responsibility for food safety lies not only in the hands of federal regulators, but the food processing industry, state agencies and the end consumer who must properly cook and prepare the food. Together, these stakeholders form a patchwork quilt, as opposed to a single blanket agency. Is such a system adequate? We will focus on the government agencies that are responsible for food safety and compare and contrast the food safety system in the United States with the food safety system in Saudi Arabia. We also present data on foodborne disease rates to compare the effectiveness of the food safety system in both countries.

G64

## THERMAL ECOLOGY OF HIBERNATION IN *NERODIA SIPEDON*

Jerrod Shipman (graduate student)  
Biology  
[js8a@mtmail.mtsu.edu](mailto:js8a@mtmail.mtsu.edu)

Vince Cobb (faculty, mentor)  
Biology  
[vcobb@mtsu.edu](mailto:vcobb@mtsu.edu)

Hibernation is a thermally unique time for reptiles in which they must seek shelter to escape from potentially life threatening temperatures. Although hibernation at northern latitudes has been addressed in several snake species, little is known about the overwintering habits of reptiles in the southern U.S. In this study, we radiotracked Midland Watersnakes along a river in Middle Tennessee, surgically implanted with radio transmitters and temperature data loggers, to document ingress and egress patterns, potential winter activity, and body temperature variation during hibernation. Snakes chose to hibernate immediately adjacent to their area of activity in the river. Hibernation duration was  $113 \pm 6.5$  days. Snakes rarely emerged to bask mid-winter and mean body temperature during hibernation was  $7.3^{\circ}\text{C}$ . Snake body temperatures tracked local air temperatures and water temperatures closely throughout hibernation indicating snakes did not see refuges deep enough to buffer them from daily temperature variation. Interestingly, while this is one of the first studies to examine body temperature variation in southern species, hibernation body temperatures were only slightly warmer than what several studies have reported for northern latitude species.

**G65**

## **THE EFFECTS OF PRE-COLLEGE AURAL TRAINING ON INSTRUMENTAL MUSIC MAJORS**

Chris Dunn (graduate student)  
School of Music  
[chrisrdunn@gmail.com](mailto:chrisrdunn@gmail.com)

Jamila McWhirter (mentor)  
School of Music  
[jmcwhirt@mtsu.edu](mailto:jmcwhirt@mtsu.edu)

Much research has been completed examining the effects of aural training in K-12 music classes. Most of these studies have been short term and have examined the correlation of aural training with sight-reading, ear-playing, and/or memory. Little research has been done on the longterm effects of pre-college aural training. Accordingly, there are still many questions about the value of implementing aural training into a pre-college curriculum. The purpose of this pilot study will be to examine the effects of pre-college aural training on instrumental music majors. Areas of examination include: (a) the prevalence of pre-college aural training in instrumental music majors' K-12 classes, private instruction, and independent study; and (b) the perceived effects that pre-college aural training have on academic and performance success in college. Data will be reported as frequencies and percentages. Results of this pilot study will be used as a basis for further investigation and discussion of the effects of pre-college aural training on the success of instrumental music majors.

## PREDICTING PARENTAL INVOLVEMENT IN A RURAL MIDDLE SCHOOL SETTING

Andrea Van Hoozer (graduate student)  
Psychology  
[amv2f@mtmail.mtsu.edu](mailto:amv2f@mtmail.mtsu.edu)

Aimee Holt (mentor)  
Music  
[aholt@mtsu.edu](mailto:aholt@mtsu.edu)

Parental involvement has become a focus for schools, especially since federal laws (e.g., the No Child Left Behind Act) mandate that schools promote more parental involvement. The current study examined differences between parents' and teachers' perceptions of the definition of parental involvement at home and at school. Additionally, two models were developed to predict parental involvement at school and at home. Thirty-four teachers and 212 parents from a rural middle school in the Southeast completed surveys on parental involvement. The majority of the participants were Caucasian and female. A series of one-way ANOVAs indicated there was a significant difference found between parents' and teachers' perceptions of how often parents were involved in their child's schoolwork at home,  $F(1, 226) = 16.63, p < .000$ . Parents reported higher rates of involvement at home ( $M = 3.39, SD = .69$ ) compared to the rate that teachers reported regarding their perceptions of the parent involvement at home ( $M = 2.79, SD = .57$ ). Separate hierarchical multiple regressions were conducted to predict the level of parental involvement at home and school. Similar to predicting school involvement, the addition of each set of variables over the three steps were found to be significant; however, the unique contribution of each variable was found to impact the prediction of involvement at home differently from school involvement. Although teacher communication continued to be the most salient variable, parent self-efficacy and role beliefs were found to be significant predictors of parents' self-reported levels of involvement at home where they had not been for predicting school involvement. The results of the current study were similar to other studies with different populations. The study indicated that teacher invitations / communication was a strong predictor of parental involvement at home and school.

**G67**

## **INFLUENCE OF MUSICAL ABILITY ON LINGUISTIC STRESS PERCEPTION: AN EEG STUDY**

Deanna Jordan (graduate student)  
Psychology  
[cmagne@mtsu.edu](mailto:cmagne@mtsu.edu)

Cyrille Magne (faculty, mentor)  
Psychology  
[cmagne@mtsu.edu](mailto:cmagne@mtsu.edu)

Speech meter corresponds to the organization of stressed and unstressed syllables while speech rhythm refers to the temporal distribution of the stressed syllables. In stress-timed languages such as English, sensitivity to those rhythmic and metrical cues plays an important role in both language acquisition in children and word segmentation in adults. Speech rhythm and meter may also help the listener to make predictions about upcoming words, and to guide their attention toward the most relevant parts of the speech signal. The proposed study is aimed at identifying electrophysiological signatures of speech meter. To this end, the participants' electroencephalogram (EEG) is recorded while they are presented with lists of four spoken bisyllabic words ending with one word that had either the same or different stress pattern as the previous three. In addition, because meter and rhythm are also important aspects of music processing, the study investigates to what extent the participants' musical aptitude influences the brain correlates underlying the detection of metrical violations in word sequences. The implications of the results, not only for speech acquisition but also education practices will be discussed.

**G68**

## **FREQUENCY OF USE AND PERCEPTIONS OF THE NATIONAL STANDARDS IN BAND**

Mike Blumberg (graduate student)  
School of Music  
[jmb3m@mtsu.edu](mailto:jmb3m@mtsu.edu)

Jamila McWhirter (mentor)  
School of Music  
[jmcwhirt@mtsu.edu](mailto:jmcwhirt@mtsu.edu)

The National Standards for Music Education have been accepted and used in music education for more than two decades. In that time, they have been discussed, expounded upon, and practiced. While the standards are meant to be a living document, able to be added to, expanded, or eliminated as needed, they have been seen as full and complete since their inception. Music educators tend to agree that the standards are essential and should be used in all music classes. The purpose of this pilot study is to investigate the frequency of use of each of the nine standards in a middle or high school band setting and how middle and high school band directors in middle Tennessee perceive them. Areas of examination include: (a) how frequently band directors incorporate each of the nine standards in their lessons; (b) how band directors perceive the standards; and (c) which standards band directors find easily incorporated, and those they find to be more difficult. Data will be presented as frequencies, percentages and open-ended questions will be categorized. Results of this pilot study will be used as a basis for further research, including how band directors might implement all nine standards, what band directors feel is enough to say a standard has been used, and if there is a consensus in adding to and/or subtracting from the nine standards.

**EVALUATION OF A 16-WEEK, FAMILY-BASED AFTER-SCHOOL NUTRITION AND PHYSICAL ACTIVITY HEALTH PROGRAM ON SELECTED HEALTH VARIABLES IN SCHOOL-AGED YOUTH**

Joel Reece (graduate student)  
Health and Human Performance  
[jdr5f@mtmail.mtsu.edu](mailto:jdr5f@mtmail.mtsu.edu)

Hilary Keen (graduate student)  
Health and Human Performance

Janet Colson, Human Sciences (faculty)  
Andrea Cain, Linda Gilbert (community members)

Don Morgan (faculty, mentor)  
Health and Human Performance  
[dmorgan@mtsu.edu](mailto:dmorgan@mtsu.edu)

**Background:** Some schools have implemented physical activity (PA) programs to help combat the problem of overweight and obesity among children. Although health programs involving family participation appear to be a promising method of improving PA, consistent evidence is lacking. **Purpose:** This pilot study evaluated the effectiveness of a once-a-week, 16-week after-school nutrition and physical activity program featuring four “family night” sessions to produce changes in specific health variables in children (N = 25) and parents (N = 19) at two elementary schools. **Methods:** Overweight and obese children grades 3 to 6 participated in the Body and Mind (BAM) curriculum that was developed by the Centers for Disease Control and Prevention. Outcome variables of interest included child and parent PA (daily step counts), 1-mile walk/run time (1MWRT), body mass (kg), and body mass index (BMI) percentile. **Results:** No significant pre- to post-program differences ( $p < 0.05$ ) were observed in child and parental PA ( $5654 \pm 4115$  steps and  $6856 \pm 4261$  steps), 1MWRT ( $17:28 \pm 3:02$  and  $17:38 \pm 3:50$ ), body mass ( $55.9 \pm 14.6$  kg and  $54.9 \pm 12.4$  kg), and BMI percentile ( $96.9 \pm 5.1\%$  and  $96.6 \pm 6.2\%$ ). **Conclusion:** While the BAM after-school program did not improve selected markers of child or family health, child body mass and BMI percentile remained stable over a 16-week period. Further research should be conducted to assess the impact of a more frequent weekly presentation of the BAM program on the health profiles of young school-aged children and their parents. Supported by a grant from the MTSU Center for Physical Activity and Health in Youth.

**G70**

## **BETWEEN TWO WORLDS: THE FORMATION OF ETHNIC IDENTITY IN LATINO UNIVERSITY STUDENTS**

Rebecca Zanolini (graduate student)  
Curriculum and Instruction  
[zanolini@mtsu.edu](mailto:zanolini@mtsu.edu)

Barbara Young (mentor)  
Curriculum and Instruction  
[bayoung@mtsu.edu](mailto:bayoung@mtsu.edu)

The United States has long been home to immigrants from all around the globe. Currently, the majority of new immigrants coming to the U.S. are arriving from neighboring Latin America. As a result, Hispanics are the largest minority group in the United States. Consequently, the current and future generations of Hispanic Americans will have a significant impact on U.S. society in terms of ethnic identity. Ethnic identity, defined as, “the sameness of a band or nation of people who share common customs, traditions, historical experiences”, is considered to be a basic need for full understanding of the self. Thus, this qualitative case study focused on examining the factors and perceptions of ethnic identity within U.S. Hispanic university students. The study examined the following questions: 1) What tangible/non-tangible factors contribute to ethnic identity? 2) What is the perception of the sample group’s ethnicity as a result of experiences with members of their ethnic community? 3) What is the perception of the sample group’s ethnicity as a result of experiences with members of the mainstream culture? The population for this study is defined as Hispanic students attending Middle Tennessee State University. Data were collected in the form of discussion questions to measure ethnic identity formation. The results are a combination of external and internal factor that contribute to the individual’s ethnic identity. The information gleaned from this study provides insight in today’s fastest growing minority as a means to improve society and educational practices.

**G71**

## **THE RELATIONSHIP BETWEEN AGE OF SEXUAL INITIATION AND SUBSTANCE USE AMONG U.S. HIGH SCHOOL STUDENTS**

Brittney Oliver (graduate student)  
Health and Human Performance

Poliala Mahoney-Dickson, Samuel Sowah, Amanda Cole (graduate students)  
Health and Human Performance

Andrew Owusu (faculty)  
Health and Human Performance  
[aowusu@mtsu.edu](mailto:aowusu@mtsu.edu)

Background/Purpose: Existing research indicates adolescent health risk behaviors are correlated and often occur together. This study investigated the relationship between age of sexual initiation and substance use among high school students in the United States who have ever had sex. Methods: Data from the 2009 Youth Risk Behavior Survey was utilized. A total of 16,410 students participated in the 2009 YRBS. A complex sample logistic regression in SPSS was used to examine if students who initiated sex before age 13 years were more likely to also report substance use (alcohol, tobacco, cocaine, marijuana, methamphetamine and ecstasy) compared to students who initiated sex after age 13 years. Results: 5.9% (CI: 5.1-6.8) of high school students report initiating sex prior to age 13. When controlling for select demographic variables, students who initiated sex before age 13 are significantly more likely to report using marijuana (OR: 4.19; CI: 3.42-5.13), cocaine (OR: 9.10; CI: 6.50–13.00), methamphetamine (OR: 8.90; CI: 6.84–11.67), and ecstasy (OR: 6.65; CI: 5.14–8.61) compared to students who had sex after age 13. Additionally, students who initiated sex before age 13 were significantly more likely to engage in early onset (prior to 13 years of age) of alcohol consumption (OR: 5.10; CI: 4.20-6.20) and cigarette smoking (OR: 9.52; CI: 7.46-12.30) compared to students who initiated sex after age 13. Conclusion: Significant associations indicate the need to concurrently address potential substance use as part of programs focusing on early sexual debut among adolescents in the United States.

**G72**

## **INTEGRATING THE ARTS TO PROMOTE MULTIMODAL LITERACIES**

Kaylin Davis (graduate student)  
Curriculum Instruction  
[kmd3e@mtmail.mtsu.edu](mailto:kmd3e@mtmail.mtsu.edu)

Beverly Boulware (mentor)  
Special Education  
[boulware@mtsu.edu](mailto:boulware@mtsu.edu)

Literacy can be expressed through interactions with words, pictures, visual and performing arts, and technology; it is not merely the interpretation of symbolic written word on a tangible page. It is a well-known fact that students have different learning styles and thrive in various ways, however, research has indicated that students learn best when their learning is hands-on and meaningful to their everyday lives. The purpose of this study was to explore the many ways in which students make meaning and to develop best practices for integrating the arts in the everyday classroom through multimodal literacies. Multimodality refers to the integration of two or more modes of learning—audio, visual, tactile, and kinesthetic. In this context, teachers are encouraged to differentiate their instruction to fit students' individual ways of knowing through use of technology, visual art, creativity, picture symbols, drama, and music. Research has expressed that teaching to students' ways of knowing increases retention, motivation, self worth, and ownership of one's learning experience, therefore making learning more authentic, meaningful, and relevant. This study seeks to analyze the value of multimodal literacies and explore the benefit of integrating the arts in the classroom.

**G73**

## **THE EFFECT OF BULLYING ON MENTAL HEALTH STATUS WHEN CONSIDERING WEIGHT STATUS AMONG TENNESSEE HIGH SCHOOL STUDENTS**

Amanda Cole (graduate student)  
Health and Human Performance  
[arc3a@mtmail.mtsu.edu](mailto:arc3a@mtmail.mtsu.edu)

Brittney Oliver, Poliala Mahoney-Dickson, Samuel Sowah (graduate students)  
Health and Human Performance

Andrew Owusu (faculty, mentor)  
Health and Human Performance  
[aowusu@mtsu.edu](mailto:aowusu@mtsu.edu)

Background/Purpose: Adolescent obesity and bullying are serious issues that cause negative health outcomes both emotionally and physically. This study investigated the relationship between bullying and mental health status among Tennessee high school students when controlling for gender and weight status. Methods: This study utilized data from the 2009 Tennessee Youth Risk Behavior Survey (YRBS). Logistic regression was used to predict the effect of bullying on signs of depression, suicide ideation, suicide planning, and suicide attempt when controlling for gender and weight statuses of overweight and obese. Results: A total of 2,220 students participated in the Tennessee 2009 YRBS with 17.2% reporting being bullied on school property during the past 12 months. When controlling for weight status and gender, students who are bullied during school are significantly more likely to report signs of depression (OR: 3.28; CI: 2.44-4.41), suicide ideation (OR: 3.10; CI: 2.30-4.17), having a suicide plan (OR: 2.83; CI: 2.06-3.90), and suicide attempt (OR: 4.20; CI: 2.51-7.00) compared to students who are not bullied on school property. Conclusion: Significant associations exist between bullying and mental health status. Future studies are necessary to address the relationships between varying demographic variables and to strengthen existing interventions.

**G74**

## **MOBILE DATA DESIGN AND APPLICATIONS FOR EMERGENCY RESPONSE VEHICLES**

Doug Brown (graduate student)  
Engineering Technology  
[dbrown@rutherfordcountyttn.gov](mailto:dbrown@rutherfordcountyttn.gov)

Saleh Sbenaty (faculty, mentor)  
Engineering Technology  
[ssbenaty@mtsu.edu](mailto:ssbenaty@mtsu.edu)

The need for mobile data in emergency vehicles has become a concern for many organizations so that workers can be provided timely information to assist them in producing a quicker and more effective response in critical situations. With the introduction of rugged grade mobile equipment by enterprise class manufacturers along with the advent of cellular 3G and 4G networks, many types of data can be provided to field workers to help reach this goal. In addition to providing information to the field, data such as patient diagnostic data such as electrocardiograms (EKG) or global positioning systems (GPS) / automatic vehicle location (AVL) coordinates of the ambulances. This data can be sent back to a central location to assist in patient triage as well as track workers, vehicles, and equipment in the field. Making this data path securely and readily available in a harsh environment has been tested and implemented with good results to date. This poster will document the mobile equipment that was selected and installed in production ambulances as well as the centralized systems that secures and disseminates the data on the backend. Furthermore, examples of the various data outputs will be provided to demonstrate the functionality of the systems. Finally, possible improvements or augmentations such as VOIP and telemedicine will be discussed to provide even more mobile functionality to improve the emergency response.

**G75**

**IDEOLOGY-COLORED GLASSES: PARTY IDENTIFICATION AND RATINGS OF THE NATIONAL ECONOMY, 2001-2011**

Misa Culley (graduate student)  
Journalism  
[misa.culley@gmail.com](mailto:misa.culley@gmail.com)

Ken Blake (mentor)  
Journalism  
[drkblake@gmail.com](mailto:drkblake@gmail.com)

Tichenor, Donahue & Olien's "knowledge gap" hypotheses asserts that members of higher socioeconomic status groups tend to acquire knowledge about public affairs from media at a faster rate than do members of lower socioeconomic status groups. The resulting disparity impedes the development of well informed public opinion, which, in turn, can hamper the resolution of social problems. The hypothesis has been criticized on epistemological grounds, though, by those who say that observed disparities in the distribution of knowledge across socioeconomic groups may have more to do with how the observer defines knowledge than with how knowledge disseminates. Specifically, describing groups as "information rich" or "information poor" implies a positivist conception of knowledge and an observer who chooses to define and value knowledge using a currency that only some, or maybe none, of the groups in question recognize. In response, some theorists are expanding the knowledge gap hypothesis to consider "belief gaps" that pertain to politically contested facts and arise among groups defined more by ideological traits than by socioeconomic ones. Based on data from 20 MTSU Poll RDD telephone polls conducted in Tennessee between Spring 2001 and Spring 2011, this study hypothesizes that a belief gap will be evident between ratings of the national economy provided by self-described Republicans, Democrats, and independents. Specifically, the study hypothesizes that, independently of actual economic cycles between 2001 and 2011, Republicans rated the national economy better than did Democrats while a Republican occupied the White House and, conversely, that Democrats rated the national economy better than did Republicans while a Democrat was in the White House. Multiple regression analysis supported these hypotheses.

**G76**

**EMPLOYMENT, WAGE, AND OUTPUT DYNAMICS UNDER EXTERNAL HABIT FORMATION AND SHIRKING EFFICIENCY WAGES**

Matthew Booth (graduate student)  
Economics and Finance  
[mattbooth23@gmail.com](mailto:mattbooth23@gmail.com)

Greg Givens (mentor)  
Economics and Finance  
[ggivens@mtsu.edu](mailto:ggivens@mtsu.edu)

I construct an equilibrium model that combines external habit formation in consumption and efficiency wages arising from imperfectly observable effort to evaluate wage, employment, and output dynamics under fiscal and technology shocks. At certain levels of insurance and habit formation employment-output correlations and output volatilities match US data better than a model without habit formation. However, increased employment volatility and counterfactually negative wage-employment correlations are present. I use impulse response functions to explain the mechanisms that give rise to the observed changes in second moments. I then allow differing efficiency wages for workers depending on last period's employment status. Different habit stock causes a different no-shirking wage to be chosen by the employer, who is aware of the employee's recent employment status. As expected, the recently unemployed are offered lower wages for the same effort. Employment volatility is reduced in comparison to the first model.

**G77**

**MALE PARTICIPATION IN CHORAL ENSEMBLES AS PERCEIVED BY  
CHORAL DIRECTORS IN RUTHERFORD COUNTY HIGH SCHOOLS**

Kevin Isbell (graduate student)  
Music Education  
[kci2a@mtmail.mtsu.edu](mailto:kci2a@mtmail.mtsu.edu)

Jamila McWhirter (mentor)  
Music Education  
[jmcwhirt@mtsu.edu](mailto:jmcwhirt@mtsu.edu)

Music educators of today feel that the male student population lacks an interest in singing and organized choral ensembles. There are many different factors that could attribute to this, and much research has been done in order to assist teachers in recruiting and retaining male students. Furthermore, much research has been completed to assist in helping music educators teach the male voice. The purpose of this qualitative case study is to determine how teachers within the high schools of Rutherford County (TN) perceive male participation within the system's choral ensembles. Through the use of personal interviews, the researcher will analyze the data presented by the educators as to their perceptions of why males (grades 9-12) choose to participate or not to participate in choral music education. Areas of examination will include the teachers' perceptions of why males do or do not participate in choral ensembles. Questions will be asked regarding gender stereotyping that exists from outside the realm of choral music, and how teachers feel this stereotyping impacts the overall music education of their male students. In addition, it will be examined how these teachers recruit males and retain their participation within choral programs. Data will be reported as frequencies and percentages, and the results will be categorized. The study will be a basis for further investigation into male participation, and will hopefully launch future research on effective strategies for recruiting and retaining males within high school choral ensembles. A review of the related literature will be used to formulate the interview questions.

**G78**

**GIVING COLLEGE STUDENTS INCENTIVES TO COMPLETE THEIR HOMEWORK:  
REWARDS OR PUNISHMENTS**

Chiaki Shima (graduate student)  
Educational Leadership  
[cs3g@mtmail.mtsu.edu](mailto:cs3g@mtmail.mtsu.edu)

Dorothy Craig (faculty, mentor)  
Educational Leadership  
[dvcraig@mtsu.edu](mailto:dvcraig@mtsu.edu)

This study examined the effectiveness of negative and positive incentives as well as related factors that impact homework completion among university students enrolled in Japanese I classes at Middle Tennessee State University. The study took place over one academic semester and included a variety of data collected throughout the semester. Findings indicate that there was little difference in the use of different incentives. The formerly established work habits and academic habits had a greater impact on participant success in completing homework in the university classroom.

**G79**

## **WOMEN'S OUTDOOR EXPERIENCES AT THE 2009 TENNESSEE "BECOMING AN OUTDOORS-WOMAN" (BOW) PROGRAMS**

Karen Hargrove (graduate student)  
Health and Human Performance  
[khargrov@mtsu.edu](mailto:khargrov@mtsu.edu)

Dawn Shelar (faculty, mentor)  
Health and Human Performance  
[vshelar@mtsu.edu](mailto:vshelar@mtsu.edu)

This study examined women's experience in outdoor activities in light of their previous and current participation in outdoor activities, with whom they participated, possible constraints to participation, the impact of these constraints, and strategies used to negotiate identified constraints. The women in the study were participants in the 2009 Tennessee "Becoming an Outdoors-Woman" (BOW) Program. Information about their experience with the Tennessee program as well as demographic information was collected. Data were collected with a researcher-designed questionnaire, and analyzed using SPSS. Narrative comments indicated that women were most constrained by lack of companions, lack of time, lack of skills, no place to go, and various fears. Women overcame their constraints through prioritizing, education, taking classes, finding places to go, and identifying like-minded companions. Demographic information indicated that there was a lack of diversity which might be overcome by program promotion to more diverse groups and by including trainers of more diverse backgrounds. Comments by the women in the Tennessee program indicated that BOW was a valued recreation program that helped women gain or maintain self-confidence, strength, and independence.

**G80**

**A PRIOR PREDICTIVE ANALYSIS OF THE EFFECTS OF LOSS AVERSION / NARROW FRAMING IN A MACROECONOMIC MODEL FOR ASSET PRICING**

Yuanyuan Chen (graduate student)  
Economics and Finance  
[yc2f@mtmail.mtsu.edu](mailto:yc2f@mtmail.mtsu.edu)

Charles Baum (mentor)  
Economic and Finance  
[cbaum@mtsu.edu](mailto:cbaum@mtsu.edu)

In a macroeconomic framework, I quantitatively evaluate the theory of Loss Aversion/Narrow Framing (LANF) as a resolution to the Equity Premium Puzzle (EPP). The EPP is where the neoclassical asset pricing model cannot be reconciled with the empirical fact that stocks have much higher returns than risk-free assets. The prior predictive analysis employed follows a Bayesian approach that draws realizations for preferences that describe the degree of LANF characterizing consumer's tastes. The analysis is also extended along two more dimensions: the variance of aggregate uncertainty and the elasticity of labor. The priors used are carefully defined from previous works in the literature. This Monte Carlo procedure finds that the theory is unable to jointly describe the equity premium and labor's elasticity of supply. That is, only when the labor supply elasticity is unreasonably low can LANF preferences generate high equity premiums. Alternatively, when the elasticity is more realistically high, LANF preferences fail to generate significant premiums. My analysis therefore concludes that a resolution to the EPP via a theory of LANF must be modified along the description of labor's choices. As ancillary result, the hybrid perturbation-projection method developed for this experiment is shown to be a robust technique.