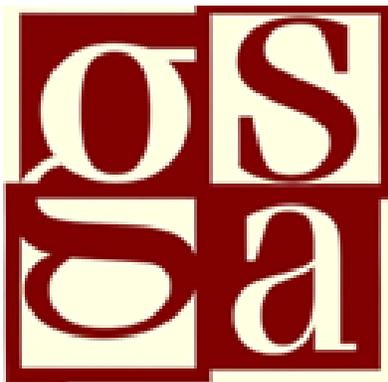# 15th Annual MSU Graduate Student Research Symposium

March 25, 2017
Allen Hall

Symposium Winners Abstracts

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2017 Winners of 15th Annual Graduate Research Symposium
Abstracts

Poster Presentations
Arts & Humanities

First Place - Irmarie Cruz López
School Psychology, Ph.D.
Improving Oral Reading Fluency in Elementary School Children: Comparing the Effectiveness of Group Repeated Reading and Individual Repeated Reading

Abstract: Many elementary school students are referred to special education for a deficiency in reading skills (National Reading Panel [NRP], 2000). Researchers have studied at least twenty reading interventions have been studied over the decade. Repeated Reading (RR) intervention has shown to be one of the most effective (Welsch, 2006). Repeated Reading has been studied using different topographies and elements such as having the participant practice 5-6 words before completing RR with error correction procedure (Tam, Heward, & Heng, 2006), receiving feedback after RR and practice the incorrect words (Nelson, Alber, & Gordy, 2004), and receiving a reward for reaching a criterion (Chafouleas, Martens, Dobson, Weinstein, & Gardner,
2004), listening passage preview (Rose, 1984), and contingent reward (Daly, Bonfiglio, Mattson, Persampieri, & Foreman-Yates, 2005). The research has been focus on a one-to-one instruction, and less attention has been paid to the effectiveness of this intervention packages in a group setting. The purpose of this study was to compare two Repeated Reading intervention packages. An alternative treatment design (ATD) was used to compare the effective ness of Individual Repeated Reading and Group Repeated Reading. Results indicated that both interventions packages are effective in improve the students' oral reading fluency.

Second Place – Madison A. Sully, M.A.
School Psychology, Ed.S.
Implementation of Road to the Code Phonological Awareness Program with One 1st Grade Student

Abstract: Early literacy skills have an impact on future academic success in reading and writing. These skills include letter identification, phonological

awareness, decoding, rapid automatized naming, oral language, and concepts about print. Phonological awareness has been researched as an important beginning literacy skill necessary for reading and one that can begin before school within the home environment. Phonological awareness is the understanding that words are composed of individual sounds. In this study, one first grade student received intervention using the Road to the Code intervention program twice a week for twelve weeks. A parametric design with a withdrawal component was used to track student progress each week. Overall, the student was observed to increase his skill in letter sound fluency closer to his current grade level. In phoneme segmentation the student also increased his skill set to a kindergarten spring instructional level. Theses results suggest that the Road to the Code intervention can be effective at addressing students with below grade level phonological awareness skills.

Life and Biomedical Sciences

First Place - Mercedes Siegle-Gaither
Forestry, M.S.
Using deuterium and oxygen-18 isotopes to better understand stemflow generation mechanisms

Abstract: Stemflow is a form of nutrient-enriched rain partitioning that redirects intercepted water from the forest canopy down tree trunks, creating biogeochemical hotspots at tree bases. Few studies have examined species-specific effects of bark structure and storm meteorological conditions on stemflow generation via stable isotope tracers. Stemflow volume and isotopic composition were measured over one year to determine (i) origins and pathways of stemflow water using stable isotopes, (ii) differences in stemflow generation mechanisms between tree species, and (iii) differences in stemflow generation mechanisms between storm events. Stemflow collars were installed on 18 trees of six species. Water samples were collected within 24 hours of individual storm events. Laser ablation spectroscopy showed that isotopic composition ($\delta2H$) of stemflow (-20.08±10.18‰) is distinct from that of throughfall (-21.25±9.09‰) and precipitation (-15.49±10.03‰). The difference in isotopic composition of stemflow relative to precipitation signifies evaporation, suggesting that this pathway is composed of pre-event and event water. A bark-wetting experiment showed bark water storage capacity (BWSC) per trunk to be greatest in red oaks (86.4±21.5L), then white oaks (51.4±30.9L), and hickories (22.7±15.7L), respectively. Oaks with thick, continuous bark generate lower stemflow volumes and have higher BWSC; hickories tend to have thinner, irregular bark that leads to higher stemflow volumes

and lower BWSC. Species-specific BWSC is thus a determining factor for stemflow generation during an event, and for how much pre-event water contributes to this flux in terms of volume and chemistry. Results suggest stemflow significantly impacts forest hydrology and microclimate based on interspecific differences in bark.

Second Place – Chathurika Wijewardana
Plant Science, Ph.D.
Trans-generational Inheritance of Drought Stress Induced Loss on Soybean Seed Germination

Abstract: Seed germination in many plant species is governed by the environment under which its parent plants were raised and matured. Prior studies have shown that stress-induced responses are inherited through plants' trans-generational memory. Soil moisture stress that occurs during soybean seed fill greatly reduces seed yield, but less attention has been paid to determine its influence in expression of traits on offspring. In this study, we tested the hypothesis that soybean seeds formed after exposure
to different soil moisture stress levels would affect the seed based traits in next generation. Initially, two soybean cultivars; Asgrow 5332 and Progeny 5333 were grown at five levels of evapotranspiration (ET) (100, 80, 60, 40, and 20% ET) of irrigation treatments under sunlit environmental conditions at flowering stage. Then, seeds obtained from these treatments were tested for seed germination vitality traits at five different in-vitro osmotic stress treatments using polyethylene glycol (PEG 8000) solutions which mimic water potentials ranging from 0.0 to -0.9 MPa with -0.2
MPa increments and incubated at 25 °C. Maximum seed germination, time to 50% germination, and seed germination rate were derived by using appropriate regression analysis. Cultivars differed significantly for the seed-based traits and significantly decreased with decreasing osmotic potential. Soil moisture stress induced irreversible change in seed quality of the offspring where the damage was increased further when exposed to same type of stresses. The results suggest that the stress- induced memory from previous generations can possibly be carried over, persuading flexibility to stress damage in the successive generations.

Third Place – Saira Talwar
Exercise Physiology, M.S.
Abstract: COMPARING MOVEMENT PROPERTIES OF UNIMANUAL AND BIMANUAL MOVEMENTS

S. Talwarl, Z. PanI,R. Plamondon2, S. Bidias2, A. Martin3, & A.W.A. Van Gemmert3
Mississippi State University, MS State, MS; 2Ecole Polytechnique de Montreal, Montreal, Quebec, Canada; 3Louisiana State University, Baton Rouge, LA

Objective: This study was done to compare movement generation properties of rapid unimanual and bimanual drawing strokes. Methods: Right-handed participants (N: 16; age: 22.27 ± 2.76 yrs; males: 6) with no neurological, visual, or auditory ailments were instructed to perform 120 rapid drawings, unimanually and synchronously bimaually. Movement preparation efficiency was assessed using the reaction time (RT), and execution proficiency was assessed using the movement time (MT), time to peak velocity (PT), peak velocity (PV), and the distance (vector length) between the start and end of the movement (DS). 2x2 Repeated Measures ANOVA was applied to all dependent variables using factors of manual condition and hand used; a :S 0.05. Key Findings: Main effect ofthe manual condition was found for all dependent measures (RT ($F = 514.300$, $p < 0.001$), MT ($F = 54.507$, $p < 0.001$), PT ($F = 705.964$, $p < 0.001$), PV ($F = 344.622$, $p < 0.001$)) except DS, $F = 1.386$, $p = 0.257$. Main effect of hand used proved significant for MT ($F = 14.961$, $p = 0.002$) and PV ($F = 5.459$, $p = 0.034$), but not for RT ($F = 1.866$, $p = 0.192$), PT ($F = 0.300$, $p = 0.592$) and DS ($F = 0.027$, $p = 0.872$). No interactions reached significance. Conclusions: The results suggest that the production of unimanual rapid drawing movements require less preparation and execution time than bimanual movements despite the similarity of the movement final product (distance).

Physics, Math, Engineering

First Place - Achala S. Liyanage
Chemistry, Ph.D.
Adsorption of lead from aqueous solution onto activated carbon prepared from Garcinia cambogia

Abstract: Adsorption of lead onto activated carbon prepared from plant material, Garcinia cambogia was investigated in this study. Activated carbon was prepared by chemical activation using phosphoric acid treatment.
The surface chemistry and composition of the activated carbon were examined by SEM, SEM-EDX, elemental analysis, thermal gravimetric analysis and surface area measurements. Batch sorption studies were carried out at 25, 35 and 45°C, pH 2 - 7 and with different adsorbate concentrations. Remediated solutions were then analyzed using atomic adsorption spectroscopy. The kinetic data were fitted to

pseudo-first-order and pseudo-second-order models. The results indicate that the second-order model best describes the adsorption kinetic data. Activated carbon sorption was evaluated using the Langmuir,

Freundlich, Sips, Redlich–Peterson, and Toth adsorption isotherm models. Langmuir isotherm provided the best fit to the equilibrium data, showing maximum monolayer adsorption capacity of 56.26 mg/g at pH 5 and 45 °C. The results of the present study suggest that the prepared activated carbon may be used effectively for the metal ion remediation from water and wastewater systems.

Second Place - Catie Dillon
Biological Engineering, M.S.
Application and Validation of STWAVE in the Nearshore of Deer Island, MS
Abstract: Waves are the driving force for many costal processes. The process of sediment transport along a beach face is highly tied to the presence and action of waves. Therefore, due to the constant sediment transport occurring along Deer Island in Harrison County, MS, and the costly procedures required to maintain the sediment budget of the area, an accurate understanding of the wave parameters in the area is important. To date, no validation of a local model or any other published data on the waves for the area exists. The purpose of this study is to validate a vocal model which will be able to be used to forcast or hind cast wave information for present or future work done on Deer Island. To quantify wave parameters of the area a wave model is the best option for its ability to generate high resolution information for this study, the STWAVE model was chosen because of the mild and uniform conditions of the area and for STWAVE's fast computational efficiency. Field data of recorded wave information was taken from a Nortek Vector which recorded wave and current data between the months of June and September, 2016. The raw data of the Vector will be processed using the PUV method to produce wave height, wave period, and wave direction information. Wave data was also taken during the same time period through littoral environmental measurements (LEM) made at the shoreline. Both Sets of gathered wave information will be used to validate the STWAVE model.

Third Place – Zhuo Wang
Mechanical Engineering, Ph.D.
Effect of meso-scale geometry on piezoelectric performances of additively manufactured flexible polymer-Pb(ZrxTil-x)O3 composites.

Abstract: The effects of meso-scale geometry on piezoelectric properties of additively manufactured flexible polymer-ferroelectric Pb(ZrxTi1−x)O3 (PZT) composites are systematically investigated through an integrated computational framework. Specifically, phase-field simulations are used to generate the meso-scale geometry and large-deformation finite-element modeling is applied to predict the properties of the composites. The model predicts superb stress transfer efficiency in the 3-3 composite with three-dimensional (3D) interconnected geometry of PZT. Comparisons on hydrostatic performance are made to demonstrate the great potential of the 3-3 composite for fabricating underwater acoustic devices.

Key Words: Meso-scale geometry; Additive manufacturing; Polymer-ceramics composite

Social and Behavioral Sciences

First Place - Poram Choi
Kinesiology, Ph.D.
Prediction of oxygen uptake from pedometer output across different activities
Abstract: Pedometers can be used to estimate physical activity level; however, there is limited research examining the accuracy of predicting energy cost from step-rate measured by pedometer output across different activities. We examined whether step rate and height predict the rate of oxygen uptake (VO2) across sitting and different types of activities. Thirty-six healthy young adults (21±4 yrs; 16 women) completed 8 activities each lasting 6 min: (a) sitting; (b) level walk at 2.5 mph; (c) walk at 3.5 mph and 5% grade; (d) jog at 5 mph; (e) moving a box between 2 carts 7 m apart; (f) washing dishes; (g) ascending and descending a 20-step staircase; and (h) vacuuming. We measured VO2 with a portable open -circuit spirometer and step rate with a pedometer on the non-dominant hip. Significant predictors of VO2 were step rate and its square ($p \leq 0.001$; $R2 = .72$), but not height. Absolute error across all activities combined was 29.4±27.3%. Absolute error differed between activities ($p < 0.001$): (a) sitting, 66 ± 30%; (b) walk at 2.5 mph, 62±25%; (c) walk at 3.5 mph, 11±13%; (d) jog, 16±17%; (e) moving box, 15±14%; (f) washing dishes, 15±15%; (g) stairs, 22±8%; and (h) vacuuming, 29±13%. Pedometer-determined step rate and its square are significant predictors of VO2 across different activities in healthy young adults. Height does not contribute to VO2 prediction. Accuracy of the prediction across activities is low to moderate.

Second Place – Ethan D. Lantz
Clinical Psychology, Ph.D.
The Mediation of Gratitude on the Relation between Religiosity and Satisfaction with Life

Abstract: Previous research has found that gratitude, which is a central concept or practice in many spiritual traditions, benefits an individual's well-being and may reduce symptoms of depression (Emmons & Stern, 2013). The current study, which used two different samples (i.e., the psychology department research pool of undergraduates, and a national, MTURK-based sample of individuals formerly raised by custodial grandparents and/or through foster care) examined the relation between religiosity and well-being, as measured by life satisfaction (Satisfaction with Life Scale, SWL) and symptoms of depression (Center for Epidemiological Studies of Depression Scale- Revised, CESD-R), which were mediated by two measures of gratitude (the Gratitude Questionnaire-6 Item Form, GQ-6; and the Transpersonal Gratitude Scale, TGS).

Third Place – Alice C. Long, M.S.
Human Development and Family Science, Ph.D.
Mother's Depression and Child Sleep: The mediating role of parent-child attachment

Abstract: The last decade has highlighted the importance of sleep in the context of family for understanding child development (El-Sheikh, 2011). Thus, delineating the pathways and processes that contribute to child sleep, particularly parent and family variables, is imperative. Maternal depression is a known risk factor for disturbances in children's sleep (Armitage et al., 2009) as well as insecurity in the parent-child relationship (Cummings & Davies, 1994). Further, greater attachment security is associated with fewer sleep difficulties in children (Keller et al., 2008). Given these established relations, we examined the possible mediating role of parent-child attachment in the association between maternal depression and child sleep. Mothers (N = 64) of preschool children from low-income backgrounds (93% African American) completed the Center for Epidemiologic Studies Depression Scale (Radloff, 1977), the Children's Sleep Habits Questionnaire (Owens et al., 2000), and the Parent-Child Reunion Inventory attachment survey (Marcus, 1990). Maternal depression significantly predicted child sleep [$F_{(1, 62)} = 6.749$; $p < .01$], and parent-child attachment [$F_{(1, 63)} = 4.365$; $p < .05$]. Results

indicated a significant indirect effect of maternal depression on child sleep through parent-child attachment, [$F_{(2, 54)} = 6.053$; $p < .01$], supporting mediation; $R^2 = .15$. The effect of maternal depression on child sleep was reduced from $\beta = .313**$ to $\beta = .248$ when the attachment variable was included in the model. Results suggest that education on fostering secure parent-child bonds may be an intervention strategy that will improve child sleep outcomes associated with maternal depression.

Oral Presentations

Arts and Humanities

First Place- Caitlin Ruby
Geosciences in Geospatial Sciences, M.S.
Application of Coastal and Marine Ecological Classification Standard (CMECS) to Remotely Operated Vehicle (ROV) Video Data for Enhanced Geospatial Analysis of Deep Sea Environments

Abstract: The Coastal and Marine Ecological Classification Standard (CMECS) provides a comprehensive framework of common terminology for organizing physical, chemical, biological, and geological information about marine ecosystems. This classification standard serves as a means for scientists to more easily access, compare, and integrate marine environmental data from a wide range of sources and platforms. Federally endorsed as a dynamic content standard, all federally funded data must be CMECS-compliant by 2018; however, applying CMECS to deep sea environments and underwater video datasets have not been extensively examined. The presented research demonstrates the extent to which CMECS can be applied to deep sea benthic habitats, assesses the feasibility of applying CMECS to remotely operated vehicle (ROV) video data in near-real-time, and establishes best practices for mapping environmental aspects and observed habitats as viewed by the ROV's forward-facing
camera by comparing two mapping techniques (buffered approach and viewshed approach). The resulting geospatial data products support enhanced spatiotemporal analysis of the observed benthic habitats by promoting data discovery, accelerated data analysis, and data visualization – especially within the context of a GIS. As determined through analysis of ROV video and ancillary data collected by the National Oceanic and Atmospheric Administration's (NOAA) ROV Deep Discoverer and ship Okeanos Explorer during 2014 in the Northern

Gulf of Mexico: CMECS is applicable to deep sea benthic habitats; CMECS is applicable to ROV data, but is not practical to apply in near-real-time applications; and the viewshed mapping approach is the preferred method for cartographically displaying underwater video content.

Second Place – Tianyu Li
PhD, Department of Geosciences
Which Music Genres Are The Most Popular on Internet
Abstract: Ever since the development of the Internet, it has changed the way we source and listen to music. Hard copies (e.g. CDs or tapes) of music were no longer the only choice for music consumers and have been replaced by online music streaming services. With the recent rise in access to the massive volumes of web data and advanced computational research tools, 'big data' comes to music and entertainment studies, and opens new avenues of research. Efficiently analyzing 'big data' enables us to develop new decision support applications, and provides unprecedented values for the whole music industry. In this study, we aim to find the most listened to genre based on analysis of more than 700 musicians on two major music streaming service platforms. To identify the popularity of nine major genres (e.g. blues, country, folk, hip-pop, jazz, soul, R&B, rock and EDM), we utilized web scraping methods to extract information of music genres and corresponding artists by using application program interface provided by online music streaming services. The scraped information was then formatted and integrated into a data frame. Additionally, we explored which categories of music genres were the most listened. The result revealed that the rock music receives more love from listeners on the Internet than other music genres and the 'alternative metal rock' is the most popular category of rock music. Moreover, by examining concert data, artist's performances in the real world were demonstrated to display weak relationships with their popularities on the Internet.

Third Place - Aynaz Lotfata
Earth and Atmospheric Science, Ph.D.
Natural Disaster and Vulnerability: An Analysis of 2016 Flooding in Louisiana
Abstract: Disasters happen when a natural hazard strikes vulnerable people. Type and extent of people's vulnerability determine the intensity of a disaster. Both hazard mitigation and vulnerability reduction are required to diminish the impacts of disasters. In Louisiana, floods frequently affect cities and towns. In August 2016, Louisiana parishes witnessed record levels of rainfall resulting in catastrophic flooding in Amite and Comite Rivers. In this study, we analyzed how anthropogenic activities in terms of land use and land cover change and urban

development in flood zones increased the vulnerability of the people of East Baton Rouge, Ascension and Livingston parishes in Louisiana. The results show that overall, in all flood zones (A, AE and X), there was a significant increase in the impervious surfaces. While in zone A, there was 3.3 sq. km increase in developed areas, in AE zone, there was an increase in developed areas by 15.8 sq.km and in zone X, there was about 38.3 sq. km increase. This significant change in land use and land cover has increased people's vulnerability to flooding. Further, both Livingston and Ascension parishes saw constant positive net-migration of people over the last 10 years, only in the East Baton Rouge parish, net migration was negative. This shows that these parishes added more anthropogenic activities by adding more people and thus increased the chance disaster caused by flooding, and the overall vulnerability of people. The study also shows how different ethnic and economic groups, and people with flood insurance or lack of it were affected by this disaster.

Honorable Mentions - Zhangjin Xu
Physics, Ph.D.
Electric dipole radiation between two mirrors
Abstract: Electromagnetic energy emitted by an oscillating electric dipole in free space travels in straight lines from the site of the dipole to infinity. We consider such a dipole located in the space between two parallel mirrors. The emitted light interferes with the light reflected off each of the two mirrors, and interference leads to intricate energy flow patterns. The reflected light is identical to the light emitted by an infinite array of image dipoles, lying on a line perpendicular to the mirrors. We shall show graphically that, depending on the mirror separation, the location of the dipole and the angle of oscillation with respect to the plane of the mirrors, numerous vortices and singularities appear. It is found that the location of vortices is determined by the vanishing of the magnetic field at the center of the vortex. In certain cases, the light travels to, say, the right, then turns around, swings by the dipole for a second time, and leaves the system on the left. Interference patterns containing singularities repeat on the scale of a wavelength, and persist to infinity along the waveguide structure. We shall also show that in the very vicinity of the dipole the light is emitted in a four-vortex structure, contrary to the expectation that the radiation field should be dominated by the emitted light by the dipole itself, and travel initially along a straight line (as in free space).

Life and Biomedical Sciences

First Place - Keelee J. McCarty
Agricultural Science, M.S.
Effect of melatonin supplementation during mid- to late- gestation on maternal uterine blood flow and calf size at birth

Abstract: Evaluating endometrial perfusion is a method of assessing fertility and a decrease has been linked to infertility. The objective was to determine endometrial perfusion and hormone enzyme activity contralateral and ipsilateral to both the corpus luteum (CL) and developing dominant follicle (DF). Fourteen Angus cows were subjected to an estrous synchronization protocol. Equine AI rods were passed through the cervices, which provided a canal for the laser Doppler probe (Perimed Inc., Ardmore, PA) to collect endometrial perfusion. Optimal perfusion was obtained by selecting 10 sec. of relatively constant perfusion from each horn. After perfusion was collected, cattle were subjected to an endometrial biopsy from each horn. Perfusion and uterine biopsies were collected on day 12, 15, 18, and 21 of the estrous cycle. Data were analyzed using repeated measures ANOVA of the MIXED procedure of SAS (SAS Inst. Inc., Cary, NC). Uterine biopsies were homogenized and activity of uridine 5'-diphospho-glucuronosyltransferase (UGT) was determined via luminogenic substrates (expressed per mg of protein); however, no differences ($P \geq 0.38$) were found. No differences ($P \geq 0.15$) in endometrial perfusion were observed based on the location of the CL nor within day. However, endometrial perfusion was greater ($P < 0.01$) on the ipsilateral side to the DF. In conclusion, endometrial perfusion relative to location of the DF were different whereas the CL location did not influence blood perfusion or UGT activity. This alteration in endometrial perfusion could be due to an increase in estrogen due to the presence of the DF.

Second Place – Katie Cooley Lock
Small Animal Internal Medicine Specialty.
Erythrocyte damage and in-line pressure changes associated with transfusion of canine blood through microaggregate filters.

Abstract: Blood transfusions can be life-saving in dogs. Unfortunately, research has shown that red blood cells (RBCs) transfused via syringe pumps have a significantly shorter post-transfusion survival time compared to RBCs transfused via gravity flow. One explanation for this decrease in RBC survival is that, during a transfusion, RBCs may be damaged as blood is forced through an in-line filter. The goal of this study was to determine if blood passing through a filter, via a syringe pump, would damage canine RBCs. Our hypothesis was that the filter

would accumulate fibrin and cellular debris, thereby causing an increase in damaged RBCs over time. Whole blood (50 mL) was collected from 8 healthy dogs and, using a syringe pump, blood was passed through a standard microaggregate filter at three rates (12.5, 25, and 50 mL/hr). Pre- and post-filter blood samples were collected at the beginning and end of a simulated transfusion. Samples were analyzed to determine mean corpuscular fragility [MCF]), RBC count, hemoglobin, RBC distribution width (RDW), and RBC morphology. The force required to pass blood through the filter was measured continuously during the simulated transfusion.

There was no change in MCF, RBC count, hemoglobin, or RDW between pre- and post-filter samples, and no significant change in force was seen over time. Echinocytes were the most common abnormal erythrocyte morphology, and schistocytes were also identified in one sample. Our study suggests that use of a filter does not alter RBC fragility, but may alter RBC morphology and contribute to decreased RBC survival.

Third Place – Gourav Sharma
Plant Science, M.S.
Greenhouse Screening for Drifted Herbicides among Diverse Germplasm of Tomatoes

Abstract: Gourav Sharma, Te-ming Paul Tseng Mississippi State University, Mississippi State, MS, USA

Solanum lycopersicum, the domesticated species of tomato, are consumed and produced globally. It is one of the economically important vegetable crop worldwide. US produced ranked 2nd in the production worldwide. In commercial production of tomatoes weeds are controlled using herbicides; however, herbicide options are limited because tomatoes are sensitive to most herbicides, one of them being auxin herbicides. Injury on tomatoes from auxin herbicides and glyphosate were shown at rates as low as 0.01X. At present auxin herbicides and glyphosate have greatest potential of being drifted to tomato plants from adjacent fields. This results in significant reduction in yield, and plant growth. A diverse germplasm of tomato exists that includes wild relatives known to be tolerant to numerous biotic and abiotic stresses. Chemical stress is an abiotic stress, we hypothesized that wild tomato accessions may have natural tolerance to herbicides in addition to other abiotic stresses. One hundred and ten tomato lines were used for screening of herbicide tolerance. Plants from these accessions were sprayed with simulated drift rates of 2,4-D, dicamba, glyphosate, quincloarc, aminopyralid,

aminocycloparachlor and picloram. The visual injury rating of each accession for each herbicide treatment was recorded after 7, 14, and 21 DAT on the scale of 0-100 %. 10 accessions for both 2,4-D and glyphosate, 11 for dicamba, and 5 for quincloarc. Further studies to determine the mechanism of herbicide tolerance will help us better understand chemical stress tolerance at the genetic and biochemical level.

Physics, Math, and Engineering

First Place – Ashkan Khalili
PhD, Aerospace Engineering
Enhanced Cross-correlation method (ECCM) for detection and localization of damages in plates using ultrasonic lamb waves

Abstract: An enhanced cross-correlation method (MCCM) is proposed in order to localize damages in plate. Three major modification is applied on cross-correlation (CCM) method in order to improve its capabilities: actuator-sensor configuration, signal pre-processing, and
signal post-processing. A new actuator-sensor configuration is introduced capable of locating damages outside of the enclosed area by sensors. A new method proposed to calculate the group velocity from waterfall graph in order to reduce the complexity of the signal processing. At the last step a Gaussian weight with normal distribution is applied on the results in order to avoid the secondary reflections. Numerical simulation is performed using commercial FE software, Abaqus. Two different configurations are
tested in numerical part with two damage scenarios. Experimental studies are done using a PZT transducer as actuator and scanner laser Doppler vibrometer (SLDV) as sensor. In all of the numerical and experimental tests, the proposed method is capable of detecting the damage location with high precision compared to non-modified method.

Second Place – Sheida Riahi
PhD, Mathematics - Measuring and Testing Central Symmetry in Bivariate Settings

Abstract: A concept of symmetry plays an important role in statistics. For example, detection of abnormalities as asymmetrical patterns in the thermographic images is linked to the concept of symmetric regression functions or the null distributions of t and F statistics in the univariate general linear model depend on spherical symmetry of the error distribution. For a multivariate distribution one can define different kinds of symmetry, e.g. central, spherical, elliptical symmetry

etc. Our interest here is to study these symmetries in bivariate set-up with the intention of measuring (quantifying) and testing for different kinds of asymmetries. For that here as a first step we have been able to extend the recently proposed quantification of asymmetry and tests for symmetry in Partlett and Patil (2015) to the central symmetry in bivariate settings.

Third Place - Maheshwar Ghimire
PhD, Applied Physics - Highly sensitive fiber loop ringdown strain sensor with low temperature sensitivity

Abstract: We present a highly sensitive static strain sensor based on the fiber loop ring-down technique. For the fabrication of the sensor head, fiber loop of the single mode fiber was cut, both fiber ends were polished and aligned carefully to form a micro air-gap. Any strain produced during the measurement changes the size of the miro air-gap, hence changing the coupling efficiency between the fiber ends, which is represented by the change in ringdown time. In the experiment, strain sensitivity as low as 65 nε with temperature induced strain error as low as 15 nε was observed, which is better than any static strain sensor in the literature featuring low cross temperature sensitivity. Furthermore, the strain sensitivity can be adjusted simply by changing the length of the sensor

Honorable Mention - Olanrewaju Raji
Sustainable Bioproducts, Ph.D.
Analysis of hindgut bacterial phyla frequency and diversity in subterranean termites exposed to chitosan-treated wood

Abstract: The termite hindgut contains a microbial community that symbiotically aids in digestion of lignocellulosic materials. For better understanding of the dynamics of the bacteria-termite relationship, a species survey of bacterial hindgut microbes in subterranean termites (Reticulitermes flavipes: Kollar) collected from Louisville, Mississippi was performed. Chitosan-treated and control (water-treated) wood samples, half of which were exposed to environmental conditions for 16 weeks, were exposed to termites. Total genomic DNA was isolated from termite hindguts, amplified and 16S ribosomal RNA (rRNA) gene fragments were uniquely indexed using Illumina designed primers and then subsequently sequenced on the Illumina MiSeq system. A total of 27 bacteria phyla containing 707 genera and 1721 bacteria species were identified with the sample groups. 65 bacteria species showed significantly ($p = 0.05$) higher amounts within the chitosan treated group unexposed to environment when compared to other treatment groups. This suggests a treatment driven effect on the hindgut bacteria population.

Honorable Mention- Sarah M. Montgomery
Agronomy, M.S.
Effects of Annual Ryegrass Cytotype on Forage Productivity, Nutritive Value and Animal Performance

Abstract: Annual ryegrass (Lollium multiflorum Lam.) exists as either diploid (2n=2x) or tetraploid (2n=4x). Tetraploids are derived from diploid cultivars by doubling of chromosomes via colchicine treatment. The industry push is tetraploid cultivars because, putatively they have increased seedling vigor, are more robust growth with a correspondingly greater yield. However, research suggests no difference in yield between diploid and tetraploid cultivars; yet there may be a difference in weight gain in cattle grazing tetraploid versus diploid varieties. Therefore, the objectives of this study are to evaluate weight gain of cattle grazing diploid and tetraploid cultivars. To determine if there is an advantage in weight gain in steers grazing diploid and tetraploid ryegrass, we set up a grazing study at Mississippi State's Prairie Research Unit, utilizing four common varieties, two diploid (Marshall and Tam 90) and two tetraploid (Jumbo and Nelson), in 2.5-acre pastures replicated four times. Two steers were randomly assigned to each pasture for an 84-day grazing period. Two-day mean average daily gain of the steers was taken pre-, mid- and post-grazing throughout the grazing season to compare weight gain between varieties. Other variables include: herbage mass, dry matter yield, in vitro dry matter digestibility, relative forage quality, visual emergence rating and °Brix. This research is currently underway and may give an in depth view of how ryegrass cytotypes are utilized by cattle and provide producers the information necessary to make economic decisions for their production system.

Honorable Mention – Preeti Muire
Veterinary Medical Science, Ph.D.
Trained Immunity and Protection in T and B Cell Deficient *rag1*-/- Mutant Zebrafish

Abstract: Immune responses are mediated by innate immune cells and adaptive immune cells. Monocytes, macrophages and Natural Killer (NK) cells are the principal innate immune cells, and T and B cells are adaptive immune cells. Early immunity in mammals and fish is reliant on innate immune cells. Trained immunity provides protection and survival if acquired immune responses are not present, or not sufficient. Trained immune responses are mediated by monocytes,

macrophages and NK cells in mammals. T and B cell deficient rag1-/- mutant zebrafish mediate protective immunity to intracellular
bacteria. Our hypothesis is that NK cells and macrophages are the cells involved in this response in fish. We have identified zebrafish NK cells. Next, to determine the role of these cells in an immune compromised case, we injected rag1-/- mutant zebrafish with immune stimulants (TLR ligands) along with a vaccine. Another group received only the vaccine. After bacterial (E. ictaluri) challenge, fish that received TLR ligands when vaccinated had the highest survival, demonstrating the need for additional stimulation and vaccination to mount a memory immune response. Using quantitative PCR
and western blots we quantified gene and protein expression of innate immune cell specific markers
following exposure to TLR ligands. These results will help us further elucidate mechanisms underlying macrophage and NK cell-based protective immunity in fish and will revolutionize our view of host defense and immunological memory, leading to developing new classes of vaccines and immunotherapies in aquaculture.

Social and Behavioral Sciences

First Place - Jeffrey D. Simpson, M.S.
Biomechanics, Ph.D.
Assessment of ground reaction forces during a drop vertical jump following three weeks of external load training

Abstract: The primary purpose of this study was to examine the impact of external load training (ELT) on ground reaction forces (GRF)
during a drop vertical jump (DVJ) in well-trained women. Female participants stratified into two groups (ELT = 11; Control = 10), completed
a DVJ from a 45.72 cm box onto an AMTI force platform at baseline (BL), post-ELT, and post-detraining (DET). ELT consisted of wearing
weight vests (WV) with ~8% body mass for 32 h/wk during daily living and 3 training ses/wk for 3 weeks, while the control group was restricted from wearing WVs. After ELT, a DET phase was completed. Medial/lateral (Fx), anterior/posterior (Fy), and vertical (Fz) components of the GRF were assessed at initial contact (IC), take off (TO), and second landing (SL), normalized to multiples of body weight (BW). Dependent measures were analyzed using a 2 (group) x 3 (time) mixed model ANOVA with time as the repeated measure ($p \times< 0.05$). Analyses revealed significantly greater

Fz at IC for the ELT group. There were significant reductions in Fx at TO from BL to post-DET, and significant increases in Fz during SL from BL to post-ELT, and BL to post-DET in both groups. Increased landing GRFs are associated with a greater risk of lower extremity injury. While incorporating ELT may enhance high intensity task performance, the combination of increased Fz during IC and SL phases suggest that ELT could alter ground reaction forces when landing, which could have negative implications for this training method.

Second Place - Jenny Bailey Jones
Instructional Systems and Workforce Development, Ph.D.
Web Conference vs. webcast: The perceived effectiveness of training sessions at a southeastern community college

Abstract: Professional development is a lifelong learning process and technology has provided and will continue to provide new and different delivery methods. This research determined if live web conference or recorded webcast training sessions were an effective delivery method of training.

Specifically, seven research questions were developed determine if live web conference or recorded webcast training sessions were an effective delivery method of training, if the sessions were having an impact on professional learning, and if there were factors that were affecting participation in the sessions. The primary mode of data collection was though a survey instrument designed by the researcher.

Results of the statistical analysis showed that faculty are participating in the sessions beyond minimum requirements, with the highest participation in recorded webcasts. Participants valued the elements of the live sessions including interaction and the ability to clarify information without delay. Several barriers raised for attending the live sessions included the following: lack of time, presentation speed, and lack of topic detail. Participants indicated the appreciated elements of a recorded webcast included the following: convenience, ease of use, and flexibility. Participants did not raise many barriers for attendance in recorded webcasts, although lack of time and repetitive topics were mentioned.

The findings indicated the training program studied was very effective as indicated by high session attendance and moderate to high ability of participants being able to utilize the information gained from the sessions. The study concludes with implications and recommendations for further research.

Third Place - Margaret Bernheim
School Psychology, Ph.D.
Interventions to Improve Oral Reading Fluency in Secondary-Aged Struggling
Readers: A Comparison of Repeated Reading and Listening Passage Preview

Abstract: Oral reading fluency has been established in previous literature as a key
component in becoming an effective reader. The current study used an alternating
treatments design to compare the effectiveness of two intervention conditions on
the oral reading fluency of three secondary students who struggled with reading.
The participants were randomly exposed to a Repeated Reading condition, a
Listening Passage Preview condition, and a non-intervention Control condition.
Oral reading fluency, measured using words read correctly per minute, was
recorded across participants for each condition, and the data were visually
analyzed through graphs. Results indicated that overall, the Repeated Reading
condition led to the greatest improvements in oral reading fluency. Results also
indicated that both the Repeated Reading condition and Listening Passage Preview
conditions led to greater improvements in oral reading fluency than the Control
condition for all participants. Discussion focuses on implications of the current
study and future research needed in the area of reading interventions for
secondary-aged students.