

<b>First Place Winners - Oral</b>	<b>Name</b>
Natural Sciences/Engineering	<b>Colton Turner</b>
<p data-bbox="326 327 1297 359"><b>PEDESTRIAN DETECTION IN A NIGHT TIME DRIVING AND TEXTING TASK</b></p> <p data-bbox="626 363 997 394">Faculty Mentor: Alex Chaparro</p> <p data-bbox="540 396 1081 428">Fairmount College of Liberal Arts &amp; Sciences</p> <p data-bbox="313 464 1299 659">The dangers of texting and driving have become the focal point of driving research in recent years. Most of this research has been directed at examining the dangers distracted drivers present to other motorists. However, roadside pedestrians are also endangered by distracted drivers. According to the National Highway Traffic Safety Administration nearly 76,000 pedestrians were injured in traffic accidents in 2012. An additional 5,000 accidents resulted in pedestrian deaths.</p> <p data-bbox="313 695 1307 890">Current research tends to focus on daytime driving despite the fact that distracted night time driving is far more dangerous for motorists and pedestrians alike. Nearly 70% of all pedestrian/automobile fatalities in 2012 occurred at night. These numbers are projected to continue over the coming years. Despite this projection surprisingly little research has been done on preventing pedestrian/vehicle collisions. Even less research has been done on night time prevention.</p> <p data-bbox="313 926 1307 1163">The goal of this research study was to examine the effects texting while driving at night has on a driver's ability to detect roadside pedestrians as well as examining the effects the pedestrian's clothing has on their visibility. To do this participants were driven through a closed road course at night and given a texting task to complete when prompted. The participants were also asked to report anytime they saw a roadside pedestrian. The pedestrians were wearing one of three possible clothing options.</p> <p data-bbox="313 1199 1284 1293">The results of this study indicate that the presence of texting is not the determining factor of if a pedestrian will be detected, but instead it is the pedestrians clothing choice that determines detection and the distance of detection.</p>	
Social Sciences/Humanities	<b>Gage Webb</b>
<p data-bbox="321 1465 1299 1497"><b>MANUFACTURING'S RELATIONSHIP TO ECONOMIC GROWTH IN WICHITA</b></p> <p data-bbox="626 1501 997 1533">Faculty Mentor: Jen-Chi Cheng</p> <p data-bbox="656 1535 967 1566">Barton School of Business</p> <p data-bbox="313 1602 1299 1797">When the Great Recession hit Wichita, KS it hit hard. Jobs disappeared overnight, unemployment rates rose, and things changed in a bad way for the average Wichita citizen. Since then, however, the city has seen a resurgence of growth that has helped get things back on track. My question when analyzing this situation is simple: What caused this new growth? Was it manufacturing and aerospace coming back in force, or something else entirely?</p> <p data-bbox="313 1833 1299 1894">To answer these questions I researched the economic trends of Wichita over the last 25 years (in particular the local unemployment rates) and compared these trends</p>	

closely with those found in the Wichita manufacturing sector specifically. Compiling, graphing, and analyzing this data allowed for several realizations. Firstly, it became clear that, since at least 1990, the local Wichita economy has been heavily influenced by the manufacturing industry. This concept is reflected clearly during the most recent financial crisis when manufacturing jobs in the city dropped by nearly 20,000 and unemployment, as a result, rose by about 6%. These two forces remained closely intertwined until around 2010 when things began to unravel.

In 2010, local unemployment rates and manufacturing job creation separated. The overall health of the Wichita economy improved steadily while the number of manufacturing jobs remained stagnant. This new found trend continues to this day, and it is hard to see it as anything other than a blessing. In the last five years Wichita has successfully begun the diversification of its economy. Local technology, education, health, and business service industries have demonstrated measurable economic growth that has “filled in” for some of the stagnancy in the manufacturing industry. This diversification has lowered the risk levels of the overall Wichita economy and improved the local economy’s ability to resist recession and other forms of economic downturn.

Second Place Winners-Oral	Name
Natural Sciences/Engineering	<b>Christopher Thacker</b>

**DEVELOPING A TARGETING SYSTEM FOR BACTERIAL MEMBRANES**

Faculty Mentor: Dennis Burns

Co-Authors: Zifan Wang, Doug English, and Dennis Burns  
Fairmount College of Liberal Arts & Sciences

An ammonium picket porphyrin that targets bacterial membranes has been prepared and shown to bind to phosphatidylglycerol (PG), a bacterial lipid, when the lipid was in solution, contained within synthetic membrane vesicles, or when in Gram-negative and Gram-positive bacterial membranes. The multifunctional receptor was designed to interact with both the phosphate anion portion and neutral glycerol portion of the lipid headgroup. The receptor’s affinity and selectivity for binding to surfactant vesicles or lipid vesicles that contain PG within their membranes was directly measured using fluorescence correlation spectroscopy (FCS). FCS demonstrated that the picket porphyrin’s binding pocket was complementary for the lipid headgroup, since simple Coulombic interactions alone did not induce binding. The lipid-receptor binding motif in solution was shown to mirror the binding motif of membrane-bound PG and receptor. Cell lysis assays with *E. coli* (Gram-negative) and *Bacillus thuringiensis* (Gram-positive) probed with UV/Visible spectrophotometry indicated that the receptor was able to penetrate either bacterial cell wall and to bind to the bacterial inner membrane. Interestingly, the receptor itself inhibits gram-negative bacterial growth in low concentrations while not being degraded or metabolized.

Social Sciences/Humanities	<b>Lindsey Stillwell</b>
<p><b>A LOST HISTORY: AN ETHNOGRAPHY OF THE HISTORIC DUNBAR THEATRE</b>  Faculty Mentor: Natalie Grant  Fairmount College of Liberal Arts &amp; Sciences</p> <p>This research explored sense of place and generational values of an African American cohort from Wichita, Kansas, that experienced the Historic Dunbar Theatre during the 22-years following its opening in 1941. Utilizing narrative inquiry and semi-structured interviews, the cohort described their individual lived experiences and memories in the community. Results show a strong sense of place among the cohort reinforced by a sense of belongingness and a generational value that emphasizes the importance of community and human relationships. Issues of social justice and further research are also presented.</p>	

<b>First Place Winners-Poster</b>	Name
Natural Sciences and Engineering	<b>Lindsey Carson</b>
<p><b>MUSCLE DAMAGE IN HIND LIMB ISCHEMIA MURINE MODEL OF PAD</b>  Faculty Mentor: Kim Cluff  Co-Author: Kaitlyn Howard, Ryan Becker, and Hootan Mehraein  College of Engineering</p> <p>Peripheral Artery Disease (PAD), defined as atherosclerotic blockages of the arteries supplying blood to the lower extremities, becomes more common with age and produces a considerable public health burden. PAD produces a progressive accumulation of ischemic injury to the muscles cells, nerves, skin and subcutaneous tissues of the leg. At the level of the skeletal muscle cell, this injury includes altered metabolic processes, damaged organelles, and compromised bioenergetics. High variation in PAD patient clinical presentations complicate the study of skeletal muscle damage. PAD patients have high variation in their clinical presentation, disease severity, and differ greatly in comorbidities. This research studied the muscle pathology in the absence of this high variation of comorbidities by using a hind limb ischemia mouse model of PAD. The objective of this study was to identify novel Raman micro-spectral biomarkers which may characterize biochemical alterations in the diseased muscle and complement existing methods for diagnosis and monitoring of PAD patients. Eight mice had their left femoral artery ligated and a sham procedure on the right limb. The mice were allowed to live for 14-30 days before excision of the gastrocnemius muscle and euthanasia. The harvested muscle was analyzed using Raman micro-spectroscopy. Statistical analysis of the muscle tissue Raman spectra included a paired t-test, principal component analysis and discriminant analysis. Significant differences (<math>p &lt; 0.05</math>) in</p>	

spectral peaks were found in the finger print region of the spectra using a paired t-test. Fishers Linear Discriminant analysis on the first principal component was able to correctly classify the ischemic and control muscle tissue with 100% accuracy. The Raman spectral profiles showed a consistent difference between the ischemic and non-ischemic muscle tissue. Raman micro-spectroscopy may provide a novel method of label-free tissue analysis and has the potential to aid in diagnosis and treatment monitoring of PAD patients.

Social Sciences/Humanities	<b>Kelly Ha</b>
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**SPORTS PLAYING TO IMPROVE VISUAL FUNCTIONS**

Faculty Mentor: Rui Ni  
Fairmount College of Liberal Arts & Sciences

Visual and motor skills are essential for our daily tasks, including driving and playing sports. Previous research (e.g. Paul et al., 2011) has mainly focused on the relationship between visual functions and performance in sports. The current study aims to examine the effect of playing sports in improving eye-hand coordination (EHC) and visual functions by training participants with Ping-Pong playing.

In this study, 11 college students of ages 18-35 were recruited to go through multiple visual tests and training sessions over four nonconsecutive days. Performance on a series of visual tasks were compared between the first and last day, including processing speed, motion-in-depth perception, and divided attention, to examine the improvement as a result from playing Ping-Pong. At the beginning of the first training day and at the end of last training day, participants were also measured on their EHC performance. All participants went through multiple training sessions playing against a Ping-Pong robot.

A four-way repeated-measures ANOVA was conducted to evaluate the effect of training on EHC and visual functions. Although participants didn't improve on their Ping-Pong playing performance over just two days' training, the results showed a significant ( $P < 0.01$ ) improvement in their EHC function. More importantly and interestingly, significant improvements were found in visual processing speed and divided attention, suggesting that sports playing can be a useful intervention to improve motor skills and visual functions.

<b>Second Place Winners-Poster</b>	Name
Natural Sciences and Engineering	<b>Kaitlyn Howard</b>
<b>FOURIER TRANSFORM INFRARED SPECTRAL BIOMAKERS OF MUSCLE DEGENERATION</b> Faculty Mentor: Kim Cluff Co-Author: Hootan Mehraein, Ryan Becker, and Kim Cluff College of Engineering	

Peripheral artery disease (PAD), characterized by blockages of the arteries to the legs, affects approximately 8 million lives in the United States. This injury includes altered metabolic processes, damaged organelles, and compromised bioenergetics in the affected muscle. In this study, we evaluated the hypothesis that Fourier Transform Infrared (FTIR) spectroscopy of human biopsy samples (gastrocnemius muscle) can be used to identify biochemical alterations in PAD muscle and characterize severity of muscle damage. When comparing spectral peaks between controls and patients with PAD, significant differences were found in the fingerprint region. FTIR spectroscopy was able to characterize the secondary effect of PAD on the gastrocnemius by identifying unique biochemical signatures of diseased PAD skeletal muscle.

Natural Sciences and Engineering

**Jennifer Smith**

**EFFECTS OF FIRE ON FORB GERMINATION AND SURVIVAL IN A SOUTH-CENTRAL KANSAS TALLGRASS PRAIRIE**

Faculty Mentor: Gregory Houseman  
Fairmount College of Liberal Arts & Sciences

Prescribed burning is an important tool for the conservation, restoration, and management of prairies, but, how fire impacts seeds in the year of the fire is poorly understood. For example, prairie burns can result in litter removal and increased nutrient availability, however it is unclear whether fire causes high seed mortality, or if such losses are offset by increased germination or establishment. In this study, we examined whether prescribed burning has facilitative or suppressive effects on the germination and survivorship of forbs in a south-central Kansas tallgrass prairie. Seven experimental treatments, which manipulated litter removal, burning of the seeds (lab and field), and burning of the prairie, were applied to 0.5 x 0.5-m plots to examine the effects on 15 species of common Kansas forbs. After one growing season, cumulative germination and end-of-season survivorship strongly increased in plots that were burned or had litter removed, though the effects were lower when seeds were sown prior to the burn. These results suggest that in similar tallgrass prairies, prescribed burns have a net positive effect on forb colonization and that sowing native forbs following a prescribed burn may be an effective restoration technique.

Natural Sciences and Engineering

**Maha Madi**

**REDUCING MEDICATION ADMINISTRATION ERRORS IN EMERGENCY MEDICAL SERVICES THROUGH THE IMPLEMENTATION OF A VERBAL VERIFICATION METHOD**

Faculty Mentor: Joseph Keebler  
Co-Authors: Paul Misasi, Joseph Keebler, and Brady Patzer  
Fairmount College of Liberal Arts & Sciences

Healthcare reform is a reoccurring issue that is common to legislatures across the country. Policy changes to healthcare affect everyone and in order to better provide for the citizens of the State agreements must be made on the type of reform that is needed. Reforming healthcare in the United States includes improving the access and quality of care provided to citizens. In order to improve the quality of care, medication errors need to be minimized in the healthcare field. Emergency Medical Services (EMS) professionals evaluate over 36 million people a year with over 16 million of these people transported to hospitals for additional care. Thousands of these people are prone to preventable medication administration errors made by providers. One of the many causes of these errors is in the way EMS professionals verify the drugs they are administering. The current verification method in place, is known as the 5 Rights method, has been questioned since no empirical data exists to support it. The 5 Rights method is a mental verification susceptible to fallibility of human processing. Currently we are studying the effects of a new Medication Administration Cross-Check (MACC) on the frequency of medication administration errors. We hypothesize that the introduction of the MACC will significantly reduce medication administration errors compared to prior MACC implementation. By implementing MACC, the quality of the administration of healthcare in Kansas can be greatly improved.