

## Abstracts of Papers Presented at the 2018 Collegiate Meetings

## Middle Region

Belmont University  
Nashville, Tennessee  
21 April 2018

## Chemistry

The reaction of a copper (II) centered Schiff-base complex with strong acid: a kinetic investigation. **Christopher Joseph Hansen\* and Justin Stace**. Belmont University, Nashville, Tennessee. Photocatalysts are molecules that use energy from sunlight to drive reactions. The copper(II) centered Schiff-base complex  $\text{CuLN}_4(\text{ClO}_4)_2$ , ( $\text{LN}_4 = \text{N,N}'\text{-bis-(1-pyridin-2-yl-ethylidene)-propane-1,3-diamine}$ ), is similar to the porphyrin ring structure found in chlorophyll. The complex is synthesized by the condensation of 1,3-diaminopropane and 2-acetylpyridine in methanol. Upon addition of a solution of copper(II) perchlorate in methanol, a blue precipitate rapidly forms. The precipitate is purified via recrystallized in acetonitrile by diethyl ether vapor diffusion. The interest of this complex is its reactivity in acidic solutions. Through UV-vis spectroscopy and colorimetric titration it can be seen that four molar equivalents of hydrochloric acid react completely with the  $\text{CuLN}_4(\text{ClO}_4)_2$ . Rapid-mixing kinetic data suggest a two-step mechanism. The data outlines an  $\text{A} + \text{B} \rightarrow \text{I} + \text{D}$  ( $k_1$ );  $\text{I} + \text{B} \rightarrow \text{P} + \text{D}$  ( $k_2$ ) mechanism, where the B and D are colorless in the visible and near-ultraviolet region of the spectrum.

Modulation of phospho tensin homolog (PTEN) in cancer cells and lipid peroxides in peripheral blood mononuclear cells (PBMCs) following exposure to flavonoids. **Alekzander S. Garcia\*, Elbert L. Myles, and William Y. Boadi**, Tennessee State University, Nashville, Tennessee. Studies indicate that peripheral blood mononuclear cells (PBMCs) and cancer cells are used to study several biochemical endpoints. In this study we investigated the effects of the flavonoids, quercetin, kaempferol and genistein on PTEN levels in cancer cells (i.e., breast cancer BT-549 and MCF-7; lung cancer A-549) and lipid peroxides in PBMCs. The objective was to study the expression levels of PTEN and lipid peroxidation following exposure to the flavonoids with and without oxidative stress. Cell-lines and PBMCs from donors were exposed to each flavonoid at concentrations of 0, 5, 10, 15, 20 and 25  $\mu\text{M}$ . The results showed decreases in lipid peroxides in the PBMCs in the flavonoid treated samples following the Fenton's reaction. PTEN levels for the flavonoid treated cells increased gradually but were not significantly different from each other. The

studies suggest that the flavonoids may play an important role in diminishing oxidative stress in those cells.

Electronic spectroscopy, reactivity, and solvation of a terbium phenanthroline complex: possible chemical sensing agent. **Avery S. Daniels\* and Dr. Justin Stace**, Belmont University, Nashville, Tennessee. Many common uses for lanthanide ligand complexes include: labels in fluorescent based bio-assays, imaging, electroluminescent devices, telecommunications security links, and countless others. Chemical sensing proves to be a valuable, and well investigated area of study of such complexes. A terbium centered complex is directly synthesized from the combination of more than two molar equivalents of 1,10-phenanthroline (phen) with terbium(III) nitrate hexahydrate in methanol. The resulting product is then purified using 2-propanol and identified to be  $(\text{Tb}(\text{phen})_2(\text{NO}_3)_3)$ . The electronic absorption spectroscopy and standard, solvent dependent emission offers tantalizing possibility of synthesizing a chemical sensing species. While completely insoluble in all common solvents, the complex does form optically clear colloidal suspensions in high-polarity solvents. Addition of excess strong acid produces a true homogenous solution and we report the  $^1\text{H-NMR}$  of the complex.

## Health and Medical Sciences

The effects of tomoxetine hydrochloride on the ability to recall memories of adult zebra fish. **Elizabeth Sparks\* and Lori McGrew**. Belmont University, Nashville, Tennessee. For this project tomoxetine hydrochloride will be given to adult aged zebrafish to test their ability to recall memories. The zebrafish will be trained on the T-maze until they reach a successful pass rate of sixty percent. There will then be three groups of the zebrafish: a control, a group receiving 0.5 microliters of tomoxetine hydrochloride, and a group receiving 1.0 microliters of tomoxetine hydrochloride. Each fish will then individually be put into a small beaker filled with their amount of methylphenidate for one hour. Each fish will then be put into the T-maze and their results will be monitored and collected. The results ended up being inconclusive to the sample size of the fish being so low, due to mortality rates of the zebra fish, but the data showed that the zebrafish receiving the middle dosage were the ones with the highest rate of success.

The effects of an antidepressant, Bupropion, on the chemotaxis of nicotine-treated *Caenorhabditis elegans* to-

wards an attractant. **Sargoel Rezanejad\* and Robert Grammer.** *Belmont University, Nashville, Tennessee.* Nicotine is a parasympathomimetic stimulant that crosses the blood-brain barrier in humans and binds to cholinergic receptors in the brain, impairing cognitive functions. Lately, nicotine antagonists such as antidepressants have been shown to reduce the effects of nicotine addiction and induce cessation. One such pharmaceutical, Bupropion, does so by blocking the nicotinic acetylcholine receptors in the brain, promoting nicotine suppression in humans. In this study, we investigated the effects of nicotine and the antidepressant, Bupropion, on the chemotaxis of *C. elegans* towards an attractant. A dose response assessment of nicotine was performed. Furthermore, assays done with nicotine-agar fed worms demonstrated that nicotine impedes their chemotaxis to the attractant. Finally, we washed nicotine-treated worms with Bupropion to see if the pharmaceutical would reduce the effects of the nicotine and improve the nematodes' chemotaxis towards the attractant. Bupropion was effective in improving the chemotaxis ability of nicotine treated worms.

The effects of  $\beta$ -estradiol and 11-ketotestosterone on sexual aggregation and stress in adult *Danio rerio*. **Rebecca Derby\* and Lori McGrew,** *Belmont University, Nashville, Tennessee.* *Danio rerio* share nervous and endocrine system mechanisms with humans making them a popular model organism. Zebrafish regulate sexual aggregation with 11-ketotestosterone and  $\beta$ -estradiol, but when they are exposed to hormones of the opposite sex they show reversal in these behaviors coupled with opposing stress responses. Minute quantities of these hormones are found in drinking water, however, little is known about effects on human physiology. Using zebrafish as a model, this study investigated potential dangers. When female zebrafish were treated with 11-ketotestosterone and male zebrafish were treated with  $\beta$ -estradiol a reversal of shoaling behavior did not occur. However, female zebrafish exhibited stress-induced behaviors and had elevated cortisol levels while male zebrafish did not and actually showed a decrease in cortisol levels. This suggests that that the concentration of sex steroids found in drinking water could pose a threat to humans who use many of the same endocrine mechanisms as zebrafish.

The effects of natural sugars and artificial sweeteners on zebrafish. **Christian Candler\* and Lori McGrew,** *Belmont University, Nashville, Tennessee.* Artificial sweeteners have been getting an increasingly poor reputation over the past few years. This study will look at the relationship between both natural and artificial sweeteners and learning during the development of the *Danio Rerio* or zebrafish. Zebrafish larvae will be given food that has been placed in different solutions containing separate sweeteners. The developing zebrafish will be tested in a T-Maze to assess learning capabilities while becoming accustomed to the sugary foods. A statistical analysis was done to see how the groups compare on their learning capabilities after eating the sugary

foods. The hypothesis for this study is that the zebra fish that are eating the artificially sweetened foods will be more impaired than the natural sugar foods, and those groups will be more impaired than the control group that isn't treated with any sugar.

### Zoology/Ecology/Environmental Sciences

The effect of urban green roof size on the diversity and abundance of arthropods and mollusks. **Courtney L. Ankrapp\* and Darlene Panvini,** *Belmont University, Nashville, Tennessee.* Green roofs provide a valuable habitat to arthropods and mollusks in urban areas that have limited green space. Arthropods and terrestrial mollusks can colonize green roofs of all types, even those with limited soil structure and plant diversity. Fifteen pitfall traps were constructed, sorted and sampled on three urban green roofs of different sizes (1 trap per 24m<sup>2</sup>) and specimens collected 96 hours later. Plant diversity and coverage was similar among the three roofs. The expectation was that diversity and abundance of arthropods and mollusks would vary in relation to green roof size. More specimens were collected on the large green roof, however, the small green roof had more of an occurrence of arthropods and mollusks than the medium sized green roof. There was no significant evidence that green roof size had an effect on the occurrence of arthropods and mollusks.

Learning and classical conditioning to predation cues in a snail. **Martena Ibrahim\* and John Niedzwiecki,** *Belmont University, Nashville, Tennessee.* Kariomones are chemical cues given off by organisms. Learning can help animals assess new predation threats We attempt to assess whether classical conditioning guides snails to learn a new cue and change in defense strategies for future predator encounters. We manipulated predator exposure by adding a novel predator and assessed behavioral responses to predator cues. The purpose of the experiment was to determine whether snails can associate novel betta fish cues with native predator and alarm cues. Results did not support that snails learned to avoid the novel predator. Those which never saw the alarm cues were higher than any other group, when exposed to alarm and predator cues. The group that saw alarm cue during conditioning did not respond, perhaps showing habituation, a simple form of learning. There was an overall effect of the pre-treatments on position in the water column, which may indicate a residual effect of pretreatment with cues also.

Size dependent behavioral response of snails to crayfish kairomones. **Catherine Issac\* and John Niedzwiecki,** *Belmont University, Nashville, Tennessee.* Kariomones are chemical cues given off by organisms. These cues can be used by prey to detect predators. The response to a chemical cue may depend on something about the organism receiving the cue that is state dependence. A hungry snail, or a snail with a

large strong shell may choose to ignore a cue that would cause a reaction to a snail in a different state. Detecting chemical cues has been shown to be important in the anti-predator responses of snails. In this study, we examined two size classes of snails and tried to detect differences in the way they responded to predation cues. Unfortunately, we were not able to detect antipredator behavior, in the form of either crawl out behavior or changes in over-all activity level. The method of observation may have affected snails' behavior, future studies may need to minimize observer effects.

The decomposition of leaf litter on urban green roofs of different ages compared to decomposition in a community garden. **Latiara Jarvis\* and A. Darlene Panvini, Belmont University, Nashville, Tennessee.** This experiment analyzed the decomposition rate among three green roofs and a community garden on Belmont University's campus in Nashville, Tennessee. The purpose was to determine whether a natural ecosystem compared to a green roof ecosystem would have the same decomposition rates. Litterbags were utilized to help determine the decomposition rate between the leaves being placed at the site. There was no significant difference in decomposition between the ages of the green roofs. The green roofs had faster decomposition compared to the garden. Both the green roof and the garden are ecosystems that carry out natural functions such as decomposition.

The effects of long term soil warming on soil respiration and carbon storage. **States D. Labrum\*, William Werner, Michael Bernard, Jerry Melillo, Harvard University, Cambridge, Massachusetts (WW, MB, JM), and Columbia State Community College, Columbia, Tennessee (SL).** Our research objective is to investigate the relationship between long term soil warming and subsequent soil carbon release into the atmosphere. We conducted soil warming experiments to examine how various soil temperatures affect carbon release through soil microbial respiration, and whether the soil microbes may compensate for the effects of rising temperatures by the phenomenon of thermal acclimation. Our field experimental results showed a pattern of decreased soil respiration in the heated plots. The observed decrease in microbial biomass in heated soils caused the decrease in respiration relative to controls. Additionally, to remove potential bearing of substrate limitation, we amended the soils with sucrose further minimizing the difference in respiration between treatments. The results indicated that microbial biomass and substrate limitations are primarily responsible for thermal acclimation. We concluded that structural and functional changes in soil microbial communities drive the patterns of thermal acclimation, directly impacting soil carbon release.

The diversity of microbial communities on urban campus green roofs and community garden in Nashville TN. **Terra'lexus Roberts\* and Darlene Panvini, Belmont Univer-**

**sity, Nashville, Tennessee.** Green roofs provide ecosystems that allow for a greater diversity of organisms to exist in urban environments. The occurrence of microbes on green roofs on an urban campus in Nashville, TN was determined by collecting soil samples from three roofs and a community garden. The green roofs varied in age. Soil microbial community analyses were determined using Biolog Eco-Plates. The occurrence of *E.coli*/coliforms, *Staphylococcus aureus*, and Enterobacteriaceae was assessed using 3M Petrifilms. Microbial functional diversity was higher on the older and newer green roofs, but lowest in the community garden. The green roofs showed high similarities in microbial functional diversity. *E. coli* was found at all sites while *Staphylococcus* and coliforms were found only in the garden and mid-aged roof. The observation of microbial communities on green roofs can expand an understanding of the role of bacteria and fungi in ecological processes such as decomposition and nutrient cycling.

Cladistic comparisons of mitochondrial DNA and nuclear DNA in *Ambystoma barbouri* and *Ambystoma texanum* phylogeography. **Shaoyun Yang\* and John Niedzwiecki, Belmont University, Nashville, Tennessee.** Phylogeny is the history of evolution amongst species in which they share a common ancestral lineage. Past researchers have been able to derive a phylogenetic tree of the salamander species, *Ambystoma barbouri* and *Ambystoma texanum* based on its mitochondrial DNA. This study examines whether the mitochondrial phylogenetic tree will be in support or in conflict when compared to patterns derived from nuclear DNA. We performed DNA extractions on a number of populations, conducted PCR based on several genomic DNA regions confirmed with gel electrophoresis and obtained Sequences of those genomic markers. We Compared results from two nuclear sequences to the mtDNA phylogeny. Only had a small number of synapomorphies were found, these indicated that there was both consistency and conflict with the mitochondrial phylogenetic tree. Therefore, further research with longer genomic sequences or additional markers should be conducted to truly get a clearer idea of genetic history of these salamanders.

Variations in organism diversity across green roofs differing in age and types of plant coverage. **Taryn G. Anderson\* and Darlene Panvini, Belmont University, Nashville, Tennessee.** Green roofs are roofs in urban settings that contain foliage and plants that act as a habitat to increase animal and insect diversity. The increased insect diversity promotes an improved biodiversity and overall environment of green roofs. It was hypothesized that two factors of green roofs, age of roof and plant coverage, would cause a variation in insect diversity across the Belmont Campus green roofs. Pitfall traps under certain plant types were used to collect organisms once in mid-September and once in early November on three of Belmont green roofs. The organisms were then collected and identified to the family level, and using statistical analysis, the factors hypothesized were

studied to see the difference in the diversity in organisms on the green roofs. The results suggest a relationship between age of a green roof, seasonality, and plant coverage, with how diverse the organism population is.

### Cell and Molecular Biology/Microbiology

Effect of inorganic vs. organic selenium compounds as a pre-treatment to oxidative stress caused by 6-Hydroxydopamine treatment in *C. elegans*. **AC Dowd\*** and **Nick Ragsdale**, Belmont University, Nashville, Tennessee. Parkinson's disease has been linked to oxidative stress. Selenoproteins have been found to act as an antioxidant. Selenium is a micronutrient needed for normal bodily function that is incorporated into the selenoproteins. This experiment compared an inorganic form and an organic form of selenium in reducing the damage caused by a 6-hydroxydopamine (6-OHDA) oxidative challenge to the dopaminergic neurons. No difference was found in the mobility shift patterns between *C. elegans* treated with the two forms of selenium and 6-OHDA. It is assumed that both forms of selenium can be effectively incorporated into selenoproteins and thus contribute to antioxidant properties.

Kinetics of progression of pathogenicity of *Caenorhabditis elegans* in response to *Bacillus thuringiensis*. **Dana Cornwell\*** and **Dr. Robert Grammer**, Belmont University, Nashville, Tennessee. The purpose of this experiment was to determine the kinetics of pathogenicity of *Caenorhabditis elegans* in response to *Bacillus thuringiensis*. To execute, *C. elegans*' activity and rigor were observed after being exposed to *Bacillus thuringiensis* for pre-determined amounts of time. In this experiment, *C. elegans* exhibited increased rigor after exposure to the *Bacillus thuringiensis* for 9 hours, and a significant number of *C. elegans* became completely inactive or died after 15 hours of exposure. Additionally, there is 100% lethality of *C. elegans* in response to *Bacillus thuringiensis* after 27 hours, in agreement with published values. Nomarski observation indicated visible pathogenic symptoms after 12 hours of exposure to *B. thuringiensis*, including vacuolations, accumulation of bacteria near the pharynx, and about 50% reduction in the intestinal width.

Abiotic factors affecting the migration rate of cyanobacterial cells through sediment columns. **C. Rasner\***, **J.S. Metcalf**, **K. Rasner\***, **R. Richer**, **A.D. Panvini**. Belmont University, Nashville, Tennessee, and Institute for Ethnomedicine, Jackson, Wyoming and University of Wisconsin Marinette, Marinette, Wisconsin. Cyanobacterial cells and their toxins are found in drinking water supplies obtained from groundwater aquifers. How the molecules travel through sediment, contaminating reservoirs of water, is less understood. Prior studies indicate the flow of cyanobacterial cells and the toxin microcystin through sediment columns over a 72-hour period. Aquifers in the Great Lakes region may be

disproportionately affected by cyanobacteria if the flow rate through sediment is impacted by environmental factors related to mining, climate change, or agricultural activity that lead to acidification, rising temperatures, or eutrophication. In this study, the movement of the cyanobacterial cells is investigated under varying abiotic conditions. Six sediment columns were filled with natural sediment obtained from Lake Michigan and the flow rate of cyanobacteria measured under two varying conditions: pH and NPK. These abiotic factors had no significant measurable effects on the migration of cyanobacterial cells through lake sediment.

The combined effect of canagliflozin and metformin in human prostate cancer cells. **Kierra Ware\***, **LaMonica Stewart**, and **E. Lewis Myles**, Meharry Medical College, Nashville, Tennessee, and Tennessee State University, Nashville, Tennessee. Two drugs used to treat type 2 diabetes, *metformin* and *canagliflozin*, may be effective treatments for castration-resistant prostate cancer. It is not known if combined treatment with *metformin* and *canagliflozin* suppresses the growth of prostate cancer cells better than each drug alone. This study examines the effectiveness of the combination of *canagliflozin* and *metformin* as an alternative treatment for prostate cancer. *Canagliflozin* produced a significant decrease in the proliferation of PC3 and 22Rv1 cells. While *metformin* showed no significant decrease in proliferation of PC3 cells, *metformin* did significantly decrease 22Rv1 proliferation. The effect of *canagliflozin* plus *metformin* on proliferation was no greater than *canagliflozin* alone. However, the combination of *metformin* and *canagliflozin* was the most effective in reducing androgen receptor (AR) levels in prostate cancer cells. These data suggest that combination treatments involving *metformin* and *canagliflozin* could be used to decrease tumor growth and AR expression in prostate cancer patients.

Insight on aversive learning in *Caenorhabditis elegans* when introduced to *Bacillus thuringiensis* during reproduction and growth. **Brandi Duke\*** and **Robert Grammer**, Belmont University, Nashville, Tennessee. Most natural environments offer a wide variety of food sources to their inhabitants. Thus, feeding frequently involves making choices and decisions. The ability to learn about and analyze a food source prior to ingestion can greatly increase an animal's chance of survival and reproduction. *C. elegans* possess the remarkable capability to learn and recall environmental stimuli associated with food source quality (Law, 2004). Though extremely pathogenic to *C. elegans*, *Bacillus thuringiensis* (Bt), has been shown to attract the nematode (Luo, 2013). The purpose of this work was to determine if *C. elegans* would modify its chemotaxis preference after exposure to Bt. A series of assays was utilized to compare the chemotaxis behavior of *C. elegans* naive to Bt and *C. elegans* which were previously introduced to the bacterium. Statistical analysis revealed that exposure to Bt during

growth lead to subsequent pathogenic avoidance and significantly altered chemotaxis behavior.

Synchronization of the life cycle of *Caenorhabditis elegans* and the correlation of worm age and worm death from the pathogen *Bacillus thuringiensis*. **Haley Hatfield\* and Robert Grammer**, Belmont University Nashville, Tennessee. This experiment sought to find out if there is a correlation between the stage of the life cycle of *Caenorhabditis elegans* at the point of infection and their mortality rate due to the toxicity of the pathogen *Bacillus thuringiensis*. The method used to synchronize the worm's life stage is called bleach synchronization and allows all ages of worms to disintegrate while the eggs remain intact. Once the worms were synchronized, the pathogen, *Bacillus thuringiensis*, was introduced to the worms at each stage of their life cycle (L1, L2, L3, L4), and the number of dead worms at each stage was compared. We hypothesized that there is a correlation between the age of the worms upon introduction to *Bacillus thuringiensis* and the mortality rate. Our results showed that there was a significant correlation between the age of the worms and the rate at which they would die.

#### Eastern Region

Pellissippi State Community College  
Knoxville, Tennessee  
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Prevalence of *Ophidiomyces ophiodiicola* in eastern Tennessee snake populations: Is it a cause for concern? **Cullen T. Harris\***, Team Salamander and **Thomas P. Wilson**, The University of Tennessee at Chattanooga, Chattanooga, Tennessee. In recent times it has been well documented that disease has played a major role in population collapse of certain taxa. Amphibian populations have been decimated by chytrid fungus and bats have been heavily impacted by white nose syndrome. In just the past few years a new pathogen, *Ophidiomyces ophiodiicola* or snake fungal disease (SFD), has emerged and has been proven to cause death and declines in North American-endemic snakes. Snakes are extremely important for ecosystem function and play key roles in complex predator-prey relationships. There are still many questions surrounding this disease; Which species are at the highest risk? Where is the fungus located and which populations are being affected? What conservation, management and biosecurity practices can be implemented to stave the spread of SFD? The goal is to determine prevalence of the pathogen in eastern Tennessee and create a directive for further studies into this pressing issue.

Prevalence of lineage formation in the raccoon, *Procyon lotor*, over space and time in varied habitats in Southwestern Tennessee. **Jillian P. Sturtevant\***, **Evelyn Chukwurah**, **John R. Hisey**, **Michael L. Kennedy**, **Brian D. Carver**, Lee University, Cleveland, Tennessee (JPS, JRH), University of South

Carolina, Columbia, South Carolina (EC), University of Memphis, Memphis, Tennessee (MLK), Tennessee Tech University, Cookeville, Tennessee (BDC). Based on reports in the literature, we hypothesized the formation of clusters of closely related female raccoons on our 13.8-km<sup>2</sup>-study area in southwestern Tennessee. Our 1870 captures of 839 raccoons over a 19-year period and microsatellite genetic analysis of 440 of these revealed only 32 parent-adult offspring pairs. For daughter-parent pairs, the mean distance-of-separation was 900.64m (n=15) with 86.67% separated by <1,000m, and 6,672.72m as the maximum distance of separation. For son-parent pairs, the mean distance-of-separation was 9,947m (n=17) with 64.71% separated by <1,000m, and 11.76% separated by >68,000m. Individuals of a pair were rarely captured at the same location in the same time period or over extended time. Our findings fail to support the hypothesis of kin clusters in closely related females (daughter-parent pairs), but do show the dispersion of males (son-parent pairs). The dispersal patterns of male raccoons require further investigation.

Soil Sample Analysis of Cuba's Oldest Tobacco Farm – Finca El Pinar Robaina. **Erin Guy\*** and **Saeed Rahmanian**, Roane State Community College, Harriman, Tennessee. The Robaina tobacco farm is among the oldest operating tobacco farms in Cuba. A soil analysis had not been conducted in over two years, and soil analysis information was needed to adjust fertilizer and cover crop usage for the following growing season. The first objective was to conduct a soil analysis from three separate plots to determine; types of soil based on particle size, pH, and NPK. The secondary objective was to collect GPS coordinates to create a map displaying the results. Results showed that Nitrogen and Potassium were depleted/deficient in all plots, while Phosphorus was sufficient in all. pH ranged from 5.3–6.7, and both sandy-loam and loamy-sand soil types were identified. GIS coordinates properly displayed all plots, and analysis data was successfully linked to create an accurate display of the farm and analysis results. Our conclusions corroborated with the experiences of the Robaina family farmers.

Investigating the effect of statins on the regulation of the hepatic organic transporter OATP1B3. **Damilola Oluwalana\*** and **Steve Wright**, Carson-Newman University, Jefferson City, Tennessee. Organic anion transporting protein 1B3 (OATP1B3) is part of the solute carrier family of uptake transporters. Typically expressed in hepatocytes, it is responsible for transporting several large organic endogenous and exogenous substances such as bilirubin and statins into hepatocytes. Statins are cholesterol-lowering drugs typically prescribed to treat hypercholesterolemia. Prior work suggests that statins may have regulatory effects on OATP1B3 which we sought to confirm in his study. In this study, we treated human embryonic kidney cells (HEK-293) transiently transfected with OATP1B3 with various statins. We observed bimodal regulation of OATP1B3 mRNA

expression and total protein expression by different concentrations of statins. We also show that rosuvastatin and pravastatin can induce an increase in transporter activity after a 4-hour pretreatment with 50 $\mu$ M of the statin. Thus, we confirm the regulatory effect of statins on OATP1B3.

Marine Biodiversity Monitoring of the Pelagos Sanctuary in the Mediterranean Sea. **Meghan Sutton\***, **Michael Freake**, **Jonathon Cornett**, **Paola Tepisch**, **Aurelie Moulins**, and **Bryan Poole**, *Lee University, Cleveland, Tennessee (MS, MF, JC, BP)*, *CIMA Research Foundation, Savona, Italy (PT, AM)*. The Pelagos Sanctuary is a marine biodiversity hotspot, as well as a busy zone for vessel traffic. Research has made great efforts to help manage this protected area yet has tended to overlook non-cetacean species. For this study, we included cetacean and non-cetacean species in conducting diversity and anthropogenic disturbance analyses to estimate ecosystem stress. The survey area was split into two regions, Imperia and Genova, using kernel density estimation and minimum convex polygons. Diversity indices showed that Imperia exhibited higher species evenness than Genova. Disturbance was quantified based on vessel traffic and fishermen long lines. Genova exhibited significantly higher levels of vessel traffic, but no difference was indicated from analyzing long lines. These results suggest that Genova may be less stable since there is lower diversity accompanied by

increased disturbance, when compared to Imperia. This research can inform ecosystem-based management programs where effort is needed most for these regions.

Promotion of sustainability initiatives on Pellissippi State's Hardin Valley campus by documenting and understanding recycling habits of the campus population. **Ryan Sharpe\*** and **Brad Moats**, *Pellissippi State Community College, Knoxville, Tennessee*. The PSCC Sustainable Campus Initiative sought to gain information on use of recycling collection points on campus. These collection points can accept paper, plastic and aluminum, or landfill items. It was hypothesized that many recyclables would be found in the landfill containers. For one week during fall 2017, the thirteen recycling/trash bins were audited daily in the Goins Building at the Hardin Valley Campus, and the results were analyzed. A total of 318 pounds of waste was weighed and audited. Fifty-five percent was properly sorted for recycling with 104 pounds of paper and 72 pounds of aluminum and plastic. Forty-five percent (142 pounds) was placed in the "landfill" bins with a significant portion as waste that could have been recycled. Contents were subjected to a detailed analysis. Based on this information, the campus has reduced Styrofoam usage and improved signage (to better educate students) at recycling bins on campus.