VCU Poster Symposium
For Undergraduate Research and Creativity

Wednesday April 20, 2016
Student Commons 2nd Floor
11am—2pm Keynote at 12pm

Part of VCU Research Weeks 2016

Questions?
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All Abstracts Organized by Poster Number

1. Mechanisms That Regulate Stability of Axonal Domains

Sarah Izabel, Dept. of Psychology, IMSD Research Training Fellow, with Dr. Jeffrey Dupree, Dept. of Anatomy and Neurobiology

Multiple sclerosis (MS) is an autoimmune disease of the central nervous system (CNS) that affects the brain and spinal cord resulting in inflammatory and immunological events. Microglia are immune cells of the CNS that through phagocytosis remove damaged or dead cells while also presenting repairing properties within the CNS. Microglia contact the axonal initial segment (AIS) and may play a role in establishing it. Work from our lab has shown that microglial-AIS contact is increased during inflammatory insults concomitant with AIS breakdown consistent with these cells targeting the AIS for inflammation-mediated disruption. Here we have furthered this line of investigation by determining if activated microglia also contact other axonal domains – specifically the juxtaparanode. Using double immunohistochemical labeling combined with confocal microscopy, we have determined that activated microglia do not contact the juxtaparanode indicating that microglia appear to specifically interact with the AIS. Current studies are underway to identify the mechanism responsible for this specific interaction. Since studies form other labs have also implicated decreased neuronal activity as a trigger for AIS disruption, I have also initiated studies designed to quantify synaptic bouton integrity of the pyramidal cells of the cortex. For this work, we have employed triple immunohistochemical labeling combined with Structured Illumination Microscopy (SIM "super resolution" microscopy). This approach provides superior resolution to confocal microscopy and will provide the required resolution to distinguish between pre and post synaptic markers, which is required to accurately quantify the integrity of the synapses associated with the AIS and more specifically to determine whether the pre or post synaptic cell is the primary target of the inflammatory attack. Together, findings from these studies will significantly advance our understanding of the pathologic events that drive axonal pathology in inflammatory diseases such as multiple sclerosis and more importantly, will identify targets for the development of novel therapeutic strategies designed to alleviate the devastating effects of these diseases.

This work was supported by a Veterans Affairs Merit Award and the IMSD Research Training Program.

2. Subjective Measures of MZ and DZ Twins during Anxiety-Provoking Tasks

Sravya Uppalapati, Depts. of Biology and Psychology, with Dr. Roxann Roberson-Nay, Virginia Institute for Psychiatric and Behavioral Genetics, VCU

Transient anxiety is a healthy response to stress; however, constant anxiety elicits negative responses and threatens an individual's day-to-day living. In the study, monozygotic 84 (MZ) and 153 dizygotic (DZ) adolescent twins pairs, ages 15 to 20 years, participated in anxiety-provoking tasks and subjective experiences of anxiety were measured using subjective units of distress (SUDS). The twin participants were recruited through the Mid-Atlantic Twin Registry (MATR) at Virginia Commonwealth University. The twins participated in a carbon dioxide (CO_2) breathing task and a trier social stress task (TSST). The study aims were to evaluate the relationship between anxiety-provoking tasks and subjective experiences of anxiety in MZ and DZ adolescent twins and to compare SUDS ratings in the CO2 task to SUDS ratings in the TSST to determine which task produces greater anxiety. The data was analyzed using correlational models. MZ twins reported more similar SUDS in both the CO2 task and trier task than the DZ twins, however, not at significant values. The mean SUDS ratings for MZ twins and DZ twins were higher in the trier task than the CO_2 task, suggesting that the trier task was a better inducer of anxiety than the CO_2 task. The goal of the research was to characterize etiological pathways involved in the development of internalizing disorders and to set the stage for advancement of effective intervention and prevention programs. Further study is needed to evaluate the heritability of anxiety response.

3. Breathing Ozone Weakens the Brain's Defense Against Toxicity

Demetrius Carter, Dept. of Psychology, Center on Health Disparities IMSD Research Trainee with Dr. Andrew K. Ottens, Department of Anatomy and Neurobiology, VCU

Recently it has been demonstrated that acute inhalation of pollutants, such as ozone (O3), can cause vascular dysfunction. Here we extend those findings into the brain, which is protected by the blood brain barrier (BBB). Tight junctions within the endothelial wall of cerebrovasculature act to quarantine the brain from circulating blood factors that may prove neurotoxic. However, inhalted pollutants such as O3have been recently shown to degrade vascular function, raising the possibility that it may similarly influence cerebrovasculature and the BBB. Here we tested for an *in vivo*effect of O3exposure on the BBB. We employed immunofluorescence microscopy with antibodies targeting serum albumin, which is normal excluded by the BBB, ZO-1, the anchoring protein of endothelial tight junctions and PGP an inducible ATP-dependent efflux pump for removal of xenobiotic compounds. Results show that O3exposure induces BBB permeability and access of circulating factors into the brain. Findings from these studies support a new mechanism by which inhaled pollutants compromise the BBB to permit neurotoxic entry that may influence neurodegenerative disease and behavioral disorders.

4. Stall Seat Journal as a Social Norms Intervention for Risky Drinking among College Students

Zackaria Niazi, Dept. of Biology, with Mariam Alshagra, Post-Baccalaureate, Pre-Medical, and Dr. Jinni Su, African American Studies, and Dr. Linda Hancock, WELL Director, VCU

Alcohol use is prevalent among college students and many participate in risky drinking behaviors over the course of their college careers, leading to negative consequences. The social norms theory posits that individuals behave based on their perceptions of peer behavior. Overestimation of peers' problem behavior is associated with increase in their own problem behavior. The Stall Seat Journal (SSJ), developed by the Wellness Resource Center, is used in part to help correct common misperceptions, including those related to peer alcohol use. Our study aimed to see if Stall Seat Journal readership was associated with perception of peer alcohol use among VCU students and if perception of peer alcohol use was associated with alcohol use outcomes. We performed linear multiple regression for continuous dependent variables and logistic regression for binary dependent variables and controlled for gender and cohort. Responses from 4290 VCU Students who participated in the Spring 2015 Spit for Science Survey were used in this study. Stall Seat Journal readership was negatively associated with perception of peer alcohol use ($\beta = -0.05$, $p < .01$). The correlation was weak but statistically significant. Perception of alcohol use was not significantly related to frequency of alcohol use ($\beta = 0.01$, $p > .05$), but was significantly associated with quantity of alcohol use ($\beta = 0.20$, $p < .01$) and likelihood of experiencing blackout (odds ratio = 1.12, $p < .05$). Based on our findings, Stall Seat Journal readership can be used to positively influence college students and potentially lessen risky drinking.

5. Quantitation of Residual Fatty Acids in Forensic Microbiological Samples using Direct Analysis in Real Time Mass Spectrometry (DART-MS)

Eva Childrey, UROP Summer Research Fellow, Depts. of Chemistry and Forensic Science, with Christina Stanciu and Dr. Christopher Ehrhardt, Dept. of Forensic Science

The goal of this research was to develop a rapid, quantitative assay for determining the structure and relative abundance of residual fatty acids from forensically-relevant microbiological samples using Direct Analysis in Real Time Mass Spectrometry (DART-MS). Although cellular fatty acids have been used to characterize the taxonomy and growth conditions for an unknown organism, the analytical sensitivity of ambient mass spectrometry techniques and their compatibility with standard forensic collection practices has not been explored. To address this, we developed a fatty acid quantitation assay for Bacillus cereus spores using pentadecanoic acid to analyze membrane-derived, as well as free fatty acids found in different types of forensic samples. These included liquid suspensions of whole cells, dried spore material, spent medium and the supernatant fraction from water wash purification steps of spores. DART-MS profiles of Bc14579, BcT-strain, BtHD1 and BtHD522 spores showed five distinct fatty acid biomarkers: 213 m/z, 227 m/z, 241 m/z, 267 m/z, and 269 m/z, which correspond to 13:0/13:0iso, 14:0/14:0iso, 15:0/15:0iso, 17:1 w5c, and 17:0/17:0 iso structures, respectively. The limit of detection for the DART-MS method was ~ 1x10-5 µg of fatty acid, equivalent to ~100 spore cells. Importantly, the biomarkers from whole cell suspensions were also observed in the culture medium after the spore cells had been removed, as well as in the supernatant of subsequent water washing purification steps. Concentrations of fatty acids ranged between 0.002 µg/mL to 6 µg/mL for spent water supernatant samples. This suggests that Bacillus fatty acids are released into the culture medium and/or the water wash fraction during spore production and persist after the cells have been harvested. This has the potential to enhance forensic collection methods for microbiological samples since residual fatty acids may be used to identify surfaces or locations where biothreat agents were grown, even when cells are not present.

6. Creating a Hybrid Scaffold for Lung Modeling and Regeneration

Brittany Allen, UROP Summer Research Fellow, Dept. of Biomedical Engineering, with Dr. Rebecca Heise, Bethany M. Young, Bryan A. Blakeney, Robert A. Pouliot, Dept. of Biomedical Engineering

This research has focused on creating scaffolds that maximize lung cell biocompatibility while also matching the mechanical properties of native lung tissue. To create scaffolds meeting these requirements, decellularized pig lung extracellular matrix (PLECM) was combined with poly-L-lactic acid (PLLA) by electrospinning material fabrication. Increasing concentration of PLECM decreased the elastic modulus of the electrospun scaffold, making it closer to the low elastic modulus of native lung tissue. Additionally, the PLECM scaffolds showed similar stress-relaxation and hysteresis behavior to native lung tissue. Upon SEM analysis, both the PLLA-only and hybrid PLLA/PLECM scaffolds appeared to be uniform scaffolds with minimal defects. Increased PLECM content correlated to a significant increase in SAEC and A549 immortalized lung epithelium proliferation. The hybrid PLLA/PLECM scaffolds are promising for use in lung tissue engineering applications because of their enhanced biocompatibility in comparison to synthetic materials alone and because of their ability to more closely mimic the mechanical properties of native lung tissue.

KEYWORDS
electrospinning, ECM, scaffold, lung regeneration, PLLA

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7. 3D Printed, Electronic Prosthetic Hand and Continuous Control Using Electromyography

Michael Teller, Dept. of Mechanical and Nuclear Engineering, with Dr. Woon-Hong Yeo, Dept. of Mechanical and Nuclear Engineering

Recent advances in manufacturing expand various fabrication opportunities for creating complex features such as human organs and body parts. Here we utilize the 3D printing method that fabricates a realistic prosthetic hand based on the ABS plastic. Electromechanical components including a series of servos finalize the assembly of an electronic prosthetic hand. A portable wireless system with skin-mounted electrodes allows the high-quality recording of surface electromyograms (EMG), produced by the movement of the skeletal muscles. Data acquisition software including signal filtering and classification algorithms collects raw EMG data from the forearm and convert them to digital signals for a continuous control of the prosthetic hand. The development of the prototype device and control system enables EMG from wide ranging areas of the body. The measurements have quality sufficient for advanced forms of human-machine interfaces.

8. Forensic Signatures for Growth Medium Recipe Used to Culture *Bacillus thuringiensis* Spores

Dani Jabado, Dept. of Forensic Science, with Dr. Christopher J. Ehrhardt, Dept. of Forensic Science

Forensic and biodefense agencies have a critical need for chemical signatures that can indicate growth medium recipes or other key aspects of the production conditions for illicitly-grown bacterial pathogens. In this study, Fatty Acid Methyl Ester (FAME) profiles were analyzed from *Bacillus thuringiensis* spores grown five different published medium recipes. *B. thuringiensis* was chosen due to its biochemical, structural, and genetic similarity to *B. anthracis*, a Biosafety Level III select agent and the organism used in the Amerithrax attacks in 2001. The relative abundance of 13 different fatty acid biomarkers, spanning four structure classes, was compared across all spore samples. Differences in the types and relative abundance of specific fatty acids was observed across each medium formulation, particularly within branched-odd and anteiso structure classes (e.g.15:0 iso, 17:0 iso, 15:0 anteiso). Spore cultures also varied in the proportion of unsaturated and saturated fatty acid biomarkers. When examining specific FAME biomarkers, CAD medium spores showed an average relative abundance of 30% for 15:0 iso, whereas LD and Sch media spores showed average relative abundances of 23% and 27% respectively, for the same fatty acid. The 17:0 iso fatty acid exhibited higher average abundances of 12% in CAD, and lower average abundances in LD and Sch medium formulations (10% and 6% respectively). Fatty acid biomarker 15:0 anteiso was enriched in CAD medium (11.8%) compared to LD (8.5%) and Sch (9%) formulations. The results indicate that FAME profiles can be used to discriminate between a *Bacillus thuringiensis* species grown in different mediums and may be used to build robust biosignatures to reverse engineer the growth medium recipe for a Bacillus spore recovered as evidence.

Keywords: Fatty Acid Methyl Ester Profiling; Microbial Forensics; *Bacillus* spore; Gas Chromatography

9. Predictors of Sleep Problems in Adolescents with ADHD

Jonathan Kinder and Solome Jabessa, Dept. of Psychology, with Dr. Joshua Langberg, Dept. of Psychology

Background: Attention-deficit/hyperactivity disorder (ADHD) is associated with impaired sleep, with up to 50% of youth with ADHD reporting sleep problems (Gruber, 2009). However, the factors contributing to high rates of sleep problems in ADHD are largely unknown. Symptoms of anxiety and depression and ADHD medication use may contribute to sleep problems. Mayes et al. (2009) and Accardo et al. (2012) found that children with ADHD and comorbid anxiety/depression were more likely to experience higher rates of sleep problems. Mayes et al. (2009) also found that medicated children reported increased difficulties falling asleep. Still, a recent meta-analysis concluded that sleep problems among youth with ADHD were not functions of medication or non-ODD psychiatric comorbidity (Konofal et al., 2010). Mixed findings may be due to studies conceptualizing sleep broadly (e.g., at total score), and failing to account for the multi-dimensional nature of sleep. Internalizing symptoms and medication use may predict some aspects of sleep (e.g., sleep onset delay) but not others (e.g., bedtime resistance). Accordingly, the primary goal of this study is to evaluate the association between anxiety/depression, medication, and multiple distinct aspects of sleep.

We hypothesized that anxiety/depressive symptoms would only predict *Night Wakings* and *Sleep Onset Delay* and that consistent with the meta-analytic findings, ADHD medication use would not be associated with sleep. Given the heterogeneity of sleep problems among adolescents with ADHD, we will also run and include latent class analyses to investigate whether different patterns of sleep problems emerge.

Methods: Participants included 212 young adolescents (*M* age = 12.5) with ADHD. Adolescents and their parents completed ratings of behavior (Behavior Assessment System for Children) and sleep (Child Sleep Habits Questionnaire).

Results: Analyses revealed high rates of parent-reported sleep problems (sample $M = 47.86$, $SD = 6.89$) on the CSHQ (84.3% above the clinical cutoff of 41; Owens et al., 2000). Self-reported anxiety symptoms significantly predicted *Night Wakings* $b = .14$, $t(227) = 2.13$, $p = .03$ and *Sleep Anxiety* $b = .13$, $t(224) = 2.01$, $p = .05$ but not daytime sleepiness, bedtime resistance, or sleep onset delay. Self-reported depressive symptoms significantly predicted *Night Wakings* $b = .20$, $t(227) = 3.01$, $p = .003$, *Sleep Anxiety* $b = .14$, $t(224) = 2.05$, $p = .04$, and *Sleep Onset Delay* $b = -1.6$, $t(236) = -2.49$, $p = .01$. ADHD medication use did not predict any aspect of sleep problems. Interestingly, when parent-rated ADHD symptoms were added to the model, anxiety and depression no longer predicted *Sleep Anxiety* and anxiety no longer predicted *Night Wakings*. Depression remained a significant predictor of *Night Wakings* ($\Delta R^2 = .039$, $p = .012$) and also predicted *Sleep Onset Delay* ($\Delta R^2 = .035$, $p = .017$).

Conclusions: Comorbid symptoms of anxiety and depression only predicted a couple of specific aspects of sleep above and beyond symptoms of ADHD, and ADHD medication use did not predict any aspect of sleep. Overall, these findings suggest that the field needs to move beyond the focus on comorbid conditions to identify other factors that may best account for the high rates of sleep problems in youth with ADHD.

10. Realistic spiking neuron statistics in a population are described by a single parametric distribution

Lauren Crow, Dept. of Mathematical Sciences, with Dr. Cheng Ly, Dept. of Statistical Sciences and Operations Research.

The spiking of activity of neurons throughout the cortex is random and complicated. This complicated activity requires theoretical formulations in order to understand the underlying principles of neural processing. A key aspect of theoretical investigations is characterizing the probability distribution of spiking activity. This study aims to better understand the statistics of the time between spikes, or interspike interval, in both real data and a spiking model with many time scales. Exploration of the interspike intervals of neural network activity can provide a better understanding of neural responses to different stimuli. We consider different parametric distribution fitting techniques to characterize the random spike times of a population of neurons in the visual cortex of a mammal. Five different probability distribution functions were considered, including three mixture models, and their goodness of fit was determined through two criteria: maximum likelihood and Akaike Information Criteria. Despite being largely heterogeneous, both criteria indicated that one distribution, although different for each criteria, was the best fitting for all of the neurons in the data set. The Gamma-Gamma mixture distribution was the best according to maximum likelihood and the Exponential distribution

was the best according to AIC. The statistical methodology applied to a burst model yielded the same results, and the AIC formula was further investigated to better understand its consistent selection of the same parametric distribution. We find that complicated neural spiking activity can sometimes be described by a single parametric distribution, which is hopefully comforting for theorists.

11. The Polish Response to the Ukrainian Crisis: the Media's Frustration with Politics as Usual

Michelle Shuman, Dept. of International Studies: Modern Europe, with Dr. David Brandenberger, Dept. of History, University of Richmond

This study considered the effect of the Ukrainian crisis not on Ukraine or Russia, but on one of Ukraine's other neighbors: Poland. The Ukrainian crisis presented an opportunity for Poland to either take charge and jettison its old image as a post-Soviet state or to lay low and rely on collective action. A comprehensive understanding of the Polish position in the crisis was important for American foreign policy as America began to consider acting as one of Poland's closest allies. This project's methodology featured a systematic analysis of qualitative material drawn from the Polish press. Editorials published in Polish media were evaluated and correlated with data from public opinion polls to cover the three parties in question: politicians, press, and public. Editorial samples were drawn from the two major periodicals: Gazeta Wyborcza (liberal) and Rzeczpospolita (conservative) on Saturdays and Wednesdays for the entirety of 2014 with one month on either end (December 2013 and January 2015). There were distinct differences among the three groups in question. The public expressed a hesitance to act alone and a preference for softer solutions while still feeling wary, conflicted, and, above all, threatened. The politicians struggled to address those issues and concerns of the public while navigating relations with other less invested actors. The press was highly critical of what it perceived to be the politicians' weakness, finding their actions insufficient and misguided more often than not and calling for Poland to be more assertive and capitalize on this leadership opportunity.

12. Are Parental Competence, Religiosity, and Relationship Quality Associated with Substance Use Messages?

Jerry Mize, UROP Summer Research Fellow, Dept. of Psychology, with Dr. Wendy Kliewer, Dept. of Psychology

Using transcribed interviews from a GEO- and UKZN-funded study with a low-income, multi-ethnic sample in Durban, South Africa (N = 272), messages regarding what caregivers recall saying to their children about drug use were coded into one of eight categories by a trained research team. Categories included: Just the Facts, Real Examples, Resistance Tactics, Drugs are Bad, Negative Consequences, Encouraging Abstinence, Zero Tolerance, and Use Responsibly. The contributions of 1) parent religiosity, 2) parental competence, and 3) parent-adolescent relationship quality to the message content will be examined. Implications for future research and interventions will be discussed.

13. Plant functionality across an environmental gradient

Taylor Price, Dept. of Biology, with Dr. Julie Zinnert, Coastal Plant Ecology Lab, Dept. of Biology

Community assemblages provide insight into ecosystem processes spatially and temporally. They interact with biotic and abiotic factors that vary with habitat structure, influencing community composition. Ecological theory demonstrates that species have the potential for a wide fundamental niche, but may be restricted to a certain range by factors exposed to species in their realized niche. In barrier island ecosystems, edaphic and environmental characteristics are major drivers in determining where and how plant communities establish. Variables such as salt stress and drought are major drivers in community grouping that alter plant function within the environment. With projected increases in sea level rise and storm

disturbance it is important to understand how plant communities are organized across barrier islands as most studies are limited to dune habitats. In my study, I analyzed plant communities across an environmental gradient on Virginia barrier island from dune to marsh. I established transects on Hog Island and assessed soil characteristics (i.e. carbon, nitrogen, pH), species composition, percent cover and specific leaf area. Elevation and distance to shoreline were obtained using recent Lidar imagery. My research shows that position on the landscape is an important driver in structuring dominant species such as *Ammophila breviligulata*, *Spartina patens*, and *Spartina alterniflora.* Elevation and distance to shoreline both show relationships with edaphic processes that influence species composition broadly. Elevation was important in structuring the dominant community types (i.e. dune building and marsh plants). Distance to the shoreline was related to percent carbon in the soil. This reflects biotic processes that occur in the interior portion of the island. Surprisingly, there was no obvious relationship with percent nitrogen due to the extremely low levels across the ecosystem. Understanding community structure across coastal ecosystems is necessary predicting how shorelines and interior communities will be affected with projected sea level rise and increases in storm frequencies.

14. Nanomedicine Entity Extraction System

John Murphy, Dept. of Computer Science, with Dr. Nastassja Lewinski, Dept. of Chemical and Life Sciences Engineering and Dr. Bridget McInnes, Dept. of Computer Science

Background: Nanomedicines can demonstrate improved targeting efficiency and reduced side effects over conventional formulations. Hence, there is a critical need to automatically synthesize knowledge and trends in nanotechnology research from an exponentially increasing body of literature. In nanomedicine, new engineered nanostructures and formulations are continuously being applied, and Natural Language Processing approaches can semi-automate the cataloguing and tracking of the different nanomedicines being developed.

Purpose: The goal of this project is to automatically identify nanomedicines from the literature using name entity recognition. In this work, we present (1) evaluation of the performance of current entity extraction systems developed for general English and (2) the initial development of our own named entity extraction system (NanoB2B) that unlike current systems will incorporate contextual and semantic information.

Design/Method: For our training data, we utilized the Drugs@FDA Database, which contains the product inserts of a wide variety of FDA approved drugs, as well as the NCBI PubMed Database. The data was manually annotated for entity mentions consisting of nanomedicine physico-chemical characterizations, exposure information, and biological response information of 42 FDA-approved nanomedicines. We evaluated the performance of two state-of-the-art named entity recognition systems developed for general English (StandfordNER and OpenNLP NameFinder). We compare the results of those systems to the initial development of our NanoB2B entity extraction system which currently incorporates contextual information about the entity. We implement our system using the Naive-Bayes algorithm from the WEKA datamining package. Each instance was given an array of values, 0 or 1, denoting whether a corresponding contextual feature is within a specified window of the entity mention. This information was transcribed to standard WEKA notation, and evaluated using an X-fold cross validation.

Results: The results show that state-of-the-art entity recognition systems developed for general English are not sufficient to extract the nanomedicine mentions with F-measures ranging from 0.1 to 0.7. However, our specialized NanoB2B entity extraction system produced initial results that show great promise; demonstrating an increase in F-measure for almost all entities with results ranging from 0.5 to 0.8.

Conclusions: In conclusion, our results demonstrate that there is sufficient reason and promising proof to the validity of developing an entity extraction system specifically for nanomedicines. Our initial Incorporating contextual information increases accuracy of the results for most nanomedicine entities. In the future, we will explore utilizing additional contextual and semantic attributes to the WEKA structure.

15. Sports Participation and Achievement Outcomes Among Students In Special Education

Natalie Robles, IE Summer Research Fellow, Dept. of Psychology, with Princess Melissa Washington-Nortey and Dr. Zewelanji Serpell, Dept. of Psychology

High levels of fitness are related to better executive functioning (EF) and a lower risk of dementia in older adults. A meta-analytic review by Sibley & Etnier (2003) indicates positive relationships between exercise and cognitive performance in college students; and Davis et al (2011), in a study of sedentary overweight 7–11 year-olds, showed that high-dose aerobics improves EF. However, Diamond and Lee (2011) suggest that sports might benefit EF more than aerobic exercise, because sports challenge executive functions by requiring sustained attention, working memory, and disciplined action, while at the same time bring joy, pride, and social bonding. Among disabled populations hindrances such as higher obesity rates, poor risk-benefit analyses, and perceptions of lower capacities may prevent the benefits of sports activities from being realized. EF deficits are implicated in many disabilities, and sports involvement may be especially beneficial for this population. Given the tremendous role that sports play in American society, systematic research to assess the effects of sports participation on children's mental functions and achievement is warranted. The current study explores the degree to which students with different disabilities participate on sports teams, and whether participation is associated with academic strengths. This study entails secondary analysis of data collected in the Special Education Elementary Longitudinal Study, which includes a large, nationally representative sample of children 6-12 years in special education. The study period was from 2000-2006, and was designed to assess students' educational, social, vocational, and personal development change over time. Responses were solicited through parent interviews, teacher surveys, and direct assessments with students. For this study, data collected in Wave 1 were utilized. The subsample (N=2765) was mostly male (65.7%), with a mean age of 10.37 years, and from Caucasian (69.1%), African-American (19.8%), and Hispanic (11.1%) backgrounds,. In this sub-sample 36.5% participated on a sports team. Participants had a variety of disabilities that were recoded into four categories: physical disabilities (32.9%), intellectual disabilities (31.5%), social-emotional disabilities (18.7%), and multiple disabilities (4.7%--excluded from analyses). A 3 X 2 between subjects MANCOVA with Bonferroni correction was performed to assess whether disability category and sports team participation predicted math and reading outcomes among students in Special Education, controlling for age, ethnicity, and gender. There was a significant main effect of disability category on math ($F2, 2765= 5.65$, $p<.05$) and reading ($F2, 2765= 7.46$, $p<.05$). There was also a significant main effect of sports team participation on math ($F1, 2765= 75.28$, $p<.001$) and reading outcomes ($F1, 2765= 30.09$, $p<.001$). Additionally, a significant interaction effect between disability category and sports team participation emerged for both math ($F2, 2765= 8.36$, $p<0.001$) and reading ($F2, 2765=9.58$, $p<0.001$). The largest mean difference for sport participants and non-participants was among students with intellectual disabilities. This study focuses on children with disabilities, a population for whom research is much needed. Results highlight that sports participation is beneficial for children in all disability categories, but may be particularly beneficial for children with intellectual disabilities. These findings have important implications for intervention.

16. The Usage of Dose-Dependent Perfluorocarbon (Oxycyte) on Rehabilitating Functional Outcome post Spinal Cord Injury (SCI)

Kunva Barot, Dept. of Biology, with Dr. Adly Yacoub, Dept. of Neurosurgery

Spinal cord injury (SCI) is a traumatic, life-altering event, which presently, cannot be reversed. A key component of the secondary injury cascade of SCI is an inadequate blood supply (ischemia) present at the injury site, leading to a decrease in oxygen delivery (hypoxia), and possibly neuronal cell death (apoptosis). However, a third generation perfluorocarbon (Oxycyte™), at the appropriate dosage, can improve oxygenation of the injured tissue and overall motor behavior. To test this hypothesis, adult Long-Evans rats were divided into six experimental groups: a control group, a laminectomy group with no treatment, a 2 mL/kg and 5 mL/kg saline group, and a 2 mL/kg and 5 mL/kg Oxycyte group, with the focus on the 5mL/kg Oxycyte

group. After performing a laminectomy on T9-T10 of the spinal cord, a 10g weight-dropping device was used at 25mm height, to mimic SCI, and the respective treatment was given. Post operation, rats were monitored and subjected to scoring according to the BBB scale and inclined plane test, to determine improvement on a functional level, day 1, 4, 7, 14, 21, 28, 35, and 42 after surgery. After functional tests were conducted, rats were euthanized for various lab tests, including histopathology and immunohistochemical analyses, to determine the key apoptotic related proteins, including caspase-3, ERK1/2, and TNFα. The results indicated a statistically significant improvement in recovery, on a functional and molecular level, in rats receiving 5 mL/kg dosage Oxycyte. However, more research of the optimal safe, efficacious dose needs to be conducted to present this research in a clinical setting.

17. Patterns of Improvement in Kidney Function Among Patients Converted to Belatacept from Calcineurin Inhibitors for Kidney Allograft Dysfunction

Dhiren Kumar[1], Anil Regmi[1], Hasan Fattah[1], Hitarth Dave[1], Justin Joseph[1], Pamela Kimball[2], Amit Sharma[2], Chandra Bhati[2], Hugh Massey[3], Anne King[1], Gaurav Gupta[1]

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Background: Belatacept might be an alternative to Calcineurin Inhibitors (CNI) to avoid short and long-term nephrotoxicity. We have previously reported our initial experience on six patients suggesting improved renal function in high immunologic risk kidney transplant recipients (KTxp) switched from CNI to belatacept (Gupta et al, Am J Transplant. 2015 Oct). Here we present extended cumulative data on the use of a belatacept conversion regimen in patients with impaired graft function.

Methods: EBV seropositive patients were converted to belatacept from tacrolimus for biopsy proven acute CNI toxicity and/or interstitial fibrosis/tubular atrophy. Belatacept was initiated based upon prior published protocols. Mycophenolate mofetil dose was increased from baseline dose of 1-2g/d to a dose of 2-3g/d to minimize risk of rejection.

Results: Thirty one (mean age=46±11 years) patients were switched from tacrolimus to belatacept at a median of 7 months post-KTxp. A majority were African-American (23/31; 74%). Eleven patients (35%) were sensitized (mean PRA=27%; range=0-99%). Overall, renal function improved significantly from a peak mean GFR of 28±12 ml/min/1.73m2 to 36±15ml/min/1.73m2 (p=0.001) at a median follow-up of 14 (range=3-37) months post-conversion. Analysis of various metabolic parameters (lipid profile, hemoglobin A1c and hypertension) demonstrated a significant decline in a need for hypertension medications from a mean of 2.2 pre-conversion to 1.9 post-conversion (p=0.037). A comparison of patients who had an improvement in GFR (defined as >5ml/min/1.73m2; n=17) vs. those who did not (n=14) showed that increasing length of therapy with belatacept (21±10months vs 9±7months, p=0.001) was the only factor associated with improvement in graft function. Surveillance biopsies performed on 17 (out of 31) patients revealed 1 (6%) case of subclinical rejection. Cumulative chronicity scores pre- (3.6±1.6) and post-conversion (4.0±1.6) remained unchanged (p=0.49). In 28/31 (90%) patients there was no evidence of de-novo donor specific antibody (DSA). Two highly sensitized patients with stable creatinine had rising DSA after an infection. There were no new cases of BK viremia, CMV disease or malignancy.

Conclusions: In this extended experience on KTxp patients with significantly reduced GFR, we report remarkable improvement in renal function in patients converted from tacrolimus to belatacept with acute CNI toxicity and chronic allograft fibrosis without a significant concurrent increase in risk of rejection, worsening chronicity and DSA. Further follow-up and protocol biopsies are planned to ensure safety and wider applicability of this approach.

References: [1] Gupta et al, Am J Transplant. 2015 Oct

18. A mixed-methods study of pet-owning domestic violence survivors: What is the role of veterinary professionals in recognizing and intervening in multidirectional violence involving pets?

Colleen Parker, Ksenia Dombo, Anna Maternick, Nani Moskal, with Dr. Shelby McDonald, VCU School of Social Work

This study reports quantitative and qualitative findings pertaining to veterinary care of companion animals among families that receive community-based domestic violence (DV) services. Specifically, we examined the rate and quality of veterinary care among pets in households affected by DV as well as treatment of pets by abusive partners and their children. Data were collected as part of a mixed methods phenomenological research study. Two hundred and ninety-one women with children between the ages of 7 and 12 were recruited from 22 domestic violence agencies in a western state. Qualitative data were analyzed using the method of template analysis. Quantitative data were analyzed using descriptive statistics and chi-square tests of independence. Among participants with pet cats, 39% reported that their pet did not receive regular veterinary care; among participants with dogs, 34% reported that their pet did not receive regular veterinary care. Twenty-five percent of participants reported that their partner had hurt or killed a pet. A chi-square test of independence indicated that animal maltreatment by a partner was related to an absence of regular veterinary care of companion animals in the home at the level of a statistical trend ($X^2(1)= 3.00$, $p= .08$). Qualitative findings included: 1) Preventing Regular and Emergency Veterinary Care as a Means of Coercive Control by Partners and 2) Veterinary Professionals' Involvement in Treating Pets Injured by DV Perpetrators. Our findings highlight the vital role that veterinary professionals may play in recognizing and intervening in animal abuse and neglect resulting from DV. We discuss the role that veterinary health care providers may serve in efforts to address animal maltreatment and connect DV survivors and their pets with appropriate community services.

19. The behavioral assessment of relational humility: Are you as humble as you think you are?

Ciera Cannizzaro, Azza Hussein, Amanda Mueller, Caroline Cunningham, Dept. of Psychology, with Rachel Garthe, Brandon Griffin, and Dr. Everett Worthington, Dept. of Psychology

Couples face challenges such as disagreements on finances, communication, sex, and transitioning to parenthood. Parenthood can create stress, and it is important for couples to handle the stress appropriately to effectively cope (Dyrdal & Lucas, 2013; Doss, Rhoades, Stanley, & Markman, 2009). Research has found that humility plays a big role in relationship satisfaction, which can then lead to stronger and committed relationships (Farrell et al., 2015). Humility is defined as having an accurate view of self and at the same time recognizing differences between self and others (Tongeren, Davis, & Hook, 2014). Self reports have been widely used to measure humility. However, we believe that behavioral coding of humility will offer an unbiased rating. For instance, in self-reports, individuals who are humble may be less likely to report humble characteristics, whereas individuals who are more arrogant may be more likely to report being humble. Thus, behavioral coding provides a more relevant and objective method in measuring human characteristics such as humility (Black et al., 2013; Karney and Bradbury, 1995). For the current study, we will be exploring the methods and procedures in behavioral coding of relational humility. We will describe reliability processes and the 16-item measure used to do this innovative approach to defining humility. We will present the procedures of the behavioral coding process of humility within 69 married couples who were transitioning to parenthood for the first time. This poster will inform future studies that wish to use behavioral measures to assess virtues within couples.

20. Defining Cellular Dynamics and Biomechanical Forces During Wound Healing in Xenopus laevis Embryos.

Delisa Clay, Dept. of Biology, with Dr. Amanda Dickinson, Dept. of Biology and Dr. Daniel Conway, Dept. of Biomedical Engineering.

Wound repair of skin is necessary to restore barrier function in response to injury. *Xenopus laevis* embryos are excellent model organisms for studying the mechanisms of wound healing in humans. Many of the morphological changes and molecular mechanisms of mammalian wound healing are conserved in *Xenopus* embryos. Further, the embryonic skin is simple and heals rapidly which permits complex imaging approaches as well as screening chemicals in a whole organism that would otherwise not be feasible. In general, working with *Xenopus* rather than mice has several other advantages. For example, experiments can be performed easily in free living *Xenopus* embryos that are also large in size, develop rapidly, and can be obtained in great numbers (500-1000) at the same time by in vitro fertilization. I developed a wound-healing assay in *Xenopus* embryos where I used a scalpel to surgical cut off the tail. The tail heals completely in several hours using this assay. My first goal was to define the cellular dynamics during wound healing. I used an antibody that detects E-cadherin and outlines the cells allowing me to capture cell shape changes after wounding. The obtained results showed that cells at the leading edge of the wound had an increased in the length to width ratio, that is they elongated, by 1.8 fold at 15 minutes post injury. These cells also aligned perpendicular (90 degree angle) to the wound edge compared to unwounded embryos that displayed random (45 degree angle) alignment. Similar changes in cellular morphology were observed in scratch-wound assays performed in an MDCK cell line. I next wanted to know whether perturbing the biomechanical properties of cells altered these cellular dynamics. I treated cells with a myosin II inhibitor (blebbistatin) and noted that cellular elongation at the edge of the wound as well as cellular alignment was reduced significantly compared to untreated controls. Myosin is an important mediator of cytoskeletal changes and force production within the cell and therefore, these results suggest that decreased forces could be an important factor in wound repair. Together these results suggest that biomechanical forces may mediate both cellular elongation as well as cellular alignment. Therefore, my last goal is to measure mechanical tension in epithelial cells in the *Xenopus* embryo by utilizing an existing Förster resonance energy transfer (FRET)-based tension biosensor for E-cadherin. Since mechanical force across E-cadherin is increased during wound-induced migration in mammalian cells this could be a valuable tool in *Xenopus.* The E-cadherin tension sensor was expressed in the *Xenopus* embryo, localizing to cell-cell contacts. The sensor was readily imaged in skin cells at the surface of the embryo. The original obtained construct was for canine E-cadherin, but we are currently optimizing the performance of a novel *Xenopus* E-cadherin FRET sensor to obtain better expression in our model. The data obtained thus far indicates that it will be possible to measure tension across E-cadherin during wound healing in *Xenopus laevis* embryos. I plan to correlate the morphological changes seen in cells as well as cellular alignment during wound healing to various levels of tension across E-cadherin using the FRET-based tension biosensor. This work will provide novel insight into the role of biomechanical forces during wound healing.

21. "I play to win!": Gender differences in the motivations for playing single-player, MOBA, and strategy games

Alec McElroy, Dept. of Psychology, with Dr. Everett Worthington, Dept. of Psychology

Video games are a rising form of media whose players encapsulate people from childhood all the way through late adulthood. Past research has shown that there are indeed gender differences in video game habits and even video game preferences (e.g., Homer et al., 2012). However, what distinct motivations drive men and women to play different types of games? This study aims to explore the gender differences behind the motivations that drive men and women to play single-player, MOBA (Multiplayer Online Battle Arena), and strategy games. Participants (n=159) were recruited through Internet outreach and VCU SONA systems. The results of the study indicate that, across all three game types, men are significantly more motivated to play by aspects of mechanics and competition than women are. Conversely, for both MOBAs and strategy games, women are more motivated by aspects such as relationship formation and role-playing than men. An

understanding of the different motivations that drive men and women provides insight into the fact that men and women may play the same types of video games, but are fulfilled by these games in different ways.

22. The Influence of Infant Construction Strategy on Language Development in Toddlers

Syed Gullnar, Dept. of Psychology, with Dr. Stacey Dusing and Dr. Emily Marcinowski, Dept. of Physical Therapy

Infants learn from interaction with physical objects in their environments. Object construction, or merging individual objects into a single structure, has been linked previously to language. Items and toys can be structured and combined with similarity to word combinations (Greenfield, 1991). Infants initially combine 2 objects and then graduate on to combine 3 pieces or more. Words are put together in comparable ways, with each word corresponding to an object, and a sentence corresponding to a single structure. The purpose of this project is to explore how construction ability in infants affects language ability in toddlers. We hypothesize that the more advanced the infant's construction ability at 14 months, the more advanced their language ability will be at 24 months. Methods: At 14 months of age, 47 infants were given 2 sets of nesting cups to assess construction strategy while video-recorded (Greenfield, Nelson, & Saltzman, 1972). Construction strategies coded included "nothing," (no cup combination), "pairing," (one cup placed on or inside another cup), and "potting," (two or more cups placed in or stacked on a third cup). Expressive and receptive language was assessed at 2 years of age using the Preschool Language Scales, 5th edition. Data was analyzed with a regression model, using Hierarchical Linear Modeling 7 (Student version). Results: Infants who combined objects scored higher on expressive language (βs 9.52-14.3, *t*s(44) 2.19-2.62, *p*s 0.01-0.03), than infants who did not combine objects at 14 months (β_{00}=92.82). No differences were found for construction strategy and receptive language (βs 5.49-11.79, *t*s(44) 1.67-0.98, *p*s > 0.102). Conclusion: The ability to combine cups at 14 months is related to higher expressive language scores. We speculate that the ability to combine toys lays a foundation for combining words into sentences, while language comprehension may originate from other mechanisms. Further studies may assess the number of objects paired successfully and the complexity of construction with success and complexity of sentence structure at different time points throughout early childhood.

23. Bystander Behavior and Mindfulness

Savannah Clements, Dept. of Psychology, with Brandon Griffin and Dr. Everett Worthington, Dept. of Psychology

A growing body of evidence suggests that the ways in which bystanders respond to bullying has important implications for victims and perpetrators of bullying. The aim of the present study was to examine predictors of defending, outsider, and pro-bully behavior among individuals who report witnessing bullying occur. When controlling for the effects of demographics variables and levels of empathy, we hypothesized that an individual's belief that they are responsible to intervene in bullying situations would be positively associated with defending behavior, negatively associated with outsider behavior, and negatively associated with pro-bully behavior. Moreover, we suspect that these associations would be amplified among participants who report being more mindful. VCU students (N = 186) completed an anonymous electronic survey, and data were analyzed using hierarchical multiple regression. Results indicated that the association between perceived responsibility to intervene and defending behavior was more strongly positive and the association between perceived responsibility to intervene and outsider behavior was more strongly negative among participants who reported higher levels of mindfulness relative to those who reported being less mindful. No evidence suggested that mindfulness and perceived responsibility to intervene interacted to predict pro-bully behavior. These findings indicate that bystanders' levels of mindfulness are important targets of intervention for bulling prevention efforts.

24. Wellness in the Workplace

Natalie Goodin, Dept. of Interdisciplinary Studies, with Prof. Mary Shelden, University College

For my BIS Capstone course this semester, our project was to identify a need within a company and help them fulfill that need. I partnered with Verisk Health, a data analytic company in the healthcare industry, to create a wellness committee across their five office locations in the United States. Being that Verisk Health is in the healthcare industry, it is important that they promote a healthy lifestyle to their employees. Wellness programs implemented in offices has been proven to boost morale as well as reduce health related costs to the employer. My poster will show the research-based evidence on why a wellness program in the workplace is important, and what tools were applied in Verisk Health's own wellness program.

25. Causal evidence that ETS causing behavioral deficits via altering mitochondrial energetics

Pallavi Pilaka, Dept. of Biology, with Dr. Andrew K. Ottens, Dept. of Anatomy and Neurobiology

Children growing up exposed to environmental tobacco smoke (ETS) exposure have a significantly increased risk for behavioral issues associated with attention deficit and conduct disorders. Yet, biological causation remains unclear as do the mechanisms involved. We have recently devised a developmental model system of ETS exposure to address this gap. Applying a systems biology approach, our laboratory has demonstrated that ETS exposure during critical periods of postnatal development results in amplified mitochondrial division mediated via dynamin-related protein 1 (Drp1). Here we looked to demonstrate the causal relationship between ETS increased Drp1 activity and measured juvenile deficits in attention and impulsive activity. We administered mitochondrial division inhibitor 1 (Mdivi-1, i.p.), a selective Drp1 inhibitor, ahead of daily 6 h ETS exposure beginning on postnatal day 8 (PD8) through PD23. Mdivi-1 was administered in groups of 0 mg/kg, 2mg/kg, and 4mg/kg in a hydroxyl-propyl-B-cyclodextrin (HPBCD) vehicle. The interactive effects of Mdivi-1 and ETS were then assessed molecularly via Western blot and immunofluorescence microscopy and behaviorally using novel object attention and light-dark box tasks by PD24. Results demonstrate the effective reversal of ETS induced Drp1-mediated mitochondrial proliferation within the cruciform region of cerebellum associated for higher-order activity control. As expected, the Drp1 inhibitor Mdivi-1 reversed 98% ($p=0.02$) of the 2-fold increase ($p=0.003$) in mitochondrial staining produced by ETS exposure. Furthermore, Mdivi-1 administration protected against ETS-induced behavioral deficits. A 32% reduction ($p=0.004$) in novel-object attention exhibited by ETS exposed animals was absent ($p=0.04$) in animals receiving the 4 mg/kg dose of Mdivi-1. Likewise, the 1.5-fold increase ($p=0.01$) in time ETS-exposed animals spent exploring the adverse light-portion of a light-dark box was ameliorated (%; $p=0.025$) at the 4 mg/kg Mdivi-1 dose. These findings substantiate that increased juvenile activity-control deficits exhibited after ETS exposure is causally related to Drp1-mediated increased mitochondrial proliferation during circuit development. These model system studies support a biological mechanism for the increased prevalence of childhood disorders in those growing up with ETS, a connection with mitochondrial energetics that may prove relevant to other childhood inhalation exposures.

26. Graphical Images of the Symptom Experience Created by Adolescents and Young Adults with Cancer

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BACKGROUND: Understanding symptom experiences of adolescents and young adults (AYAs) with cancer is critical to improving outcomes. Few tools to measure AYA symptoms are available, creating challenges for AYAs to communicate and manage complex symptoms. Studies from older adults suggest that symptom

experiences may differ by gender. Given the developmental changes that occur, age may also be a factor. As a newly-developed iPad application, the Computer Symptom Capture Tool (C-SCAT) uses an innovative heuristics approach to capture AYA symptom experiences. The C-SCAT guides AYAs to create graphical images of perceived symptoms, allowing AYAs to cluster, prioritize and establish relationships among symptoms.

Aims: Examine symptom clusters, relationships and priorities from C-SCAT graphical images by age group (adolescents: 13-17 years, young adults: 18-29 years) and gender.

METHODS: Secondary analysis of a descriptive study that included 72 AYAs (ages 13-29 years) receiving myelosuppressive chemotherapy. AYAs were recruited from 5 institutions across the US, with the majority being young adults (54%) and male (56%). AYAs completed the C-SCAT within 24-96 hours of receiving chemotherapy. From a list of 30 symptoms, AYAs created unique graphical images containing symptoms, clusters, priority symptoms within clusters, and relationships among symptoms. Descriptive statistics, including chi-square and t-tests, examined differences in priority symptoms, symptom clusters, and relationships by age group and sex.

RESULTS: Adolescents were more likely to cluster symptoms (p=0.045), identify symptom relationships (p=0.025), and report fewer total symptoms (p=0.019) than young adults. Priority symptom frequencies significantly differed by age: young adults reported more emotional symptoms, and adolescents reported more physical symptoms (p=0.001). There were no differences by gender in the number of symptoms (p=0.488), symptom clusters (p=0.784) or symptom relationships (p=0.141). Priority symptom frequencies also did not differ by gender (p=0.619).

CONCLUSIONS: Although evidence suggests that the symptom experience may differ by gender in AYAs with cancer, data from this study suggests that age group may be a more significant factor deserving further research.

27. Presentation for the Greater Non-Profit

Kousha Kangerloo, Dept. of Interdisciplinary Studies, with Prof. Mary Shelden, University College

For my project proposal I would like to find the right venue within the VCU community to host an event for the non-profit I have decided to work with. This event would be a huge promotional effort to support the growth of the non-profit sector throughout the VCU community and just the greater Richmond region as whole. The current organization I work with, the YNPN(Young Non-Profit Professional Network) puts a lot of work into making this happen routinely by holding social events and promoting community service efforts , fundraisers, and charity benefits as well as philanthropy events. By hosting this event I will be able to reach out to and inform the current student body of the benefits and perks that come with working and/or volunteering in the non-profit sector. I will also be able to tell them how these efforts truly makes the community all-around us a better place to live and builds character benefiting themselves and the community around them.

28. The Evaluation of the Measurement of Low Concentrations

Pacifique Munezero, UROP Summer Research Fellow, Dept. of Clinical Lab Sciences, with Dr. William Korzun, Dept. of Clinical Lab Sciences

The purpose of this project, conducted through a collaboration of the Department of Clinical Laboratory Sciences and the Department of Internal Medicine, was to modify and then evaluate methods available for the Cobas® c311 automated chemistry analyzer for the measurement of cholesterol and triglycerides in human serum, to be able to measure concentrations of cholesterol and triglycerides in chromatography fractions of mouse plasma which are much lower than the lower limit of quantitation for commercially available methods.

The method parameters were modified to maximize the specimen to reagent volume ratio. The modified methods showed linear responses up to 12 mg/dL for triglycerides and up to 14.5 mg/dL for cholesterol in mouse plasma diluted with chromatography mobile phase. The limit of detection (LOD) was also assessed by diluting mouse plasma with chromatography mobile phase. For cholesterol and triglycerides, 20 replicates yielded mean values of 0.12 mg/dL and 0.14 mg/dL, with C.V.s equal to 14 % and 20% respectively. These data suggest that the functional sensitivity of the modified assays is ~0.1 mg/dL. To assess feasibility and reliability of the performance of the assays, chromatography fractions of plasma collected from mice in Dr. Ghosh's lab were analyzed. With a total of thirty six (36) gel filtration chromatography fractions per mouse, we could demonstrate a clear difference in lipoprotein patterns for a mouse lacking LDL receptors and mice with normal lipid metabolism.

29. Ibudilast reversed expression of behavioral sensitization to cocaine in male and female rats

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There are no FDA-approved pharmacotherapies for cocaine use disorder, indicating a need to identify novel reagents with therapeutic potential. Ibudilast is an anti-inflammatory glial attenuator and non-selective phosphodiesterase inhibitor currently undergoing clinical evaluation for methamphetamine use disorder. We previously showed that twice daily (b.i.d.) ibudilast reduced the development of methamphetamine sensitization in male mice. However, nothing is known about the ability of ibudilast to modulate the expression of sensitization that occurs after drug re-exposure during abstinence, effects on cocaine-mediated behaviors, or sexually dimorphic effects. Male and female rats were administered cocaine for 7 days and expression of sensitization assessed by cocaine challenge after 21 days abstinence. On test days, 15 mg/kg, i.p. cocaine was evaluated, whereas 30 mg/kg was administered on intervening days. Lower test doses avoid competition of non-motor behaviors with locomotion. In all measures where sensitization was expressed, ibudilast (7.5 and 10 mg/kg, i.p., b.i.d. for 3 days and once on test day) reversed this behavior to levels seen after acute exposure, but not below. There were some intriguing sexually dimorphic effects that were not a function of estrous cycle. Specifically, distance travelled in the center of the test arena and rearing only sensitized in male rats, and ibudilast reversed these behaviors to levels seen after acute cocaine exposure. In females, center distance travelled was reduced below acute cocaine levels by 7.5 mg/kg ibudilast. Increased distance travelled in the center versus periphery is thought to model anxiolytic-like behavior due to increased predation risk. Taken together, these data suggest that ibudilast may have the potential to treat cocaine use disorder.

30. A Tale of Two Coils: Characterization and Analysis of the Rebuildable Dripping Atomizer for Electronic Cigarettes

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Introduction:
After attending this presentation, attendees will be able to understand the characteristics of rebuildable dripping atomizer (RDA or "dripper") devices used in modified electronic cigarettes (e-cigs) to optimize drug delivery. Drippers make up a popular subset of rebuildable atomizers in e-cig devices. The e-liquid (refill formulation) is dripped directly onto the coil and wick by the user and is replenished by the user as it is aerosolized. Dripper use is favorable for users vaping e-liquids with insoluble components, because the dripper prevents the atomizer from clogging via the traditional tank wicking method. Dripper devices are also used for wax-based formulations (dabs). Different designs of drippers are available to consumers, which currently range from two to six posts, allowing for multiple coils in the atomizer, thus allowing users a vast array of coil configurations. However, there are basic builds for drippers which can reduce the time it takes to complete a homemade atomizer. This study evaluated the temperature of the coils in the dripper atomizer and the efficiency to aerosolize nicotine.

Methods:
A Tobeco Plume Veil V1.5 Clone dripper and dual contact coils with ten 1.2 mm ID wraps of 26 American wire gauge (AWG) Kanthal® wire at 3.7 V were used for coil temperature and nicotine dose capture trials. A 12 mg/mL nicotine in vegetable glycerin refill formulation was utilized in nicotine dose capture trials. Coil temperature data was collected by using a Micro-Epsilon dual IR laser temperature sensor with a range of 100 °C to 1500 °C and Compact Connect software version 1.9.8.6. Nicotine dose capture was collected using a water trap and trapped solutions were quantitatively analyzed by high performance liquid chromatography-tandem mass spectrometry (HPLC-MS/MS) using nicotine-d4 internal standard.

Results:
Coil temperature analysis produced maximum temperatures from 751 °C (coil B) to 1044 °C (coil A) after energizing for eight seconds. Temperature variance was observed reaching 206 °C difference between the dual coils. The average heating rate was determined to be 156 °C per second for coil A and 87 °C per second for coil B. The median lethal dose to the average adult human is 40 to 60 mg of nicotine; the highest single dose capture in this study was 301 µg of nicotine.

Conclusion:
This study is beneficial to the forensic science community by addressing the characteristics of drippers as drug delivery devices. Drippers are used for the concealment of illicit drug use, whether via e-liquid, crude botanical, or wax. Modifications in electronic cigarettes can impact dose delivery. Thus, it is important to follow the evolution of electronic cigarettes as drug delivery devices.

Keywords:
Drippers, rebuildable dripping atomizers, electronic cigarettes

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31. Depression Intervention in Low-Income High Schools

Gopika Hari, Dept. of Biology, with Prof. Mary Boyes, VCU Honors College

It is estimated that 2.6 million adolescents suffer from major depressive episodes each year. Research has noted that symptoms in youth have become indicators of mental health complications later in life. Studies reveal that low income is a risk factor for depression and that socioeconomically-disadvantaged teenagers are more than twice as likely to develop mental illnesses. Only roughly 25% of children with mental illnesses receive adequate help and 80% of these resources come from schools. This study focuses on establishing the importance of depression intervention programs in low-income high schools and on designing novel guidelines for effective protocols. A compilation of expert opinion on depression screening, education, and treatment, as well as analysis of previously implemented school screening and/or awareness programs, was examined in order to understand key strategies. This study found that a multi-layered approach that includes screening, universal education, and high-risk intervention is most effective in addressing mental health needs of low-income adolescents. To ensure feasibility and efficacy, screening should be conducted with a modified PHQ-a test and followed-up with timely clinical interviews by school psychologists. All students should receive universal depression education curriculum consisting of principles like depression literacy, asset theory, and promotion of help-seeking behaviors. Extending universal education to teachers would also be beneficial in promoting mental health communication and positive classroom environments. It is vital that students screened positively for depression or suicidality then receive high-risk protocols, ranging from group Cognitive-Behavioral Therapy to facilitated mental health center referrals based on individual severity. Effectively addressing depression in school systems requires integration of mental health promotion, depression prevention, and psychotherapy. By taking a multidimensional approach addressing all three aspects, public health officials and school administrations can ensure that adequate resources are being directed to those most in need.

32. Reproductive success of a Neotropical migratory songbird in response to a changing climate

Ashley Grupenhoff, Dept. of Biology, with Dr. Leslie Bulluck, Dept. of Biology

Climate change is of rising concern especially due to how and if this changing climate affects individual species and their fitness. Migratory species, especially long-distance migrants, are ideal models for exploring the relationship between warming temperatures on temperate breeding grounds and decreased precipitation on tropical wintering areas. Few studies have long term data sets to observe species-specific assessments of fitness in relation to changing precipitation and temperature patterns, and those that have assessed these relationships show inconsistent results. We analyzed long-term data of a neo-tropical migratory songbird (*Protonotaria citrea*) to assess the potential relationships between indices of reproductive success and variation in tropical rainfall and breeding season temperature. We found that the species tended to have longer breeding seasons in years with increased annual temperatures and increased rates of double brooding with increased precipitation in the wintering grounds. Prothonotary warblers had smaller first clutches in stronger El Nino years, though this relationship was weak. Breeding ground precipitation was not correlated with any index of reproductive success. Results suggest that a combination of breeding ground temperature and wintering grounds precipitation play a role in the timing of spring breeding and the prevalence of double brooding, respectively. These findings are important for predicting the sensitivity of long-distance migratory birds to changes in climate, and provides additional evidence for carry over effects between portions of the annual cycle in migratory songbirds.

33. Comparing the Influence of Intrinsic and Extrinsic Motivation for Physical Activity on Employee Outcomes

Courtney Tat, Amanda Mueller, and Ciera Cannizzaro, Dept. of Psychology, with Dr. Charles Calderwood, Dept. of Psychology

Organizations are increasingly relying on external incentives to motivate their employees to engage in physical activity both inside and outside of the workplace. Although such efforts may yield positive outcomes for

employees, such as reduced stress perceptions, lower burnout, and better physical health, focusing solely on extrinsic motives to pursue physical activity may be misguided. Specifically, self-determination theory (SDT) emphasizes the importance of personal intrinsic factors (i.e., employees' desires and beliefs) as powerful motivators of behavior. It was hypothesized that individuals who rated higher on intrinsic motivation will be also be high in job satisfaction and job performance. We conducted a cross-sectional online survey to compare how intrinsic and extrinsic motivation to pursue physical activity predict how often employees engage in physical activity, as well as their perceptions of job stress, job satisfaction, and job performance. Two hundred and fifty five participants (N = 255), comprising both part- and full-time employees from a wide range of industries, completed the online survey. Higher intrinsic motivation for physical activity was found to be related to several different indicators of higher job performance, as well as greater job satisfaction. In contrast, higher levels of extrinsic motivation for physical activity were positively correlated with job stress. We plan to discuss the implications of these findings for the design of employee physical activity interventions.

34. Abating Prejudice with Presence: Dispositional Mindfulness Increases Interracial Helping Behavior

Justin D. Tubbs, Daniel R. Berry, Dept. of Psychology with Dr. Kirk Warren Brown, Dept. of Psychology

Helping behavior is less frequently shown toward members of social out-groups (Cikra, Bruneau, & Saxe, 2011). Race defines a common source of social division in America and other countries, and although most condemn racial discrimination, helping is undermined in interracial interactions (Saucier, Miller, & Doucet, 2005). Recent theory suggests that *mindfulness*, a receptive attention to one's present experience, can attenuate the conceptual boundaries that typically separate and distance oneself from others (Trautwein, Schmidt, & Naranjo, 2014). We designed an experiment to examine whether dispositional mindfulness would be associated with increased helping behavior in interracial contexts. Self-identifying White participants (N = 139) witnessed a confederate in need of help while waiting to participate in a study, and experimenters observed whether participants helped them or not; self-identifying White or Black confederates were randomly assigned to each experimental session. Three-block sequential logistic regression models were constructed to identify predictors of same-race and interracial helping. Overall, dispositional mindfulness, agreeableness, and lower racial prejudice predicted greater helping behavior in same-race interactions (all $ps < 0.05$). Interestingly, mindfulness moderated the help-reducing effects of racial prejudice in the interracial interactions ($p < 0.05$). More specifically, high mindfulness was associated with increased helping behavior among those high in racial prejudice. This correlational evidence is consistent with mindfulness theory, which suggests deploying mindful attention dampens psychological barriers between self and others. This study highlights the potential for mindfulness in reducing defensive attitudes and increasing prosocial responsiveness across social lines.

35. "Black People Don't Tip": Racism in the Restaurant Industry

Hortance Houngbeke, Dept. of International Studies, African American Studies, Foreign Languages and Department of African American Studies with Dr. Vivian Dzokoto, Dept. of African American Studies

The basis of this research is to determine if waiters are less attentive to black diners. Due to discrimination, waiters are less likely to provide good customer service to their black dinners solely based on the assumption that they are bad tippers. The theory of discrimination is the foundation of this observational study where attentiveness is measured to reflect waiters' avoidance of African American diners. Assuming waiters start with their preconceived notions about Black customers, this research will use the critical race theory to determine if waiters are less attentive to African American diners. To further understand the subtle discriminatory behavior of waiters toward African Americans, this article analyzes observational data from a sample of waiters (N=40). Findings reveal higher frequency of waiters interacting with White diners compared to African American diners. The study contributes to our understanding of social context of discrimination and the experiences of African Americans in restaurants.

36. Mitochondrial Energetics goes awry in higher-order circuitry growing up with secondhand smoke

Liam Lewis, IMSD Research Scholar, Dept. of Bioinformatics with Pretal Muldoon and Dr. Andrew K. Ottens, Dept. of Anatomy and Neurobiology

Nearly one-in-five children in the United States continue to be exposed to secondhand smoke, otherwise known as environmental tobacco smoke (ETS). Recent studies show that growing up with ETS increases the risk for cognitive and behavioral deficits, even without prenatal exposure. The Ottens' laboratory developed an ETS exposure model with which to test biological causation for altered behavior. Study findings demonstrate that juvenile ETS exposure results in impaired attention, action control and impulsive behavior and that ETS effects mitochondrial energetics within cerebellum, an area of the brain involved in modulating errant activity. The present hypothesis is that ETS induces aberrant mitochondrial energetics throughout the higher-order regulatory loop between frontal cortex and cerebellum. Immunofluorescence microscopy of mitochondria and their fission/fusion proteins was performed within orbital cortex and the mediodorsal thalamic relay interconnected with cerebellum. In orbital cortex, we found that mitochondrial proliferation increased with ETS exposure relative to control in the juvenile brain (P24) and the adolescent brain (P49). Within the thalamic region, we found that mitochondrial proliferation is also increased relative to control in P24, but the mitochondrial fusion factor is found to be significantly increased within the P49 animals. This points to increased mitochondrial energetics throughout the higher-order cortico-thalamo-cerebellar circuit governing executive control functions; however, a compensatory response ensues into young adulthood, correlating with the burden of juvenile attention deficits disorders in humans that wanes with age.

37. Xeno-free culture of human embryonic stem cells on silk 3D matrices

Alexander Ip, UROP Summer Research Fellow, Dept. of Biology, with Dr. Raj Rao, Dept. of Chemical and Life Science Engineering

Eliminating reliance on undefined biological components in culture conditions is the aim for transitioning stem cell research applications into clinical settings. Using defined, biological and chemical (xeno-free) conditions is a goal for achieving these transitions. Silk fibroin three-dimensional (3D) scaffolds derived from the silk of *Bombyx mori*, a mulberry silk worm, are proposed as part of xeno-free culturing conditions, and also provides structural support that is crucial for the retention of normal tissue function. The fibroin scaffolds can be fabricated, and tested as successful cell culture substrates by embedding and culturing human embryonic stem cells (hESC), which demonstrate proliferation and good cell viability over 14 days. Current progress demonstrates that hESCs can be cultured, and maintained. Over multiple passages, hESCs demonstrate critical self-renewal properties based on colony formation. Successful embedding of cells, cell culture proliferation, immunocytochemistry testing, and hematoxylin–eosin staining is expected to confirm the overall success of the silk scaffolds as a good, xeno-free substrate for stem cell research. Further research focused on incorporating key extracellular matrix proteins into the silk scaffold is expected to lead to defined substrates for promoting adhesion and growth factor signaling for promoting hESC self-renewal. Synthesizing xeno-free, silk fibroin scaffolds that can incorporate multiple extracellular matrix components can allow for better *in vivo* models for stem cell research.

Keywords: xeno-free, silk scaffolds, human embryonic stem cells

38. Factors That Contribute to the Maintenance of Anxiety throughout Adolescence

Chantelle Miller, Dept. of Psychology, with Dr. Heather Jones, Dept. of Psychology

Current research suggests that parenting behaviors may contribute to unsuccessful treatment of youth anxiety. A literature review was conducted to investigate what other factors may contribute to the maintenance of anxiety throughout adolescence. Findings from the current systematic review suggest individual characteristics and social structures (e.g., media, gender roles) may affect the maintenance of anxiety. Additionally, gender may moderate the strength of these relationships. Therefore, researchers and clinicians should consider gender identity to improve successful intervention and prevention.

39. UMLS::Association - A Semantic Association Framework for Biomedical Texts

Keith Herbert, UROP Summer Research Fellow, Depts. of Bioinformatics and Computer Science, with Dr. Bridgett McInnes, Dept. of Computer Science

Introduction

We present UMLS::Association, a software package to explore the semantic association of biomedical terms with applications for literature-based discovery. Literature-based discovery is an endeavour to ”connect the dots” for scientists between the topics of their research and those of unexpected relevance. However, many approaches rely on the exact wording for the ideas in the research papers being analyzed. The Unified Medical Language System (UMLS) provides a way to map natural language phrases in these papers to sequences of abstract yet very specific concepts. These concepts are referred to as Concept Unique Identifiers (CUIs). We can identify which concepts are strongly associated by measuring how often they occur together within a corpus of biomedical texts and applying statistical techniques.

Methods

We measure the semantic association of CUIs with bigrams: pairs of CUIs that follow each other in some string of symbols. Research articles and clinical studies were first preprocessed by a UMLS tool that generates sequences of CUIs for every phrase within each sentence of the papers. Our framework then extracts bigrams from the CUI sequences to build a database from which we can calculate meaningful statistics for the association of two CUIs. We developed a utility to quickly return a variety of statistical association measures for any two concepts as well as an application programming interface to allow these association measures to be incorporated into new software packages.

Results

We evaluated UMLS::Association’s predictive performance for semantic association by running it on four datasets which had been tagged by human judges for semantic similarity and relatedness. The results show our semantic association measures to match human judgements on the association between concepts as well or better than current state-of-the art semantic similarity and relatedness measures.

Conclusion

UMLS::Association provides an easy to use framework for the semantic association of concepts within biomedical literature. Work is in progress to extend the reach of the bigram model with a directed graph representation of the many unique CUI sequences generated for each phrase in a sentence. A user friendly web application interface to our framework is also under development. Besides access to existing functions, it will also feature a directed graph visualization for the search results for concepts strongly associated with some query concept. This will allow any researcher to explore the semantic associations between concepts in a simple and intuitive way.

40. "Olweus Bullying Prevention Program: Assessing Teacher Competence in Class Meetings"

Bridget Condron, Melanie Crabtree, Christen Camacho, and Antoinette Waller, Dept. of Psychology, with Dr. Rachel Garthe and Dr. Terri Sullivan, Dept. of Psychology

The Olweus Bullying Prevention Program (OBPP) is a widely used school environment intervention. The VCU Clark-Hill Institute for Positive Youth Development evaluated the OBPP in three local middle schools from 2010-2014. A key component of OBPP is class meetings led by teachers that focus on bullying prevention and related topics (e.g., diversity and respect). Each week, trained fidelity observers assess teachers' competence, or the quality of class meeting delivery. Although other studies have assessed adherence to OBPP procedures (e.g., Schroeder et al., 2011), few have also considered competence ratings. The current study will assess the degree to which competence may vary based on the type and scale of classroom activities. The Competence Scale is comprised of 14-items that are scored using the following 3-point response scale: 1 – Poor, 2 – Acceptable, and 3 – Excellent. Behrhorst, Goncy, Sutherland, and Sullivan (2016) conducted a confirmatory factor analysis of the Competence Scale that identified four subscales: a) Positive teacher behaviors (e.g., "Teacher served as a positive role model", b) Classroom Management (e.g., "Teacher used clear routines, within and between activities"), c) Student Reinforcement (e.g., Teacher provided feedback to students"), and d) Intervention Procedures (e.g., "Teacher discussed the class meeting ground rules"). For the current study, analyses of variance (ANOVAs) will be used to assess mean differences in the rates of teacher competence to OBPP class meetings based on: a) type of activity within the class meeting (i.e., drawing/writing/poster, situation card/role play, discussion, or game/team building), or b) scale of activity (i.e., individual, small group, large group/whole class).

41. Competing with Corporate Businesses from a Local Level, while Maintaining and Increasing Customer Relationships with the Development of Customer Loyalty Programs

Stephanie Small, Dept. of Interdisciplinary Studies, with Prof. Mary Shelden, Dept. of Focused Inqjuiry

For my BIS senior capstone project, we were asked to partner up with a company in our community. I paired up with The Pink Palm, which is a Lilly Pulitzer signature store located in Richmond. For our project we were instructed to find a community partner that had an issue or concern that needed fixing and could benefit with our help. The reason I chose Pink Palm is because a major concern for many locally owned businesses is their competition from popular corporate companies. The Pink Palm just recently found out that a Lilly Pulitzer corporate store would be moving into the area sometime in the early summer, so I worked with them to come up with a plan to stand out and continue building their strong customer relationships. After a lot of research by their manager and I, we decided that the best way to keep their business and support was to create a customer loyalty program. My poster will illustrate the reasoning and evidence on why we believed a customer loyalty program was the best fit for this company and its customers.

42. Investigating the Effect of Gender Ratio Imbalance Beliefs and Relationship Power on HIV Risk Behaviors and HIV Testing among Black College Women

Imani White, Dept. of Psychology and African American Studies, with Dr. Vivian Dzokoto, Dept. of African American Studies

Introduction: Black women make up 64% of all AIDS cases among women of all racial/ethnic groups in the United States. Factors influencing HIV/AIDS include women's sense of empowerment and self-efficacy as well as not using condoms due to fear of adverse reactions from a male partner. Additionally, in the Black community there is a low male-to-female sex ratio (90.5 males to every 100 females). This imbalance between Black men and women may give Black men more power in intimate relationships in regard to sexual decision making, compared to Black women. This may, in turn, influence Black women to be more likely to comply

with unsafe sexual practices to secure and maintain a relationship with a male partner. Method: Surveys were given to Black college women (N = 121) aged 18-30 attending Virginia Commonwealth University concerning a variety of variables (condom use, perceived relationship power, gender role beliefs, gender ratio imbalance beliefs, peer norms concerning condom use, assertiveness in sexual communication, and sexual behavior). Variables of interests for the purpose of this study included gender ratio imbalance beliefs (beliefs about the availability of eligible male partners), relationship power, HIV risk behaviors, and HIV testing. Expected Results: It is expected that low gender ratio imbalance beliefs and high relationship power will be associated with lower HIV risk behaviors and increased HIV testing. Conclusions/Implications: Findings have implications for tailored HIV prevention efforts for Black College women including greater awareness of culturally-specific factors in HIV risk behaviors and HIV testing.

43. Twitter Sentiment Analysis

Gerard Briones, Dept. of Computer Science, with Kasun Amarasinghe and Dr. Bridget McInnes, Dept. of Computer Science

Introduction: Twitter is a widely used microblogging environment which serves as a medium to share opinions on various events and products. Because of this, analyzing Twitter has the potential of mining opinions of the general public regarding these various events or products. Mining the opinions of Twitter messages is a challenging task, however, due to a multitude of reasons, such as the shortness of the posted content, and the informal and unstructured nature of the language used. The aim of this study was to produce a methodology for analyzing sentiments of selected Twitter messages, better known as tweets. This project elaborates on two experiments carried out to analyze the sentiment of tweets, namely, Subtask A and Subtask B from SemEval-2016 Task 4.

Methods: We focus on three main methods of feature enhancement and reduction to aid in the selection of key features in the data: 1) emoticon retention, 2) word stemming, and 3) token saliency calculation. Emoticon retention aims to preserve emoticons (ie. ":-)") often used to communicate sentiment throughout different social media platforms. Word stemming serves to decompose words into their base form, reducing the amount of features in the data. Finally, token saliency aims to calculate the weight of importance of each feature against every other feature. These enhancements are measured against a baseline that does not implement these additions to determine any differences in classification accuracy. Supervised learning algorithms from the open source WEKA datamining package are utilized to conduct classification.

Results: Prediction models were created by processing test data supplied through the SemEval organization with the aforementioned methods. We evaluated the accuracy of our models against the baseline and the results show that emoticon retention and word stemming increased classification accuracy over all tests, while token saliency reflected mixed results. We believe that these findings may in part result from a training set of inadequate size (N = 3000).

Conclusion: Our results elucidate a possible classification feature model that includes enhancements through emoticon retention, word stemming, and token saliency calculation. Coupled with these findings, further research in this field would allow for advancements in sentiment analysis of twitter feeds as well as other microblogging environments. In the future, we will include more feature enhancements such as synonym set evaluations of tokens to expand our knowledge of feature selection pertaining to social media sentiment analysis.

44. Warning: Objects (and People) May Appear Closer Than They Are: Bias and Perceptual Distance

Calvin Hall, Jacqueline Hoyt, and Alexis Hingle, Dept. of Psychology with Dr. Jennifer Joy-Gaba, Dept. of Psychology

Previous research has shown that social biases can influence a person's decisions and behaviors (Correll et al. 2007; Mekawi & Bresin, 2015). Interestingly, research also suggests that social biases may influence basic functions like visual perception (Cesario & Navarrete, 2014). The goal of the current study was to determine whether unconscious bias can influence distance perception. To test, participants were asked to complete two distance estimates to either an African American or Caucasian experimenter. Results indicated that participants judged the distance to the Black confederate as closer compared to those who judged the distance to a White confederate. These findings support the idea that individuals' attitudes toward others may not only influence decisions, but also how they visually perceive the world around them.

45. Potential for Aerobic Exercise to Release Growth Factors to Induce Cognitive Changes in Children with Autism Spectrum Disorder

Maya Harrington, Dept. of Biology, with Prof. Mary Boyes, VCU Honors College

Autism Spectrum Disorder (ASD) is becoming increasingly prevalent among adolescents, and while the number of individuals diagnosed with the disorder grows, there continues to be no cure or even a clear treatment path for ASD. This study analyzes the biological stimulations that create cognitive changes—which are induced by intensive aerobic exercise—within the brains of individuals ages 8-18 diagnosed with autism. I studied journal articles on the current treatments available for ASD, the increasing prevalence of the disease, the cognitive alterations of the autistic brain relative to the brains of individuals without the disease, the release of growth factors due to aerobic exercise, and the benefits of brain derived neurotic factors (BDNF) on the hippocampus. I identified that aerobic exercise stimulates the release of growth factors such as BDNF, which target primarily the cerebral cortex and the hippocampal regions of the brain essential for learning and memory processes along with synaptic plasticity. Since adolescents with ASD have a higher risk for obesity and overall tend to have thinner myelin sheaths and shorter axon lengths, aerobic exercise as a physical component and the protein growth factors that are produced as a result of aerobic exercise as a chemical component will provide to be a possible treatment option for ASD. Since there are no current treatments that have a guaranteed benefit for reducing of symptoms of ASD, the identification of aerobic exercise as a viable treatment option will prove to be a safe and healthy alternative to medications that are currently available.

46. Balancing Work and School: Evaluating the Experiences of Students Who Work While Enrolled

Pauline Carpio, Gregory Boehme, Rebecca MacGowan, Candace Moore, Dept. of Psychology, with Dr. Charles Calderwood, Dept. of Psychology

Despite that roughly seventy-six percent of students enrolled in college at least part-time hold part-time employment, this sector of the workforce has been severely understudied in organizational research. While previous investigators have explored retention rates and academic performance in this population, researchers have yet to thoroughly explore how balancing the demands of work and school influences on-the-job performance, as well as well-being in the work and school domains. To address this limitation, we conducted a study to investigate how demands and resources in both the work and school domains influence student well-being and performance, both at work and at school. A sample of 189 part-time working students (N = 189) completed measures of demands and resources at work and at school in an in-lab survey, followed by measures of work and school well-being in an online survey distributed two weeks later. Participant's immediate work supervisors also provided ratings of their work performance via a supervisor survey which was returned via mail. Results indicated a complex pattern of both positive and negative within-domain effects and cross-domain spillover between work and school life.

47. Latanoprost and Timolol in Hydrogel Soft Drug-Dispensing Contact Lenses: A Comparative Analysis

Neha Potdar, Dept. of Biology, with Prof. Mary Boyes, VCU Honors College

Currently, glaucoma patients only have the option of instilling glaucoma eye drops into their eyes. This method results in 1-7% absorption of the medication, and the effects of the medication taper quickly. Additionally, surveys show that glaucoma patients frequently forget to insert their eye drops, and also have difficulty in administering their eye drops daily. Researchers at the Massachusetts Eye and Ear Infirmary have recently developed latanoprost drug-dispensing hydrogel soft contact lenses with a polymer film that dispense the drug, latanoprost, into the eye to help facilitate the process for glaucoma patients to take their medication. However, some glaucoma patients do not respond to latanoprost because they have uveitic glaucoma or they do not want to experience latanoprost's ocular side effects such as change in iris color and lengthening of eyelashes. Glaucoma patients need alternative drugs to latanoprost which can be inserted into drug-dispensing contact lenses if they become available on the market. Another commonly used glaucoma drug to reduce intraocular pressure levels is timolol. This could be an option for patients who do not respond to latanoprost. While, timolol has fewer ocular side effects than latanoprost, timolol presents more systematic adverse effects. Timolol is also less expensive to buy compared to latanoprost. Timolol has comparable, extended drug release rates like those of latanoprost which leads to lower intraocular pressure levels in the eye. This alternative to latanoprost would let glaucoma patients who do not respond well to latanoprost an opportunity to try timolol-dispensing contact lenses once they become available to consumers.

48. The Use of Bacterial Community Succession Associated with Oral and Anal Regions of Porcine Remains for Post Mortem Interval (PMI) Estimation

Jenny Vuong, Dept. of Forensic Science, with Dr. Baneshwar Singh, Dept. of Forensic Science

Determination of the postmortem interval (PMI) or time since death is one of the most important criteria in un-witnessed death investigation. Majority of available methods for estimation of PMI generally provide fairly accurate estimate of PMI within 36 hours after death, but PMI estimation after 72 hours of death is a major problem in death investigations. The purpose of the proposed study is to identify bacterial structural changes throughout porcine decomposition, and utilize this information for long term PMI estimation. In the study, six swine carcasses were purchased and placed within their own enclosures. From each carcass, three swab samples were routinely collected: skin, buccal, and anal swabs. The DNA collected will go through extraction and purification with a modified CTAB bead-mill extraction process. 16S rDNA will be amplified and sequenced. The analysis and information this study provides may impact future long-term PMI estimates.

49. Combination of Music and Aromatherapy to Improve the Efficiency of Motor Functions and Speech in Patients Paralyzed From Stroke

Mounica Bevara, Dept. of Biology, with Mary Boyes, VCU Honors College

With the rapid development of medical technology, millions of dollars are being spent on discovering innovative methods of treating fatal diseases such as stroke that may also result in temporary paralysis. Physiotherapy treatments aimed at restoring brain function in patients paralyzed following a stroke is subjective to the patient and does not guarantee complete rehabilitation. While many practitioners have attempted to employ complementary and alternative methods of treatment such as massage therapy, acupuncture therapy, siddha, and marma therapy, none of them proved to be equally as effective as physiotherapy. However, prior studies support the notion that aromatherapy used in combination with music

therapy showed promising results. Aromatherapy, defined as using extracted oils from plants and herbs to naturally treat the body through oral or skin absorption, has been effective in halting the process of apoptosis, or programmed cell death in cells. The inhibition of apoptosis may be principal in delaying the degeneration of brain cells. Music therapy, on the other hand, uses a process known as entrainment to access a paralyzed brain for rhythmic perception. These two processes are connected through transduction, which elaborates the relationship between the olfactory and auditory system that improves the efficiency of memory retention through familiar scents and sounds. Using aromatherapy in combination with music therapy is more effective because it is a self-paced treatment that does not require the administration of a trained professional. This alternative treatment for paralyzed stroke patients will be applicable to the general public if administered in reasonable doses under appropriate conditions.

50. Factors related to nighttime waking in children with asthma

Katlyn Garr, Parmida Enayati, Department of Psychology, with Jessica L. Greenlee, BA., Marcia A. Winter, PhD, Robin S. Everhart, PhD, & Barbara H. Fiese, PhD

Objective: Children with asthma may be at increased risk for disturbed sleep (Chugh et al., 2006; Yoon, et al., 2013), which can have negative consequences for their mental health, behavior, and quality of life (Alfano, Zakem, Costa, Taylor, & Weems, 2008; Daniel et al., 2012; Roberts, Roberts, & Duong, 2008; Yoo, Gujar, Hu, Jolesz, & Walker, 2007). However, research focused on sleep in children with asthma has produced contradictory results, with some studies showing a link between asthma symptoms and sleep dysregulation while other studies report no relationship (e.g. Chugh et al., 2006; Ronchetti, 2002). Therefore, the aim of the current study was to examine possible correlates of nighttime waking in children with asthma. We hypothesized that nighttime waking would be associated with younger age, having more mental health problems, and lower quality of life. Methods: Our sample consisted of 215 children between the ages of 5 and 12 (M = 7.84, SD = 0.15) with asthma and their primary caregivers. Children and their families were recruited through pulmonary and pediatric clinics in a mid-size city. During an in-lab study visit, caregivers reported on their child's quality of life using the Child Quality of Life measure (QoL; Juniper et al., 1995), asthma severity using the Functional Severity of Asthma Scale (Rosier et al., 1994), their child's mental health (internalizing and externalizing symptoms) with the Child Behavior Checklist (CBCL; Achenbach, 1991), how frequently their child woke at night using a measure developed for the Family Life in Asthma Project, and demographics including child age, sex, and race, and family socio-economic status (SES). Results: Of the 215 participants, 35 reported experiencing overall sleep disturbances. Child's age (r = -0.21), child's QoL (r = -0.15), and family SES (r = -0.14) were negatively correlated with disrupted sleep. Parent report of child's asthma severity (r = 0.35), depressive symptoms (r = 0.16), and ADHD symptoms (r = 0.14) were positively correlated with nighttime waking. Child sex, race, and all other subscales of the CBCL were not significantly related to nighttime waking. Conclusion: Results show that lower socioeconomic backgrounds, children with an overall reduced quality of life, more severe asthma symptoms, and higher ADHD and depressive symptoms are associated with waking in the night due to asthma. This study suggests that sleep is a crucial factor in the health and well-being of children. Further research is necessary to better understand the relationships between sleep problems and mental health in children with asthma.

51. "Olweus Bullying Prevention Program: Assessing Teacher Adherence to Class Meetings"

Megan Adair, Ashlyn Hummer, Madison Ebel, Dept. of Psychology with Dr. Rachel Garthe and Dr. Terri Sullivan, Dept. of Psychology

Bullying behavior is prevalent in adolescence and associated with adjustment difficulties (Kelly et al., 2015). The Olweus Bullying Prevention Program (OBPP; Olweus & Limber, 2007) has been implemented in local middle schools. One key element is class meetings that occur regularly between teachers and students. These meetings focus on the preventing bullying behavior and related topics (e.g., respecting others and emotion management). Prior studies (e.g., Schroeder et al., 2011) assessed teachers' adherence (i.e., how closely the teacher delivers OBPP according to specified procedures). However, few have examined how teacher behaviors and adherence to class meeting procedures may vary according to the type or scale of classroom activities. The Clark-Hill Institute for Positive Youth Development at VCU evaluated OBPP at three local middle schools. The current study focuses on adherence data collected during class meeting as part of that evaluation over four years (2010-2014). The Adherence Scale is comprised of 14-items that are scored using a 3-point response scale: 1 – *Not at all*, 2 – *Somewha*t, and 3 – *Extensively*. Analyses of variance (ANOVAs) were used to assess mean differences in the rates of teacher adherence to OBPP class meetings based on: a) the type of activity within the class meeting (i.e., drawing/writing/poster, situation card/role play, discussion, or game/team building), or b) scale of activity (i.e., individual, small group, large group/whole class). Results will examine mean differences of student engagement based on the type and scale of class activities. Implications include informing future prevention practices on how aspects of class activities may impact adherence.

52. Sociodemographic predictors of dual tobacco use among U.S. adult cigarette smokers

Jennifer Brooks, Dept. of Psychology, with Dr. Mignonne Guy, Dept. of African American Studies and Dr. Susan Bodnar-Deren, Dept. of Sociology

Background: Tobacco use is the leading cause of preventable death in the U.S. Over the past decade, rates of cigarette smoking have decreased; however, more smokers are engaging in dual tobacco use. Dual use may increase smokers' risk of tobacco-related diseases, nicotine dependence, and other substance abuse. Concomitant use of little cigars and cigarillos (LCCs) is growing in popularity. LCCs have harmful health effects equivalent to those from cigarette smoking and increase the risk of developing tobacco-related cancers, cardiovascular and respiratory disease. To address this public health concern, it is crucial to understand predictors of tobacco use behaviors that increase risk for chronic disease. The purpose of this study was to examine predictors of dual LCC use among a nationally representative sample of adult smokers.

Methods: We conducted secondary analysis on the 2013 GFK Use of Cigarette Alternative Study. The analytic sample (n=1669) was limited to current cigarette smokers (18+). Data used in this analysis include sociodemographic characteristics and tobacco use behaviors. Demographic and smoking behaviors between single users (cigarette only) (n=1500) and dual (LCC/cigarette) users (n=169) were compared using Chi-square. A weighted logistic regression model was used to estimate the likelihood of dual use.

Results: The ages of respondents were between 18-29 (17%), 30-44 (30%), and 45+ (53%). Fifty-one percent of the sample were men, 67% identified as white, 16% black, 11% Hispanic and 6% other. Thirty-five percent of respondents had incomes under $45,000 and just under 50% were unemployed. In bivariate analysis, age (p=0.004), race/ethnicity (p=0.000), sex (p=0.000), and income (p=0.000) were associated with differences between single and dual users. In the adjusted model, those ages 30-44 (OR=0.58; CI=0.35-0.94) and 60+ (OR=0.36; CI=0.36-0.65) were less likely to be dual users than those 18-29. Men were more likely to be dual users (OR=4.94; CI=3.38-7.20), as were those who were unemployed (p=0.000) and those with incomes less than $24,999 (p=0.000). Contrary to the extant literature, race and was not associated with dual use.

Conclusion: Dual use of LCCs/cigarettes is more common among young adults. Additional research should be conducted to explore interactions between race, income, and dual tobacco use behaviors.

53. An Inexpensive, Scalable Behavioral Assay for Measuring Ethanol Sedation Sensitivity and Rapid Tolerance in Drosophila

Simran Sandhu, UROP Summer Research Fellow, Dept. of Biology, with Dr. Michael Grotewiel, Dept. of Human and Molecular Genetics

Alcohol use disorder (AUD) is a serious health challenge. Despite a large hereditary component to AUD, few genes have been unambiguously implicated in their etiology. The fruit fly, *Drosophila melanogaster*, is a powerful model for exploring molecular-genetic mechanisms underlying alcohol-related behaviors and therefore holds great promise for identifying and understanding the function of genes that influence AUD. The use of the *Drosophila* model for these types of studies depends on the availability of assays that reliably measure behavioral responses to ethanol. This report describes an assay suitable for assessing ethanol sensitivity and rapid tolerance in flies. Ethanol sensitivity measured in this assay is influenced by the volume and concentration of ethanol used, a variety of previously reported genetic manipulations, and also the length of time the flies are housed without food immediately prior to testing. In contrast, ethanol sensitivity measured in this assay is not affected by the vigor of fly handling, sex of the flies, and supplementation of growth medium with antibiotics or live yeast. Three different methods for quantitating ethanol sensitivity are described, all leading to essentially indistinguishable ethanol sensitivity results. The scalable nature of this assay, combined with its overall simplicity to set-up and relatively low expense, make it suitable for small and large scale genetic analysis of ethanol sensitivity and rapid tolerance in *Drosophila*.

54. p53-Independent Noxa Induction for Head and Neck Squamous Cell Carcinoma Treatment

Thien-Trang Vu, Dept. of Biology with Dr. Hisashi Harada, VCU Massey Cancer Center

Head and neck cancer is one of the sixth most deathly cancers. Although there are many chemotherapeutic drugs and therapies available for cancer patients, advanced head and neck squamous cell carcinoma (HNSCC) are not completely treated. Cisplatin is a common chemotherapeutic drug used in various types of cancers including head and neck cancer. The prolonged use of cisplatin causes a resistance overtime. To overcome this issue, mechanism-based therapeutic strategies must be developed to maximize the effect of drugs while lowering the level of resistance. Cisplatin produces anticancer effects in multiple mechanisms. However, the most important factor of this drug is its ability to generate DNA lesions and activate DNA damage response followed by inducing the BCL-2 family-dependent mitochondrial apoptosis. Cisplatin induces the expression of pro-apoptotic BCL-2 family protein Noxa that can bind to the pro-survival BCL-2 family protein MCL-1 to inactivate its function and induce cell death. To examine the contribution of Noxa in cisplatin-induced apoptosis, shRNA for Noxa was introduced in p53-null HN8 cells, since *p53* is mutated or deleted in more than 50% of HNSCC. We concluded that the up-regulation of Noxa is critical for cisplain-induced apoptosis in p53-independent HNSCC cells. To examine the mechanisms of cisplatin-mediated Noxa induction, we performed Q-RT-PCR to determine the mRNA levels of *Noxa*. We found that *Noxa* mRNA was strongly induced at 16 hours similarly as Noxa protein in a time dependent manner, suggesting that Noxa induction is regulated at transcriptional level. We next examined the regulation of the *Noxa* promoter with a series of luciferase reporter assays. We found that the CRE site (-66~-59 from the transcription start site) located on the promoter contributed to *Noxa* induction. It has been demonstrated that the CRE site is regulated by transcription factors such as ATF-2, ATF-3, ATF-4, and CREB. Thus, we first determined the expression of these transcription factors after the cisplatin treatment. We found that ATF-3 and ATF-4 were induced by cisplatin treatment correlated with Noxa and apoptosis induction, but ATF-2 and CREB were relatively constant throughout the time course. To determine the significance of these transcription factors, we performed knockdowns of these transcription factors by shRNAs. It was determined that downregulation of ATF-4 clearly reduced Noxa induction. We will next perform ChIP assays to confirm transcription factor ATF-4 is binding to the CRE site.

Key Words: HNSCC, cisplatin, apoptosis, p53, Noxa

55. The Effect of Student-to-Student Online Interaction on Student Learning Outcomes in Online Introductory Information Technology Courses

Daniel Matheson, UROP Summer Research Fellow, Dept. of Information Systems, with Dr. Elena Popel, Dept. of Information Systems

Online courses are prevalent within the education system today, yet the design and implementation of a successful course that builds a foundation for the long-term academic success remains a complex task. It has been found that the student-to-student interaction has a positive effect on student learning (Kolloff, 2011). Our research focuses on designing an experiment that looks at the effect of student-to-student online interaction within an online introductory information technology course on student academic success. As a part of our research project, we performed the following: Identified the different types of student-to-student interactions as applicable to our specific course; Redesigned the traditional online introductory information technology course to incorporate the student-to-student interactions identified; Designed an experiment that would allow us to gather data of student performance in the traditional and redesigned courses.

56. Memantine as an Alternative Treatment to Increase Brain Plasticity in Recovering Stroke Patients

Keerthana Shankar, Dept. of Biomedical Engineering, with Prof. Mary Boyes, VCU Honors College

Recovering stroke patients go through rehabilitation to fix the paretic limbs and adapt to the nerve damage. Recovery consists of repetitive tasks that are designed to guide the plastic brain to adapt to new movements and gain muscle memory in those movements. Rehabilitation is strongly dependent on the brain's plasticity, which is enacted through increased levels of brain-derived neurotrophic factor (BDNF). BDNF has been proven to be increased through aerobic exercise, a common element found in rehabilitation programs. It is vital that the exercises performed in rehabilitation result in higher brain plasticity due to the limited time window of the critical period. Certain requirements such as maximum heart rate and frequency of exercises performed must be met to increase the plasticity in the brain. These requirements are not always possible for every patient going through rehabilitation due to their differing activity levels. Understanding the relationship between time, exercise, plasticity, and recovery is essential to finding alternative treatments besides exercise that can be used to increase brain plasticity. Memantine, an Alzheimer's drug tested in rats regarding motor function, is a viable drug to increase plasticity. In several rat models, Memantine was proven to increase cognitive function and BDNF levels in the brain, which is vital for the recovery of stroke patients. For patients that are not physically or mentally capable of meeting the requirements needed to increase plasticity, Memantine can be administered as an alternative or conjoined treatment, so that patients may go through rehabilitation training and recover with a positive functional outcome.

57. Factors Contributing to Sleep Deprivation in College Students: The Seemingly Unsolvable Problem

Wilson Yang, Dept. of Biomedical Engineering, with Prof. Mary Boyes, VCU Honors College

College is a time where young adults get a taste of the real world. With the experience of the real world come real problems. One of the major issues with college students is sleep deprivation. Most college students claim that they do not get enough sleep making this issue very real and very important. Sleep deprivation is associated with many psychiatric disorders such as depression, substance abuse, and poor physical health. College students are prime candidates for sleep deprivation because they are exposed to fear tactics which are not efficient at doing their job, faced with economic constraints, in the process of identity discovery, and surrounded by constant noise. All these problems together make it seem nearly impossible to allow students to receive enough sleep. Different articles were examined in order to evaluate the influence each contributor

to the lack of sleep affecting college students. Each contributor in of itself is not too significant, but once everything is compounded together sleep deprivation becomes very real. It is necessary to come up with new methods to encourage the necessary amount of sleep for college students. Scare tactics can be replaced with new methods that are much more effective, more reasonable forms of loans can be established, students can be placed in dorms based on interest, and quiet hours in the dorms should be established and enforced. These methods can save time and reduce stress in order to allow students to sleep more.

58. Changing Unconscious Awareness: Increasing Women's Implicit Liking of Mathematics through the Presence of a Female Scientist

Mary C. Markley, Lisa Y. Chung, Dept. of Psychology with Dr. Jennifer A. Joy-Gaba, Dept. of Psychology

While women have earned 57 percent of all bachelor's degrees, only about half of those are awarded through the fields of science, technology, engineering, and math (STEM) (The National Science Board, 2015). This gender gap persists even after college: while men are vastly dominating STEM professions, the number of women represented in engineering and physical science occupations is at a staggering 15 and 12 percent (The National Science Board, 2015). Previous findings suggest that individuals automatically associate males with STEM. This association may, in part, account for the ongoing gender gap within STEM degrees, and therefore STEM occupations. The current study investigates whether these implicit attitudes can be changed through interaction with a female scientist. To test, participants completed an implicit task and self-report questions to assess mathematics attitudes and gender-math stereotypes for both men and women. Participants interacted with either a male or female experimenter. Results revealed that the gender of the experimenter differentially influenced implicit, but not self-reported, attitudes toward mathematics among female and male participants. In the presence of a male experimenter, women's implicit attitudes toward math were more negative than men's attitudes. However, in the presence of a female experimenter, women's implicit attitudes toward math were more positive, and there was no gender difference. This suggests that implicit evaluations are response to subtle social features present in the environment.

59. High Dietary Omega-3 Fatty Acids Blunt Alcohol Responsive Behaviors in Mice

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Alcohol use disorder (AUD) affected 16.6 million Americans in 2013. Genetics contribute to approximately 50% of the risk for developing an AUD. However, the specific genes and how these genes interact with the environment is not precisely known. Fish oil supplements containing high omega-3 levels are commonly used by millions of Americans, but the contribution of this environmental variable to AUD risk is unknown. We showed that high levels of the omega-3 eicosapentaenoic acid (EPA) blunted ethanol sensitivity in the round worm *Caenorhabditis elegans (C. elegans)*. Next, we tested the hypothesis that high dietary omega-3 levels interact with mammalian genetic background to increase AUD risk. Two genetically defined mouse strains with distinct and well-studied behavioral responses to ethanol (DBA/2J and C57BL/6) were fed diets containing high or low levels of omega-3s. Approximately 10 weeks of regulated diet significantly augmented or depleted blood EPA levels. Subsequently, acute stimulatory and anxiolytic-like behavioral responses to ethanol were measured. Following ethanol injection (0, 1.5, 2.0 g/kg, 10% w/v, i.p.), the DBA/2J strain normally exhibits a robust locomotor stimulation that is not observed in the C57BL/6 strain. Intriguingly, we

found that high dietary omega-3s blunted the acute stimulatory effect of ethanol in DBA/2J, but not C57BL/6 mice. No differences were seen in either strain for anxiolytic-like effects. Currently, we are studying hypnotic effects and consummatory behaviors, comparing these results to blood ethanol concentration and blood and brain omega-3 levels. Importantly, the behavior of mice fed diets high in omega-3s is strikingly similar to our *C. elegans* observations. Because ethanol sensitivity is predictive of risk for developing AUD in humans, the high congruence of these cross-species data indicate that dietary omega-3 levels should be evaluated for their impact on AUD risk in humans.

60. The Great Divide: What's Keeping Black Students From Studying Abroad?

Alexis Briggs, Dept. of African American Studies, with Dr. Vivian Dzokoto, Dept. of African American Studies

The goal of this study is to examine the factors that contribute to Black students studying abroad, as well as identify the factors that challenge or hinder Black students from studying abroad. According the Institute for International Education, only 5.6 percent of study abroad students in the academic year 20132014 were Black. Black students, next to Native Americans, are the least likely to study abroad. Previous research has examined factors that may explain why Black students are less likely to study abroad, and these include financial concerns, social capital, fear of discrimination abroad, and institutional factors. To examine this issue, semistructured qualitative interviews were conducted on both Black study abroad returnees and Black study abroad aspirants to determine what factors contribute to Black students participating in study abroad programs. Interview transcripts were analyzed thematically in order to identify relevant themes. Results conclude that money is an important factor in Black Students' ability to study abroad. The findings help to bring meaning to the 5.6 percent of students that study abroad, and to shed light on the issues that need to be addressed in order to raise the number of Black students that study abroad. Keywords: Black, study abroad

61. A Field Test for Nicotine in Refill Formulations for Electronic Cigarettes

Laura McNew, Depts. of Chemistry and Forensic Science, with Dr. Michelle Peace, Dept. of Forensic Science

As of 2016, there are still many smaller cities across the US that have not changed local ordinances to reflect e-cigarette use. In these areas, it has become extremely easy for minors to obtain e-cigarette devices and to purchase e-liquids containing the highly addictive nicotine. It is expected that within the next year, smaller town and city ordinances will catch up with the bigger cities; however, in the interim, local police agencies in those areas have been conducting e-cigarette stings to confiscate the devices from minors. The purpose of this research project was to develop a presumptive, colorimetric method that can be easily used by law enforcement, is cheap, and has the least amount of errors due to interferences.
Several colorimetric methods were tested to determine which method is most efficient, in process and expense, for nicotine. A concentration of 99% nicotine was first tested with each reagent, and a limit of detection was tested up to 1.2 % nicotine; interference studies were conducted using known interferences. The modified Sanchez color test using Meltzer's reagent and the Zwikker's reagent both showed a positive color reaction when exposed to 99 % nicotine; however, only Zwikker reagent, commonly used to test for barbiturates, continued to give a positive test for nicotine when the nicotine was diluted down to 1.2 %. Tea and Excedrin were identified in previous literature as causing a false positive test for nicotine using Zwikker reagent; however, neither showed to have an effect during this study. Because electronic cigarette devices are also used to smoke nicotine-free flavored liquid, it is necessary to have a presumptive test for nicotine available to law enforcement to prevent crime labs from being inundated with e-cigarette devices and e-liquids.

62. Using Interferon Gamma to Induce Quiescence in Mouse Mammary Carcinoma Cells

Alexander Liakos, Dept. of Biology, with Dr. Masoud Manjili, Dept. of Immunology and Microbiology

About one in eight U.S. women will develop invasive breast cancer in the course of her lifetime. While early stage breast cancer has proven fairly treatable with current therapies, the danger lies in relapse. This problem is further compounded by the fact that the treatment methods for advanced stage breast cancer can actually increase the likelihood of relapse. It is of importance to investigate the role of the immune system in preventing relapse. A relatively ubiquitous molecule already produced by the body, Interferon Gamma (IFN-γ), not only plays a key role in immune regulation and anti-tumor response but may also directly affect the cell cycle of certain subtypes of breast cancer. Our research has shown that IFN-γ has the ability to stop tumor cell division in G0/G1 phase and produce permanently dormant or quiescent tumor cells. While the entire class of interferons and their immune regulating properties have long been known, the ability of IFN-γ to induce cell cycle arrest has just begun being studied. Using flow cytometry and their respective stains to quantify the amount of cells dividing (Ki-67), their viability (FVS) and their receptor count (Neu) we determined quiescence status. With four treatments of IFN-γ on days 1,2,3, and 10 at a clinically relevant concentration of 50 ng/mL, nearly all cells had entered apoptosis. Cells that were able to escape apoptosis had decreased proliferation and Her2/neu expression, markers for quiescence. A small portion of cells that escaped apoptosis entered another type of dormancy called indolence, marked by positive Ki-67 expression and decreased Her2/neu expression. By forcing permanent dormancy in tumor cells they lose their ability to divide after they metastasize, reducing rates of relapse. Existing or future drugs may be able to supplement the immune system so it can then remove dormant tumor cells safely and with diminished use of chemotherapy drugs, radiation therapy and/or surgery.

63. β-amyloid aggregation in Alzheimer's Neurodegeneration: Using Bacillus subtilis Natto to degrade E. coli induced amyloids

Monika Devanaboyina, Dept. of Biomedical Engineering, with Prof. Mary Boyes, VCU Honors College

In the United States alone, Alzheimer's disease is the sixth leading cause of death. Symptoms of Alzheimer's disease include dementia, and current treatment includes the use of medication to reduce memory decline. Therefore, novel mechanisms to effectively treat this disease must be developed. For over the past two decades, β-amyloid aggregation within the brain has been recognized as the main contributor to Alzheimer's development, and cerebral β-amyloid deposition can occur through the RAGE transporter at the blood barrier. In addition, *Escherichia coli* produce curli, which have similar folding mechanisms to amyloids. Scientists have proposed that *E. coli* protein misfolding can induce aggregation in β-amyloid within the body. In this study, *Bacilius subtilis* natto, a probiotic in fermented soybean, was found to effectively degrade β-amyloid in vitro. Since natto can be absorbed by the gastrointestinal tract, the probiotic was examined as a possible treatment to prevent cerebral amyloidogenesis through the cleavage of peripheral amyloids. Further studies should focus on clinical implementation of *Bacilius subtilis* natto to determine the significance of the probiotic in alleviating symptoms of Alzheimer's. Other safe probiotics with similar properties should also be investigated, while observing the immediate and long-term benefits. Overall, this work increases our understanding of the role of the digestive tract and microbes in neurodegenerative diseases.

64. Synthesis and Characterization of Magnetocaloric LaxCa1-xMnO3 Nanomaterials

Devon Dryer and Melissa Tsui, Dept. of Chemistry, with Dr. Everett Carpenter, Dept. of Chemistry

The magnetic properties of manganites have been gaining attention due to its magnetocaloic nature and are considered to be promising candidate for applications such as magnetic recording, and magnetic refrigeration.[1,2] The bulk properties of $LaCaMnO_3$ is well explored, however there seem to be a lack of literature on $LaCMnO_3$ nanomaterials. In this work, $La_xCa_{1-x}MnO_3$ nanomaterials were synthesized via a modified sol-gel method and annealed at 700°C, 800°C, and 900°C to study the effect of particle size and

composition on the magnetocaloic properties. X-ray diffraction (XRD) was used to determine the phase and crystallite size of the particles, scanning electron microscopy (SEM) with energy dispersive X-ray analysis (EDx) was used to determine the size and composition of the particles.

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65. The Physical Past of Gullah Culture

Lillie Hinkle, Depts. of Anthropology and Philosophy, with Dr. Bernard Means, Dept. of Anthropology

This poster summarizes the research and work completed at Virginia Commonwealth University's Virtual Curation Lab under the direction of Dr. Bernard Means. This poster seeks to recreate the physical past of Gullah culture, what many have declared a dying people group. Gullah culture originated from the slaves that worked plantations in Georgia and lowcountry South Carolina in the 18th and 19th century. This culture has been retained by African American populations in these Southern regions, having its own language, folklore, and religion. Using 3D printing technology, my colleagues and I have been able to print models of Gullah artifacts ranging from sweetgrass basket weavings to ceramic works from Boone Hall Plantation in Mt. Pleasant, South Carolina. A background on 3D printing technology, methods, and the former slave plantation from which our data has come from will be provided as well. This research and model generation seeks to educate those on the past of a still thriving American subculture.

66. Tracking Trends in the Professional Advancement of Academic Public Services Librarians

Cassidy Sheehan, Dept. of English, with Megan Hodge, Teaching and Learning Dept., VCU Libraries

This project examines hiring practices for middle management positions at academic public services libraries. The path to management for entry-level academic librarians working in public services is not straightforward as it is in other types of libraries, with few if any stepping-stone positions between the front lines and department head. As seen in a review of the literature, many organizations are delayering, which further reduces the number of stepping-stone positions and opportunities for librarians to gain management experience. Many individual librarians have anecdotally explained their path to management on blogs and in other informal forums, advising ambitious librarians to engage in continuing professional development, build networks, and find mentors; however, little formal research on this topic has been conducted. Through open-ended interviews, this research examines the preferences and experiences of academic librarians who have served on hiring committees for middle management positions, as well as public services librarians who have recently made the transition from the front lines to their first supervisory position. Additionally, advertisements for middle management jobs in large academic public libraries were collected from the ALA JobList, INALJ, Association of Research Libraries, and ili-l archives. The required and preferred qualifications listed on these advertisements were analyzed and compared to the hiring preferences identified by librarians during the open-ended interviews. These interviews and job advertisements will be used to create a mixed-methods survey with qualitative and quantitative questions, eliciting both statistically analyzable raw data as well as freeform advice and suggestions.

67. Studying antibiotic production from an isolated fungus

Samantha Jones, Dept. of Biology, with Dr. Fernando Tenjo, Dept. of Biology

Fungi are some of the most diverse organisms known. The use of secondary metabolites by fungi help with their survival and they can be used as antibiotics or pesticides. An unknown fungus obtained from a log showed antibiotic properties in the presence of a contaminant fungus. Using DNA extraction, PCR was carried out to amplify the 18s ITS region. The PCR ITS fragment was purified and ligated into a plasmid and

transformed into *Escherichia* coli. The recombinant plasmid was purified from bacteria and sent off for sequencing. The DNA sequence was run through the BLAST database to be compared to other sequences to determine the species. The species of the unknown was identified as *Trichoderma harzianum*, which is a natural bio-pesticide. This explains the antibiotic properties that were observed. Future work to test the antibiotic activity of this fungus with other organisms will be done.

68. Surface Thermodynamics of Penta-Graphene

Stefan Chase, Dept. of Chemistry, with Dr. Alenka Luzar, Dept. of Chemistry

While their ubiquity may cause them to be often overlooked in daily life, droplets of water, or many other liquids for that manner, reveal valuable information about the surface on which they lie. A superhydrophobic material, for example, is not discernable by the naked eye, but the near spherical form a droplet assumes on its surface is an unmistakable indicator. A measurement of the angle between the droplet and surface at the interface, known as the contact angle, is a common method to probe the nature of the liquid-solid interactions at a molecular level. In this computational study we seek a first estimate of the contact angle of water on the newly discovered structure penta-graphene[1] at the nano-scale. Whereas graphene is a 2-dimensional carbon sheet consisting of 6-membered sp^2 hybridized carbon rings, penta-graphene is composed entirely of pentagons and contains both sp^2 and sp^3 carbon atoms in a 2:1 ratio. Through atomistic simulations utilizing a Lennard-Jones (LJ) potential we measure the contact angle of a sessile water droplet on the penta-graphene surface. Analysis of the density of the droplet as a function of height above the surface determines the proper region for measurement, reducing noise for cross-system comparison. This not only adds to the understanding of the wetting properties of penta-graphene specifically, but sheds light on the recurring theme relating molecular structure and its connectivity to chemical properties.

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69. The Lego System Makes Co-Creation Painless for the Lego Group

Seth Peacock, Dept. of Mechanical Engineering, with Prof. Mary Boyes, VCU Honors College

Co-creation represents an opportunity for a firm to improve upon its product innovation process by incorporating the ideas of consumers. The LEGO Group has been cited as an example of successful co-creation. While the methodology of co-creation has been extensively researched, different products' relative suitability to co-creation is rarely examined. This paper examines the LEGO Group's co-creation efforts including LEGO Ideas, LEGO Factory, LEGO Mindstorms NXT, and LEGO Architecture, as well as the co-promotional LEGO Certified Professional program. These programs' reliance on LEGO's versatility, modularity, adult fan community, and fan LEGO building expertise are evaluated and compared to other firm's co-creation efforts. The adult LEGO community's custom LEGO creations, including fan-designed and fan-sold sets, commissioned sculptures, and LEGO robotics development all constitute consumer innovation independent of the firm; the LEGO Group may harness these innovations through co-creation. Because LEGO is a system and not a specific product, LEGO innovations can encompass licensing, new robotic components, integration with jewelry, and architectural scale models. This diversity of potential innovation allows the LEGO Group to take advantage of the diversity of adult LEGO fans' expertise; co-creation can reveal novel marketing opportunities. LEGO hobbyists develop knowledge of the LEGO system that makes them skilled at LEGO set design, as designing a LEGO creation and designing a LEGO set are similar processes. LEGO is modular, so co-creation can be used both to develop new LEGO elements and to design LEGO sets composed of preexisting elements. LEGO set prototypes can be easily assembled and modified, and parts palette and parts count are easily understood design limitations. This paper recommends that firms whose products are versatile, modular, and consumer-innovated pursue co-creation and co-promotion, and cautions firms without such products to adapt their co-creation and co-promotion accordingly.

70. Cyclic-AMP Regulates Postnatal Responses to NaCl in Rats

David West, Dept. of Biology, with Dr. Vijay Liyall, Dept. of Physiology and Biophysics

Salt taste develops during the postnatal period in rodents and humans. In rats, the epithelial sodium channel (ENaC) responsible for salt taste in the tongue does not develop until approximately 7 to 50 days after birth. However there is ENaC found in various locations throughout the body that is present and functional at birth. The reasoning for this delay in development and the signaling mechanism responsible is still unknown. We hypothesized that increased levels of the intracellular hormone cAMP aids in the development of functional ENaC. Therefore we investigated the effect of cAMP on the behavioral response to salt in the developing and adult rat. The developing animals were exposed to two bottle preference tests between water and 150 mM NaCl while the adult rats were exposed to two bottle preference test for a range of concentrations (0-0.5 M) of NaCl. Initially there was no difference between water and NaCl. However after topical lingual administration of 20 mM 8-CPT-cAMP, rats demonstrated preference for NaCl in the developing animals and a clear downward shift in fluid intake of higher concentrations for the adult rats. These results suggest that exposure to cAMP helps modulate an increase in newly synthesized functional ENaC units to the apical membrane found in the tongue. We conclude that cAMP can alter the behavior and enhance the salt taste development in rats.

71. Synthesis of SrFe12O19 core particles for core/shell magnetic material using a one-pot benchtop method

Brady Dowdell, Dept. of Chemistry, with Dr. Everett Carpenter, Dept. of Chemistry

$SrFe_{12}O_{19}$ is a hard magnetic material, with widely applicable intrinsic magnetic properties. These core particles were synthesized using a one-pot benchtop reaction performed under nitrogen gas and held at a 320°C reflux for 1.5 hours; this method was replicated from a previous paper and modified to include a different Strontium salt ($SrCO_3$) as opposed to the original $SrC_{36}H_{70}O_4$. Upon substitution of the $SrCO_3$, formation of a mixed phase Iron carbide occurred (Fe_3C/Fe_7C_3). Upon annealing the sample at 800°C for 1 hour and conducting an SEM analysis of the resulting material, an interesting morphology was identified in the form of small rod or wire-like structures protruding from the sample. This was a great difference from the original morphology, which resembled a large collection of roughly circular plates. Though the magnetic properties of the annealed carbide material were determined to be much lower than the ferrite, the presence of a wire morphology prompted additional investigation with further characterization methods, such as Energy Dispersive X-ray spectroscopy and Magnetic moment versus Temperature curve analysis. In addition to investigating this unusual morphology, synthesis of an Iron cobalt (FeCO) shell to accompany the core is planned for the near future.

72. Predictors of the Efficacy of a Guided Imagery Stress Management Intervention in Pregnant African American Women

Diana D. Naidoo, BA, BS, RN, UROP Summer Research Fellow with Nancy Jallo, PhD, FNP-BC and Leroy Thacker, PhD, School of Nursing

Background: Maternal stress and related symptoms of anxiety, fatigue and depressive symptoms are associated with threats to maternal well-being and negative birth outcomes especially among pregnant African American women. Recent randomized clinical trial demonstrated significant reductions in these behavioral factors in this population using a guided imagery (GI) stress management intervention. Identification of variables that predict the efficacy of this intervention could assist in the on-going development of this intervention and potentially tailor the intervention to this high-risk population. **Objectives:** Purpose was to identify predicators of the efficacy of a GI intervention for stress management in pregnant African American women. **Methods:** A secondary data analysis of a longitudinal repeated measure design with a sample of 36 pregnant African American recruited at 14-17 weeks gestation who received the 12 week GI intervention.

Study measures collected at baseline included Perceived Stress Scale (PSS), State Anxiety Inventory (STAI), Center for Epidemiologic Studies-Depression (CES-D), Brief Fatigue Inventory (BFI) and demographic factors. Participants completed a Numeric Rating Scale of Stress (NRSS) before and after listening to the intervention and documented listening time. A mixed linear model (MLM) was used to analyze the efficacy of the GI as defined as daily post minus pre stress score as a function of total listening time, adjusting for the daily pre-listening score and the total daily listening time. Subsequent models adjusted for covariates suspected to have an impact on stress score. **Results:** In the final model, age, education, gravidity, alcohol, caffeine, smoking, and PSS, STAI, BFI baselines measures were not significant predictors of GI efficacy where as listening time and baseline CES-D score were significant predictors. The more the participant listened to the intervention, the greater the change in stress scores. The higher the CES-D score, the greater change in stress scores. **Conclusion:** GI appears to be an effective stress management intervention in pregnant African American women regardless of demographic and baseline PSS, STAI, and BFI scores as well as those with higher CES-D scores. Findings suggest the intervention may be beneficial to a wide range of pregnant African American women, including those at high risk for depressive symptoms. Listening time should be encouraged.

73. Evaluation of Social Networking Sites as Applicant-Screening Tools for Human Resources Professionals

Caroline Clary, VCU School of Business, with Prof. Mary Boyes, VCU Honors College

Social networking has taken the Internet by storm with a multitude of platforms from which to choose, and human resources professionals are anxious to explore the potential of these sites as strategic screening mechanisms in order to maximize the value of their human capital and thus increase corporate profitability and sustainability. Personal social media accounts offer employers a wealth of information about each individual applicant, opening a window into a prospective employee's private life far beyond anything that can be viewed as job related. As a result, businesses may find that selecting the best and brightest talent based on social media screenings as a component of the hiring process often collides with current legislation, corporate image, and views on corporate ethics. In spite of these findings, companies continue to forge ahead with their use of social networking sites for applicant screening purposes; however, research and judicial rulings are currently lagging behind, making it difficult for employers seeking a sense of direction in the use of this new applicant screening strategy. Through an examination of current, peer-reviewed research and government publications, this study promotes informed decision-making through the analysis of current benefits as well as challenges associated with the use of social media sites in applicant screening, and provides guidance for companies wanting to incorporate its use into their screening protocols. Until social media screening is more fully evaluated and established, employers should minimize its use, and at the very least, exercise due diligence in developing policy and structured protocols that are clearly founded in job relatedness.

74. Dependence levels and alcohol use correlates among dual users of cigarettes and e-cigarettes

Sanyam Patel, Dept. of Biology with Phoebe Brosnan, Dept. of English and Dr. Caroline Cobb, Dept. of Psychology

Background: Little is known regarding levels of nicotine dependence and risky behavior patterns among dual users of cigarettes and electronic cigarettes (e-cigarettes). Some data suggest that dual use of e-cigarettes and cigarettes may support lower dependence on cigarettes. Other data suggest a positive relationship between poly-tobacco use and dependence on cigarettes. Alcohol use among dual users**,** as with cigarette smokers, may be associated with increasing dependence levels and other risky behaviors. The current study aimed to report dependence levels for cigarettes and e-cigarettes among current dual users and to examine whether alcohol use was associated with differential characteristics including demographics, engagement in risky behaviors, and dependence levels. **Methods:** This secondary analysis included 29 individuals who consented to participate in a clinical laboratory study of dual cigarette and e-cigarette users. Baseline screening data included demographics, cigarette and e-cigarette use history, alcohol and marijuana use, and cigarette and e-

cigarette dependence score both measured via the Fagerstrom Test for Nicotine Dependence (FTND and FTND-modified for e-cigarettes). FTND scoring followed standard methods. Alcohol use status was defined as either drank at least one day in the past 30 days or did not drink in the past 30 days/never drank. Following descriptive analyses, Pearson's chi-square and independent samples t-tests were used to compare differences in alcohol use status with demographics, marijuana use, cigarette and e-cigarette use history, and FTND scores. Significant findings are those with $p<0.05$. **Results:** About half of the participants were male and identified as Black/other and had some college education or more with an average age of 39 years. Over half reported smoking marijuana/hashish in their lifetime and past 30-day alcohol use. FTND scores indicated dual users had a high cigarette (average = 6) and low e-cigarette (average = 3) dependence classification. For demographics, alcohol use was significantly associated with identifying as Black/other. Lifetime marijuana use was significantly related to alcohol use (81% vs. 39%). Age of e-cigarette initiation was significantly lower (by 10 years) among drinkers. Alcohol use was not significantly related to FTND scores or cigarette/e-cigarette use history, but when examined descriptively alcohol users smoked more cigarettes per day (average = 17 vs 14 cigarettes). **Discussion:** Dual users in this sample were likely to use other substances and had higher levels of dependence for cigarettes versus e-cigarettes. Findings related to alcohol use, marijuana use, and age of e-cigarette initiation are consistent with the premise that tobacco and alcohol co-use may increase the propensity for risky behaviors. The lack of association for measures of dependence and alcohol use may be attributable to the small sample size. Continued research regarding the relationship between dual cigarette and e-cigarette use and risky behaviors is warranted. **Funding:** This research was supported by an Internal Grant from Virginia Commonwealth University's School of Nursing and the National Cancer Institute of the National Institutes of Health under Award Number R21CA184634 and the Center for Tobacco Products of the U.S. Food and Drug Administration. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health or the Food and Drug Administration.

75. The Effect of Musical Training on Mathematical Ability

Kendall Leek, Dept. of Biology, with Prof. Faye Prichard, VCU Honors College

Have you ever played a musical instrument? If so, did you ever consider the effects playing an instrument had on you? Studies have shown that our cognitive development can be affected by musical training. This relates to how we learn and behave. It is a commonly held belief that playing a musical instrument increases intelligence, especially when introduced at a young age. Parents around the world have embraced this idea, investing in music lessons and instruments for their children. Consequently, these children join school bands, orchestras and choirs to get involved in a music program and maintain their skills. In tough economic times, schools across the country are faced with budget cuts, and often, music programs are the first program cut from school funding, despite how beneficial they can be to student education. In contrast, mathematics, known to induce headaches and frustration for many students, continues to merit hours upon hours of tutoring. Time and money are poured into tedious efforts to excel. Is there another way to better mathematical ability that is both enjoyable and stimulating? Interestingly, music has been found to be beneficial in academic areas such as language and reasoning skills. This leads us to wonder if playing a musical instrument improves mathematical ability and how it would do so. This information has the potential to save music programs that are in danger of disappearing. Musical training causes increased stimulation and conditioning of the brain in structures that are also used when solving mathematical problems. Domain transfer between musical and mathematical abilities exists because of deep structural similarities between them. Since music and mathematics both require similar visual-spatial abilities, playing a musical instrument can improve mathematical skill.

76. Synthesis and Characterization of Hard Magnetic Barium Ferrite Nanoparticles

John Cuddehe, Dept. of Chemistry, with Dr. Everett Carpenter, Dept. of Chemistry

Barium ferrites have gained attention due to their high coercivity and magnetization making them good candidates for use as permanent magnets.[1,2] Barium ferrite nanoparticles have been successfully synthesized using both hydrothermal or solvothermal processes that typically take 24 hours to complete.[1] Here we introduce a simplified solvothermal approach to synthesize barium ferrites of various compositions in 6 hours by adjusting the molar ratios of barium to iron. Each ratio was characterized by x-ray diffraction (XRD) to determine the crystal structure, high temperature x-ray diffraction (HTXRD) to determine how the crystal structure of the barium ferrites change with increasing temperature, scanning electron microscopy (SEM) with energy dispersive x-ray analysis (EDX) to determine the size and composition of the nanoparticles, and vibrating sample magnetometer (VSM) to determine the magnetic properties.

References:

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77. Racial Differences in Appraisals of Disability and Functional Outcomes among Veterans with Spinal Cord Injury (SCI)

Quintia Martin, Dept. of Psychology, with Dr. Scott McDonald, VCU Department of Psychology, and McGuire VA Medical Center

Contributors: Melody Mickens, Brian Mutchler, and Michael Ellwood; VCU Department of Psychology, and McGuire VA Medical Center

Background/Objective: Disability appraisals have been identified as significant contributors to adjustment after spinal cord injury (SCI). African Americans (AAs) with SCI experience comparatively lower satisfaction with life, more medical complications, and greater self-care and mobility deficits post-rehabilitation. In other groups such as chronic pain patients, AAs have reported more negative appraisals of disabling medical conditions. However, whether there are racial differences in SCI disability appraisals remains unstudied. The aim of the current study was to explore racial differences in appraisals of disability and in functional ability. It was hypothesized that (1) AAs with SCI would have greater levels of dependence in self-care and mobility tasks than Caucasians with SCI and (2) AAs would report significantly more negative appraisals of SCI and less positive appraisals of SCI. **Design/Procedures:** Cross-sectional analysis of clinical data collected at annual SCI clinic appointments at McGuire VA Medical Center. Medical providers rated independence in self-care, mobility, and transfers using the FIM™. Participants reported SCI disability appraisals, catastrophic negativity and determined resilience, using the Appraisals of DisAbility: Primary and Secondary Scale (ADAPSS-Short Form). **Participants:** Patients (N = 135) were SCI patients who identified as AA or Caucasian and sustained an incomplete SCI (i.e., ASIA Impairment Scale rating of D). Over half (56%) were AA and married (53%) and the majority of participants were male (96%) with a mean age of 59 years (SD = 11.55). Over one third reported completing a high school diploma, 34% reported some college, and 31% were college graduates. Patients were, on average, 13 years post-injury (SD =10.76) and sustained injury at an average age of 46 (SD = 14.83). **Results:** AAs reported significantly greater catastrophic negativity, $t(124) = -2.11$, $p < .05$, and received lower ratings of independence in self-care, $t(128) = 2.25$, $p < .05$. Significantly more AAs had been diagnosed with low tetraplegia (45% v. 18% of Caucasians), while significantly more Caucasians were diagnosed with paraplegia (42% v 18% of AAs), $x^2 = 13.97$, $p<.001$. No significant differences were observed on mobility, age, age at injury, years since injury, or positive appraisals of disability. **Conclusions:** AAs were more likely to report negative appraisals of disability as well as less functional independence in self-care tasks. These findings suggest that cultural factors may impact perception of injury as well as achievement of functional outcomes post-injury. Similarly, higher levels of injury combined with cultural factors may account

for observed disparities. Future studies that examine the role of race as a moderator of appraisals and functional outcomes, as well as the influence of injury severity, self-stigma, beliefs, and attitudes towards disability within the African-American community may help to clarify this relationship and identify intervention targets during rehabilitation.

78. Synthesis and Characterization of Superhydrophobic Fibrous Membranes

Arzan Dotivala, Dept. of Chemical and Life Science Engineering with Dr. Christina Tang / Dept. of Chemical and Life Science Engineering

Superhydrophobic i.e. water repellent materials are important in a number of applications, such as self-cleaning paints, protective coatings, and textiles. Polymer-based materials such as polystyrene are of particular interest because it is cost effective, durable, heat and chemical resistant. The purpose of this project is to fabricate superhydrophobic polystyrene membranes with controlled microstructure via electrospinning. The orientation of the nanofibers will be controlled during deposition to achieve well-defined microstructure. By electrospinning onto a rotating mandrel, unidirectionally aligned fibers are achieved. In conjunction with a layer-by-layer deposition, rotating the substrate between deposition of each layer, membranes with orthogonal fibers have been synthesized. The resulting membranes have been characterized by scanning electron microscopy. Fiber spacing and fiber diameter were determined though image analysis using the software ImageJ. The hydrophobicity of the membranes have been assessed by measuring the water contact angle measurement. Computational analysis predicts an increase in fiber spacing will increase water contact angle. We have managed to create microstructures with increased tunable fiber spacing by varying deposition time. Increasing the deposition time of the top layer from 45 seconds to 2 minutes, a fiber spacing range of ~10μm to ~35μm has been acquired. However, with this range of fiber spacing, no increase in contact angle was observed (121° ± 10°). Because droplet diameter is ~100 times the estimated fiber spacing, future efforts need to decrease the water droplet volume or increase the fiber spacing further to increase contact angle. We are currently working on better representative imaging for improved quantification of fiber spacing.

79. The Efficacy of the Antioxidants, Ascorbic Acid, Glutathione, and α-Tocopherol, in treating Fetal Alcohol Syndrome using Danio rerio as a model organism

Padmini Yerramasu, Dept. of Bioinformatics, with Dr. Gregory Walsh, Dept. of Biology

Fetal Alcohol Syndrome is a major cause of non-genetic developmental delays and neural and physical abnormalities. Free radicals, highly reactive by-products of ethanol (EtOH) metabolism, cause oxidative stress that affects cell development, survival, and migration leading to abnormal craniofacial development. Antioxidants detoxify free radicals and may play a role in reducing the effects of alcohol toxicity. This study examines the effects of the antioxidants, α-tocopherol, glutathione, and ascorbic acid, on reducing ethanol's toxic effects in Fetal Alcohol Syndrome, using zebrafish as the model organism. Eggs were exposed to 100 μM tocopherol, 30 μM glutathione, 250 μM ascorbic acid, or no antioxidant at 0-24 hours post fertilization (hpf). At 6-24 hpf the eggs were exposed to 500 mM EtOH. At 5 days post fertilization (dpf) eye length, head length, body length, and heart rates were measured. Zebrafish eggs exposed to EtOH showed significant abnormalities in anterior body development which was evident in the head, body, and eye length measurements when compared to fish without EtOH exposure (P less than 0.01). To investigate the efficacy of prolonged antioxidant exposure, eggs were exposed to antioxidants for 0-5 dpf. This extended exposure with ascorbic acid and tocopherol further mitigated the toxic effects of EtOH on fetal development. Future research could focus on specific pathways affected by free radical by-products of EtOH. Antioxidants could be part of a multi-faceted treatment to reduce the teratogenic effects of EtOH.

80. Do adolescent avoidant coping and sex moderate the influence of maternal alexithymia on adolescent depression and anxiety?

Carolyn Booth, Dept. of Psychology, with Dr. Wendy Kliewer, Dept. of Psychology

Maternal emotional support is a prominent predictor of adolescent internalizing outcomes, especially for African-American youth. Although youth coping has been identified as a protective factor for internalizing disorders in ethnic majority adolescents, there is a dearth of research on coping, sex, family-level factors, and internalizing disorders in urban, low-income African-American adolescents. Maternal alexithymia, a personality trait that hinders the ability to identify one's own emotions and connect emotionally with others, likely interacts with the protective factor of avoidant coping to influence adolescent anxiety and depression in urban, low-income adolescents. This cross-sectional study will investigate how adolescent avoidant coping and sex moderate the influence of maternal alexithymia on adolescent depression and anxiety. Data will be drawn from 329 urban, low-income African-American families (53% female) who participated in Wave 1 of Project COPE, a study of community violence exposure, physiological stress responses, and youth adjustment in low-income families residing in the Richmond area. We predict that maternal alexithymia will be positively related to adolescent anxiety and depression. We also hypothesize that male sex and avoidant coping will be negatively related to adolescent anxiety and depression, with male adolescents who use high levels of avoidant coping expected to endorse the lowest levels of anxiety and depression. Avoidant coping is not expected to moderate the relationship between maternal alexithymia and adolescent depression and anxiety for female adolescents. Preliminary findings and future directions for coping interventions will be discussed.

81. Investigating the antidepressant properties of low dose Amisulpride in the Forced Swim Test

Ashley Grant, UROP Summer Research Fellow, Dept. of Exercise Science, with Dr. Joseph Porter, Dept. of Psychology

Amisulpride, a benzamide derivative, is a second generation (atypical) antipsychotic drug used to treat both schizophrenia (at high doses) and depression (at low doses). The relatively selective binding profile of amisulpride distinguishes it from most other antipsychotic drugs, by primarily targeting dopamine D_2 and D_3 receptors and serotonin 5-HT_{2B} and 5-HT_7 receptors, where it displays functional antagonist activity. The drug also has effects on the presynaptic receptors which, at low doses, increases dopaminergic transmission which is thought to be the reason why amisulpride has antidepressant effects at lower doses. The present study uses low doses of amisulpride in a Force Swim Test in an effort to study the antidepressant effects of the drug. The study used adult male C57BL/6 mice (N=18) that were housed in individual cages and maintained on free food. Animals were tested using 0.1 mg/kg and 1.0 mg/kg amisulpride given 45 minutes before the start of the test. Mice were placed in a cylindrical filled with 30 cm of water for 6 minutes. The amount of time spent immobile, where the mouse made little to no movement, was measured by three independent raters. The dose of 0.1 mg/kg was chosen based off of a study conducted by Abbas, et al. 2009, although Abbas found a significant reduction in time animals spent immobile we failed to replicate those results.

82. Preparative purification of deoxyribose-5-phosphate aldolase in order to exploit its biocatalytical properties

Linda Foreman, Dept. of Chemistry, with Dr. Katherine Belecki, Dept. of Chemistry

Deoxyribose-5-phosphate aldolase (DERA) is an enzyme found in all bacteria. The catalytic properties of DERA can be harnessed to perform carbon-carbon bond forming reactions that are relevant to the production of fine chemicals, including some pharmaceuticals. Rosuvastatin, the active ingredient in Crestor®, is currently synthesized via a lengthy and inefficient process which employs traditional organic chemistry methods. A biocatalytic approach to the chiral side chain of rosuvastatin and other statin drugs would

improve the overall process, making it more efficient and more environmentally friendly. My project consists of using recombinant DNA technology to express DERA from Escherichia coli (*E. coli*) cultures in order to harness its potential as a biocatalyst in an improved synthesis of rosuvastatin.

To begin, the *deoC* gene, which codes for the DERA protein, is inserted into a commercially available plasmid in such a way that the DERA product will have a hexahistidine tag covalently linked to its C-terminus. The altered plasmid is then introduced into *E. coli*. When the cells divide, the altered plasmid is replicated and DERA containing the hexahistidine tag is produced in all daughter cells. After protein expression, the cells are lysed and nickel affinity chromatography is used to isolate the target protein through selective coordination of the hexahistidine tag. As part of my project, standard protocols for the expression and purification of hexahistidine-tagged DERA will be developed. The prepared proteins will then be used in further experiments being conducted by the Belecki group regarding the statin side chain of rosuvastatin.

83. Promoting prosocial responsiveness across racial divides through mindfulness

Christopher Wall, Dept. of Psychology, with Daniel Berry and Dr. Kirk Warren Brown, Dept. of Psychology

In interracial and other intergroup interactions prosocial emotions and actions are often undermined (Cikara & van Bavel, 2014). Perceiving psychological separateness between "us" and "them"— which is often an automatic, unintentional process—is psychological kindling for lower prosocial responsiveness that leads to prejudice, discrimination, aggressive conflict (Cikara, 2015). Recent research has shown that mindfulness, an open and unconditional attention to one's present experiences, is associated with decreased automaticity and racial bias (Kang, Gruber, & Gray, 2013; Lueke & Gibson, 2014), barriers that hinder prosocial responsiveness (Trautwien, Schmidt, & Naranjo, 2014). Two experiments investigated whether brief mindfulness training promoted prosocial responsiveness toward an ostracized person of another race. Before witnessing a person of another race being excluded in an online ball-tossing game (Cyberball), participants in both studies were randomized to either an audio-recorded mindfulness training (MT), a structurally-equivalent attention control training (CT), or a no instruction control (NT). MI participants in Studies 1 (N=128) and 2 (N=137) reported higher empathic concern for the excluded player (ps<0.05), and wrote more comforting emails to them (ps<0.01), as coded for prosociality (c.f., Masten et al., 2011). Only in Study 2 did MI participants passed the ball more to the victim in an 'all play' game (p<.05), presumably because their identity was less "known" than in Study 1; specifically, players' photo images were loaded into the game in Study 1, but only first names were shared in Study 2. These studies underscore the potential for mindfulness training to foster sensitive attitudes across social and cultural lines within increasingly growing anonymous (i.e., online) contexts.

84. Developing Information and Communication Technologies for Education in Haiti

Nabeel Janjua, UROP Summer Research Fellow, Dept. of Economics and Information Systems, with Dr. Manoj Thomas, Dept. of Information Systems

Over the past few decades, much of the world has experienced economic development largely due to rapid growth in technology. Despite this progress, there are areas that remain untouched by advanced technology. Underdeveloped, countries such as Haiti have not experienced this technological growth. As developed countries pave their way into the future, the gap between developed and developing countries continues to widen. Haiti is one of the poorest nations in the world with more than half the population living in acute poverty (less than US $1 per day). Many Haitians have no clean running water, very limited access to electricity, and almost no access to the Internet. Only about 21% of Haitians have access to electricity and almost 50% of the country is illiterate. Due to under and unqualified teachers, a lack of resources and limited learning materials, students are only taught the basics. With little access to computing resources and digital information content, young Haitians are unable to develop the technological literacy and familiarity required to participate in todays digital economy. The Information and Communication Technologies for Education (ICTE) initiative in Haiti is a "Project of Hope." The role of ICTE in improving the quality and access to education is well recognized. In countries like Haiti, ICTE can facilitate the acquisition of basic technological skills, while simultaneously contributing to poverty reduction and human development. In order for Haiti to

succeed in the 21st century, students and young adults need to develop technology skills and knowledge. Developing technological literacy and computer familiarity will help young Haitians participate in the digital economy and/or obtain jobs that will help them and their families escape poverty.

85. Encapsulation of tannic acid, chitosan, and bovine serum albumin via Flash Nanoprecipitation for the development of advanced chemotherapeutic methods

Raven Smith, Dept. of Chemical Engineering and Biochemistry, with Dr. Christina Tang, Dept. of Chemical and Life Science Engineering

Currently, chemotherapeutic methods are often designed to target cells that exhibit rapid growth and reproduction. However, this can have the unintended effect of harming non-cancerous cells that also grow and reproduce quickly. We aim to develop a method in which the drug is delivered directly to the malignant cells to avoid harming healthy cells. To achieve this, we began working with bovine serum albumin (BSA) as a model protein, and tannic acid (TA) as a placeholder for the drugs we will use. Presently, our goal is to successfully encapsulate tannic acid, chitosan, and bovine serum albumin within the core of the nanoparticles. These core-shell nanoparticles were formulated by the Flash Nanoprecipitation (FNP) method. FNP is a method of formulating core-shell nanoparticles, in which the shell is composed of a diblock copolymer. This polymer is part hydrophobic, and part hydrophilic. Consequently, when submersed in water, these polymers will aggregate to form micelles such that their hydrophobic portions are facing inward away from the water, and their hydrophilic portions are facing outward towards the water. The core of these micelles was composed of a tannic acid-chitosan coacervate. Nanoparticle size and stability was analyzed using the Dynamic Light Scattering analysis method. To determine the stability of samples, DLS measurements were taken at intervals – first directly after formulation, then again the next day. The sample would then be dialyzed in water, and DLS would be run again directly after dialysis, and then once more the next day. When FNP was performed with just TA and BSA as the core materials, we found that the formulated nanoparticles changed significantly over time. With 10 mg/mL of PSbPEG, the sample size changed from one average peak size of 72.72 nm before dialysis to three average peak sizes of 23.72 nm, 345.2 nm, and 4563 nm, respectively, after dialysis. The average PdI value also changed from 0.281 before dialysis to 0.461 after dialysis. This change in size and monodispersity indicated that the nanoparticles were unstable. We concluded that this was the result of the high solubility of BSA in water, which was causing it to partition out of the core of the nanoparticles over time. We decided to add Chitosan to the core. Given its insolubility in water, we hoped that it would keep the BSA precipitated in the core. The TA/chitosan nanoparticles yielded much better results. The initial analysis showed average sizes around 130 nm, which increased only to 180 nm with time, and to 270 nm after dialysis. These results are much more promising and indicate the efficacy of chitosan in stabilizing the core. In the future we aim to successfully incorporate bovine serum albumin (BSA) into the nanoparticles. We have done this in the past, but have yet to determine a method by which we can achieve a stable, monodisperse sample. From there, we aim to begin incorporating drugs into the nanoparticle core, starting with antibiotics.

86. The Effects of Dietary Counseling and Nutritional Education on Patient Awareness and Compliance

Emily Johnson, UROP Summer Research Fellow, Dept. of Dental Hygiene, with Dr. Joan Pellegrini, RDH, BSDH, MS, PhD, Department of Oral Health Promotion and Community Outreach, VCU School of Dentistry

The treatment of dental caries continues to be one of the most common dental practices to date. Previous studies have indicated the benefits of dietary intervention in pediatric and geriatric populations. The use of a caries risk assessment tool has been implemented across former studies to determine an individual's probability of caries incidence. By identifying dietary habits the clinician can provide preventative dietary recommendations. The objectives of this study were to determine if there is a relationship change between age and attitudes toward nutrition and oral health along with attitudes towards nutrition and oral health within

lower socioeconomic individuals following dietary counseling and oral health education. The study consisted of 45 members from the Hillside Court Community with 84% being female participants with an age range from 18 to 65 and older. The participants completed a pre and post-test answering questions based on their general knowledge of nutrition, attitudes on the subject, and the effect of nutrition on their dental and overall health. Based on information gathered from the pretest, dietary recommendations were provided to educate subjects based on instruments available from the www.choosemyplate.gov website. Following the educational session the subjects completed the post-test and results showed that the majority of the subject's understood how nutrition can affect their oral health. Additionally, there was a significant positive change in the subject's attitudes and behaviors regarding nutrition and oral health care. The majority of the subject's stated that they were more inclined to make healthy decisions regarding the foods they purchased for themselves and their families and planned to follow the www.choosemyplate.gov recommendations.

87. Biodegradation and biocompatibility of sensors enabled by ZnO thin films

Pooja Nanjannavar, Tanin Izadi, Dept. of Chemical Engineering with Dr. Vitaliy Avrutin, Ph.D. and Dr. Nastassja Lewinski, Ph.D., Dept. of Chemical and Life Science Engineering

Implanted biosensors for long term monitoring of biomarkers for disease could improve survival rates and outcomes by giving individuals the ability to monitor their own health and take pre-emptive action against disease. However, the human body is known to reject foreign implanted objects leading to foreign body reactions, biofouling, and inflammation. The objectives of this study were to characterize the dissolution rates of zinc oxide thin film coated sensors and to determine whether these sensors are compatible with human cells. The amount of zinc ions released from the sensors after 24 hour extraction in cell culture media was measured using ICP-OES. Elevated zinc levels were measured in extracts from both ZnO coated and uncoated sensors. The cytotoxicity of the sensors by extracts and direct contact with L929 mouse fibroblasts and HaCaT human keratinocytes was measured with the MTS and LDH assays. Results from the tested sensor extracts and direct growth of cells on the sensors showed acceptable >80% cell viability after exposure. The cell viability measured for cells exposed to ZnO coated versus uncoated sensors was approximately the same. Future work includes visualizing the zinc ion release and ex vivo tissue testing.

88. Foraging and Song rate of Prothonotary Warblers in High and Low Density Breeding Sites

Denney Turner, UROP Summer Research Fellow, Center for of Environmental Studies, with Dr. Lesley Bulluck, Dept. of Biology

Focal animal observations, specifically foraging observations, can be used as an indicator of habitat quality and food availability. Few studies of breeding birds have compared foraging and song rate behaviors in high and low density systems, and those that have made these comparisons show conflicting results. Song rate may be high in high density, high quality systems due to more male-male interactions, but unmated males in poor quality habitats are also thought to sing more than mated males. Prothonotary Warblers (PROW) are excellent study species because they nest in boxes and we can manipulate density. We compared PROW foraging and song rate at a high density breeding site along the Lower James River with artificial nest boxes with observations from a lower density site in beaver wetlands and without nest boxes. Two types of behaviors were used to compare the two sites: 1). Foraging: specifically attack rate (attacks per minute) and searching speed (movements per minute), and 2). Song Rate (songs per minute). Opportunistic focal observations were made from canoe or on land, typically during the morning hours (between sunrise and 10am) when the birds are most active. Results showed that song rate was marginally higher at the low density site, even after accounting for date and time and foraging attack rate was lower at the low density site. We conclude that the low breeding density beaver wetland may be lower quality than the high density tidal freshwater James River because higher male song rate suggests lower mating success and a lower foraging attack rate suggests lower food availability. Future studies should continue to collect similar focal observations to increase our sample

size and measure food availability and mating success in these sites to further assess the mechanisms for the differing song and foraging rates.

89. An Analysis of the Factors Underlying Income Inequality

Antonio Schiano di Cola, UROP Summer Research Fellow, Dept. of Economics, with Dr. Leslie Stratton, Dept. of Economics

There has been a growing divergence in the incomes between the lowest wage earners and the highest wage earners. The inequality of incomes is a natural result of a market society but over the last several decades income inequality has been rising. Rising income inequality may have deleterious effects in a democratic society as continuing stratification of wealth inevitably strengthens class distinctions which can engender jealousy, anger, and a disillusionment with democracy itself amongst lower skill workers who have not seen their incomes grow much. They may rightly feel that the system does not work for them and at some point these sentiments can cause a people to reject the current system entirely. This may come in the form of support for radical policy positions or in revolt to the democratic government itself. This study is an exposition of the current explanations of this phenomena by the academic community and is supplemented by a statistical analysis of the factors though to underlie inequality. The two predominant schools of thought on this are the structuralists who assert that wage inequality is a result of structural technology shifts that have biased wage growth towards the highly skilled (referred to simply as Skills-Biased Technological change [SBTC]) and institutionalists who believe that labor market institutions (LMI), such as the Minimum Wage and Union Membership, significantly impact wage inequality. To study the institutionalist hypothesis, I collated data on wages by state and by occupation overall several years and ran a multivariate regression which factored for LMIs and various factors which support a SBTC view. The results show that various LMIs do have an impact on wage inequality.

90. Examination of the Use of Allied Dental Providers in Addressing Access and Equity

Sydney Brown, GEO Summer Research Fellow, Dept. of Biology, with Dr. Kim Isringhausen, Dept. of Oral Health Promotion and Community Outreach, VCU School of Dentistry

Background: The United States health care system underperforms relative to other industrialized countries on most dimensions of performance including access, and equity. Today, over 45 million adults and children live in dental shortage areas in the United States. Traditionally, low- income populations, individuals eligible for Medicaid benefits, and rural communities suffer disproportionately from oral disease due to inadequate access to affordable oral health care. Access to dental care is a global issue that has been tackled by many different countries in a variety of different ways for centuries. Improving access to healthcare requires multiple solutions using an array of providers in different settings. Although, in other countries, mid-level providers, like dental therapists, are seen as a part of the solution. A midlevel provider could be a means of increasing access to dental care and reducing the current problems associated with accessing dental care in the United States health care system. However, in the United States there is controversy surrounding the use of mid-level providers due to the lack of understanding of the historical efforts of mid-level providers internationally. Objectives: The objective of the this work is to: (1) critically assess the health care systems of Australia, New Zealand, the United Kingdom, Canada, and the Netherlands, focusing on access and equity measures in the provision of dental care; (2) determine if the use of mid-level providers has contributed to high measures of access and equity; and (3) use findings for improvement of access and equity of the United States dental delivery system. Methods: A review of existing published work related to access and equity of the health care systems of New Zealand, the United Kingdom, Canada, and the Netherlands were selected as study participants based on their use of mid-level providers like dental therapists. A survey was created to measure improvements in access and equity in the delivery of dental services based on the use of mid-level providers. The survey will be distributed to participating countries.

91. Perceptions of harm and addiction among dual users of cigarettes and e-cigarettes

Julia Rozman, Dept. of Psychology with Parker Webster, BS, Psychology and Dr. Caroline O. Cobb, PhD, Dept. of Psychology

Background: Tobacco harm perceptions are important factors in why individuals may initiate, substitute, and/or engage in dual or poly-tobacco use patterns. Identifying correlates of these perceptions is important for understanding why these cognitions may exist and help provide intervention targets. The purpose of the current study was to examine perceptions of harm and addiction among a sample of cigarette and electronic cigarette (e-cigarette) users and examine whether these perceptions differ by demographics, other substance use, and tobacco use history. **Methods:** The current sample consisted of 29 individuals who consented to participate in a clinical laboratory study of dual cigarette and e-cigarette users during 2015-2016. Screening data for this secondary analysis included demographics, substance use, other tobacco use history, and perceptions of harm and addiction. Perception items asked about the health risk level for cigarettes and e-cigarettes and the level of harm compared to regular cigarettes and likelihood of addiction for variety of tobacco products (e.g., e-cigarettes, snus, nicotine replacement therapies [NRT]). Descriptive statistics followed by independent T-tests were used to explore differences in perception items by demographics, other substance use, and tobacco use history ($p<0.05$ reported as significant). **Results:** The sample's mean age was 39 years, and a majority were White males. Half of the sample completed some college or higher. Past 30-day alcohol use (55%) and ever trying marijuana (62%) were prevalent, and most were not concurrently using other tobacco products (79%). A majority (78%) reported that cigarettes were at least somewhat risky to health, while only 48% reported the equivalent for e-cigarettes. Participants rated most tobacco products as about same harm level or higher compared to regular cigarettes except for roll-your-own cigarettes, e-cigarettes, and NRT. All participants perceived regular cigarettes and chewing tobacco as having at least a moderate addiction risk. E-cigarettes and NRT had the lowest addiction risk ratings. Only perceptions of snus addiction risk differed by gender with males reporting higher ratings. By race, ratings for addiction risk for e-cigarettes and NRT differed significantly with Whites reporting lower ratings. Lifetime marijuana users had significantly higher harm perception ratings for e-cigarettes. Perceived addiction risk for regular cigarettes and e-cigarettes was significantly lower among those who used other tobacco products. **Discussion:** Among this sample, perceptions of harm and addiction were lower for e-cigarettes and NRT relative to regular cigarettes and other tobacco products. There were few perceptions that differed by demographics and other substance/tobacco use history. Dual users who used other tobacco products were more likely to perceive lower risks for cigarettes and e-cigarettes. This association may be because lower addiction perceptions drive greater tobacco use or alternative. Current findings support future investigation of harm and addiction perceptions particularly among individuals who use more than one tobacco product.

92. Does the use of oral health education through community-based lessons provide sufficient motivation to increase patient compliance with oral health habits?

Danielle Nogle, UROP Summer Research Fellow, Dept. of Dental Hygiene, Dr. Joan Pellegrini, PhD, RDH. Virginia Commonwealth University School of Dentistry, Department of Oral Health Promotion and Community Outreach

Objectives: There is increasing evidence that low socioeconomic status is associated with an increased risk for dental caries. The use of community based programs is an important trend to improving oral health education for community members. Limited research has been done on the effectiveness of community-based informative sessions and its ability to motivate participants to be more compliant with oral health habits and the effects on expanding oral health care literacy. **Methods:** Adult residents at Hillside Court Partnership were administered an oral health education pre-test. The survey was comprised of questions regarding the participant's current oral habits, their dental health status and included questions to gauge their current oral health literacy. A one hour interactive community-based lesson was given focusing on the importance of caries prevention, oral home care and overall general oral health literacy topics. Upon completion of the informative session, a post-test was administered. Responses on the pre- and post-test were then compared.

Results: The majority of community members (30%), reported not seeing a dentist in 5 or more years with 20 % reporting they had not seeing a dentist in more than 2 years (but not more than three). Among participants, two thirds reported needing care in the last 12 months but not being able to get it. When asked why care was not received almost 62% of participants reported not being able to access care and 19% had travel problems. Half of the participants report their primary reason for the dental visit was for "having something wrong, bothering them or being in pain". No statistically significant results supported the research question but sociological and behavioral inferences were drawn from the study. **Conclusions:** Further studies should be conducted in communities with varying levels of socioeconomic status to determine if attitudes towards oral and systemic health vary with changes in demographics and education.

93. Satirical Suburbia: Interpreting the Portrayal of Female Satisfaction in "Desperate Housewives"

Olivia Golden, VCU Honors College, with Prof. Mary Boyes, VCU Honors College

It all takes place on a single, white picket-fenced suburban street: Wisteria Lane. Lynette Scavo, Susan Mayer, Gabrielle Solis, and Bree Van De Kamp are four housewives and best friends living seemingly perfect lives in an American suburb, until discovering that their neighbor, Mary Alice, has committed suicide. Throughout the series, the audience gets insight into the lives of four extremely different yet relatable housewives. This comedy-mystery-drama aired from 2004 to 2012, and gained an immense following from women across the nation. *Desperate Housewives* presents real struggles that women living in American suburbia face. Throughout the show, characters and setting are used to represent larger ideas about gender roles and societal expectations.

94. Exploring the relationship between Non-medical Prescription drug use and Mindfulness

Hassan Khuram, Dept. of Psychology, with Dr. Eric Benotsch, Dept. of Psychology

Non-medical prescription drug use (NMPDU) is quickly becoming a major endemic in the U.S. and is only second to marijuana in terms of abuse. This is especially problematic in the college age population where one in four people are likely to participate in NMPDU compared to one in seven people who are non-students. The economic cost of NMPDU is estimated to be $53.4 billion due to lost productivity, criminal justice costs, drug abuse treatment and medical complications. Most students use prescription drugs, especially stimulants, because it increases focus and attentiveness which they use to pull all-nighters to study for exams. In the past, mindfulness has been shown to be an important factor in fighting a plethora of illness ranging from depression to chronic pain. Mindfulness may reduce the overall negative effects of these conditions by changing the way we perceive symptoms and raising awareness for our internal state. It is therefore hypothesized that individuals who have higher trait mindfulness also are less likely to abuse prescription drugs. Although mindfulness has been evaluated in relation to alcohol, tobacco, and marijuana use, it has not been evaluated with NMPDU; therefore, the goal of this study is to further examine the relationships between mindfulness and prescription drug abuse. Method: Trait mindfulness, non-medical prescription drug use, and psychological factors among a sample of undergraduate students at VCU are analyzed. Results: A hierarchical logistic regression will be used to assess the independent relationship between mindfulness and NMPDU after controlling for demographic factors (age, race, gender), neuroticism, impulsivity, and perceived ability to cope. Conclusion: These findings will provide insight on how mindfulness influences NMPDU and provide direction for the development of NMPDU prevention and treatment programs.

95. Automated Linguistic Analysis of Patients with Dementia and Mild Cognitive Impairment

Ellen Korcovelos, Dept. of Bioinformatics, with Dr. Bridget McInnes, Dept. of Computer Science

Background: Individuals with dementia often have difficulties with the transmission of words in written and spoken communication rather than a deficit in word knowledge and word meanings (Burke, D., & Shafto, M., 2004). Current assessment techniques to determine the stages of dementia as they relate to transmission are primarily conducted manually. The disadvantage of these techniques is that they can be subjective and may not provide the detail and precision of measurements that are required to identify the full range of syndromes that exist for dementia patients (Pakhomov, et. al 2010). The present study aims to develop automated, objective metrics to quantify the linguistic characteristics of speech. In this work, we assess 1) type to token ratios (T:T) of unique phrases, 2) presence of indefinite words using information content (IC) scores (provided by WordNet::Similarity), and 3) frequency of filled pauses (i.e. "uh" and "um", coughing and laughter). **Methods**: Transcribed interviews of the Cookie Theft stimulus of University of Pittsburg's DementiaBank data (N = 520) contained participants of three categories: probable Alzheimer's disease (AD; N = 235), Mild Cognitive Impairment (N = 43), and those without dementia-like symptoms (N= 242). Each transcribed file was cleaned of extraneous data (i.e. investigator commentary, unnecessary symbols, part of speech tagging) and run through newly designed algorithms to determine T:T, IC variance, and pause word frequency. **Results**: We evaluated the results of the characteristics using unpaired T-tests to identify significant differences of means between the probable AD and control group, and the MCI and control group. Significant differences were identified between the probable AD and the control group for T:T (bigrams, trigrams, and 4-grams) and pause words, but not IC. Moreover, a significant difference was detected among the MCI and control group for T:T with regards to trigrams, but for no other measure (pause words or IC). **Conclusions**: Automated language analysis offers great potential for identifying possible biomarkers for patients with dementia. The results show that using speech-based variables as a way to characterize cognitive function may be used to aid in detecting changes that are indicative of dementia.

96. Exploring the Role of Planar Cell Polarity Proteins in Oligodendrocyte Migration

Anshul Jain[*1], *Babette Fuss*[2], *and Gregory Walsh*[1,] *Department of Biology*[1], *Department of Anatomy and Neurobiology*[2] *Virginia Commonwealth University, Richmond VA*

Myelination of axons in the central nervous system (CNS) is important for conduction of nerve impulses. Myelin is formed by oligodendrocytes that develop from oligodendrocyte progenitor cells (OPCs). Many OPCs migrate extensive distances from the ventral and dorsal portions of the spinal cord in order to colonize the entire CNS and form myelin sheaths. This migratory process is regulated by various extracellular signals, such as chemotactic cues and motogenic factors. Despite the current knowledge, other molecules that regulate migratory mechanisms remain to be elucidated. Accumulating evidence suggests that planar cell polarity (PCP) proteins are required for the polarized directed migration of cells, such as neural crest cells and neurons in the hindbrain. However, the role of PCP signaling in OPC migration has not been studied. To determine whether the PCP signaling pathway is required for OPC migration *in vivo* we analyzed OPC motility in Tg(nkx2.2:GFP-CAAX) zebrafish that mark OPCs. Live imaging and in-situ hybridization were performed on embryos deficient in the PCP genes, *frizzled3a (fzd3a)* and *scribble (scrib*) and compared to wildtype embryos. Using live imaging, we observed a decrease in the number of OPCs migrating out of the spinal cord of *fzd3a* mutants compared to wildtype zebrafish (3.44 vs. 5.066 cells, respectively). We are confirming this result independently using in-situ hybridization with OPC-specific probes. These data suggest that PCP proteins play an important role in dorsal migration of OPCs during spinal cord development.

97. Effect of Chemotherapeutic Agents Vorinostat, Celecoxib, and Temozolomide on Pathogenic Amoebae, Naegleria fowleri

Kelsey Grimes, Department of Biology with Dr. Francine Cabral, Department of Microbiology and Immunology

Naegleria fowleri is a free-living amoeba (FLA) which is commonly found in warm bodies of fresh water. When present in the nasal cavity of a host, *N. fowleri* can move along the nasal mucosa, through the cribriform plate, and into the brain where it begins to ingest brain tissue, causing massive inflammation leading to degeneration of the Central Nervous System (CNS), commonly referred to as Primary Amoebic Meningoencephalitis (PAM). This condition is rare but almost always fatal; as the common therapeutic agents used to treat PAM (rifampin and miltefosine) are not often effective against the amoeba, mostly because of the inability of these drugs to pass through the blood-brain barrier (BBB). In our study, we chose three chemotherapeutic agents known to cross the BBB. Vorinostat, a histone deacetylase inhibitor, Temozolomide, a second-generation alkylating agent, and Celecoxib, cyclooxygenase-2 (COX-2) inhibitor, were administered in-vitro to determine if they possessed anti-Naeglerial effects, and if so, determine their mechanism of action. Cells were placed in plastic culture dishes and treated with monotherapy or combination therapy for 24, 48, 72 and 96 hour time periods. Cells were then fixed with glutaraldehyde and examined by transmission electron microscopy (TEM). Whole cell lysates were created from the drug-treated amoebae and common pro-survival, apoptosis, and autophagy indicator proteins were measured via western immuno-blotting. Visualization by TEM had shown formation of autophagic vesicles and extensive damage to the cell membrane in drug-treated cells. Increased presence of serine/threonine protein kinase B (Akt), cleaved poly (ADP-ribose) polymerase (PARP), light chain 3A and 3B (LC3A/B), sequestosome 1 (SQSTM1), as well as cleaved caspase-3, shown by western immuno-blotting, indicate possible cell stress and autophagic vesicle formation in drug-treated samples. Our results show that these agents are efficacious in killing the amoebae (especially when used as a combination therapy), and indicate that the likely mechanism of action of these agents is autophagy-induced apoptosis.

98. Digital Color Quantification of PANI Spun Fibers

Anjali Nanjannavar, Department of Chemical Engineering, with Dr. Christina Tang, Department of Chemical and Life Science Engineering

A method for rapid, sensitive chemical detection of chemical warfare is needed to prevent exposure to military personnel. Existing technology requires that military personnel carry additional equipment. Incorporating a colorimetric chemical sensor into a soldier's uniform would protect soldiers and avoid the need for additional equipment. Fabrics with organophosphate hydrolase (OPH), an enzyme that degrades nerve agents, and polyaniline (PANI), a responsive polymer that changes color in the presence of the degradation reaction, embedded into the fibers will undergo a color change from purple/blue to green in the presence of a nerve agent. Quantifying the color from digital images as opposed to detection by eye would improve the sensitivity of detection. A method of color quantification has been developed using RGB color analysis from digital images. The samples are imaged under a controlled light setting using a Canon EOS 5D camera. Currently, our goal is to determine how the fabric composition (i.e. size of PANI particles, PANI loading, and PANI particle coating) affects the sensitivity of detection. Thus far, we have determined that finding the color intensity can be quantified from the magnitude of the RGB values for each sample. As expected, the RGB analysis indicates that increased PANI loading results in higher color intensity. We are investigating the B/G ratio to determine what particle size/PANI loading will result in the lowest limit of detection. In the future, the sensitivity of detection based on the digital images will be determined and compared to detection by eye. In addition, color analysis using smart phones will be pursued.

99. Violence Exposure, Threat Appraisal, and Life Satisfaction in Youth

Shannon Spicer and Irene Lee, Department of Psychology, with Dr. Wendy Kliewer, Dept. of Psychology

Adolescents who have been exposed to the same incidence of violence may experience varying levels of life satisfaction due to differences in their threat appraisal of the violent event. Thus, assessing various dimensions of threat appraisal may demonstrate how adolescents define their life satisfaction in aspects such as family life, friendships, school experience, themselves, where they live, and overall life. There has been limited research linking youth's exposure to violence, threat appraisals, and life satisfaction, focusing instead on violence exposure, coping behavior, and adjustment. However, threat appraisals are a key aspect of stress and coping theory. The present study seeks to fill a gap in the literature by examining adolescents' threat appraisals after being exposed to violence. Using a sample of predominately urban African American adolescents (N = 247, 46.4% male), we assessed threat appraisals as a mediator of the relation between exposure to violence and life satisfaction. Results are discussed within a risk and protective context. Implications of the present study can be used to inform future research on violence exposure and life satisfaction.

100. Literature Annotation Using GATE Software on FDA Approved Nanomedicines

Ivan Jimenez[1], Bridget McInnes, Ph.D.[2], Nastassja Lewinski, Ph.D.[1, 1]Department of Chemical and Life Science Engineering, [2] Department of Computer Science

Nanomedicine has made a rapid impact on healthcare which has led to the development of a wide range of products including therapeutics, diagnostic imaging agents, in vitro diagnostics, and medical devices[1]. However, despite the success and decades of research, few have advanced and some approved nanomedicines have even been discontinued. These failures may be a result from a lack of easily accessible information and research on previous nanomedicines. The purpose of this project is to "teach" the computer how to recognize specific pharmacokinetic properties of nanomedicines in literature so that it may automatically extract and organize those entities from documents. To do so, GATE software is being used to manually annotate pharmacokinetic properties from compiled labels of recently approved nanomedicines acquired from the Drugs@FDA website. Currently over 10,000 entities composed of words, phrases, and numbers have been manually annotated. Once enough texts have been annotated, the annotated corpus will be used in the development of machine learning programs. An entity extraction system is being developed (see poster by Murphy et al.) to automatically identify and extract any nanomedicine related entities based on the annotations created in this work. The use of machine learning will cut the time on research of nanomedicines and make the process of obtaining certain pharmacokinetic properties in the labels of future FDA approved nanomedicines or in the literature much easier. Several resources could evolve from this creation of an annotated corpus on nanomedicines, which could allow more advancements in nanomedicine and could potentially identify more nanomedicine formulations for clinical use.

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[1] Clinical Translation of Nanomedicine Yuanzeng Min,† Joseph M. Caster,† Michael J. Eblan, and Andrew Z. Wang*

101. Disturbed sleep and anxiety sensitivity on PTSD symptoms: an interactive effect in combat-exposed veterans

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Both disturbed sleep and anxiety sensitivity (AS), defined as self-reported fear reactions to physiological signs of discomfort, have established relationships with posttraumatic stress disorder (PTSD). However, few studies have examined the effects of both sleep and AS on PTSD symptoms. One recent study found independent effects of both constructs, as well as a moderating effect of sleep such that individuals with poor sleep quality and low AS had similar levels of PTSD symptoms as those with high AS (Babson 2013). Following, we aimed to replicate these findings in our sample of combat-exposed OEF/OIF veterans (N=129, 86% male, 33% with PTSD, mean [SD] age=30.4 [4.6]). Variables used in linear regressions included AS composite score (measured via the Anxiety Sensitivity Index; ASI), sleep disturbances (measured via the Pittsburgh Sleep Quality Index global score), and total non-sleep PTSD symptoms (measured via the Clinician-Administered PTSD Scale; CAPS). Individual linear regressions of each predictor alone on non-sleep PTSD symptoms showed that both disturbed sleep (std. $\beta = 0.441$, $p = 0.000$) and AS composite score (std. $\beta = 0.205$, $p = 0.020$) were independently associated with non-sleep PTSD symptoms. However, when both predictors were combined into one model, only sleep remained significant (std. $\beta = 0.420$, $p = 0.000$). Upon addition of an interaction term, there was a significant interaction between sleep and AS (std. $\beta = -0.175$, $p = 0.03$) suggesting that the effect of AS on PTSD symptoms varies by level of sleep disturbance. At higher levels of sleep disturbance, AS has little or no effect on non-sleep PTSD symptoms, while at low levels of sleep disturbance AS has a linear relationship with PTSD symptoms, such that higher AS predicts higher PTSD symptom score. Overall, these results indicate that sleep accounts for much of the relationship between AS and PTSD symptoms, serving as a moderator of AS's effect on PTSD symptoms. This has potential treatment implications: For combat veterans with disturbed sleep, identifying and addressing poor sleep, not anxiety sensitivity, is important in the context of PTSD symptoms. The opposite holds true for veterans with lower sleep disturbance scores, where it may be more useful to focus on anxiety sensitivity to improve PTSD symptoms.

102. Examination of the Moderating Effects of Anxiety Sensitivity on the Relation between Trauma Group and Coping Strategies in OEF/OIF/OND Veterans

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Research has shown that effective coping strategies allow individuals to successfully resolve problems and process stressful events both emotionally and cognitively. Specifically among trauma populations, avoidance and disengaging coping styles have been associated with increased PTSD symptoms and have negative effects on their functioning and relationships (Tiet et al., 2006). However, multiple factors may be related to the impact of particular coping strategies. One such factor is anxiety sensitivity (AS), defined as the fear of

physical sensations related to heightened anxiety (Reiss et al., 1986). The present study aims to examine the effect of AS on various coping strategies among a combat exposed sample of Operation Enduring Freedom/Operation Iraqi Freedom/Operation New Dawn (OEF/OIF/OND). Measures include the Clinician Administered PTSD Scale (CAPS), Anxiety Sensitivity Index (ASI), and COPE with a five factor subscale - 1) problem focused coping; 2) emotion focused coping; 3) behavioral disengagement; 4) mental disengagement; 5) focus on and venting of emotions. Five separate hierarchical regression analyses will be performed to test if AS moderates the relationship between coping and PTSD symptom severity. We hypothesize that AS will significantly influence the relation between PTSD and coping strategies, such that higher levels of AS will strengthen the positive relation between PTSD and maladaptive coping mechanisms and strengthen the positive inverse relation between PTSD and positive coping mechanisms.

103. Associations of personality traits and social support on self-reported resilience in combat-trauma exposed veterans

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Background: While a notable percentage of returning veterans develop some form of psychiatric symptoms associated with combat trauma, many exhibit resilience, readjusting to life and exhibiting few negative mental health outcomes. Potential predictors of psychiatric risk and resilience in veterans have been of particular interest, with studies identifying increased social support and coping behaviors associated with resilience and personality traits such as neuroticism associated with negative outcomes. The association between personality traits, social support, and resilience warrant further empirical investigation. In this study, the combined effect of personality traits and social support on resilient responding will be explored in a sample of Operations Enduring Freedom/Iraqi Freedom/New Dawn (OEF/OIF/OND) veterans.

Methods: The sample (n=285, 88.4% male, Mage=29.82, SD=4.47) completed self report measures, including: resilience assessed via the Connor-Davidson Resilience Scale (CD-RISC); personality traits using the NEO-Five Factor Inventory 3 (NEO-FFI) assessing neuroticism, extroversion, openness to experience, agreeableness, and conscientiousness; and social support assessed with the Deployment Risk and Resilience Inventory (DRRI) subscales for unit and post-deployment social support.

Results: Three linear regressions were performed to assess associations between social support and personality traits on resilience. First, personality factors of extroversion, openness, and conscientiousness were positively associated (β=.180, 95% CI=.097, .264; β=.146, 95% CI=.067, .225; β=.247, CI=.170, .325, respectively, ps<.001) while neuroticism and agreeableness were negatively associated (β=-.256, p=.000, 95% CI=-.332, -.181; β=-.100, p=.013, 95% CI=-.179, -.021, respectively) with greater resilience, as measured by the CD-RISC. Second, both unit support and post-deployment social support were significantly associated with greater resilience (β=.122, p<.001, 95% CI=.054, .190; β=.120, p=.002, 95% CI=.043, .197, respectively). Lastly, in a combined model, the social support scales did not remain significant but the pattern remained for personality traits (with all ps<.005) .

Conclusions: Social support is related to resilience, however, when accounting for personality factors this relationship is no longer significant. Findings suggest the importance of a range of personality traits on resilience.

104. The Plumed Serpent: Historical and Contemporary Conceptions

Kirby Jacobs, Department of Anthropology with Barbara Ingber, Assistant Director, Community Outreach, VCU Globe

This poster explores the pre-conquest god of the indigenous people, Quetzalcoatl as the plumed serpent, in order to better understand the nature of the legendary creature and to explore the contemporary and traditional representations. Teotitlan del Valle, located in the foothills of the Sierra Juarez Mountains of

Oaxaca, is a small Zapotec village that still retains some of its traditional language and culture. Since the Spanish conquest, many of the indigenous religious stories have been socialized out of their education. It is our intention to explore the meaning and connection this figure has for contemporary residents. We conducted our research through multiple discussions with village residents and individuals from the community who have moved from Teotitlan del Valle into the city of Oaxaca. Additionally, we expanded our research by visiting local museums and referencing online articles and videos. We found interesting personal stories that give a better idea of how traditional myths and beliefs still exist, or whether they are fading.

Spanish Translation by Victoria Reichert

105. The Hitchhiker's Guide to the Coil: A comparison of Kanthal A-1 and Nichrome wire in the electronic cigarette world

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Introduction: After attending this presentation, attendees will be able to understand the effect that voltage, wire thickness, and resistance have on electronic cigarette (e-cigs) temperature output. E-cigs have been circulating in the United States market since 2007. Since that time, the configuration of these devices have developed and changed rapidly to optimize the delivery of drugs. A typical e-cig contains a battery pack that supplies power and an atomizer that contains the coil and wicking system to vaporize the e-cig refill formulation liquid (e-liquid). Today, a popular model on the market is the rebuildable atomizer, which allows the user to manipulate the devices so that the system can deliver a higher temperature output. This would hypothetically create an increased drug delivery. Manipulation of these devices includes changing the thickness of the wire, the number of wraps to create a desired resistance, and the voltage output from the battery. This study characterized two predominant wires used in e-cigs: Kanthal®, a high temperature resistance wire comprised of iron, chromium, and aluminum alloys and nichrome, a resistance wire comprised of nickel and chromium. Temperature output was measured as the coil builds were manipulated to emulate user modifications in the Kanger Aerotank Clearomizer, the e-cig used to develop a model for investigations in this study. **Methods:** The temperature of the e-cig coils was measured using a dual IR laser temperature sensor (Micro-Epsilon, Raleigh, NC). The detection range covered 100 ℃ to 1500 ℃ and was recorded by Compact Connect version 1.9.8.6. The wire gauges used in this experiment ranged from 30 to 34 gauge on the American Wire Gauge scale. The coils were hand built into two configurations: contact, a coil with wraps that touch and non-contact, a coil with an expanded wrap. The coils were wrapped so that the wire resistance had a measurement of 1.8 Ω. Temperature outputs were measured in a series of increasing voltages, under two types of conditions: (i) “dry coil” containing no silica wick and (ii) “wet coil” containing the wick and e-cig e-liquid. **Results:** In the dry burn studies the thicker gauged wires produced average temperatures between 1013-1330 ℃ for a contact configuration and 940-1323 ℃ for a non-contact configuration. Thinner gauged wires produced average temperatures between 1315-1580 ℃ for contact configurations and 1032 ℃ -1054 ℃ for a non-contact configuration as the voltage was increased. In the wet burn studies, the thicker gauged wires produced average temperatures between 246-280 ℃ for contact configurations and 273-305 ℃ for non-contact configuration. The thinner gauged wires produced average temperatures between 258-285 ℃ for contact configurations and 244-279 ℃ for non-contact configurations as the voltage increased. Overall, both types of wires saw an increase in temperature output with an increase in gauge size. **Conclusion:** This study developed a method for determining the different temperature outputs of electronic cigarette coil, as they would be manipulated by the user to improve drug delivery. The data collected from burning dry coils and wet coils will be used as a baseline method for future studies. The data collected can be used as a trouble-shooting guide for research complications in terms of the behavior of the electronic cigarettes. Understanding the temperature profile of the coils when burned under various

conditions will lead to more thorough understanding of the efficiency of vaping pharmaceuticals and the impact of bioavailability.

Keywords: Electronic Cigarettes,

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106. Creating a Design Magazine

Michael Farmer, Dept. of Interdisciplinary Studies: Arts Journalism, with Prof. Mary Shelden, University College

The components of a magazine — content, design and audience — were individually critiqued, and subsequently integrated to create this interdisciplinary research. The results were guidelines to realizing a design magazine focusing on 20th and 21st century design, meaning furnishings. In this context, furnishings refers to primarily furniture and lighting, though interior architectural elements and other components of interior design are encompassed. These guidelines include specific information regarding the execution of a physical or digital version of a design magazine. In addition, essential questions relating to an ideological approach — or why certain elements of a design magazine exist, or are relevant — are asked and answered. For example, how is the readership of a magazine defined, or targeted? Also, what does the term “design” refer to in the 21st century? Finding the answers to these questions, and specifically realizing the formation of a design magazine, were embarked upon in order to partly satiate the lack of media coverage for galleries, auction houses and contemporary designers. Furthermore, the accessibility of design — referring to its inherent place as operating functionally, and every day in the home — allow a younger demographic of readers, aged twenty to forty, to better engage in the happenings of art through design.

107. Identification of a Biological Control Agent on Emplectonema Gracile

Dorothy Yen, UROP Summer Research Fellow, Depts. of Biology and French, with Dr. Fernando Tenjo, Dept. of Biology

Emplectonema gracile are members of the monophyletic phylum of benthic worms known as nemerteans. Known colloquially as the "Green Ribbon Worm," they are small (typically 50 centimeters long and 3-4 millimeters wide) with a rounded head and a slender body. They belong in the Hoplonemertea family, whose worms are commensal and may be parasitic. In the past, there have been studies conducted using worms of the same family as biological control agents with relative success. However, like most parasites, these types of worms could cause rapid population mortality if left uninhibited. In order to utilize these worms as biological control agents, they also need their own potential control agent to keep them in check. This experiment will focus on testing for the presence of either fungi or bacteria that may be present on samples of the same animal from different regions around the world. I used the PCR technique followed by gel analysis in order to determine if there was potentially a fungi or bacteria that was present on all samples.

108. Distinct Saccharomyces cerevisiae strains occupy an ecological niche on oak trees and are not necessarily descended from domesticated species

Nicholas Kelly, Department of Biology with Dr. Fernando Tenjo, Dept. of Biology

Archaeological evidence suggests that humans have been using yeast to make bread and alcohol as early as 4000 B.C. [1]. As with dogs, crops, and livestock, *S. cerevisiae* has been tamed over the years. Yeasts can live on a myriad of substrates including fruit, soil, trees, and even in the intestinal and urinary tracts of mammals. However, *S. cerevisiae* is most commonly found in the presence of humans. Such a long history with humans combined with the infrequency of isolating *S. cerevisiae* in the wild has led many to believe that

S. cerevisiae is a solely a domesticated yeast with an ecological niche that is directly related to its proximity to humans [2]. However, the fast rate of reproduction of yeasts allows them to adapt rather quickly to their environment, and even express new metabolic characteristics in response to a substrate change. It comes as no surprise that different substrates utilized by yeast often correlate with differences in the genome [5]. Strains of *S. cerevisiae* isolated away from human contact are genetically distinct from the domesticated species, indicating that they are not necessarily descended from the domestic species [3, 4]. Although it is difficult to isolate in the wild, several strains of *S. cerevisiae* have been isolated from oak trees and other broad leaf trees [2]. The ITS and NL sequences can be used to show genetic differences in similar yeast species. For my research project I will be isolating yeast from oak trees located around the city, and performing PCR, electrophoresis, and sequencing of the ITS and NL sequences and comparing them to known species of *S. cerevisiae.* I will also attempt to determine which sugars are utilized and rate of alcohol production to demonstrate differences in species of *S. cerevisiae*. This research could be useful in determining if oak trees are a natural habitat for *S. cerevisiae*, its genetic differences from domesticated *S. cerevisiae*, and effects that oak tree yeasts can have on nearby vineyards and orchards.

109. The Risk of Electronic Cigarettes to Public Health and Criminal Justice

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The Food and Drug Administration has currently not developed regulations on the distribution of electronic cigarettes for non-therapeutic use. Conceivably this allows children, not old enough to buy traditional cigarettes, to purchase electronic cigarettes at their neighborhood “vape store”. Vape shops are increasing in number and commercials tout these devices as a new way to quit smoking. While the FDA debates a unifying policy, states and localities are passing legislation to tax electronic cigarettes, ban sales to minors, and ban vaping indoors or in public locations. One of the largest driving forces behind legislation in some states is the danger of nicotine overdoses in children. Additionally, electronic cigarettes have become a criminal justice problem as they have become more widespread. People are modifying and adulterating electronic cigarettes and e-liquids to “vape” a variety of illicit drugs in attempts to conceal using them. The variety and availability of electronic cigarettes is prolific, yet the overall criminal justice impact is widely unknown. Data mining is imperative to define the scope of the risk.

Objective: The goal of this study was to identify information and resources to assist ongoing research efforts to understand the forensic impact and implications of electronic cigarettes to the general public. Information gleaned in the process of this study will aid publications that could impact decisions regarding criminal justice and public education. **Methods:** Data was collected from internet sources including Google Alerts utilizing the search terms: electronic cigarettes; nicotine electronic cigarettes; illegal drugs electronic cigarettes; legislation electronic cigarettes; electronic cigarette policy (by state); criminal justice electronic cigarettes; heroin electronic cigarettes; marijuana electronic cigarettes and methamphetamine electronic cigarettes. Primary sources such as YouTube videos and drug blogs were collected and cataloged. Additionally, interviews were conducted with experienced users regarding usage patterns as well as device configurations and manipulations. Policy data was compiled into a table representing state lawmaking trends. Trending media reports were cataloged into reference folders. **Results:** Modifications and adulterations to electronic cigarettes and e-liquids are described and promulgated by experienced users on the internet through videos, social media, and user blogs. Three categories of modifications to the electronic cigarette setups to optimize performance are variation of power output, modification of the device, and reformulation of the e-liquids. All fifty states have developed policy in at least one of these five areas: sales to minors, defining electronic cigarettes as tobacco products, bans on use in public, taxes or other regulations. Numerous websites and blogs (i.e. Reddit, etc.) describe using electronic cigarettes to deliver illicit drugs such as marijuana, methamphetamine, and heroin. Media has also reported deaths due to e-liquid consumption.

Conclusion/Discussion: The electronic cigarette industry is in a state of quandary. The industry has implemented some self standardization of components. However, state legislation is a piecemeal effort to regulate the electronic cigarette industry and the federal government continues to solicit research, both scientific and policy-based, to develop unifying regulation. As licit and illicit use of electronic cigarette devices proliferate, the risk to public health and criminal justice needs to be fully defined. This research will inform the forensic toxicology community of the problems and dangers of adulteration and manipulation of electronic cigarettes and e-liquids.

Keywords: Electronic Cigarettes, Data Mining, Policy

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110. Video Choreography: Closing The Gaps Between Dancers, Choreographers, and Video-makers

Alida Salerno, Dept. of Interdisciplinary Studies: Video Choreography, with Prof. Mary Shelden, Dept. of Focused Inquiry

My work as a video choreographer blends the worlds of dance and choreography with video production. With this hybrid art form comes a very specific challenge; being well versed in both fields so one can act as a liaison between dancers and videographers. How can one successfully shoot dancers without knowledge of dance and choreography or capturing moving bodies on video? How can a choreographer effectively re-choreograph a piece set originally for stage for a video work or choreograph a video dance without understanding what the camera sees and how it picks up moving bodies in space? My interdisciplinary degree starts bridging this gap between the disciplines, but integrating them is a completely different task. My research revolves around the preparation that goes into choreographing, shooting, and editing a dance piece for camera. What goes into choreographing a dance for stage versus a dance for camera? How are camera angles and positions utilized to both amplify movement and stay true to the movement? When it comes to editing, what practices are used to cohesively put together a dance piece and what errors should be avoided so the piece reads as intended? While many questions and problems I have faced in my field have been answered through my coursework in dance and video production, these questions proposed have not. My research fills in the gaps between these two fields through creating a dance for camera piece in collaboration with a local dancer to be sent to a film festival, and breaking down the preparation and execution behind each step in the process.

111. Genetic mechanism underlying the reversal to radial floral symmetry in Brachylophon curtisii(Oliver) from the zygomorphic flowered ancestor in Malpighiaceae

Farahnoz Khojayori, Department of Biology with Dr. Jingbo Zhang, and Dr. Wenheng Zhang, Dept. of Biology

CYCLOIDEA2- (CYC2-) like genes were identified to play a key role in repeated evolution of floral zygomorphy, an adaptive trait associated with increased species diversity in core eudicots. The origin of Malpighiaceae in the New World (NW) is characterized by the evolution of floral zygomorphy with a banner petal and oil glands on the calyx in association with the NW oil-bee pollination. A *CYC2*-like gene duplicated in the common ancestor of Malpighiaceae to give rise to two paralogs, *CYC2A* and *CYC2B. CYC2A/B* differentially express along a symmetrical plane in NW zygomorphic flowers in phylogenetically diverse clades of Malpighiaceae. Furthermore, phylogenetic studies indicate seven independent losses of the stereotypical NW floral characteristics, including floral zygomorphy and oil glands, due to independent migrations to the Old World

(OW). Here, we study *CYC2* evolution in the OW acridocarpoid clade that separated from its NW counterparts around 60 mya. Specifically, we are attempting to determine the mechanisms underlying the evolution of floral symmetry within acridocarpoids, which include the African *Acridocarpus* (ca. 30 species), with a two dorsal petal pattern of floral zygomorphy, and the Southeast-Asian *Brachylophon* (ca. three species) with completely actinomorphic flowers. We propose that relaxation of a highly conserved *CYC2* developmental program underlies the reversal to actinomorphy in *Brachylophon*. Our preliminary results show that *Brachylophon* has at least the CYC2A sequence, based on amplification of the sequence based on copy specific primers of its sister group Acridocarpus. Additionally the failure to amplify the CYC2 sequence in Brachylophon with use of degenerate primers and the amplification of CYC3 instead, shows the divergence of CYC2 in Brachylophon reflective of the reversal to the ancestral symmetry pattern of actinomorphy. We hope the results will allow for a better understanding of the role of *CYC2* in not only controlling flower morphology, but in helping to characterize the evolution of flowering plants in response to geographic barriers and pollinator shifts between Africa and Asia.

112. The Effects of Pet Ownership on Anxiety and Depression Among Trauma-Exposed College Students

Dung Nyguentran and Marlene Michniak, Dept. of Chemistry, with Dr. Amy Adkins, Dept. of Psychology

Rates of anxiety and depression are prevalent in college students and can be attributed in part to stress and trauma-related events. However, studies suggest that pet ownership has the possibility of alleviating symptoms of anxiety, depression, negative emotions, and suicide. The purpose of this study was to determine the relationship between pet ownership and levels of anxiety and depression among those who have experienced a traumatic event. The sample was comprised of five hundred and forty-seven VCU students who completed an online survey from Spit for Science during their Junior year. Linear regression was performed to determine the nature and strength of the relationship between our two variables. After controlling for gender, race/ethnicity, personality, social support, and resiliency, we found statistically significant lower levels of anxiety and depression among pet owners compared to non-pet owners ($p=0.004$). This study reinforces how pets can impact our mental health, and lends further research to support programs such as VCU's Center for Human-Animal Interaction (CHAI) and their Dogs on Call program.

113. Curiosity Effects on Compassion

Ashley Bacalso and Athena H. Cairo, Dept. of Psychology, with Dr. Jeffrey D. Green, Dept. of Psychology

Compassion, or feeling concern for others' well-being, is a critical part of human functioning (Zaki & Ochsner, 2012). However, seeing a person's distress may trigger either an other-oriented feeling of compassion or *empathic concern*, which motivates prosocial behavior even in the face of personal discomfort, or a self-focused *personal distress* response, which motivates alleviation of one's own distress (either by helping or escaping; Batson, 2011). One cross-cutting factor which may promote empathy in the face of these barriers is curiosity, the desire to attend to, embrace, and seek out new experiences and new knowledge (Kashdan et al., 2009); or, the positive emotion stemming from that approach motivation toward novelty (Silvia, 2005). Curiosity promotes better psychological flexibility promoting positive emotions in social interactions (Kashdan & Roberts, 2004; 2006) and particularly after experiencing something stressful (Kashdan et al., 2013), which may aid in orienting emotional responses toward compassion rather than personal distress. Additionally, there is evidence that highly empathic people may be more curious and motivated to seek out novel experiences (Smith, 1992; Davis, 1999). The current study investigates the hypothesis that curiosity promotes empathic concern and decreases personal distress emotions toward a person in need, as well as willingness to help that person. Results and applications will be discussed.

114. Mindfulness and socioemotional autonomy

Emily Ho, Courtney Tat, Alexandra Martelli, and Jordan T. Quaglia, Dept. of Psychology, with Dr. Kirk Warren Brown, Dept. of Psychology

In social contexts, maintaining a balance between emotional autonomy and connection to others may be necessary for healthy relationship functioning. Effective social emotion regulation may be integral to such balance. Mindfulness can be described as involving greater attention to and awareness of the present moment (Brown & Ryan, 2003), and has been linked to more effective emotion regulation in social contexts. Further, mindfulness is related to healthy relationship functioning, improvement in relationship quality, and boosting individual partners' coping skills. Given these previous findings, here we examine whether individuals higher in mindfulness support their own and others' autonomy in social contexts. We conducted a cross-sectional survey of romantic couples to examine mindfulness as it relates to socioemotional autonomy as indexed by partner-rated support for autonomy, social anxiety, codependence, and excessive reassurance seeking. Sixty-seven couples (N=134) completed the study. We analyzed the data using the actor-partner interdependence model. Individual mindfulness was inversely correlated with social anxiety (fear and avoidance subscales), excessive reassurance seeking, and codependence. Further, romantic partner mindfulness significantly correlated with one's own ratings of support for autonomy, such that partners high in mindfulness were rated as promoting more autonomy in their romantic partners. These findings suggest that one route to understanding healthier relationship functioning in mindfulness may be its role in effective emotion regulation that promotes socioemotional autonomy.

115. Mindful emotion regulation in social contexts: Examining the role of healthy boundaries

Courtney Tat, Emily Ho, Alexandra Martelli, and Jordan T. Quaglia, Dept. of Psychology, with Dr. Kirk Warren Brown, Dept. of Psychology

Relationships require effective emotion regulation, including navigating the unique challenges of maintaining balance between taking care of one's own emotional needs and being there for others. Mindfulness is present-moment awareness that improves emotion regulation and its expression, and which is evident across a wide range of measures at an individual level. However in an interpersonal context, adopting these attentional skills also appears to be efficacious for relationship functionality and quality. To date, there is not yet a measure that succinctly captures effective emotion regulation in social contexts, which we consider central to having "healthy boundaries." Healthy boundaries may be characterized by a balance in attending to one's emotional needs and achieving one's goals while accounting for the emotional goals and needs of the partner. Considering that emotion regulation is central to such interpersonal boundaries, here we examine whether mindfulness may facilitate one feature of healthy boundaries, namely the presence of social and emotional connection with others. Toward this end, sixty-seven romantic couples completed a cross-sectional online survey. Through an actor-partner independence model approach, it was found that one's individual level of mindfulness was positively correlated with general perspective taking, partner-specific perspective taking, and positive relations with others. Moreover, higher mindfulness ratings in one's romantic partner were directly correlated with higher perceived emotional support by those romantic partners. There were no significant findings for partner-specific empathy and general empathy. These various findings suggest mindfulness may improve relationship functioning through emotional regulatory efforts that maintain healthy boundaries by accommodating other's goals and needs while also meeting one's own.

116. Design and Creation of a Device to Induce Vergence Eye Movements

Jacob Jaminet, Depts. of Bioinformatics and Math, with Dr. Paul Wetzel, Dept. of Biomedical Engineering

Automated eye-tracking systems can detect and analyze eye movements as a means to accurately diagnose more than 20 neurological diseases including mild traumatic brain injury. Mild traumatic brain injury is an occurrence of injury to the head resulting from blunt trauma or from acceleration or deceleration forces. Eye movement refers to the voluntary or involuntary movement of the eyes, helping in acquiring, fixating and tracking visual stimuli. There are three types of voluntary eye movement to track objects: smooth pursuit,

vergence shifts and saccades. Vergence shifts are eye movements where the eyes move in opposite directions: moving to the midline in convergence or moving away in divergence. This project focused on creating a device to induce vergence eye movements via a laser source and a mirror galvanometer. The laser pointer is directed at the mirror galvanometer which then projects the laser point onto a screen that lies horizontally in front of the observer. As the laser dot moves back and forth from the viewer, the eyes converge as the dot moves toward the viewer and diverge as the dot moves away. The device will be used to develop a baseline of control data that can eventually be used to diagnose mild traumatic brain injury. Different eye trackers will be tested to determine the optimum technique for gathering vergence eye movement data.

117. Bacillus Phage Genomes as Information

Sarah Adkins, Adithya Balu, Ruairidh Barlow, Kelly Flounlacker, Emily Gardner, Syed Hasan, Brittany Hazard, Amay Iyer, Steven Jermstad, Robert Kalish, Ayub Khan, Rishabh Patel, Micah Powell, Nikhita Puthuveetil, Danny Rayes, Jennifer Snyder, Gabrielle Strandquist, Keerthana Vishwanath, Mitchell Vu, Rahul Warrier, Bethany Yachuw, Dept. of Bioinformatics, with Dr. Allison Johnson, Center for the Study of Biological Complexities

Over the past three years, VCU students have discovered and characterized the genomes of 12 bacteriophages infecting *Bacillus thuringiensis* subspecies *Kurstaki*. These phages represent several different "clusters" of genomes and suggest these phages are both diverse but also contain a core set of interesting proteins. Protein annotation provides a wealth of information about genomic content, and will be compared between these phages using a variety of computational approaches. Genome features of these phages will be compared in an infographic style presentation to explore our ability to present science in a graphically interesting way. Finally, efforts to obtain Gene Ontology based functional annotations through the the "CACAO" competition will be described.

118. Detecting Acellular Oxidative Reactivity of Engineering Nanoparticles using DCFH-DA

Jasmine Wang and Ivan Jimenez, Dept. of Chemical and Life Science Engineering, with Lynn Secondo and Dr. Nastassja Lewinski, Dept. of Chemical and Life Science Engineering

People are commonly exposed to ultrafine particles or nanoparticles in aerosols, such as diesel exhaust. Exposure to natural and manufactured nanoparticles may lead to a higher risk of reactive oxygen species (ROS) generation, which can result in oxidative stress and inflammation. ROS generation can occur due to the nanoparticles themselves or due to the cells' response to the nanoparticles. In this work, we used the indicator dye 2', 7'-dichlorodihydrofluorescin diacetate (DCFH-DA) to detect the inherent or acellular oxidative reactivity of different nanoparticles. The DCFH-DA assay involves the use horseradish peroxidase to cleave the DCFH-DA to 2', 7'-dichlorodihydrofluorescin (DCFH). If the nanoparticles generate ROS, the ROS will react with the non-fluorescent DCFH to create fluorescent dichlorofluorescein (DCF), which is used to measure oxygen reactivity. We adapted a method that was optimized to detect the acellular oxidative reactivity of nanoparticles, based on the reactivity of carbon black (FW2) and silica (Aerosil 200) nanoparticles.[2] We tested several iron oxide, gold, and diesel exhaust nanoparticles. For the study, we hypothesized that we will be able to detect different levels of ROS generation for different nanoparticles. Our results indicate that we were able to see lower ROS concentrations for iron oxides and gold nanoparticles.

119. Associations Between Childhood Trauma, Mental Health, And Tobacco Use In A Low-Income, Urban Primary Care Clinic

Daniel Bustamante, Erin R. Smith, Allison Baylor, Michael A. Trujillo, and Sarah Griffin, Dept. of Psychology, with Dr. Bruce Rybarczyk and Paul B. Perrin, Dept. of Psychology

Background/Significance. Individuals who have experienced childhood trauma have been shown to have an increased risk for mental health problems and harmful health behaviors in adulthood. However, these relationships have remained largely unexplored in low-income individuals and racially/ethnically diverse populations. **Objective/Purpose.** The present study describes relationships among history of childhood trauma, current mental health, and current tobacco use in individuals receiving services through a low-income, urban primary care clinic. **Methods.** Adult patients (n = 46) from a community-based primary care clinic serving low-income individuals completed a survey with measures assessing childhood trauma, current depression and anxiety, and tobacco use, including how many days a week participants smoke, and number of cigarettes smoked daily. 52.2% of participants were male, and 47.8% of participants were female. 60.9% of participants were Black/African American, 30.4% White/European American, 6.5% multiracial/multiethnic, and 2.2% were Latino/Hispanic. 78.3% reported an annual income from $0 - $4,999, 10.9% $5,000 - $9,999, 6.5% $10,000 - $14,999, and 4.3% reported over $30,000. **Results.** Childhood trauma was positively associated with two indices of mental health, depression (r = .46, p = .003) and anxiety (r = .60, p < .001). Childhood trauma was positively associated with how many days a week participants smoke (r = .397, p = .012) and number of cigarettes smoked daily (r = .402, p = .011). **Discussion/Conclusions.** Experiences with trauma as a child were positively associated with current mental health problems, as well as increased tobacco use in adulthood. These results suggest that a possible mechanism for mental health deficits and tobacco use in adults may be through experiences of childhood trauma. Primary care interventions may benefit from the connection among individuals' experiences with trauma, mental health, and health behaviors, such as tobacco use.

120. Independent Parenting Practices And Their Effect On Adolescent Substance Use

Brittany Burton, Dept. of Psychology, with Dr. Wendy Kliewer, Dept. of Psychology

In recent years we have seen a growing problem with adolescent substance use in younger cohorts due to a receding perception of harm. However, previous research supports the association between family relationships and adolescent substance use. Learning about specific dimensions of the family dynamic that contribute to adolescent substance use, can inform interventions aiming to reduce this problem. The present study analyzes data from Project COPE, which recruited parent and adolescent pairs residing in low income, Richmond communities over a span of four years. Here we use a subsample of 104 adolescents in grade 8, 38.5% male, 61.5% female, ages 12-16, 94.2% Black or African American, 4.7% White/Caucasian and 1% other. Adolescent and parent perceptions of parenting practices was assessed using the Parenting Practices scale, using the Parental Control and Parental Knowledge subscales we examine the contributions of parental knowledge and parental control to adolescent substance use measured in the Problem Behavior Frequency Scale. In addition, we investigate concordance of parents and adolescents reports of parenting practices. Regression and correlation analyses will be conducted to determine the contribution of parental knowledge and control to adolescent substance use and the correlation of parent and adolescent reports. This study hypothesizes that there will be a strong relationship between lack of parental knowledge with adolescent substance use. This research has the opportunity to contribute to a better understanding of the relationship between parents and adolescent substance use.

121. Multi-dimensional approaches to coping with daily hassles in adolescents exposed to violence

Robert Laverdy and Patrick Silva, Department of Psychology with Dr. Wendy Kliewer, Dept. of Psychology

It is well known that exposure to community violence during adolescence has deleterious effects on various health outcomes. Furthermore, research has shown that the resources and assets available to adolescents directly influence their coping behaviors in the context of hassles (e.g. not enough bathrooms at home) and may play a substantial role in determining psychological health outcomes. However, no study to date has examined how the combination of available resources and coping strategies influence the way in which adolescents deal with these hassles when exposed to violence. In the current study, we build upon the extant literature by examining whether exposure to community violence predicts the coping behavior of adolescents when confronted with daily hassles. In addition, we examine the extent to which resources available to adolescents moderate the way in which they cope with such hassles. Therefore we theorize that the passive and active coping behaviors associated with daily hassles will mediate the relationship between exposure to violence and psychological health outcomes. We also hypothesize that the ascribed and achieved resources available to adolescents will exert a moderating influence on the relationship between exposure to violence and coping behaviors as well as between coping behaviors and psychological health outcomes (i.e. anxiety, depression, anger, and sadness). Our sample was drawn from low-SES communities in Richmond, Virginia (91.9% African American, 53.6% female, N=358), and measures of exposure to violence were collected via self-report.

122. Reducing Childhood Obesity in America through National Legislation

Sailee Joshi, Department of Biology with Prof. Mary Boyes, VCU Honors College

According to the Harvard T. H. Chan School of Public Health, the American childhood obesity rate has increased threefold within the past 25 years, a trend accompanied by increasing rates of hypertension, type 2 diabetes, cardiovascular disease, certain types of cancer, and even mortality. Obesity has grown so prevalent, in fact, that Centers for Disease Control estimate that one in three American children is obese. According to the Chan School of Public Health, unless legislation directly targeting America's spiraling obesity rate is passed, the trend shows no signs of slowing or reversing. Passing effective legislation requires a both an understanding of the causes of obesity and the current efforts in effect taken to reduce it. Currently, legislation aiming to reduce certain factors of obesity has been passed at the state and local levels. However, very few laws have been implemented nationally. Thus, millions of children live in an environment conducive to overweight and obesity. To combat this, certain strategies can be used. For example, taxing unhealthy foods, revamping national and state regulations for school nutrition and physical education, and even beautifying communities could encourage Americans to lead more healthful lives. Essentially, national legislation to improve physical activity, quality of accessible food, and America's increasingly sedentary lifestyle will reduce America's climbing child obesity rate.

123. Cellular Endoplasmic Reticulum and Cytokine Response In an Aging Model of Ventilator Induced Lung Injury

Franck Kamga Gninzeko and Michael S. Valentine, Department of Biomedical Engineering with Dr. Rebecca Heise, Department of Biomedical Engineering

Rationale: Mechanical ventilation is a necessary clinical intervention; however, it can result in ventilator induced lung injury (VILI). The largest population requiring mechanical ventilation is the elderly, and age is a predictive factor in the severity of VILI. However the exact relationship between age and VILI is unknown. Endoplasmic reticulum (ER) stress increases with age. Recently, it has also been increasingly recognized that macrophages play a major role in mediating the inflammation that results from age-related VILI and ER stress. We hypothesize that age associated increases in ER stress upregulate the severity of VILI and that ER

stress inhibition can attenuate these effects. Furthermore, ER stress will also increase the inflammatory response mediated by the cytokines, thus activating and recruiting macrophages at the injury sites produced by mechanical ventilation. **Materials and Methods:** Type 2 alveolar cells (AT2) were harvested from mice (C57Bl6/J) from 2 different age groups (8 weeks (young) and 20 months (old)). AT2s were cultured and cyclically stretched to 5% or 15% increase in surface area for 4, 24, 48 or 96 hours. Prior to stretch groups were administered ER stress inhibitor 4-PBA or vehicle control. After stretch, cell proliferation, and pro-inflammatory and ER stress gene expression were measured. To study the macrophage response, we set up an invasion assay using mature, inactivated Bone marrow derived monocytes (BMDMs). BMDMs monocytes and macrophages were used because they originate from the same hematopoietic precursors, which is housed in the bone marrow (St-Pierre, 2016). The invasion assay was performed as described by (Murray, 2013), with a few modifications. For the reservoir media, we tested the various AT2 conditioned media from the cyclic stretch experiments compared to control AT2 media (BEGM) to see if they produced varying inflammatory environments that recruit and activate the macrophages at varying rates. After 24 hrs, the media was collected and cytokine levels, such as TNFa and CCL20, were measured using standard ELISA kits. Live/Dead staining was used to quantify the cells that invaded through the collagen membrane and porous transwell insert. **Results and Discussion:** Mechanical stretch of all values and durations induced significantly greater AT2 cell proliferation in young groups compared to static controls. Cellular proliferation decreased in old 15% stretch 96hr group compared with static controls. Cxcl15, IL-10rb, and Il-1r1 were significantly upregulated with age and stretch. Expression of ER stress associated gene ATF4 was significantly increased in old groups compared to young. 4-PBA decreased AT4 and CHOP expression in young and old stretched cells compared to static. Old mice showed significant increases in markers for inflammation and injury compared to young. Histological analysis of lung sections showed a significant increase in markers of ER stress with age. TNF-α ELISA was performed on the media collected during the transwell experiment and the results were as follow: coculturing Old BMDMs in the various media types led to the most significant increased TNF-α secretion in the BEGM+LPS group compared to the other media types. Only the AT2 24h Control CM also showed a significant difference compared to the BEGM control group. Also, BEGM+LPS caused significantly increased TNF-α secretion compared with growth media alone in old and young BMDMs. TNF-α secretion was significantly greater in Old BMDMs compared to seeding Young BMDMs in all four media types. The AT2 24hr Control CM shows only a slightly significant different when compared to BEGM or AT2 24hr 15%CM. **Conclusions:** The decrease in AT2 cell proliferation suggests that the ability to repair in response to VILI decreases with age. Age alone and age combined with stretch contribute to an upregulation of pro-inflammatory and ER stress gene expression. ER stress inhibition decreased ER stress gene expression. Old mice experience greater lung damage and elevated ER stress from injurious mechanical ventilation than do young. The reduced proinflammatory response is also reflected in the macrophage experiments, as the reduced inflammation produced less BMDM recruitment and activation. ER stress inhibition may be a viable therapeutic target in preventing VILI in the aged population through inhibition of inflammation.

124. The Effect of Estradiol and Tamoxifen on Breast Cancer-Induced Osteolysis

Vaidehi Patel, Department of Biomedical Engineering with Dr. Barbara Boyan and Dr. Zvi Schwartz, Dept. of Biomedical Engineering

Breast cancers lacking the classical estrogen receptor ERα are extremely invasive and present treatment challenges, especially after metastasis to bone. However, these cells can still express the ERα splice variant ERα36, a potentially viable drug target for tamoxifen. Our aim was to determine the effect of estradiol and tamoxifen on osteolytic tumor growth *in-vivo* of ERα-negative/ERα36-positive MDA-MB-231 breast cancer cells. Cells were implanted unilaterally into femurs of female athymic nude mice that received one of four treatments (n=12): no-treatment, estradiol, tamoxifen, or estradiol+tamoxifen. After eight weeks, osteolysis, pathological fractures, and tumors were measured. Estradiol increased osteolysis and fracture when compared to the control. Tamoxifen increased the occurrence of fracture when compared to the control but did not significantly increase osteolysis or tumor growth. Estradiol+tamoxifen resulted in the largest incidence of osteolysis, tumor growth, and pathologic fracture out of the four groups. The size of tumor and percent bone volume remaining was then quantified using MicroCT analysis. Estradiol and tamoxifen alone did not develop significantly larger tumors than the control, while estradiol+tamoxifen resulted in the largest tumor size out of all groups and presented with significantly less bone volume remaining than the control. These results suggest that estradiol and tamoxifen enhanced tumor growth and osteolysis through ER36 in ERα-negative tumor. **AUTHORS: Vaidehi Patel**, D. Joshua Cohen, Sharon Hyzy, Zvi Schwartz, Barbara Boyan

125. Reduction of Oxidative Stress and Storage Lesions (RCSL) in Red Blood Cells: Analysis of Ascorbic Acid (AA), N-Acetylcysteine Amide (AD4), and Serotonin (5-HT)

Shanmuka Gadiraju, Department of Biochemistry with Prof. Mary Boyes, VCU Honors College

Oxidative stress is a pedestrian occurrence in red blood cell (RBC) storage in blood banks throughout the world. Typically RBC units can only be stored up to 42 days for transfusion usage before being discarded. A literature review was conducted by studying various journal articles and books concerning storage-induced oxidative stress in order to examine if additives such as ascorbic acid (AA), N-acetylcysteine amide (AD4), and serotonin (5-HT) can reduce oxidative stress on RBCs. These various additives significantly alleviated a range of signs of oxidative stress on RBCs including but not limited to replenishing GSH, decreasing percent hemolysis and lysis, inhibiting the phospholipid rearrangement, and encouraging ATP production. By reducing these signs of oxidative stress, RBCs are able to last longer without any significant changes biochemically, and decrease the chances of post-transfusion complications such as Graft vs Host disease (GVHD). This is important because it can increase the patient's outage post-transfusion as well as increase the shelf life of RBC storage units past the standard 42 days via routine storage protocol (stored in SAGM-CPD additive solution) in addition to the novel additives previously stated.

126. ADAM10 mediates Th2 driven allergic disease

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ADAM10 is a zinc-dependent metalloprotease. ADAM10 has emerged as a key regulator of cellular processes by cleaving and shedding extracellular domains of multiple transmembrane receptors and ligands. In our previous studies, we examined the role of ADAM10 in the immune system. We showed that knocking out ADAM10 on the mature B cell ($ADAM10^{B-/-}$) makes these mice less susceptible to mouse models of allergic airway disease as well as lowers levels of antibody production. Conversely, in human allergic patients, B cell ADAM10 is significantly elevated, when compared to non-allergic controls. Previous work created a mouse model of overexpression of ADAM10. This transgene was driven by a lymphocyte promoter to attempt to study overexpression of ADAM10 in the immune system. Unfortunately, this overexpression leads to a defect in hematopoiesis, which eliminated B cell development completely. Currently, a new transgenic mouse has been made through the VCU transgenic core. This mouse uses a Cre recombinase driven transgene that overexpresses ADAM10. When these mice are bred to cre recombinase expressing animals controlled by cell specific promoters, they only overexpress ADAM10 on those specific cell types. This overexpression occurs due to the removal of a stop codon upstream of the ADAM transgene(LSL) by cre recombinase. These $ADAM10^{LSL}CD19^{cre}$ mice will induce overexpression in B cells, but beginning at a later stage of lymphoid development. We will then bypass the loss of B cells. For this project, we planned to characterize this novel mouse model. First, we confirmed the stop codon was being removed from only B cells by PCR. While the native ADAM10 does not have an HA protein tag, the ADAM10 transgene has an HA protein tag. We then looked for expression of this in B cells by RT-PCR after stimulation with IFNγ or anti-CD40 and IL4, as the ADAM10 transgene was driven by the MHC promotor. Unfortunately, the expression was low, but only visible with IFNγ stimulation. We next moved *in vivo,* immunizing mice with NP-KLH in alum and measuring high affinity and total affinity antibody responses. This revealed no differences between the $ADAM10^{LSL}CD19^{CRE}$ and controls. **We hypothesize that overexpression of ADAM10 on B cells increases the susceptibility to Th2 driven allergic disease, but the $ADAM10^{LSL}CD19^{CRE}$ mouse model is not overexpressing the transgene, thus we were unable to prove or disprove this hypothesis.**

127. The Effect of Bisphosphonates on Bone Healing in Rats

Lucas Olson, with David J. Cohen, Dr. Barbara D. Boyan, and Dr. Zvi Schwartz, Dept. of Biomedical Engineering

Bisphosphonates are a class of drug used to combat osteoporosis, a condition where patients suffer from low bone density. These drugs inhibit the activity of osteoclasts, cells responsible for resorbing and remodeling bone. Once ingested, bisphosphonate remains locked in the calcified matrix of bone. Tissue banks commonly harvest bone post-mortem for use as allograft in patients undergoing surgeries requiring bone grafts. Currently, tissue banks do not screen for bisphosphonate use by tissue donors, which may have an impact on the healing ability of this harvested bone. The purpose of this experiment was to determine if bisphosphonate use by bone graft donors affects the healing ability of these bone grafts when implanted in an athymic rat model. Previously our group determined that bisphosphonates do not affect demineralized bone grafts (DBGs) [1]. Since bisphosphonates bind to the mineralized matrix of bone, and would be removed during the demineralization process, we hypothesized that there would be an effect on the mineralized bone grafts (MBGs). MBG and DBG were collected from 6 different human tissue donors by the Musculoskeletal Transplant Foundation. Three patients had taken bisphosphonates, and three patients were age and sex-matched controls. MBGs and DBGs from each donor were implanted bilaterally into 3mm femoral defects in eight-week-old male athymic nude rats (n=6 rats/variable). Particularized active DBG and empty defects were used as controls. After 10 weeks the rats were sacrificed and their femurs collected. MicroCT and histology were used to assess the bone healing of the grafts, and OW ANOVA was used to determine significance. MicroCT data revealed that there was significantly more bone touching the DBGs in comparison to the MBGs, suggesting that less osteogenesis had occurred with MBGs. There was also significantly more bone in the marrow space in the DBGs compared to the MBGs, supporting that greater osteogenesis in the DBGs had occurred. Analysis of the histological data also revealed that the DBGs had significantly more bone touching the graft. Also, bisphosphonate MBGs had significantly less bone in contact with the graft in comparison to the control MBGs, suggesting that osteogenesis was limited by the bisphosphonates. Histology showed a separation between the bone bed and the bone graft in some samples. When quantified, there was a significantly greater separation area in the bisphosphonate MBGs in comparison to all other sample groups, further suggesting that the bisphosphonate MBGs inhibit the bone healing process. Histology revealed that a large area of dead bone was present in most bone grafts. All the bone (dead or new) was quantified in a predetermined area. The area of the new bone was significantly greater in the particularized active DBG control, and the area of the dead bone was significantly greater in all groups when compared to the particularized active DBG control. This suggests that processing the bone grafts in a block form negatively affects endosteal bone formation and bone healing in comparison to a particularized form.

Funding
Musculoskeletal Transplant Foundation

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128. Smart Fabrics for Colorimetric Chemical Detection

Breland Edwards, Department of Chemical and Life Science Engineering, with Dr. Christina Tang, Chemical and Life Science Engineering

Due to the prevalence of chemical warfare, soldiers often carry chemical sensing devices, to warn of oncoming nerve agents. However, these devices are cumbersome. A lightweight, wearable chemical sensing fabric that doubles as a protectant against toxins would be beneficial. This fabric can be created by incorporating (1) organophosphate hydrolase, an enzyme capable of degrading organophosphates and releasing an acidic by product, and (2) polyaniline, a color changing polymer that changes from purple to green in the presence of acid, into nylon or polyvinyl alcohol nanofibers. The first step is to produce fabrics containing polyaniline and demonstrate that the fabrics change color in the presence of an acid. Specifically, we have incorporated polyaniline into the fabrics using two methods. In one method, the polyaniline dispersions are blended with polyvinyl alcohol and electrospun into nanofibers. In the second method, polyaniline is grafted to the surface of nylon nanofibers. Currently, the sensitivity over numerous cycles is under investigation. The lowest sensitivity of instantaneous color change for the nylon grafted fabrics was 1.6μM HCl. Further research will

be conducted to establish a standard detection sensitivity and to incorporate organophosphate hydrolase into the fabric.

129. Exploring the Impact of Migration on the Village Community of Teotitlán del Valle

Cydni Gordon, CE Summer Research Fellow, Depts. of Psychology, Broadcast Journalism and African American Studies with Dr. Rosalie Corona, Dept. of Psychology

As the 2016 Presidential Race has highlighted, Mexican emigration to the United States is of great concern to politics, economics, and citizens of both Mexico and the United States. This migration trend is not though it is changing. The issue of migration has two sides, like all stories. At times, the American one is not the most empathetic. The focus of this investigation is to understand and share the reason(s) for, and the impact of migration on the individuals, families, and community of Teotitlán del Valle, in Oaxaca, Mexico. As this project highlights, the decision to emigrate is not one easily reached. It has psychological and emotional effects and impacts family and community dynamics. It is the intention that this project will lead to greater knowledge of the complexity of migration and foster more empathy. To accomplish this, 9 semi-structured qualitative interviews were conducted in Teotitlán del Valle over a four-week period. Such work is important because many people are leaving Teotitlán del Valle, and not returning—what does this mean in terms of preserving indigenous culture? Besides delving into Oaxacan migration patterns, this project sheds light on Teotitlán's rich and deeply rooted indigenous culture.

130. Bridging the Nerve Gap: Optimizing the Application of Carbon Nanotubes in Scaffolding Structures to assist in the Regeneration of Physically Damaged Sciatic and Ulnar Nerves

Patrick Jones, Department of Biomedical Engineering with Prof. Mary Boyes, VCU Honors College

For traumatic peripheral nerve injuries that result in the severing of a nerve, nerve grafts are the current standard treatment option. However, nerve grafts consist of removing a portion of a nerve from another part of the body to transplant into the target location; in order to avoid the resulting loss of sensation or function at the donor site, hollow nerve conduits have appeared as a potential solution to allow for the regeneration of the damaged nerves in a controlled and directionally guided manner. This study examines the existing approaches of applying carbon nanotubes in the composite materials used to construct these conduits through the exploration of the effects of CNTs' inherent tensile strength and conductivity on the physical characteristics of the nerve conduits. I reviewed the existing research on this specific application of carbon nanotubes to determine how the material can improve the mechanical strength and conductivity of nerve conduits, and how these factors can be beneficial in tissue engineering when working with electroactive tissues. Using carbon nanotubes in these structures increases the ability to withstand forces when applied *in vivo* as well as increases the conductivity of the conduits, which allows for electrical stimulation of the electroactive tissues and increases the rate and degree of regeneration of damaged peripheral nerves. Carbon nanotubes can be used in scaffolding structures to positively impact tissue regeneration in sciatic nerves based upon the conductivity and strength provided to scaffolding structures with minimal toxic effects on surrounding cells and tissues. It is essential that more research concerning the use of CNTs to help regenerate peripheral nerves be conducted to determine how to best use carbon nanotubes in this application, and to realize potential wider uses of the treatment.

131. The Association between Maternal Eating Habits and Adolescent BMI: Moderation by Physical Activity Level

Richard Mensah, Department of Psychology with Dr. Wendy Kliewer, Dept. of Psychology

Obesity, clinically characterized by a Body Mass Index (BMI) over 30, is on the rise in the United States. According to the Center for Disease Control and Prevention (CDC) Healthy School Report in 2016, the percentage of adolescents aged 12-19 years who were obese increased from 5% to nearly 21% from 1980 to 2012. The same report also estimated that in 2012, more than one third of children and adolescents were overweight or obese. This can be attributed to "caloric imbalance" in which too few calories are expended for the amount of calories consumed. This imbalance is affected by various genetic, behavioral and environmental factors. Obesity can have both immediate and long-term psychological and clinical implications for the well-being of adolescents, serving as risk factors for depression, poor self-esteem, social stigmatization, cardiovascular disease, diabetes and several types of cancers (CDC, 2016). It has been shown that parental control of feeding practices, especially restrictive feeding practices, tend to be associated with overeating and poorer self-regulation of energy intake in children (Savage et al., 2007). It has been researched and shown that physically active youth have lower levels of adiposity than those less active and hence a much higher risk overweight adolescents becoming overweight adults (Stankov et al., 2012). However, to date not many study has investigated the moderating impact of physical activity on the relationship between maternal eating habits and child BMI. The present study addresses this gap and adds to literature with a focus on maternal eating habits and its association with adolescent BMI moderated by adolescent physical activity level in low-income African-American families residing in Richmond Virginia. The current sample comes from Project HEART (Health and Resilience in Teens) a study which sought to understand the association between cumulative risks and physiological well-being. Biological dyads of African-American mothers and their adolescent children participated in at-home interviews involving an interview and physical health assessments conducted by trained interviewers. Measures used in the current study include the PACE+ Dietary Fat Screening measure, to assess maternal eating behaviors, the San Diego High School survey to assess adolescent physical activity, and measures of adolescent BMI. Regression analysis will be used to analyze the data. A total of 110 dyads participated in the study. The percentage of male and female adolescents was 43.6% and 56.4% respectively, with ages ranging from 13-17 years old. It is proposed by this paper that there will exist a correlation between parental eating habits and adolescent BMI, and that child's physical activity level might play a relatively larger role/influence in higher child BMI. Thus, it is hypothesized that children who embark on a regular routine of energy expending physical activity will have a relatively lower BMI than those that do not with maternal eating habits relatively having a weaker relationship with adolescent BMI.

132. Emotion Similarity Within Romantic Couples as a Predictor of Relationship Quality

Marsha Wilson, Department of Psychology with Jordan Quaglia and Dr. Kirk Warren Brown, with Dept. of Psychology

Personal relationships are among the most gratifying aspects of people's lives. Romantic relationships, in particular, fulfill a particular desire that most individuals have for emotional expression and intimacy. Knowing what factors are associated with higher quality romantic relationships contributes to a greater general understanding of healthy interpersonal relationships, which can lead to advances in social theories. The present study on 68 couples investigated how similarity of romantic couples' emotional lives relates to the quality of their relationships. To determine emotion similarity, difference scores for partners' total levels of positive emotion and negative emotion were computed, as assessed by the Positive and Negative Affect Scale – Expanded Form (PANAS-X), alongside measures of perceived discord and closeness in the couple's relationship. Results of actor-partner interdependence modeling indicated that emotion similarity was not a predictor of closeness. For relationship discord, however, results showed that a significant interaction between positive and negative emotion difference scores predicted discord. Specifically, high positive emotion difference scores were related to more relationship discord only when the couple also had high negative

emotion differences. Simple slopes analysis confirmed a positive relationship between negative emotion differences at high levels of positive emotion difference. These findings suggest that the combination of both positive and negative emotion differences may be critical for understanding the role of emotional similarity in relationship quality.

133. Keeping Richmond Active Getting Richmond Clean

Antone Bouché, Department of Marketing for Mass Media, with Prof. Mary Shelden, Dept. of Focused Inquiry

Richmond is a very active city. It hosts some of the biggest running and biking events in the country. One of the reasons Richmond stays so active is its tight knit communities. But what really gets people outdoors is its beautiful trails and parks. One problem that the parks and rivers have been facing is littering, The James River park system has been trying to organize cleanups but does not receive very much money to fully maintain the trails and parks, they relies on donations and some government grants to support them. My idea is to create a campaign and work with Sports backers a popular a non-profit that helps organize marathons and events, I want to create and sell merchandise during their upcoming 10k to raise money to help keep Richmond parks clean. This will not only fund the efforts but raise awareness for runners and bikers alike for these coming summer months.

134. The affect of substrate stiffness and cellular forces in tumorigenesis

Devin B. Mair, UROP Summer Research Fellow, Dept. of Biomedical Engineering, with Dr. Christopher A. Lemmon, Dept. of Biomedical Engineering

Cancer cells have enormous impact on the surrounding environment. They create a stiffer tissue and release cytokines and growth factors to influence the fate of the cells surrounding them, effectively recruiting the surrounding healthy cells into the tumor. In epithelial cells (cells that line organs), healthy cells are recruited by the tumor cells and undergo epithelial to mesenchymal transition (EMT): a process in which they lose their epithelial characteristics (such as cell to cell connections) and become more motile and invasive. After undergoing this transition, epithelial cells can enter the blood stream and migrate to different parts of the body, invading these new locales and beginning tumorigenesis anew. Additionally, all cells apply contractile forces to the extracellular matrix (ECM) in order to assemble proteins in the ECM into fibrils and migrate. Recent studies have shown that cancer cells may apply increased contractile forces to the ECM and to other cells, and that inhibition of these contractile forces could revert the malignant cells back to their healthy phenotype. With this in mind, we set out to measure the contractile forces of the cell using microfabricated post arrays while monitoring additional indicators of EMT in healthy cell and EMT induced cell conditions, enabling us to compare healthy epithelial contractile forces to cancerous conditions. We also plated the cells at differing substrate stiffness levels, which allowed us to see how the stiffness affects EMT and the contractile forces displayed by the cells.

135. TGF-β-induced Epithelial Mesenchymal Transition (EMT) in breast cancer cells: a role for fibronectin fibrils

Karishma Mehta, Dept. of Biology, with Dr. Lynne Elmore, Dept. of Pathology

Background/Objective: Breast cancer is the most common form of cancer found in the female population, with one in eight women being diagnosed in their lifetime. Of those diagnosed, 17% will succumb to the disease almost exclusively due to metastases. Epithelial mesenchymal transition (EMT) has been implicated as a critical early step in the metastatic process. This transition is characterized, in part, by an upregulation of mesenchymal markers (including fibronectin) with a concomitant reduction in epithelial-associated genes. Recognizing that breast tumors often express high levels of fibronectin (FN), and breast cancers with a dense fibrotic stroma are associated with a poorer prognosis, we hypothesized that blocking FN fibril assembly will

interfere with EMT, and thus potentially inhibit breast cancer progression. Study Design: Human breast cancer cells, HMT-3522 T4-2, when co-injected with breast adipose-derived mesenchymal stem cells (MSCs) into immunocompromised mice form tumors that are larger, more invasive, and have more abundant FN-rich stroma compared to pure T4-2 tumors. Tissue sections of mixed versus pure xenografts were immunohistochemically stained for vimentin (mesenchymal marker) and E-cadherin to assay for the EMT of T4-2 cells in vivo. Since MSCs in response to breast cancer conditioned media express high levels of TGF-β, a growth factor that readily triggers EMT in normal and immortal cells, cultures of T4-2 cells (along with MCF-10A cells as a positive control), were treated + 2ng/ml TGF-β for 48 or 72 hours and then examined by immunofluorescence for E-cadherin, FN and actin stress fibers. RNA was isolated and qRT-PCR performed to access expression levels of multiple EMT-associated genes. Results: Within T4-2/MSC mixed xenografts a subset of cells within the primary tumor were intensely stained for vimentin and exhibited breakdown of adherens junctions; of note, these putative 'transitioning' T4-2 cells tended to be in close association with extracellular matrix. Cultures of T4-2 and MCF-10A cells consistently exhibited upregulation of FN, snail and N-cadherin mRNA. Surprisingly, TGF-β treated T4-2 cells exhibited an upregulation of E-cadherin mRNA. As previously reported for MCF-10A cells, T4-2 breast cancer cells exhibited pronounced stress fibers (Phalloidin) within cells, widespread breakdown of adherens junctions (E-Cad) between cells, and abundant FN fibrils outside the cells in response to acute TGF-β treatment. Conclusions: Collectively our data suggest that TGF-β triggers EMT in T4-2 human breast cancer cells. Studies are currently ongoing to test whether blocking FN fibril assembly with FUD is sufficient to interfere with EMT, while future in vivo studies are planned to investigate whether inhibition of FN fibrillogenesis using our mixed xenograft model can block breast cancer progression.

136. Exploring the Relationship Between Organ Perfusion Pressure (Mean Arterial Pressure) and Airway pH (Exhaled Breath Condensate pH) in Mechanically Ventilated Adults

Kyle Wickliff, RN, UROP Summer Research Fellow, VCU School of Nursing, with Dr. Alison Montpetit, VCU School of Nursing

BACKGROUND: Exhaled breath condensate (EBC) is a biological fluid that represents the water phase of exhaled breath and contains biomarkers representative of those in the airway lining fluid of the respiratory tract. The most studied EBC biomarker is pH and a low EBC pH is associated with negative sequela in the airway. Normal EBC pH is in the range of 7.4-8; when EBC pH values are below 7.4, the patient is considered to be experiencing "airway acidity", an emerging area of research in pulmonary conditions. Aside from aspiration of acidic gastric contents, there is limited evidence on what causes airway acidity. A recent advancement in the study of airway acidity is that EBC pH can now be evaluated continuously in mechanically ventilated study participants. In a previously conducted study (*ICU Breath Study*), we collected continuous EBC pH tracings from mechanically ventilated patients starting on day one of intubation and up to five days. Our data suggests that airway acidity occurs in the majority of this population; however, potential causes of airway acidity were not evaluated. Because low organ perfusion pressure is associated with increased gastric pH and thus gastric ulcer formation, we hypothesized that organ perfusion pressure may also be associated with airway pH. Patients receiving mechanical ventilation are under continuous hemodynamic monitoring, including assessment of mean arterial pressure (MAP), an estimate of organ perfusion pressure. Therefore, the purpose of this study was to explore the relationship between organ perfusion pressure (MAP) and airway pH (EBC pH). **METHODS:** We conducted retrospective chart reviews to collect hourly MAP data from the *ICU Breath Study* participants (N=61) and aligned MAP data with EBC pH data. The sampling rate for the participant's EBC pH was every 20 seconds and the MAP was every hour; therefore we averaged the pH over a 1-hour window to match the MAP sampling rate. During the exploratory data analysis phase, we explored the relationship of MAP as a predictor of EBC pH for each participant and found that a linear relationship between MAP and EBC pH was reasonable. Therefore, linear zero-intercept regressions were fit for each participant, with 95% confidence levels for the parameter estimates and full model diagnostics performed. **RESULTS:** All (N=61) regression parameter estimates (slopes) were positive and statistically significant ($p<0.05$). The minimum slope was 0.052, the maximum was 0.111, and the average was 0.084 with the majority of regression estimates in the range of 0.065 to 0.095.
DISCUSSION: Our data suggest a positive relationship between MAP and EBC pH. The regression parameter estimates can be interpreted as, for every one-unit increase in MAP (mmHg), EBC pH increases by b, the slope. For example, if the average regression parameter estimate is b=0.084, a one-unit change in MAP leads

to a 0.084 increase in airway pH. A one unit change in MAP is not clinically significant; however, for every 10 mmHg increase in MAP results in a 0.84 unit change in pH, almost a 1 unit change in pH - a very significant clinical finding. In the intensive care unit it is common practice to try and maintain organ perfusion pressure to support organ function; however, the effect of low organ perfusion pressure on airway acidity has not been considered. Future studies should address the negative impact of low organ perfusion pressures states on lung health and evaluate potential interventions to reduce airway acidity and support lung health.

137. Investigation of Dityrosine Crosslinking in Alpha-Synuclein

Madeleine K. Crozier, Dept. of Chemistry, with Dr. Heather R. Lucas, Dept. of Chemistry

Parkinson's disease is a common progressive degenerative disease that affects more than 1 million Americans each year and is estimated to affect 6.3 million people worldwide. Parkinson's disease symptoms often do not start until about 80% of the dopaminergic neurons in the substantia nigra are lost. This loss is believed to be caused by a buildup of insoluble deposits known as a Lewy bodies in the neurons; a Lewy body is a beta-sheet fibril comprised primarily of alpha-synuclein. Interestingly, dityrosine crosslinks can be found within aggregated alpha-synuclein, suggesting that the stability of the fibrils is due to these covalent crosslinks. Dityrosine is known to be very stable and highly resistant to acid hydrolysis, high pH, exposure to oxygen and protease. It can be created by metal-catalysis, particularly in the presence of Cu^{+} ions, which have recently been found to accelerate the amyloidogenic process by activating O_2 leading to enhanced oxidative stress. Thus, dityrosine may serve as an important biological marker of oxidative stress in PD. However, very little is known about the mechanisms that lead to alpha-synuclein aggregation and the specific tyrosine residues involved. Within the wild-type alpha-synuclein sequence, there are four tyrosine residues, meaning that a crosslinking can occur within the monomeric sequence (*intra*molecular) or with another alpha-synuclein protein (*inter*molecular). In this proposed experiment, new plasmids will be designed, and site directed mutagenesis will be used to create each mutation, Y to F (Y39F, Y125F, Y133F, and Y136F). Expression and purification will be carrieed out using standard techniques, such as the use of ion-exchange columns and UV-visible spectroscopy readings. Each variant will then be tested to determine the importance of each tyrosine residue in terms of how it affects the overall aggregation of alpha-synuclein when involved in oxidative or nitrosative events.

138. Single molecule forensic DNA characterization with laser-induced nanopore heating

Nicole Auka, Dept. of Forensic Science, with Dr. Sarah Williams, Dept. of Forensic Science

Identifying mixtures early on in the DNA analysis process is beneficial in forensic casework. It has been suggested that nanopore sensing has the potential to determine the number of contributors within a sample by distinguishing differently sized DNA fragments. The objective of this research is to demonstrate proof-of-concept that nanopore sensing can be applied to forensic samples in order to identify the number of contributors. Nanopore sensing is implemented by placing a nanopore into a bacterial membrane with a current steadily running through it. When the nanopore is empty, a baseline current will be detected. After a sample of extracted DNA is applied, the current drives the DNA molecules into the nanopore thus reducing the flow of the current and producing a current blockade. The size of the current blockade is proportional to the size of the DNA fragment. Synthetic homopolymer DNA fragments were added together in various mixtures and demonstrated how distinguishing mixtures through nanopore sensing is feasible. When the synthetic TPOX DNA fragments were applied to the nanopore it was determined that identifying mixtures using nanopore sensing is also applicable to forensic samples.

139. Examining Fungal Biodiversity from Soil Samples Obtained Along the James River

Shelby Bennett, Dept. of Biology, with Dr. Fernando Tenjo, Dept. of Biology

Fungi are considered to be the most genetically diverse kingdom in the ecosystem. Species within the Fungi kingdom range from single-celled to multi-cellular organisms. In addition to being genetically diverse, fungi also live in diverse conditions within the ecosystem. These environments range from aquatic, terrestrial, and air environments. Fungi have a multitude of roles in which they play on the ecosystem. These can vary from decomposers to distinct parasitic abilities. This study was conducted to (1) extract fungal DNA from soil samples collected along the James River, and (2) sequence the DNA in order to determine the fungal diversity within each sample. **Methods and Materials:** Soil samples were collected along the James River during the summer. The samples came from 13 different locations along the James River. Fungal DNA was extracted from the samples and purified. PCR was ran on the purified products, and the results were observed using gel electrophoresis. Two of the purified products were cloned using an E.coli cloning vector. The cloned samples were grown on YPD plates that contained antibiotics. The samples that grew were then purified, and hand PCR performed on them. The samples were then sent off for sequencing. **Results:** Throughout the extraction and purification process, the samples appeared to contain fungal DNA. Of the two samples that were chosen to undergo cloning, approximately 12 clones were formed for sample one, and 16 were formed for sample 2. Of these, three were chosen from sample one, and eight were chosen from sample 2. The purified samples showed distinct differences in banding patterns under gel electrophoresis. These samples were chosen to be sequenced due to this. A total of six plasmids were chosen based off banding patterns. Of the six sequenced genomes, only three matched with other fungal sequences in the BLAST database. The three species that matched were an uncultured Agriomycetes, Fusarium *verticillioides*, and Lentinula *edodes*. **Conclusion:** The findings suggest that there is fungal diversity among soil samples that were collected along the James River. The species that were found come from distinctly different phylums. The two environmental samples that were chosen were within close proximity to each other, and yet had very different results in the sequencing. Future studies would include looking at the remaining ten samples, and compare these to the samples that have already been sequenced.

140. Can metal-dioxygen chemistry be used to prepare new fragrances?

Jalynn Taylor-Farmer, Dept. of Chemistry, with Dr. Heather Lucas, Dept. of Chemistry

Scientists in the fragrance industry are constantly searching for new odors to create and new, more efficient processes to create them. Scientists mainly look for new ways to synthesis fragrances to reduce the impact on the environment, produce them at lower costs, produce higher yields, and sometimes to produce a more potent odor [4]. In this research, we investigated the use of metal-dioxygen chemistry to prepare new fragrances. Will bind a metal dioxygen complex to a macrocyclic amine cyclen ligand that I synthesized previously to use as a reagent in the synthesis of an odorant compound. Then will characterize using GC and HNMR.

141. Comparison of Electrochemical Measurements Using Nanoporous Gold and Planar Gold

Mai Lam, Dept. of Biochemistry and Molecular Biology, with Dr. Maryanne Collinson, Dept. of Chemistry

Nanoporous gold (NPG) electrodes were prepared using nanoporous gold leaves on planar gold slides. The preparation of the NPG electrodes involved dissolving silver-gold alloy leaves in concentrated nitric acid in order to form nanoporous gold leaves and thoroughly cleaning the planar gold slides before placement of the nanoporous gold leaves on top of the planar gold slides. These NPG electrodes, along with planar gold electrodes, were used to collect potentiometric redox measurements in phosphate buffer solutions containing either potassium ferri-/ ferrocyanide or ascorbic acid. Potentiometric redox measurements were conducting using clean electrodes and electrodes biofouled in various concentrations of bovine fibrinogen. For high concentrations (approximately 0.2 mM) of ferri-/ ferrocyanide, both clean and biofouled NPG and planar gold electrodes gave Nerstian slopes of 55.0-59.0 mV. However, at concentrations of ferri-/ ferrocyanide equal to or less than 0.1 mM, clean and biofouled planar gold electrodes deviated from Nernstian behavior, whereas clean

and biofouled NPG electrodes continued to exhibit Nernstian behavior. For solutions of ascorbic acid, clean and biofouled NPG electrodes gave Nernst slopes of approximately -41 mV. Biofouled planar gold electrodes did not give any potentiometric redox response in ascorbic acid. Cyclic voltammetric measurements on biofouled planar gold electrodes demonstrated a significant decrease of Faradaic electrical activity, but cyclic voltammetric measurements on biofouled NPG electrodes showed no electrochemical impairments. These results show that NPG electrodes are ideal to use when collecting potentiometric and cyclic voltammetric measurements of various solutions, particularly of solutions at relatively low concentrations.

142. But First, Let Me Take a Selfie: Personality and Social Media Usage

Alexis Hingle and Ian Ferguson, Dept. of Psychology, with Dr. Charles Calderwood and Dr. Jennifer Joy-Gaba, Dept. of Psychology

In today's society, Social Networking Sites (SNS) offer a popular means of facilitating virtual interactions in real time, allowing users to connect with friends and family at anytime and anywhere. The current study investigates whether personality traits predict the type of information posted. Previous research suggests that individuals with lower self-esteem will compensate by seeking activities on SNS that connect them with other users (Tazghini & Siedlecki, 2013). In addition, previous findings demonstrate that individuals with a narcissistic personality use SNS for self-promotion purposes, including projecting a positive self-image (Bergman, Fearrington, Davenport, Bergman, 2011; Carpenter, 2012). To test the hypothesis that narcissistic and individuals with low self-esteem would be more likely to use SNS to promote themselves, we counted the number and type of photos that participants posted over a thirty day period. Results showed high self-esteem was negatively related to narcissism. Further, findings suggest that self-esteem, but not narcissism, predicted the number of photos posted.

143. The Cytotoxic Effects of Dihydroxyacetone, Benzophenone, and Hydroquinone

Mouni Talari, Bioinformatics, with Prof. Mary Boyes, VCU Honors College

Dihydroxyacetone, benzophenone, and hydroquinone are all common chemicals found in sunscreen lotions and sprays. Dihydroxyacetone is a glycerone and a simple carbohydrate that is derived from plant sources. Benzophenone is an organic compound that helps protect against ultraviolet (UV) light. Hydroquinone is an aromatic organic compound that is known for its tyrosinase inhibitory properties, which prevent the skin from losing moisture. All of these chemicals are commonly found in consumer products such as sunscreens, but also in skin whitening creams and sunless tanning sprays. The FDA fails to recognize these chemicals as toxic due to the fact that many of these chemicals do not show acute toxicity. However, prolonged usage of products that contain these chemicals may lead to chronic toxicity and the entrance of the chemicals into the bloodstream. Once in the bloodstream, chemicals have the ability to effect brain function, causing learning developments and neurological diseases. Such chemicals also have the ability to act as endocrine mimickers, and can imitate hormones and result in hyperactive hormonal changes. There are many different ways to measure the toxicities of these three chemicals, and various methods produce varying results. However, most of these results have indicated that hydroquinone has a greater toxicity than benzophenone or dihydroxyacetone, and has more severe chronic side effects. Organic alternatives can be used in place of chemical sunscreens, especially herbal alternatives or those with chemical-free zinc or titanium oxide.

144. Examining the Effect of Self-Handicapping and Skepticism on Academic Achievement

Jorday Taswell, Krystal Thomas, and Tennisha Riley, Dept. of Psychology, with Dr. Zewelanji Serpell, Dept. of Psychology

Self-handicapping is frequently examined in education research because it is associated with students' personal growth and development, as well as their academic success. A cognitive strategy – self-handicapping – allows students to make excuses for an action's poor outcome before or after underperforming

(Tannenbaum, 2007). Self-handicapping is most likely to occur when fear of failure exists, as it is used to compensate for the possibility of such failure. Additionally, self-handicapping can lead to hindrance of future goal obtainment. For example, self-handicapping can result in a glass ceiling effect in which one is unable to move past a current state of achievement whether it be academic status, goal orientation, or work performance, and prevent his or herself from attaining future achievements (Park & Brown, 2014).

Skepticism about the relevance of academic work for future success can also influence students' development and academic success. In the case of college students, this skepticism can create an uncertainty in the applicability of certain courses to the "real world" (Goodman, 1983, p. 819). The current study investigates self-handicapping and skepticism in a sample of first year college students. Specifically, we examine the associations between self-handicapping and performance in a first year math course and whether this relationship is moderated by skepticism about the relevance of mathematics for future success. The main hypothesis is that college students with higher scores on a self-handicapping scale will have lower grades, and score higher on the skepticism scale than students who have lower self-handicapping scores. Participants were 486 college students from a historically Black university (mean age in years = 19.32, SD 2.94), with males making up 36% of the sample and 64% female. The students completed self-report measures of self-handicapping and skepticism about the relevance of math for future success. Final math course grades were used as the outcome measure. Multiple regression analyses were used to assess associations between self-handicapping and math grade, and the moderating role of skepticism about the relevance of math for future success. The overall model with skepticism and self-handicapping entered predicting final course math grades was statistically significant $F(2,484) = 4.573$, $p = .01$, $R^2 = .02$. Follow-up univariate analyses indicated that skepticism carried the model as it was the only statistically significant predictor ($\beta = -.14$, $t(484) = -3.024$, $p < .01$).. The interaction between self-handicapping and skepticism was not significant ($\Delta R^2 = 0$, $F(3, 483) = 3.042$, $p > .05$). The results of the current study indicate that beliefs students have about academic achievement can impede upon academic success. Specifically, being skeptical about whether achievement in math will influence future success leads to lower math grades. Instead of focusing on remediation, interventions that demonstrate the relevance of math for career attainment may best serve students.

145. The Impact of Race and Religion on Rates of Infidelity in Heterosexual Relationships

Elhaam Jawadi, Dept. of Psychology, with Prof. Mary Boyes, VCU Honors College

Infidelity is commonly known as a sexual and/or emotional violation of a contract between two individuals who involve themselves in a romantic relationship (Glass). Although many individuals view infidelity negatively, it is an act that affects many romantic relationships in the United States, including heterosexual and homosexual relationships. There are many reasons a couple may experience infidelity in romantic relationships, such as the lack of sexual or emotional connection by one side in the relationship. However once infidelity is committed by one partner, it may have a negative impact on the romantic relationship, including terminating the relationship or decreasing the trust factors in the relationship. Currently, couple therapists are attempting to help couples who have experienced infidelity based on their race or religion, considering the fact that cultures may have different views on infidelity.

146. *In Vitro* Biological Response to Diesel Exhaust Particles in Lung Cells

Marley Hodson, Dept. of Chemical and Life Science Engineering, with Lynn Secondo, M.S.E., and Dr. Nastassja Lewinski, Dept. of Chemical and Life Science Engineering

Diesel fuel is a common alternative to gasoline because of its economic advantage, but many fail to recognize the dangers of the exhaust emitted. Diesel exhaust particles (DEP), produced from the burning of diesel fuel, are a gaseous suspension of toxic nanoparticles, capable of penetrating the lungs and mutating lung cells

which classifies these nanoparticles as carcinogens. This study followed the *in vitro*, non-living organism based, research of Turner et al., which analyzed the biological response to DEP. While *in vivo*, living organism based, methods would have established a more realistic scenario, the risk of the test subjects developing adverse reactions such as cancer or cardiovascular diseases, makes *in vitro* the preferable method. Toxicology assays were performed on human lung cell lines, BEAS-2B, EA.hy926 and Calu-3, to study the correlation between DEP dosage and resulting biological response by measuring the reactive oxidative stress of the cells (measure of damage or mutation of cells) after the diesel exhaust treatment. Two additional colorimetric assays were introduced to gather additional information on the cellular damage, but were discontinued due particle interference. Results of these assays were obtained through a microplate reader, which evaluated cellular response as a whole/average as opposed to the Turner et al. flow cytometry method, which analyzed individual cellular response. Three to four trials were conducted and all trials revealed a toxic response on each cell line, demonstrating that diesel exhaust particles are capable of altering and harming the human lung. Future work of this project includes the progression to a more realistic lung model, which suspends cells in an air liquid interface similar to the condition of a human lung. This new three dimensional model would better simulate a human lung, and therefore capture more accurate results.

147. Methods for Obtaining STR-Quality Touch DNA from a Non-Porous Surface after Latent Print Collection

Madison Hytinen, Dept. of Forensic Science, with Dr. Tracey Dawson Cruz, Dept. of Forensic Science

Touch DNA is commonly left behind at crime scenes when the skin comes into contact with another surface. To retrieve a latent fingerprint from a non-porous surface, investigators will often treat the surface for visualization prior to pressing clear adhesive directly on top of the sample and then transferring it to a paper-backing card. This method preserves the fingerprint pattern, but commonly leaves behind residual fingerprint powder, which may contain touch DNA, on the original surface after the lift. Thus, the purpose of this study was to determine if it is possible to obtain STR-quality DNA profiles from a non-porous surface post latent fingerprint visualization and collection utilizing the tape-lifting method. In this study, participants deposited latent fingerprints on a sterile, non-porous surface (glass) and were either untreated or treated with one of two different enhancement techniques (black powder or magnetic powder). The samples were tape lifted and transferred onto paper-backing cards. Afterwards, the fingerprint area was swabbed using either a single swab or with the double swab method to evaluate which technique would provide the highest DNA yield. The QIAGEN QIAamp® DNA Investigator Kit was used to extract DNA from the fingerprint swabs. The samples were processed following traditional forensic DNA work flow (extraction, quantitation, amplification using routine recommended parameters, and CE analysis using standard protocols). This work confirmed that quantifiable DNA is left behind on the non-porous surface after tape-lifting latent fingerprints. The double swab technique produced a higher total DNA yield (average 0.184 ng) than the single swab technique (average 0.119 ng). Regarding the three visualization treatments, the fingerprints treated with magnetic powder prior to lifting yielded the highest DNA with an average of 0.220 ng, while untreated and black powder treated fingerprints produced a total average DNA yield of 0.162 ng and 0.059 ng, respectively. No STR alleles detected regardless of treatment or collection method. As such, this could signal a need to adjust the work flow in processing touch DNA to increase the chance of STR allele detection with purification step and combine DNA extracted from the both swab and fingerprint.

148. Provider Communication Impact on Adolescents with Type 1 Diabetes

Sarah Rogan, Dept. of Biology, with Dr. Rosalie Corona, Dept. of Psychology

Type 1 diabetes, an autoimmune condition which causes the destruction of pancreatic beta cells, predominantly develops during childhood and adolescents. The disease results in a complete loss of ability to produce insulin and therefore an inability to regulate blood glucose levels. Therefore those patients that are insulin deficient must monitor their blood sugar, keep a relatively strict diet, and consistently keep up with insulin injections and bolusing. Often it can be quite difficult when working with adolescents to get them to follow a rigid care plan. School days give adolescents ample time to not be checking their blood sugar, and free reign over their food choices, which they may or may not be properly correcting for with insulin injections. However, poor glycemic control not only causes severe problems in the moment with severe highs and lows and running the risk of ketoacidosis, but over time adolescents with poor control are putting themselves at higher risk for long term complications. This issue begs the question of how to work with adolescents to improve adherence and therefore overall outlook for the disease. If doctors were to implement an approach involving more patient centered communication (PCC) it could improve patient adherence by opening the adolescent to the discussion of their disease. Patient provider interaction is a tremendously important relationship to build when working with an autoimmune disease that makes check-ups necessary every three months. The patient perception of their sessions with their providers is important for the continued course of their treatment. The patient should feel respected and also be comfortable in order to be able to share their feelings on how their diabetes is being handled. Doctor's using patient centered communication will help to open sessions to the patient and give credence to their ideas as well. By opening sessions to the patient, there will be more interaction of the adolescent with the development of their care plan which in turn may increase their adherence to the plan. However, there isn't enough research done yet on adolescents with type 1 diabetes in this area to know whether adherence will necessarily improve through this discourse. Although it is know that provider communication has a major impact on health protocols in adults, further research on how this communication specifically benefits adolescents with diabetes should be done.

149. Axon Initial Segment Loss is not Observed in the Hippocampus of a Experimental Autoimmune Encephalomyelitis and Lipopolysaccharide Mouse Models

Praveen Mohanraju, Kareem Clark, Nicholas George, Savannah Benusa, Dept. of Biology, with Dr. Jeffrey Dupree, Dept. of Anatomy, and Dr. Sarah Golding, Dept. of Biology

The axon initial segment (AIS) is fundamental for neuronal communication and action potential initiation, a characteristic which has been shown to be disrupted in inflammatory diseases such as Multiple Sclerosis (MS). Previous work from our lab has shown AIS breakdown in layer 5 of the cortex in a mouse model of MS known as experimental autoimmune encephalomyelitis (EAE). Moreover, it was shown that AIS breakdown was independent of demyelination but temporally correlated with microglial inflammatory reactivity. In order to determine if this pathology is specific to the cortex or affects other regions of the brain, we exploited these EAE induced mice and investigated AIS integrity in the hippocampus, a region associated with cognitive dysfunction in inflammatory diseases. Additionally, we used a second model of microglial activation that was shown to have AIS breakdown in the cortex. This model relies on the injection of lipopolysaccharide (LPS). Although LPS activates microglia, there is little to no direct effect on other immune cells, which is not the case for EAE. To test AIS stability in the hippocampus, EAE was induced in 12 week old c57bl/6 mice; LPS was injected into 11-12 week old c57bl/6 mice. AnkyrinG, which is an essential cytoskeletal scaffolding protein necessary for proper AIS structure and function, was used to examine AIS integrity through immunohistochemistry (IHC) combined with laser scanning confocal microscopy. Qualitative analysis of AIS produced by confocal imaging, displayed no prevalent signs of AIS shortening in early or late stages of inflammation in the EAE mouse model. The breakdown of βIV spectrin, a cytoskeletal protein that is also clustered in the AIS and is known to link ankyrinG-NaV to the actin cytoskeleton, was correlated with

structural disruption of AIS. βIV spectrin breakdown products can be assessed by western blot analysis; however, no breakdown products were observed from the hippocampus of either LPS injected or EAE induced mice. These findings are preliminary but they indicate that the AIS has differential stabilities throughout the CNS, which may provide a tentative explanation for regional differences within the brain. Future studies will include quantitation of microglial activation; we believe the depletion of microglial cells play a vital role in both maintaining AIS stability and AIS disruption. These cells are enigmatic and are known to play different roles in different regions of the brain. We are also interested in isolating these cells from the hippocampus and from the cortex in order to compare their expression profiles. Findings from these studies should shed light on the role microglia play in different brain regions during disease.

150. The Importance of Storytelling in Medicine: Tradition and Innovation

Susannah Boyed, Interdisciplinary Studies, with Dr. Mary Shelden, Dept. of Focused Inquiry

This paper explores storytelling in medicine. Through considering its ancient roots while simultaneously examining contemporary iterations, I argue that storytelling as related to illness narratives is important to both patient and physician. I address objections to the idea that illness narratives are not empowering or verifiable and I conclude that they have a central role in a patient's experience. Woven through this research are some observations from a community partnership I recently established with Richmond based nonprofit, "The Doorways". Through my work providing translation services, I notice and write about ways that storytelling might be incorporated in their goals to provide hospitality to individuals experiencing medical crisis.

151. Climate conditions explain annual variation of carotenoid content in female Prothonotary warblers (*Protonotaria citrea*)

Amanda J. McGhee, Dept. of Biology, Sarah Huber, Virginia Institute of Marine Sciences, Dept. of Fisheries, Samantha Kay, Columbia University, Dept. of Ecology, Evolution, and Environmental Biology, Miranda Foster, VCU Center for Environmental Studies, D. Ethan Cox, Dept. of Biology, with Dr. Lesley Bulluck and Dr. Sarah Golding, Dept. of Biology

The role of male ornamentation in avian species is well understood through the process of sexual selection, but the role of female ornaments is less understood. Few studies have assessed annual variation and climatic conditions from one year to the next on plumage quality of females. Using data from a long term study of reproductive ecology on the Prothonotary warbler, we address annual variation of plumage characteristics at the population and individual level as a function of climate conditions (temperature and precipitation) during July and August, when their feathers are molted. We used two criteria to represent feather characteristics -- violet blue chroma (VBC) to represent carotenoid content, and yellow intensity to represent color brightness. Feather samples were collected from 112 warbler females, 36 of which we have feather samples from more than one breeding season, from 2010 to 2014. At the population level, we found July precipitation the previous year to be positively correlated with yellow intensity of crown feathers, and August precipitation the previous year to be positively correlated with carotenoid content of breast feathers. In a subset of individuals for which we have consecutive years of data, we found that individual females showing an increase in yellow intensity between years also showed an increase in crown carotenoid content. Also at the individual level, we found that females whose previous breeding season was prolonged (i.e., late last fledge date) were more likely to show a decline in carotenoid content in their breast feathers than those whose last fledge date was earlier in the previous season. Overall, these results suggest that feather characteristics at the population level may be a product of climate characteristics during the previous late summer molt, and that individual level variation in feather characteristics are dependent on the breeding effort the previous year which can influence the individual's timing of molt.

152. Anthropometric Prediction of Visceral Adiposity in Persons with Spinal Cord Injury

Liron V. Segal, Dept. of Kinesiology and Health Sciences, with Robin S. Stout; Victoria G. Thornton; Jennifer Hubert; Rehan Khan; and Dr. Ashraf S. Gorgey

Hunter Holmes McGuire VA Medical Center, Spinal Cord Injury Services and Disorders, Richmond, VA, USA

Hunter Holmes McGuire VA Medical Center, Radiology Service, Richmond, VA, USA Visceral adipose tissue (VAT) imposes significant cardiovascular risks and has been associated with negative metabolic sequelae after spinal cord injury (SCI). Persons with SCI have greater VAT and VAT to subcutaneous adipose tissue (SAT) ratio than able-bodied controls. Magnetic resonance imaging is considered a gold-standard technique in measuring VAT and SAT. However, we are still lacking a field method to accurately evaluate VAT after SCI. **PURPOSE:** To establish and validate a prediction equation using abdominal and waist circumferences as well as abdominal skin fold thickness to estimate umbilical VAT cross-sectional area (CSA) in persons with chronic SCI. **METHODS:** Eighteen men (37 ± 11 years old; 82 ± 13 kg; 1.79 ± 0.6 m and BMI of 26 ± 3.5 kg/m2) with motor complete SCI (C5-T11) participated in the current study. Magnetic resonance imaging was captured in a multi-axial fashion to measure VAT CSA (VAT MRICSA) and SAT CSA (SAT MRI-CSA). Abdominal and waist circumferences were measured in supine position (Trunk circum. = 2πr) using a standard inflexible measuring tape. Abdominal and supra-iliac subcutaneous fat thickness (SFT) were also measured during expiration in supine position using a Harpenden skinfold caliper. Mathematical equations [circumference =2π*radius & area =π*(radius)2] were then used to predict whole trunk, SAT and VAT CSAs using the anthropometric measurements. **RESULTS:** Whole trunk MRI-CSA, SAT MRI-CSA, VAT MRI-CSA were 680 ± 169 cm2, 212 ± 102 cm2 and 141 ± 79 cm2, respectively. Trunk circum. and SFT were 89 ± 12 cm and 4 ± 1.7 cm, respectively. Predicted trunk predicted-CSA , SAT predicted-CSA and VAT predicted -CSA were 642 ± 166 cm2 (r2 =0.92, *P*<0.0001), 160 ± 84 cm2 (r2 =0.85, *P*<0.0001) and 147 ± 88 cm2 (r2 =0.95, *P*<0.0001), respectively. When SFT was used to predict MRI thickness (r2 =0.87, *P*<0.0001) and abdominal circumferences to predict constant ratio between VAT and internal organs (r2 =0.57, *P*<0.0001), SAT predicted-CSA and VAT predicted -CSA were 161± 69cm2 (r2 =0.73, *P*<0.0001) and 146 ± 77cm2 (r2 =0.61, *P*<0.0001), respectively. **CONCLUSION:** The present study demonstrated that abdominal and waist circumferences and trunk skinfold thickness can be used effectively to predict SAT a

153. Remyelination Promoting Therapies in Multiple Sclerosis: ATX/ENPP2 as a Potential Target

Minh K. Nguyen, Preetha Palasuberniam, Natalie Wheeler, Fatemah S. Afshari, with Dr. Babette Fuss, Dept. of Anatomy and Neurobiology

Multiple sclerosis (MS) is a disease of the central nervous system for which there is no cure. MS is characterized by demyelination and sites of lesion where oligodendrocyte progenitor cells (OPCs) are present but fail to differentiate into mature oligodendrocytes (OLGs). This failure in regeneration is thought to be due, at least in part, to a lack of promyelinating factors. In this regard, our data suggest that the expression levels of the extracellular protein autotaxin (ATX) are decreased in the CNS of MS patients and under conditions of limited myelin regeneration. We present here two models by which ATX may exert its promyelinating functions and thereby its lack may contribute to limitations in remyelination as seen in MS.

The first model being tested is that OPCs and differentiating OLGs secrete ATX. Functionally, autotaxin has been shown to possess an enzymatic (lysoPLD) activity that cleaves a choline group off of lysophosphatidylcholine (LPC), to create lypophosphatidic acid (LPA). LPA then binds to one of its cognate receptors (LPARs) expressed on the surface of OLGs which leads to a downstream activation of histone deacetylase 1/2 (HDAC1/2) in the nucleus of the cell. The histone deacteylation in turn mediates repression of transcriptional inhibitors of OLG differentiation and promotes the expression of OLG differentiation genes. The second model being tested is that LPA, generated via ATX's lyoPLD activity influences microglia, the resident immune cells of the CNS, to release promyelinating factors and to thereby indirectly promote OLG differentiation and myelination. Taken together, our data introduce the ATX-LPA signaling axis as a potential target for therapeutic intervention toward enhancing the regeneration of the myelin sheath under pathological conditions.

154. Virginia for Student Veterans Non-Profit

Cady Andrews, Interdisciplinary Studies, with Dr. Mary Shelden, Dept. of Focused Inquiry

Introduce Steven Ross, director of Military Student Services at Virginia Commonwealth University. Discuss the roles of the office and his future goals at VCU, like creating the Green Zone and having more available positions at VCU. Discuss what he would like to see improved at the office and what I would be doing to help him with my local non-profit. Some of these concerns we would like improved would be emergency medical attention and procedure, transportation, housing, mental health, and funding needs for equipment and travel. Also, fundraising to hire a social events/ social media employee at the office to create comradery. Discuss the importance of how comradery helps bring together a sense of family for veteran students that they used to have in the military and how it creates a drive in their mission to success, which for student veterans, it is graduating. The ultimate goal is to increase graduation rates in student veterans through this second support by the organization for VCU. Discuss how the organization can be used as an outline for other states and other colleges. Body-Non-profit- design which includes founder (me) board members, CEO and CFO. Discuss where the organization will meet, how many donors and how much money we would have to start out. Discuss fundraising in full detail of ideas in local Richmond, how many times a year, how many orientations and events to attract new donors, thank volunteers, and to spread the word of the mission. Discuss the mission and ethical values and policies for legal and financial matters, as well as, policies for behavior. How many times board meets up per year and what their specific jobs are for different committees in the organization. Discuss employees within the nonprofit. Ex: Admin, fundraising committee, volunteer coordinators and finance committee. Conclusion-Vision for the future- discuss how the nonprofit will be maintained with fundraising. Discuss further about what we would like to bring to the table for the student veterans at VCU and a more specific timeline for when these goals are perceived to be achieved.

155. Black Juveniles Involved in the School to Prison Pipeline

Casey Lopez, Dept. of Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

This paper aims to explore black juveniles who are involved in the school to prison pipeline. Institutionalized racism has been a core issue in the dynamic of American culture for centuries. Through the dissection of 15 scholarly resources, this paper will underline the prevalence of black juveniles becoming incarcerated, and also provide data on their re-entry into the system later in their lives. Racism indefinitely exists within the prison industrial complex, and it is intolerable on all levels. Until our society addresses the imbalance involved in the system, we will never reach our full potential as a nation. This paper will cover several topics – first, through the utilization of the resources, the history, severity, and prevalence of the issue will be defined. Next, the paper will touch base on some potential resolutions for the issue, and also discuss advocacy within the community. Lastly, the paper will touch base on the importance of support systems and the role they play in the prevention of re-entry into the system.

156. How Systems of Control Effect Incarcerated Women

Victoria Froberg, Dept. of Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

Description: The goal of my research paper is to examine the correlation between systems of control against women in American culture, and how this affects women who are incarcerated. Acts of control, through violence and surveillance of the body, are intensified for women who face imprisonment. I will give examples of how the intersectionality of race, status as U.S. citizen, gender/sexual identity, HIV/AIDS status, and drug use play a role in the treatment of women in and out of prison. I will also show how socio/economic factors play a role in what leads to criminal acts and who society deems criminal.

157. Misled by the Media

Emily Fultz, Dept. of Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

Brief Description: The mainstream media has predominately portrayed men as the sole majority of incarcerated populations. Girls and women are part of a growing demographic that fills the American prison system yet there are few media representations of this change and it is impacting the public's perception of incarcerated people. Many viewers that do not have prior knowledge of the prison industrial complex take these images as justification for the continuation of prisons. Thesis: The lack of accurate, substantive media representations of incarcerated girls and women leads to different views about the prison industrial complex which displays men as aggressive and women as either romanticized or entirely erratically behaved. The public's perception of the PIC would be greatly impacted if they knew the numbers of women, especially mothers, that entered the system.

158. Disrupting Motherhood: The Stigma of Mothering Before and After Incarceration

Erin C. Tucker, Depts. of Gender, Sexuality, & Women Studies and Sociology, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

This research project will analyze systems of oppression that directly impact women's experiences of mothering including the Prison Industrial Complex, child welfare laws, and their community. These systems primarily impact the life course of women of color, disenfranchised communities, and children. Marginalized women face specific institutional forces that disrupt their ability to mother their children in the way they want to; while these systems are seen as institutions protecting the communities, children, and the public, often they disrupt community building, distance children from mothers, and criminalize motherhood for these women while simultaneously stigmatizing women for mothering off time.

159. Breaking the Bars of the Poverty Cycle

Margaret vonVorys-Norton, Dept. of Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

There is a systemic cycle that has been created in our nation. This sustainable cycle that creates poverty for minorities which remains due to the fact that it is nearly impossible to break the chains of the system, especially since these individuals are over policed and more likely to end up in prisons for small or non violent crimes. The system also has strengthened recidivism which greatly impacts the progression and growth of this cycle.

160. Locked Down, Locked Out, and Rebuilt- The Effect of Mass Incarceration on African American Individuals, Families, and Communities

Britney Stephenson, Dept. of Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

Mass incarceration systematically destroys Black America on individual, familial, and communal levels. The prison industrial complex functions to keep minorities and impoverished individuals in a perpetual state of inferiority and second-class citizenship, all while weakening interpersonal relationships amongst minorities, specifically African Americans. There exist an urgent need for community acknowledgment and action against malicious, systematically racist and classist networks that are specifically designed to further marginalize people of color. Community involvement in early development has the power to directly influence members of marginalized societies, and forge a path that deconstructs mass incarceration.

161. The Future Behind Bars

Zipporah Freeman, Depts. of Gender, Sexuality, & Women Studies and African American Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

With the overwhelming population of incarcerated mothers-to-be, nursery programs should be more accessible and available to women and their newborns. The results of these nursery programs can have short and long term effects on the mother and child, in and out of prison. The United States has the highest incarceration rate of women in the world, with more than 205,000 women either in state and federal prisons or jails and nearly a million on parole or probation. This massive increase in number is largely due to the "war on drugs," and the laws attached to non violent drug crimes. Due of this surge in population, there are over a million children that are living without their biological mothers. At the same time, there are 10 states that now offer prison based nursery programs that accommodate mothers and their newborns in special quarters. This allows the two to bond as well as provide the inmates with a sense of motherhood. Although these programs differ in services, capacity, eligibility and length of stay, they all are very beneficial for all involved.

162. Making a Murderer: The Racialization of Incarcerated People in the Media

Emily Niedhammer, Depts. of English and Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

Abstract: the purpose of this paper is to examine the effect of the media (including fictitious and nonfiction outlets) upon the perception of prisons and incarcerated people. This essay focuses on the public fetishization of white crime (that is, crime involving white perpetrators) and the public erasure or demonization of bodies of color within the prison industrial complex. By examining the significant media attention given to cases such as that of Steven Avery, and the apparent lack of attention given to cases about black men, such as Anthony Ray Hinton and George Stinney, it seems apparent that the racialization of incarcerated people causes either a media frenzy or intentional media ignorance.

163. Pregnancy Behind Bars: The Effect of Stress and Trauma on Mother and Child

Margaret Murphy, Dept. of Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

Stress and trauma greatly impact both mother and child during the course of pregnancy. Pregnant women are exposed to various forms of stress and trauma that cause irreparable harm to both mother and child.

164. Gender Dichotomy as a Colonial Tool of Control

Elizabeth Remick, Dept. of Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

Abstract: The Western Gender Dichotomy has been used as a colonial tool of control and does not benefit people of color, as seen through the history of lynching and the microcosm of our prison industry.

165. Healthcare Access in Women's Prisons: An Intersectional Perspective

Megan Bray, Dept. of Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

This paper will be identifying the key factors that contribute to the significant lack of health care in prisons in the U.S., specifically in women's correctional facilities. I will be lending my focus to disparities in mental health, HIV/AIDs care, reproductive health, trans health, and physical health issues among inmates. There is a lack of care, access, and proper treatment for women inmates in U.S. prisons and reform is needed. I foresee the best possible way to accomplish this change is by reforming healthcare policies in prisons, creating competency trainings for healthcare professionals in correctional facilities, and advocating for policy reform outside of the prisons as well. By creating better access to care for women outside of prison, many crimes of necessity will decrease, as well as substance abuse.

166. Fetishization of Female Inmates in United States Pop Culture and Media

Heather Kirkpatrick, Dept. of Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

Description: In this paper I want to further explore the phenomena and pop culture around prisons and female inmates as depicted in television and film. I first want to explore the history of prison exploration films and there progression through the years. I think that this foundation could help me to analysis the contemporary films and shows. I want to incorporate "Policing Bodies" and "Discipline and Punish". My rough thesis is: The depiction of female inmates in prisons on television and film has created a pop culture phenomena that is problematic in that it fetishizes and sexualizes the female body as prisoner

167. Expressions of Freedom: The Art of Guantanamo Bay Detainees

Camila Grez-Messina, Dept. of Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

Abstract: Serving as a physical emblem of U.S. imperialism, the Guantánamo Bay Detention Camp has been the site of several human rights abuses. The impact of abuse and torture of detainees, as well as the conditions of the camp itself, is expressed through their created artwork.

168. Building Picket Fences: An Historical Analysis of the Policing and Genocide of the Indigenous Peoples of America

Selu Sky Lark, Dept. of Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

Through the up-rise of American society came the downfall of the Indigenous peoples of America through genocides, slavery, and various forms of social control. This paper will examine the relationship Indigenous cultures have with the prison industrial complex, both historical and modern, as well as other forms of governmental policing. Through over policing and lack of media exposure, the modern prison industrial complex has erased indigenous people from American consciousness and leaves them in a perpetual cycle of systematic, institutional oppression. This research will analyze the effects that it has had on their cultures such as the oppressive infringement that legally enforced genocide has imposed through policing on and off reservations, the government regulation of indigenous citizenship, and lack of proper documentation of crimes against Indigenous Americans.

169. Constructions of Race Through Space and Place: The Connections Between Urban Environments and the PIC

Briana Willis, Depts. of Gender, Sexuality, & Women Studies and Sociology, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

Urban space and place is created in ways that allow the prison industrial complex to flourish. Carceral rule over these spaces create the idea that blackness is inherently criminal, dangerous, and violent. In these spaces individuals do not have autonomy over their own identities. In my writing I want to discuss connections to prison + slavery (black identity being compromised, prison labor, difficult with re-entry) I also want to analyze the reasons why blackness is viewed as being inherently criminal/violent and why the PIC relies on that in order to maintain its shape. I think the important things I want to focus on is:

- how black bodies operate and function in relation to space + policing.
- how the racialization of space contributes to the policing of black bodies and a system that makes it more likely for black people to be incarcerated
- discussions of people who are currently incarcerated and people who are out on parole, plus people who live in highly policed areas and the ways in which place/space impact their personhood
- 'carceral geography'
- 'organization theory'
- "hood"
- "environmental racism"

170. Prison and the Family, a reflection on how the prison-industrial-complex effects my family

Brittney Maddox, Dept. of Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

I am interested in the relation that the prison system has in constructing the family. What are the the ways that social institutions have in forming the way we view the families. Because the PIC is a looming issue but is becoming more highlighted in mainstream America, I want to examine how family is shaped by varying ways through gender roles, religion, race and class. I will apply themes, paradigms through my research which is based in reflexive practice. I will examine my own relationship with the prison-industrial-complex through a series of journals.

171. Reform in Prison Industrial Complex

Kathleen Brown, Dept. of Gender, Sexuality, & Women Studies, with Dr. Liz Canfield, Dept. of Gender, Sexuality, & Women Studies

Specific age group: Middle school, high school age prison preventative strategies, cross culturally and especially in communities of poverty, as that tends to be a vulnerable group susceptible to being charged.

172. The Effects of Exercise on the Rate of Depression and Anxiety in College Students

Joshua Frank, Health Science Program, Dept. of Psychology, with Dr. Amy Adkins, Dept. of Psychology

The literature shows an inverse association between exercise and mental disorders. The aim of this study is to further elaborate on this association with regards to exercise and its relationship with anxiety and depression in a college sample. The subject group focused on seniors in the Spit for Science dataset which incorporated a total of 821 students. Physical activity was assessed using the International Physical Activity Questionnaire (IPAQ) to estimate the overall metabolic equivalents (MET's) each student spent in walking, moderate, or vigorous activity levels in the previous week. Sum scores were used to measure depression and anxiety. Overall, the data showed that students 124 students had a walking or low activity level, 255 had a moderate activity level, and 442 had a vigorous or high activity level. There is a significant mean difference in anxiety and depression sum scores between moderate compared to vigorous and moderate compared to low exercise

classifications, however no significant mean differences were found between vigorous compared to low exercise groups. Tests showed the correlation between overall MET's per week compared to anxiety and depression was significant, with an inverse association between the two. This inverse relationship showed that as the overall MET's increased, the sum score of depression and anxiety both decrease and vice versa. Regression analyses are underway, and covariates are being assessed, for further analyses to determine the relationship between exercise and depression and anxiety. The results of this study can lead to understanding the link between how much exercise is needed to derive a mental benefit as well as where the threshold amount of exercise needed to reverse detrimental effects of inactivity is.

173. The Relationship Between Caffeine Use and Sleep

Marlene Michniak, Dept. of Chemistry, with Dr. Amy Adkins, Dept. of Psychology

Lack of sleep is a common theme throughout college students' lives. Additionally, college students report being dependent on caffeine to perform their best.The purpose of this study was to determine if there is a link between how much caffeine students are using and how much sleep they are getting. The sample contained data from the 2011-2014 cohorts of the Spit for Science dataset. Both sleep and caffeine use data were collected at several points: first year fall semester (n=1799), third year spring semester (n=1918), and fourth year spring semester (n=859). Sleep data included the hours and minutes of sleep that students typically get per night. Caffeine use was asked by a simple yes or no "Do you drink any caffeinated beverages?" Independent sample t-tests were performed for each of the stated survey waves for caffeine use vs. the total hours of sleep of each cohort. The relationship between caffeine use and the total hours of sleep in the first year fall survey data was not found to be statistically significant ($p=0.193$). The relationship between caffeine use and the total hours of sleep of the third year and fourth year spring surveys was found to be statistically significant ($p=0.041$ and $p=0.034$, respectively), with caffeine consumption related to decreased sleep. Sleep is an important part of well being, so additional research is needed to figure out how students' sleep cycles are being affected in relation to their caffeine consumption.

174. Digital Tales of Shining Sea and Rising Sun: an examination of cultural storytelling in the genre of horror via the medium of video games

Anna Webster, Dept. of English, with Brian McTague, VCU Writing Center

In the modern era, video games are hardly the simple, mindless medium that they used to be. Rather, they are now being used as a vehicle for artistic expression and storytelling worldwide, creating a colorful and comprehensive new approach to the storytelling experience that was previously reserved for books or movies. The immersive nature of the medium provides for a richer and more stimulating experience, from which the genre of horror greatly benefits. Rather than the more passive experience the viewer gets from watching a movie or reading a book, video games allow for the player to be completely immersed, experiencing the story rather than just witnessing it. This general aspect combined with the opportunity for unique artistic expression and storytelling, provides for a better overall horror experience. Within the horror genre, there are two schools of storytelling: the Eastern Style (primarily from Japan and countries in the Far East), and the Western Style (particularly the United States). These styles are both unique with their approaches to the genre, begging the question: what do different cultures find scary? Through careful analysis of the Eastern and Western styles, we can understand the characteristics and unique components, identifying the reasoning behind them. An examination of broader social implications in the areas of religion, history, and psychology, will expand the scope of the digital media studies, providing a greater understanding of the continued evolution of human storytelling. The evolution and future possibilities of storytelling are explored in this study by examining the techniques and implications specific to these two identified schools within the horror genre of video games.

175. Dropout in College Freshmen

Tiffany Ho and Divya Krishna, Dept. of Biology, with Dr. Amy Adkins, Dept. of Psychology

Previous research has shown that a variety of factors can impact college student's academic performance, including healthy nutrition, physical activity, substance use, smoking, early sexual activity, bullying, excessive television watching, internet use, and playing video games. The purpose of the current study was to explore possible predictors of dropout in students after their first year of college. Data came from the Spit for Science sample and were limited to individuals in the first three cohorts that answered the survey during the fall of their freshmen year (N=6105). Logistic regression was used to test a variety of risk factors, including mental/behavior risk factors, familial risk factors, stress/trauma exposure, and personality factors, in order to see whether or not there was a correlation between risk factors and dropout rates. Initially, multiple risk factors were found to be significantly associated with dropout. However, depression (OR = 1.04, $p < 0.05$) was the only factor associated with dropout after we included GPA (OR = 0.395, $p < 0.001$) as a covariate. Supplementary analyses revealed that many of the factors that were found to be significantly associated with dropout rates were significantly related to GPA, suggesting that these risk factors may influence dropout through their effect on GPA.

176. Associations between Neighborhood Stress and Depressive Symptoms in Pediatric Asthma

Sohum Bhatt, Department of Psychology, Jeremy Barsell, B.S., Department of Psychology & Robin S. Everhart, Ph.D., Assistant Professor, Department of Psychology

Background: In children, asthma is often comorbid with depressive symptoms, which may contribute to worse health outcomes and decreased quality of life. An asthma diagnosis and symptoms may increase psychological stress, which can be linked to more depressive symptoms. Furthermore, depressive symptoms may reduce patient compliance with medications. For families living in urban areas, such as Richmond, neighborhood stressors may be associated with more depressive symptoms in children with asthma.

Objective: The purpose of this study was to determine the association between neighborhood stress and depressive symptoms in low income, urban children with asthma.

Methods: A total of 61 participants (M = 9.59 years, *SD* = 1.52) were included in this study, with the majority being African American (90%). Thirty-seven percent of the families had a total household income in one month less than $1,000, 25% had a total household income between $1,000 and 1,999, and 24% had a household income between $2,000 and 2,999. Children and their caregivers completed a research session either in our lab or in the family's home. Children completed the Children's Depression Inventory (CDI) and a 23 item questionnaire about neighborhood stressors (e.g., violence, noise). Asthma diagnosis and symptoms were reported by the child's caregiver.

Results: Depressive symptoms and neighborhood stress scores were not associated with monthly income. Pearson correlational analyses revealed a significant association between child depressive symptoms and neighborhood stressors ($r = .29$, $p = .03$); higher depressive scores were associated with more reported neighborhood stress.

Conclusion: Findings from the study highlight the possibility that children living in urban areas may be at risk for experiencing more depressive symptoms due to neighborhood stressors. Strategies to help children minimize the psychological impact of neighborhood stress may be one avenue worth pursuing in future research. However, directionality between neighborhood stress and depressive symptoms is not known. Longitudinal studies are needed to determine how depressive symptoms and neighborhood stressors influence each other over time.

177. The Presence of Complications to the Psychological Adjustments of Neurotypical Siblings of Individuals with Autism Spectrum Disoder (ASD) and the Effectiveness of the Utilization of Support Groups/Social Support in Lessening the Potential Complications

Swathi Deo Sambatha, Department of Biology, with Prof. Tara Dacey, VCU Honors College

Siblings of individuals with behavioral disorders are reported to have complex psychological adjustments ranging across a multitude of sociodemographic factors. In addition, these children are at risk of mental health disorders and negative psychological symptoms. Support groups or extensive social support are known to increase intra-communication and create better sibling dynamics between the neurotypical and autistic siblings. This paper investigates such complications to the psychological adjustment of neurotypical siblings of individuals with autism spectrum disorder (ASD) and determines the implications of the utilization of support groups/social support. The analyzed trends and results of multiple studies were noted and compiled to form the current study's data. The resulting data indicated that the neurotypical individuals do have an extent of complication in their adjustment that only vary due to sociodemographic factors like age, class, income, birth order, and etc. The impact of the support groups/social support was extremely effective amongst neurotypical individuals of all sociodemographic factors indicating potential plan of actions upon diagnosis of ASD in the family. In conclusion, the psychological adjustment is definitely complicated to an extent, but the complication is lessened with facilitated social support/support groups. The implications of such data for further research and for enforcement are discussed.

178. The Role of Confucianism on Modern Chinese Parenting: The Impact of Filial Piety

Taylor Wilkerson, Department of Psychology, with Prof. Tara Dacey, VCU Honors College

Parenting styles and techniques, two widely debated topics between scholars and normal mothers alike, are prone to be shaped to a culture's desired traits and outcomes in a child, including deviations in academics, addiction, and even sexuality. While psychology aims to be a multidimensional and multicultural field, little research has been conducted on what cultural influence impact the decisions Chinese parents make. Modern Chinese culture (derived only from those with mainland Chinese ancestors), although changing, still sees much influence and sway from traditional Confucian beliefs. While the Chinese cultural roots in Confucianism are widespread, the idea of filial piety, or "the emotional and material support children provide to their parents and the elderly, including respect, love, attendance to their needs, deference and compliance to their wishes and memorialization of ancestors" is the most influential in how parents decide which ideals and standards to raise their children (Chen and Wong, 2014). The reason for adhering to filial piety within Confucian ideals hold a large amount of influence. Parents may expect their children to "respect the superior" and obey them without much sway (authoritarian), while others see filial piety as repaying their family for raising them (reciprocal). Research goals aim to analyze the correlation between parents' adherence to or dimension of belief in filial piety along a spectrum and that influence on a child's academic achievement and self-esteem. For instance, authoritarian filial piety has been correlated with negative development outcomes, such as an unchanging entity view on education and negative self-esteem.

179. Parenting Style Influence on College Students Alcohol Abuse

Hirsh Shah, Department of Biology, with Dr. Amy Adkins, Dept. of Psychology

Growing evidence shows that alcohol use at an early age may have negative effects on adolescents' development and may lead to substance abuse problems later in life. This underscores the importance of parent's roles and influences on their children's substance use behaviors. In order to investigate the correlation between parenting style and college student alcohol abuse, the Spit for Science dataset will be used. Spit for Science is a university wide research project at Virginia Commonwealth University aimed at understanding how genes and environment impact alcohol use, substance abuse, and mental health outcomes in college students. Parenting style influence was measured through six specific questions, three of which dealt with autonomy granting and three of which dealt with an involved parenting style. Alcohol abuse was measured through grams of ethanol consumed per month, frequency of drinking (days) per month, and

quantity (number) when having alcoholic drinks. Covariates included sex, age, and religiosity. Preliminary correlation analyses suggest a relationship between parental influence and alcohol abuse. Regression analysis are ongoing. The results drawn from this research project can be implemented at VCU by helping tailor personal prevention/intervention programs for alcohol abuse that are specific to one's parenting style background.

180. The Doctor's Order: An Analysis of Vaccination Consumerism and the Social Awareness of Public Health Advocacy

Quinnie Phan, Department of Biomedical Engineering, with Prof. Tara Dacey, VCU Honors College

Over the last century, the routine use of immunizations has led to a decrease in the occurrence of vaccine-preventable diseases and epidemics. Despite multiple reports made by the scientific community to discredit claims that undermine the safety of vaccines, a prominent population still holds suspicion and mistrust towards vaccines. Increased global travel has resulted in increased risk of exposure to disease-causing viruses and bacteria. Consequently, a decline in vaccine consumption today will have more severe consequences than ever. Studies predict that if vaccination rates fall below 90%, pathogens will circulate with ease, magnifying the risk of infection (Blume, 2006). The purpose of the current study is to 1) precisely define the cause of concern amongst individuals who hold anti-vaccination sentiments; 2) assess the reason as to why anti-vaccination sentiments are perpetuated; and 3) determine changes that should be made to public health information in order to increase vaccination consumerism. In order to determine why individuals maintain their anti-vaccination beliefs when challenged, this study analyzes opposing vaccination messages provided in current literature. By applying McGuire's Inoculation Theory and the criteria of technical rationality and cultural rationality to the information on anti-vaccination movements supplied in current literature, the study begins to discover that promotional messages may be ineffective in converting anti-vaccination opinions because these messages do not necessarily take experiential context into account. It also indicates possible application to other issues in areas of public health where risk communication is appropriate.

181. Effect of Parental Involvement on Academic Achievement in American Schools

Reshma Mandava, Department of Biology, with Prof. Tara Dacey, VCU Honors College

The purpose of this study is to determine the effect of parental involvement on academic achievement among secondary school children. The majority of studies regarding parental involvement and achievement have shown a positive trend. Parental involvement, however, comes in many different forms and is implemented in a variety of ways. During their primary school years, children look to their parents for support and structure regarding academics. As they grow older, children begin to mature into young adults, and crave independence from parents. The type of parental involvement which worked best during the elementary years, therefore, does not work in later years. This study seeks to determine which types of parental involvement are best at increasing student achievement among middle school and high school students. A variety of studies were gathered from many different databases. They were analyzed separately, and conclusions were drawn from each different study. The results showed that speaking to the young adults about college and future plans had the most effect on positive academic achievement. Checking homework and monitoring leisure time had a negative effect on academic achievement. Middle and high school students crave autonomy, and do not respond well to home involvement which disrupts their independence. School involvement had diverse effects on achievement. Further research could be directed in terms of how often and in which way the parents should try to engage their children in future plans in order to be effective.

182. Film Tourism and Expectation: Using the Hallyu Wave to Model How Governments and Media Exports Influence National Image

Aishat Bello, Department of Biology, with Prof. Tara Dacey, VCU Honors College

Film tourism encompasses the interest, investment and influence that exported media products can contribute to cultural globalization, and subsequent visitation of a nation. The Korean Wave or Hallyu wave has been studied and commended for its rapid spread and growing popularity within Asia and more recently, on a more global scale. By comparing and contrasting the methods used by the Korean government to enhance Hallyu, with several trade deals made by the US government to support Hollywood, we can see how the effects of film tourism were directed towards modifying perspectives on Korean culture. A few consequences of making trade agreements with the US are also discussed, as these affected local film industries and global stereotyping through US cultural imperialism. Using peer-reviewed studies and primary sources, it can be said that the Korean Wave is a consequence of imitation of Hollywood practices. However, we can infer from similar successes in other nations, including New Zealand, that there are various reproducible methods to boost film tourism and influence national image.

183. Reviving Panxiu in Contemporary Culture: Exhibition and Cultural Exchange

Cassie Sun, GEO Summer Research Fellow, Dept. of Painting and Printmaking, with Prof. Kristin Caskey, Dept. of Fashion

In order to revive PanXiu, a traditional, disappearing embroidery technique from Qinghai, China, and develop more contemporary art and design using this craft, the Reviving Project asked seventeen artists to make clothes, accessories, jewelry and art. These artists and designers worked with and were inspired by pieces of PanXiu embroidery made by traditional Tu craftsmen. The Reviving PanXiu project intends to express the interaction of culture in a contemporary way. The exhibition was hosted in Richmond, VA, USA and Beijing, China. A percentage of the profit made by selling work in the show will go to the Bureau of Culture and the Tu craftsmen as return on their material and financial support. This support and acknowledgement will give the artisans making PanXiu encouragement to continue their work and will help promote the craft. A selected collection of works from the exhibition will be accessioned into the permanent collection of the Bureau of Culture in Huzhu, China.

184. An Investigation of the Not Anymore Title IX Prevention Training at Virginia Commonwealth University

James Wilbur, Depts. of Chemistry and Economics, with Prof. Faye Prichard, VCU Honors College

Title IX of the Education Amendments of 1972 states that, “No person in the United States shall, on the basis of sex, be excluded from participation in, or denied the benefits of, or be subjected to discrimination under any educational program or activity receiving federal financial assistance.” In recent years, legislation including the Jeanne Cleary Act and the Campus SaVE Act have been used to define sexual misconduct as a form of gender based discrimination. As a result, institutions of higher education must take active measures to prevent sexual misconduct, as well as provide some form of prevention education. At Virginia Commonwealth University all incoming students are required to complete *Not Anymore*, an online prevention module. The purpose of this investigation was to determine whether or not the prevention program was effective at informing students about sexual misconduct, and if not how it could be improved. After obtaining background information on Title IX and sexual misconduct on campus the *Not Anymore* program’s pre and post-test data were statistically analyzed. Undergraduate data was isolated and outliers were removed. Then, a z-test was performed at an α-value of 0.05. Additional research was conducted to determine the efficacy of online education, and strategies that have been used effectively in an online setting. The *Not Anymore*

program was found to be weakly, but not significantly, associated with an increase in pre and post-test score. To improve the program, the prevention education must be restructured to foster an active learning environment. In an online setting, a collaborative component has been found to significantly correspond with student performance. Based on my research, the introduction of some sort of discussion board component would greatly improve student performance and understanding of the content addressed by the *Not Anymore* prevention program.

185. Religion, Standard of Living, and Life Satisfaction

Jess Corson, Dept. of Chemical and Life Science Engineering, with Prof. Faye Prichard, VCU Honors College

With a trillion dollar debt in the United States, rising unemployment rates, and world-wide inflation, the economy is suffering. In an increasingly secular, global, and recessing market economy, is religion still pertinent to success? I am examining whether or not religion has an impact on success in terms of standard of living and quality of life; if it does, how? I analyze several perspectives on this subject. Firstly, religiosity may positively impact standard of living as it motivates people to work, collaborate for mutual gain, and extend compassion to the underprivileged. Conversely and secondly, religiosity may negatively impact standard of living. Survey data indicates lower monetary assets among the more religious than among the less. Thirdly, religion is positively associated with subjective well-being or life satisfaction. Those who actively participate in a religion tend to be more content with their resources and attest to higher levels of happiness then the less involved or non-religious. Finally, I study the factors of subjective well-being and how religiosity may pertain to these factors. So far, I have found that while the association between religiosity and standard of living is ambiguous, there is a positive association between religiosity and subjective well-being. While I would like to further investigate the trends between religiosity and economic success, I expect, due to my current research, that they will be negative. This implies that religion encourages people to be content with their standard of living and diverts their focus from monetary gain.

186. The Differences between Eastern and Western Cultures as They Affect Women's Perception and Disclosure of Mental Illness

Whitney Sherrick, Dept. of Biology, with Prof. Faye Prichard, VCU Honors College

Mental illnesses and the stigma that surrounds them have caused societal unrest since the development of the modern human. However, there remain differences in the way individuals perceive mental illness, allowing various levels of stigma to arise. The focus of this research is to determine the contrast between the views of Western and Eastern cultures concerning mental health status - exploring how cultural expectations for women affect their perception, and disclosure, of mental illnesses. This research involves studies that examined societal expectations for Western and Eastern cultures, and experiments measuring the perceptions of mental illness from individuals with various heritages. Articles concentrating on the factors that influence one's disclosure of mental illness were included, as well. My research has discovered that there is a strong correlation between culture and one's perception of mental illness. Western cultures are more likely to embrace, and thus, treat psychological ailments, due to the increased levels of social acceptance and available treatment options. Eastern cultures, however, are less likely to seek treatment or disclose their mental state at all, because of the social stigma associated with having a mental illness. More intensive research must be completed to determine the direct implications upon women. Uncovering the principal reasons for the existing stigma will expose it directly, and create opportunities for populations to become educated on the realities of mental illness. This will allow for disorders of this caliber to be more widely accepted, and thus, cause the social stigma associated with them to eventually dissipate.

187. Implementation of DRGs in Psychiatric Units of General Hospitals

Lauren Hux, Depts. of Statistics and Applied Mathematics, with Prof. Mary Boyes, VCU Honors College

I am studying the implementation of the diagnosis-related group (DRG) statistical system in psychiatric units of general hospitals. The DRG system categorizes inpatient stay into 467 prospective payment groups for purposes of both the payment that the patient makes and reimbursement that the hospital receives. I want to find out if the DRG system is linked to a gradual decline in the quality of psychiatric care, so that problems with the system can be identified and improved upon in the future. I investigated sources that claim that the data used to diagnose patients into DRGs is limited, and that the 467 prospective payment groups themselves are not specialized enough to account for all health problems that may potentially arise in a patient. I also examined sources that claim that admissions to hospitals that are exempt from the DRG system, due to factors such as the hospital's demographic including a disproportionate amount of poor patients, is significantly less for patients who are being treated at hospitals who are implementing the DRG system. I also analyzed the problem from the perspective of other specialized units in general hospitals, and these same problems also exist in areas such as gastroenterology. I expect my results to show that the DRG system is ultimately ineffective, and that the implementation of a separate and new prospective payment system in similar units of hospitals will prove to be more effective for patients in regards to both treatment and financial strain. These results could help emphasize the importance of implementing a new prospective payment system and lead to overall economic growth, as hospital resources can be used more efficiently and patients will not continue to be overcharged for hospital services.

188. Why is it that mosquito-borne viruses prevail even after their habitat has been destroyed through urbanization and land use?

Nikhita Puthuveetil, Dept. of Bioinformatics, with Prof. Faye Prichard, VCU Honors College

Mosquito-borne diseases such as yellow fever, dengue, and West Nile are rapidly emerging across the globe. Their emergence is often aided by the growth of their vector population, or the organisms that transmit the virus to the host. Urbanization and land use often destroys the habitat of the virus and its vector. However, the virus and its vector often survive despite the changes to its environment. The goal of this paper is to find out exactly how urbanization and changes in land use affect mosquito-borne viruses and how these viruses survive despite the destruction of their habitats. To understand how mosquitoes are affected by urbanization, I analyzed several observational studies on mosquito vector populations in different environments. I also studied several journal articles which specifically evaluated particular mosquito-borne diseases and examined how land use and climate affect the spread of disease. I also considered articles which offered theories on land use and disease emergence and presented solutions to prevent future epidemics. From these articles, I found that mosquito-borne viruses and their vectors are highly adaptable. Due to urbanization, some mosquito species become anthropophilic, they prey specifically on humans, and accordingly, the virus prefers humans over animals as their hosts. Urbanization often promotes mosquito population growth, thereby promoting virus population growth. From understanding how urbanization affects virus and vector populations, we can minimize disease emergence and prevent viruses and their vectors from becoming anthropophilic.

189. Maternal Mortality in Uganda

Reid Wolfe, Dept. of Anthropology, with Prof. Faye Prichard, VCU Honors College

Maternal mortality, or the death or a woman during pregnancy, labor, or post-partum, is a leading cause of death for women in Uganda. While the popular belief about maternal mortality in Uganda is that women simply do not have access to obstetric services, I speculated that deeply ingrained traditional beliefs surrounding pregnancy and birth might also contribute to the high maternal mortality rate. Therefore, my

research question is-- what role do cultural traditions surrounding women's health and childbirth play in maternal mortality rates in Uganda? In order to assess this problem, I looked at studies about traditional birth practices, the most frequent causes of maternal mortality, gender roles, and the provision of obstetric services in Uganda. I project that the results of this paper will demonstrate that a combination of factors influence maternal mortality in Uganda. Lack of access to reliable transportation and comprehensive obstetric facilities, as well as the cultural preference to be attended by a Traditional Birth Attendant or family member during labor, cause many women to forego antenatal care and delivery in a hospital. However, many women are not given the opportunity to seek professional care because of clearly defined gender roles in Ugandan society, which put men in charge of money. Often the use of cheap and readily available unregulated herbal medicines for pregnant and laboring women is preferred by men, as opposed to expensive prescription drugs. The findings of this paper illustrate that maternal mortality in Uganda will not disappear overnight. Radical changes in cultural tradition and health care provisions will be needed in order to empower women and give them the opportunity to have a safe pregnancy and delivery.

190. Divest VCU

Catherine Lamb, VCU Honors College, with Prof. Faye Prichard, VCU Honors College

Recently in the United States there has been an increasing number of student organizations and protests created with the goal of 'divesting' their universities from fossil fuels. These organizations are usually focused on university endowments – where tuition and other forms of university income is kept and multiplies over time in the stock market. Students claim universities are morally responsible for the companies they invest in and feel that by profiting from them universities are profiting from destruction and contributing to climate change. They believe that by divesting from these stocks the companies will suffer both in the public eye and economically. This is what I have set out to determine. I have studied both articles from sources that consider divestment to be a valid solution as well as those who don't, along with neutral informational sources. Through this research I have found that there is little to no direct economic result on fossil fuel companies through divestment due to the nature of stock exchange, however it can change public perception, and subsequently public policy, indirectly affecting the companies. This means that although divestment does not necessarily accomplish what students set out to do, it is not a futile attempt at changing the economy and could be a valid strategy to changing public policy and influencing proactive environmental legislation.

191. The Social Implications of Safe House Rehabilitation in the Treatment of Minor Sex Trafficking Victims with Complex Trauma

Michelle Taft, Dept. of Cinema, with Prof. Mary Boyes, VCU Honors College

Due to the recent movement in the United States to decriminalize child victims of sex trafficking (with the Trafficking Victims Protection Act of 2000 being followed by state laws such as such as the Safe Harbor Act 2010 Illinois Safe Children Act, the 81st Texas Legislature amended section 43.02 of the Texas Penal Code), Decriminalized victims of domestic minor sex trafficking are beginning to be filtered instead into safe houses and rehabilitative programs in greater numbers than before. As the number of trafficking victims increases, underfunded safe houses—often nonprofit organizations dependent on volunteer staff—are in drastic need of best practices research. Reviewing prominent research on the subject, this paper examines the implications of trauma-informed care treatment modalities on the social aspects of United States safe houses; how interpersonal relationships (including staff, living circumstances, peer-interaction, group therapy, and scheduled activities) can be integrated in safe houses to achieve recovery goals laid out by complex trauma (CT) treatment models. The synthesis of research regarding safe house practices and CT treatment modalities reveals a great deal of benefit in the social aspect of safe houses. Because CT symptoms are deeply related to interpersonal distrust and breakdown of relationships, building a safe community where DMST victims are supported by peers and mentors can both accelerate and deepen recovery. Because complex trauma is

diagnosed in a diversity of situations other than DMST (including domestic violence, childhood sexual abuse, child soldiering, and concentration camps) potential implications of best practices in safe houses stretch even beyond the specific focus of this research.

192. Filial Piety in Confucianism and the Educational Expectations of Chinese Parents in China vs. Chinese Immigrant Parents in the United States

Jennifer Mak, Dept. of Biomedical Engineering, with Prof. Mary Boyes, VCU Honors College

Filial piety in Confucianism is a multifaceted concept defined by academic achievement and excellence, respect for parents and authority, family duty, and work ethic. Confucianism also regards the role of a scholar with the utmost importance. One way children can fulfill filial piety and bring honor to the family is through education. I am studying the filial piety in 21st-century Chinese culture because I want to find out why it influences Chinese-American immigrant parents to have different or similar attitudes toward education compared to Chinese parents in China for their middle-school-aged children in order to help my readers understand how ancient Chinese philosophy still impacts Chinese parents' academic standards in the United States and China. I conducted literature reviews on numerous psychology and education journal articles that interviewed Chinese and Chinese-American parents. Chinese-American parents struggle with their children's more individualistic attitudes and lack of respect of the parents' wishes. Both Chinese and Chinese-American parents hold high academic expectations for their children and expect their children to get technical jobs in STEM fields. However, Chinese-American parents appear to be more lenient and have less strict standards. Both Chinese and Chinese-American parents make great investments in their children's education. They believe that instilling a strong work ethic in their children will lead to academic and professional success. These results indicate that because Chinese people are willing to modify their own beliefs to correspond with the community's, immigrant parents have adjusted filial beliefs to maintain harmony with their families.

193. Forensic Chemical Analysis of Synthetic Cathinones Using Portable Mass Spectrometric Instrumentation

Caitlin Cain, Depts. of Forensic Science and Chemistry, with Prof. Mary Boyes, VCU Honors College

Forensic laboratories face issues with large backlogs on evidence needing to be analyzed is due to two reasons: budgeting issues and the emergence of designer drugs. Currently, forensic laboratory directors cite that there are a shortage of scientists to deal with the yearly increase in caseloads. Additionally, designer drugs like synthetic cathinones, commonly known as "bath salts," have increased the backlog due to the changing chemical compositions and misidentification as other compounds. Therefore, the use of a portable mass spectrometer for on-site forensic chemical analysis of synthetic cathinones would reduce the backlog of suspected controlled substances in forensic chemistry laboratories. A comparison of research on gas chromatography-mass spectrometry (GC-MS), typically used in forensic laboratories, and ambient mass spectrometry, an upcoming method, was conducted to determine which technique would be more suitable for on-site analysis of synthetic cathinones. Ambient mass spectrometry techniques are proven to successfully analyze these evidence samples without degradation and to be employed in the field without extensive power requirements at a low cost. Also, ambient mass spectrometry methods are able to be conducted by non-technical operators. Through use of portable ambient mass spectrometry techniques, synthetic cathinones would be accurately identified in the field, reducing the strain of the backlog in forensic laboratories. Future studies are needed to make the analysis of a spectrum coming from an ambient mass spectrometer easier for non-technical operators to identify synthetic cathinones.

194. War Photography and the Fabrication of War

Brianna Perry, Dept. of Sculpture, with Prof. Mary Boyes, VCU Honors College

Research Problem: I am studying the usage of photography in film, print, and digital media during the Iraq War and the war in Afghanistan, because I want to find out how war imagery created by photojournalists and soldiers informs the American public's opinion of the aforementioned wars in order to help my reader understand how compositional choices, government influence, and current mediums, such as network television and the Internet, craft and alter the narratives of these wars in order to generate pro-war sentiment.

Discipline: Cultural Studies, Media Studies, Fine Arts

Since the Crimean War began in 1853, photographers have actively participated in war by documenting the battlefield. The media has never shied away from publishing gruesome imagery, and wars prior to the twenty-first century can usually be defined by an iconic image. War photography has been traditionally used for awareness, and in the past, advanced peace efforts by the American public. Nevertheless, the intersection of art, media and political motivation typically concludes in propaganda, leading many researchers to wonder if war photography is mainly a pro-war medium. With the advancement of digital media corresponding to the recent wars in Afghanistan and Iraq, photography on the battlefield has expanded beyond the realm of photojournalism. Soldiers are now active participators in the documentation of war, and in extreme cases, their images flood the media with ease. The participation of soldiers in war photojournalism has resulted in a prominent 'human face' behind the war, with family members, and consequently, the American public, being able to view the war from their homes. As the demarcation between life and war shrinks, the purpose of war photography continues to be attacked. The war photograph exists an aesthetic and political document, and critics such as John Berger and Susan Sontag questioned rather the war photograph has any power in a world overwhelmed and saturated by images. The rise of embedded journalism led to doubt of the objectivity of photojournalists, an inevitable result of their relationship with the government and the media. With the ability of photography to replace the war itself, content analyses indicate the government and photojournalist's ability to 'frame' a war, perhaps fictionalizing and shaping the outcome of wars through the release of specific imagery. The hyper-saturation of war imagery and photography in the media may be informing the American public of the events occurring on the battlefield, but begs the question of what is not being shown. I will examine war photograph and imagery originating during the wars in Afghanistan and Iraq, incorporating research from peer-reviewed journals, in order to prove the deliberate use of war photography and imagery in print, film, and digital media in the progression of war and to generate pro-war sentiment.

195. The Female Athlete Triad and its Implications in the Development of Second Metatarsal Stress Fractures in Professional Ballerinas

Shira Lanyi, Dept. of Biology, with Prof. Faye Prichard, VCU Honors College

The professional ballet world is plagued by high injury rates that negatively impact both the ballet company and its dancers. Female dancers between the ages of 18 and 30 are particularly prone to stress fractures of the lower extremities and medial forefoot. Current research suggests that the volume of dance injuries in women correlates to the symptoms of the female athlete triad. This triad is characterized by disordered eating patterns, amenorrhea, and bone mineral loss. The aesthetic nature of ballet and the desire to remain thin, lead many dancers to display the symptoms of the triad, and ultimately lend themselves to injury. How do second metatarsal stress fractures in professional female ballet dancers correlate to the female athlete triad syndrome and in what way can education and therapy reduce the prevalence of this injury in dance companies? I looked at the triad from the perspective that bone density loss is a physiological response to menstrual dysfunction. I reviewed primary sources that suggest menstrual dysfunction is symptomatic of nutrient deficit in females. I also reviewed research from the perspective that caloric deficit often leads to a reduction of resting metabolic rate and bone mineral density. Studies I found indicated that disordered eating in professional dancers is primarily a psychological and sociological response related to the extreme pressure

to maintain an ideal body shape. I also reviewed research from the perspective that injury is related to ballet footwear and faulty technique. Results from my research suggest that the female athlete triad is a process that begins with an unhealthy body image and disordered eating patterns. Providing dancers, teachers, and administrators with the resources to acknowledge and address the serious implication related to the female athlete triad can diminish the excessively high rate of injury observed, enhance overall performance, and lengthen a career in professional ballet.

196. How do corticosteroid injections and the delay of spinal decompression surgery affect patient recovery and quality of life?

Aniket Kulkarni, Dept. of Biomedical Engineering, with Prof. Faye Prichard, VCU Honors College

Spinal stenosis is an ailment that a majority of people will encounter in their lifetimes. Narrowing of the spinal cord can be caused by cysts, trauma or disk herniation which can lead to permanent nerve damage and physical debilitation. When looking at an illness that is so prominent and severe, it is important to consider the current treatment options. Surgery is the final invasive form of treatment; however, the primary form of non-invasive treatment is the administration of corticosteroid injections, the efficacy of which are highly debated. I wanted to discuss the efficacy and the implications of corticosteroid injections, and their current use in treatment. I am very interested in how delaying a surgery may lead to worse surgery outcomes as the stenosis may become more severe with time and nerve damage is very difficult to repair. After learning about the deeper implications of spinal stenosis I wanted to find out: How do corticosteroid injections and the delay of spinal decompression surgery affect patient recovery and quality of life? To approach this question I learned about the mechanisms through which corticosteroids function and their efficacy. I then approached the normal outcomes of spinal decompression surgery, and reviewed the current understanding of corticosteroid use in the treatment of spinal stenosis. Spinal decompression surgery was found to be much more complicated than I initially thought, aside from normal surgery complications; after a spinal decompression surgery the probability of a second disk herniation increases significantly. The increased rate of disk herniation complicates the debate between determining whether a surgical approach to spinal stenosis treatment is superior to a conservative approach, of course there will be a significant decrease in pain experienced by a patient after surgery; however, each non-critical surgery also increases the possible complications for a patient.

197. Integration of Visual Art Production into the Curricula of Craniofacial Cosmetic Surgeons; A Proposal to Increase Stimulation of the Sensorimotor and Visual Analysis Development

Jatin Vemuri, Dept. of Biology, with Prof. Mary Boyes, VCU Honors College

Artistic education is often overlooked as a key component of the educational systems currently in place for the development of future doctors. However, it is important to acknowledge that the neurological connectivity and flexibility that is resultant of visual art production. These neurophysiological benefits should not be ignored for their overall enhancement of neurological efficiency and creativity. Developments in neurological topography such as these are especially important in the performance of craniofacial surgeons as a result of their occupational necessity for innovative problem solving and creativity.

I am studying the effects of integrating visual art production in the curricula of craniofacial surgeons and art production's stimulation of the sensorimotor complexes and visual analysis development during medical school, because I want to find out how this will affect the quality of the surgeons' care in comparison to surgeons that have not been exposed to these fields of study regularly, in order to help my reader understand the possible benefits of doctors who have been trained in visual art production thus resulting in an increased neurological connectivity and plasticity.

I examined journal articles that study the effects of art on an individual's brain as well as studies conducted about the comprehensive understanding of anatomy for medical students via visual art production. Studies contend that visual art production can enhance overall understanding of anatomy as well as produce increased neuroplasticity. If the correlation within the studies is accurate, craniofacial surgeons will have an improved quality of care for future treatment.

198. An Investigation of the Influence of Current Public Health Policies in the United States on the Prevalence of Rural Health Professional Shortage Areas

Hayne Noh, Dept. of Biology, with Prof. Mary Boyes, VCU Honors College

RESEARCH PROBLEM: I am studying current relief programs in place for rural primary care Health Professional Shortage Areas (HPSAs) in the United States, specifically Loan repayment Programs and Scholarship Programs, because I want to evaluate the effectiveness of these current programs in order to propose potential Public Health policy solutions that would allow a greater number of rural Americans access to primary health care.

DISCIPLINE: Public Health Policy

ABSTRACT: The healthcare professional shortage or maldistribution severely limits access to sufficient health care, affecting many Americans, particularly in rural areas. There is a range studies that agree that the health professional shortage is a pressing issue, but none that specifically evaluate the overall effectiveness and improvements to be made to government funded programs, such as Loan repayment and scholarship programs aimed at attracting physicians to these rural underserved areas. This study analyzes both quantitative and qualitative data from 21 peer-reviewed journals about rural primary Health Professional Shortage Areas, Title-VII funded schools, and rural primary health care. Although Loan Repayment Programs and Scholarship programs are both necessary and potentially effective programs to attracting primary care physicians to rural areas, these programs may be improved by lifting stringent contract policies, limiting the use of Health Professional Shortage Areas in determining need, growing collaboration between State programs and National programs, and increasing the overall allure of rural health care by early exposure to medical students through rural focused medical school curricula and sending physicians to underserved areas in groups. This work reveals innovative steps these programs can take in order to provide a greater number of rural Americans access to proper healthcare.

199. American Education in Decline: Here's Why and How

Madeline Hays, Dept. of Biomedical Engineering, with Prof. Faye Prichard, VCU Honors College

Although education holds implications for economic growth, scientific progress, and political participation, the United States remains on the lower end of educational quality compared to other industrial and first-world nations. Despite substantial efforts by the American government to mend this issue, reforms have yielded minimal improvement in results. Identifying the reasons for the declining nature of US education is essential in understanding how to improve the current academic state. Why has there been a decline in education quality in America compared to other first-world countries since World War II? In order to distinguish the characteristics correlating with low-achievement in the US, I examined cross-cultural comparisons between America and top-achieving nations. Once the absent or abnormal markers of American education were identified, I investigated possible roots through economic, social, and political perspectives. Results suggest the decline in American education is the consequence of lingering effects of the Cold War, the Civil Rights Movement, and the Standards Movement. These major societal events created a state of argument between levels of government and their partisan groups. Their products—misled reforms, drains of educational funding, poor curriculum decisions, and attempts at privatization—have contributed to poor academic achievement. Additionally, there are implications for the treatment of teachers and lacking precedence for

core studies among the United States general population affecting academic success. With the knowledge of the issues and their roots facing American schooling today, the road to a more holistic and effective treatment of United States education becomes much more clear.

200. A Theory on the Effects of Perceptions of Menstruation and Premenstrual Syndrome on Women in Politics

Hallie Chametzky, Dept. of Dance and Choreography, with Prof. Mary Boyes, VCU Honors College

Despite major advances in gender equality, women are still greatly underrepresented in United States political offices. Some recent research has argued that gender stereotypes do not explicitly harm female candidates. Many scholars disagree, arguing that stereotypes and bias may be more concealed than they have been historically, but do still exist. Additionally, many stigmas of the female body, including those pertaining to the menstrual cycle, remain prevalent in Western society. Research questioning menstrual stigma's effects on women seeking elected office has not previously been conducted. I examine how perceptions of menstruation and Premenstrual syndrome affect United States women in politics. Research reviewed includes empirical data on policy and trait stereotypes commonly held about female politicians, factors influencing likelihood to support female candidates, attitudes toward menstruating women, and effects of menstrual stigma on women. Also included are feminist scholars' theories on menstrual stigma. I find a correlation between the negative associations with menstruation and those concerning female politicians and propose a theory on their causal relationship. This research holds implications for United States citizens in analysis of their voting patterns and possible unconscious biases against female politicians, and an alternate explanation for women's underrepresentation in elected office. Future research should focus on controlled study and empirical data collection concerning menstrual stigma's effects on support for and attitudes towards women in politics.

201. An Economic Evaluation of Personalized Medicine in Lung Cancer Treatment

Mathew Alexander, Dept. of Biology, with Prof. Faye Prichard, VCU Honors College

According to the National Cancer Institute, lung cancers are the leading cause of cancer death in the United States. 85-90% of cases are attributable to non-small cell lung cancers (NSCLC), some of which are associated with solely a genetic component and little to no smoking history. Specifically, 7% of NSCLC cases are caused by chromosomal translocations in the anaplastic lymphoma kinase (ALK) gene. Although chemotherapy previously represented the main treatment for ALK-positive NSCLC patients, the rise of personalized medicine and companion diagnostics has allowed for the development of targeted therapies and biomarker screening based on an individual's genetic information. Though the practice offers the promise of improved clinical outcomes, the economic utility of diagnostics like fluorescence in situ hybridization (FISH) and ALK-inhibitors such as ceritinib is unknown. Thus, the research question was how do screening middle-aged (35-60 year-old) adults with FISH testing for ALK-positive NSCLC and treating with ceritinib potentially present a more cost effective solution than chemotherapy regimens pemetrexed or docetaxel? To assess the cost-effectiveness of diagnostic testing, test efficacy and costs were compared between sources supporting the use of FISH and sources supporting the use of other diagnostics. Similarly, the effectiveness of ceritinib was compared to that of chemotherapy using health utility and quality adjusted life year (QALY) data obtained from clinical trials that used each of the drugs to treat ALK-positive NSCLC. Preliminary results show that FISH screening has the highest test efficiency and ceritinib has the greatest health utility and additional QALY. Therefore, the results suggest that assuming a maximum cost threshold of $150,000 in a universal healthcare system, ceritinib offers a more cost-effective solution than current chemotherapies. The efficacy of ceritinib offers hope for increasing ALK-positive NSCLC survivorship, and illustrates that the use of personalized medicine to improve patient outcomes can be administered in a cost-effective manner.

202. Implementation of Attention Deficit Hyperactivity Disorder Therapies to Prevent Neurocognitive Late Effects in Pediatric Patients with Acute Lymphoblastic Leukemia and Brain Tumors

Madihah Alam, Dept. of Psychology, with Prof. Mary Boyes, VCU Honors College

Many pediatric patients with brain tumors or acute lymphoblastic leukemia develop neurocognitive late effects after receiving their cancer treatment. It is crucial to implement immediate neurocognitive behavioral therapy while the patients are receiving cancer treatment to prevent these effects. Since Attention Deficit Hyperactivity Disorder (ADHD) and pediatric brain cancers have similar symptoms and structural effects on the brain, ADHD behavioral therapy will be an effective alternative treatment for the patients. There are many studies that evaluate the neurocognitive late effects in pediatric patients, but the studies do not compare ADHD with pediatric brain cancer or stress the importance of immediate therapy. This study analyzes data from peer-reviewed journals in order to understand the efficacy of using ADHD neurocognitive behavioral therapy on pediatric brain cancer patients. The pediatric cancer survivors have many challenges throughout their lives, such as the lowering of their intelligence quotient by 3 or 4 points every year. There are similarities in the way that pediatric brain cancers and ADHD affect the brain structure and function. About 73% of acute lymphoblastic leukemia patients had white matter changes after receiving chemotherapy while ADHD patients faced a 9.2% decline in their white matter regions. Creating connections between ADHD and brain cancer will enable physicians to prevent their brain tumor or leukemia patients from developing neurocognitive late effects by implementing the best suited ADHD treatment. The findings from this study demonstrate the importance of implementing preventative measures in order to decrease the neurocognitive outcome on patients.
Keywords: brain tumors, acute lymphoblastic leukemia, attention deficit hyperactivity disorder, neurocognitive late effects

203. How to Define Binge-Watching Television by the Motives and Effects of Indulging to Excess

Brenna Davis, Depts. of Photo and Film, with Prof. Mary Boyes, VCU Honors College

With the accessibility of television programs provided by popular streaming platforms, like Netflix, consumers can watch episodes or seasons of their favorite programming in just one sitting. This new practice of watching television has been referred to as binge-watching, and is defined by Netflix as watching two to six episodes of the same show in one sitting. Netflix's definition is the most widely used definition of binge-watching, but does not account for the varying lengths of episodes for the different types of programming. There is a lack of standardization in what constitutes a television binge, like the standards that exist for other binge behaviors, and a lack of research conducted about how these new television watching practices affect health and wellness. To bring awareness to television binging habits and encourage further research of this subject, I studied the neurocognitive and behavioral motivations and effects of excess indulgence to propose a new definition for binge-watching. I found high patterns of television use were associated with increased risk for heart disease and all-cause mortality, poorer cognitive function in midlife, shortened leukocyte telomere length, and disrupted circadian rhythm patterns, independent of factors such as physical activity and family history. I assessed binge-watching in comparison to binge-drinking and used the format of a study on the perceptions of binge-drinking to conduct a survey of college students on their television practices and perceptions of what constitutes binge-watching. Using these results and the research discussed, I will propose a standard definition for binge-watching television.

204. Incorporation of Interprofessional Education and Special Care Dentistry into Standard Dental School Curriculum

Adzima Marshall, Dept. of Biology, with Prof. Mary Boyes, VCU Honors College

In terms of dentistry, special needs is defined as individuals whose medical, physical, psychological, or social situations may make it necessary to modify normal dental routines in order to provide dental treatment for them. Due to the deinstitutionalization of special needs facilities, this population is growing. The lack of educated professionals in special care dentistry is leading to severe and untreated systemic and oral health problems in the special needs population. The implementation of interprofessional treatment for special needs individuals has proven to be the most effective method of treatment within the special needs population. This study seeks to examine the current application of special care dentistry and interprofessional education curricula through the analysis of case studies and surveys in order to establish a reform that provides a more comprehensive implementation of classes that train oral health professionals on how to treat special needs patients. Through this analysis, key issues were identified which allowed parallels to be drawn in order to formulate a solution. Despite newly established accreditation standards, graduating dental students do not feel adequately prepared to engage in the treatment of special needs patients. Some studies have suggested that a mandatory post graduate year for dental students will correct this problem, however, this is an expensive solution that would present a financial burden to dental students. This paper identifies a system that combines special care and interprofessional education courses into a didactic and hands-on learning curriculum that will fit into curricula and surpass the CODA accreditation standards. By forming a universal special care dentistry curriculum taught through an interprofessional approach, special needs patients will not only receive better care but cost and treatment will be improved as well.

205. Ethnic Diversity on Boards of Directors of Large U.S. Companies and Firm Financial Performance and Group Dynamics

Saajan Sappal, Depts. of Finance and Economics, with Prof. Mary Boyes, VCU Honors College

Research Problem: I am studying ethnic diversity on boards of directors of US Fortune 500 food production and service companies because I want to learn if executive diversity in large corporations can increase firm financial performance so that my reader understands if heterogeneous leadership is prone to marginalization and how an ethnically diverse leadership dynamic affects operational efficiency and group cohesion.

Disciplines: Business Analytics, Human Resource Management

Abstract: Ethnic minorities are significantly underrepresented on the Board of Directors of large US firms. White males comprise nearly twice the proportion of directorships of Fortune 1000 companies as they do the total US population. Ethnic diversity in corporate governance is valued as an asset per two prominent theories: Resource Dependence theory and Agency theory. However, Ethnic diversity on the Board of Directors can also impair the group process per Status theory and constraints such as tokenism and marginalization. This paper is aimed at developing both a theoretical and empirical understanding of the value of ethnic minorities on the Board of Directors of Fortune 500 Food Service and Production firms as it relates to financial performance. Analysis of Fortune 500 Food Service and Production firms finds a positive correlation between ethnic diversity on Board of Directors and market value, return on assets, and return on investment. As a result, empirical evidence suggests that future pressures aimed at increasing diversity in corporate governance may prove financially valuable.

206. Cultural and Economic Factors Associated with Corneal Blindness in Female Population in Rural Regions of Andhra Pradesh

Kiranpreet Kaur, Dept. of Biology, with Prof. Mary Boyes, VCU Honors College

Despite efforts of Vision 2020 in India, the Andhra Pradesh Eye Disease Study (APEDS) revealed, in 2000, approximately 18.7 million blind people in India and also, projected an increase to 31.6 million blind people by 2020. Within the state Andhra Pradesh itself, preventable corneal blindness increased to 1.84% from 1.5% in the late 1980s. Numerous public health studies have been conducted to outline factors that cause and preclude treatment of avoidable corneal blindness in the India. Conclusively, the escalation of corneal blindness can be largely attributed to personal, social, and economic barriers in utilizing available eye-care services. However, due to the heterogeneity among regions in India, the degree and specificity of these respective barriers varies. Accordingly, no single approach can be implemented to effectively ameliorate eye health. Instead, population-based studies are required to understand individual regions and their varying levels of need. Accordingly, this research is an examination of the female population in rural regions of Andhra Pradesh through the analysis of two major studies (1) the impact of private/non-governmental organizations (NGOs) on economic development and (2) sociological factors, namely economic and social aspects, engendering lack of utilization of eye-care services, in order to find a correlation between these two seemingly disparate studies. Overwhelmingly, the presence of private/non-governmental organizations (NGOs) increases economic status of regions by increasing access to both education and employment opportunities. In comparison to developed, urban areas, NGOs presence in rural regions is significantly limited leading to discrepancies in economic development, and thereafter, lack of opportunity for economic and social growth for females. Correspondingly, for years, higher incidences of corneal blindness have plagued the female population residing in underdeveloped, rural areas of India, especially in comparison to female counterparts in urban areas. I found this to be significantly attributed to an intermittent and cyclic combination of sociological limitations, specifically lack of education/employment opportunities and cultural/societal restrictions, which, in turn, are linked to comparably diminished levels of private/NGO sector involvement. Only through understanding the correlation between these two aspects can intervention efforts be appropriately pursued to effectively reduce corneal blindness rates in this at-risk demographic group. This work increases our understanding of the limitations that exist in accessing treatment options for females and furthermore, obtained results can potentially be extended to other regions of India to create and implement similar public policies.

207. Hinduism and Related Cultural Factors that Influence the Prevalence of Mental Health Disorders in South Asian Women and Possible Customization in Treatment/Therapy

Navya Nanda, Dept. of Biology, with Prof. Mary Boyes, VCU Honors College

Despite the large amount of research being conducted regarding depression and mental health disorders, surprisingly, there are quite a few gaps in the area when it comes to mental health disorders and how they affect South Asian women in particular. Eight studies published by reputed academic journals were analyzed in order to conduct this research. As a result of thorough analysis, it was found that factors related to Hinduism such as the practice of dowry, *dharma*, and deep-rooted patriarchy play a large role in the mental health of South Asian women. Dowry is a common practice pre-marriage and causes immense amounts of emotional stress. *Dharma*, or duty can overshadow a woman's sense of self, thus causing an avoidance of any seemingly "unimportant" problem that is unrelated to one's duties. Additionally, deeply rooted patriarchy propagates a sense of helplessness and submission in many women. Furthermore, the vast cultural differences and the struggles associated with these differences between the Eastern and Western world were found to be important factors to consider in studying how mental health disorders affect South Asian women. Though these religious and cultural factors are imperative to consider when treating mental health disorders in South Asian women, not many healthcare professionals implement such considerations in their practices. This study aims to shed more light on the specific factors that healthcare professionals should focus on when

working with South Asian women with mental health disorders as well as suggest methods by which these factors can be incorporated in treatment.

208. Influence of Nationalism on Danish Policies for Syrian Refugees

Camilla Harris, Dept. of International Studies, with Prof. Faye Prichard, VCU Honors College

In recent years, refugees have fled conflict in Syria in huge numbers, spreading to nearby countries and overflowing into Europe. Many European countries have struggled to decide how to help refugees in need while simultaneously addressing security and economic concerns. In Denmark, the influx of Syrian refugees has prompted the government to put new restrictive entry laws into place, as well as laws to cover costs, such as the widely criticized policy allowing the government to seize valuables from refugees seeking asylum in Denmark. My research question is: to what extent does nationalism influence Denmark's policies regarding Syrian refugees? I compare evidence of Danish nationalism with recently passed immigration policies directed toward Syrian refugees entering Denmark. These include policies intended to deter refugees from coming to Denmark, policies to integrate accepted refugees into Danish culture, and miscellaneous policies such as the one allowing for search and seizure of valuable items. The Danish government has used values associated with the Danish national identity to justify these policies, suggesting a strong link between nationalism and these policies. Denmark's progressive ideals, such as gender equality and support for a welfare state, have become internalized in Danish national identity and are used as reasoning for exclusion or forced integration of immigrant groups with opposing values. This predominantly affects Middle Eastern immigrants whose cultures are perceived to be backwards and oppressive. Although Denmark presents itself as a paradise of inclusivity and equality, a link between its upsurge in nationalism and its passage of restrictive immigration laws would color this perception with xenophobia.

209. The New Community School of Richmond

Ronald Jones, Interdisciplinary Studies-Social Media Management, with Prof. Mary Shelden, Dept. of Focused Inquiry

For my senior capstone project, we were asked to partner up with an organization or company that has made a difference within the community. I decided to pair up with The New Community School of Richmond, which is located on Laburnum road. Once we found our partner we were asked to help them with a problem or anything they needed help with. TNCS is a school that is for students with dyslexia that ranges from middle school throughout high school. They have a small student body of no more than 200 in order for the faculty and staff to get as much 1on1 time with the students for efficiently teaching in learning. Besides that one minute detail, the student life there is just as great and no different from any other school. With my major being in communications and media, they needed my help with exposure. I worked with them to come up with a plan to increase their exposure on social media platforms such as Facebook and Twitter, as well as spreading the word about their art event through word of mouth and posters. With me giving exposure to their art event, it also directly gave exposure to this wonderful school and sheds light on what they do and what dyslexia actually is. My Poster will display what exactly TNCS is about, how I helped them, and how they make the Richmond Community a better place.

210. Central Virginia Football Association (CVFA)

Yashua Torres, Interdisciplinary Studies, with Prof. Mary Shelden, Dept. of Focused Inquiry

This poster I will be giving viewers a bird's eye view of what the CVFA is and where it's heading. Because the League is not motivated to just stick in Richmond, it's motivated to bring the success it's had in Richmond

and expand to other locations in Virginia. This friendly neighborhood football league is one that brings people and families together. The CVFA is having its biggest season yet, with almost 80 teams on the schedule, you would understand why they're looking for more hands on deck. I am looking for ways to reach out to more people to help with this cause. I've gone online, passed out flyers and even spread word of mouth and I already have people who are willing to help in this established league that brings America's favorite sport to your backyard. Doing research on the matter I've noticed in community athletics it's best to give those free trials or "samples" to gain interest and to see first-hand how much fun it is, because at the end of the day the sport and community attracts those who would typically already be willing to participate.

211. Faith based housing solutions

Michael Price, Interdisciplinary Studies, with Prof. Mary Shelden, Dept. of Focused Inquiry

I chose to partner with the Virginia Department of Corrections to help assess and find solutions for the lack of transitional housing for recently released Offenders. The need for transitional housing is an ever growing issue with the state. Funding for this housing is limited to the General Assembly's allocated budget which falls short of the department's needs. With a limited budget the need to reach out to faith based organizations to offset the lack of contract transitional housing is necessary in order to accommodate the growing number of returning citizens.

212. The Public Eye on Colonial Williamsburg

Brett Guminsky, Interdisciplinary Studies, with Prof. Mary Shelden, Dept. of Focused Inquiry

In efforts to help a community partner within reach of the Richmond Virginia and Peninsula areas, this research project will focus on the needs of the historic site of Colonial Williamsburg in Williamsburg, VA to decrease the negative publicity that has been projected on them in recent years as well as to gain positive publicity to increase tourism. The research included draws on primary sources such as employees of all positions working at Colonial Williamsburg as well as recent newspaper articles. The most recent research shows negative publicity over the presentation of slaves within the tourist attraction. This research project will seek to show how Colonial Williamsburg can increase their publicity while still achieving the goals of this historic site.

213. Surviving a Plague in Richmond Virginia

Negeen Kianersi, Interdisciplinary Studies, with Prof. Mary Shelden, Dept. of Focused Inquiry

In 2014, Richmond was ranked one of the nation's highest rates of people living with HIV according to data from the U.S. Centers for Disease Control and Prevention. The city had 1,162 HIV infected residents per 100,000 populations. Richmond ranked 17th among 2,300 U.S. localities that reported the diagnoses to the CDC's database. In 2012, 59% of people living with an HIV diagnosis were black, 8% Hispanic/Latino, and 30% white. Additionally, 72% of HIV cases in men were from male-male sexual contact. A study by the CDC shows that 1 in 2 gay black men are likely to contract HIV and consequently AIDS. Richmond's rates are a grim reminder of the social construction and corruptions of a disease. Historically, disease has been a powerful metaphor for anxieties around social and moral disorder. Marginalized groups of people embody the essence of a disease and social corruption. Racial difference continues to be produced in gender and class terms, and gender difference in racial terms. This marginalization of minorities has been a product of years of negligence by government health reforms throughout the United States, dating back to the 1980s when the advocacy for AIDS care became prevalent.

214. Organizational structure of non-profit businesses focusing on all ethnicities

Dennis Rogers, Interdisciplinary Studies, with Prof. Mary Shelden, Dept. of Focused Inquiry

With this project I want to explain how I can develop a modern and more interracial clubhouse/rec center for kids. I grew up going to the boys and girls club in Wilmington and it was some of the best years I had. We had many field trips, speakers, events and met a lot of lifelong friends. One thing I noticed was it was a lot of blacks and barely any other races. I want to attract everyone from race, gender and even kids with special needs. I feel like this can shape and round this world on a better basic due to racism and prodigious people.

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