

**Part of  
Research  
Week!!**



# Poster Symposium

## For Undergraduate Research and Creativity



**Wednesday April 25, 2012  
Student Commons 2nd Floor  
11am—2pm Keynote at 12pm**



## **The following individuals and departments are acknowledged for their many contributions:**

- Ann Nichols-Casebolt, Ph.D., Office of Research
- Frank Macrina, Ph.D., Vice President for Research
- Herb Hill, UROP Coordinator
- Tamara Highsmith, VCU Dining Services
- Sarah Golding, Ph.D, UR Coordinator, Biology
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- VCU School of Arts
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## **All Abstracts Organized by Poster Number**

### **1. The Reinforcement of the Western Female Hairlessness Norm Through the American Capitalist Markets in Advertising**

*Jezrehiah Towner, Dept. of Graphic Arts, with Prof. Mary Boyes, University College*

The female hairlessness norm in Western culture sets a beauty standard that rejects post-pubescent female body hair, leading women to view their natural hair as something that must be constantly removed in the face of social acceptability. I have gathered research on studies regarding this cultural focus of self-maintenance and body image in relation to femininity, sexual attraction, social interaction, and quality of life. The Western female hairlessness norm is reinforced through advertising by the American capitalist market for hair removal products, which uses these cultural body image insecurities to its advantage. I have analyzed the commercials of several well-known American hair removal product companies in order to identify the relationship between the commercials, female body image insecurities, and the perpetuation of the norm.

### **2. Improving the Gram Stain**

*Mary Reck, Clinical Laboratory Science, UROP Summer Fellow, with Emily Hill, Clinical Laboratory Science*

Gram stain results provide the information needed to presumptively diagnose an infection. Fixing the patient's specimen to the slide is an essential step in the preparation of gram stains. The standard heat fixation (HF) technique can distort morphological characteristics of bacteria and cells rendering the gram stain difficult to interpret. Reports indicate that methanol fixation (MF), an alternative technique, results in greater adherence of the specimen to the slide and maintains morphological characteristics. Using American Type Culture Collection (ATCC) strains and direct patient specimens, methanol and heat fixation will be compared based on adherence, stain results, and smear quality.

### **3. Spaghetti Westerns: An Italian View of the American West**

*Joel Rhodes, Mass Communications, with Margaret Ozierski, School of World Studies*

For my research, I am studying the distinctions between American and Italian Westerns and how they reflect different views on the American West. There is a major emphasis on how heroes are portrayed in American and Italian culture, and a minor emphasis on Jungian psychology to elaborate on how American and Italian history produced these different portrayals of heroes. To illustrate these contrasts, I will use George S. Stevens' *Shane* and Sergio Leone's *Fistful of Dollars* with brief references to other westerns.

#### **4. Ontogeny of risk across the aquatic-terrestrial interface: how changing behavior and morphology affect predation through anuran metamorphosis**

*Shane Abinette, with R. R. Jimenez, J. C. Touchon, J. R. Vonesh & K. M. Warkentin Univ. Nac. de Costa Rica, Virginia Commonwealth Univ., Boston Univ., Virginia Commonwealth Univ., Boston Univ.*

Metamorphosis dramatically changes morphology, physiology, behavior and performance. As anurans change from aquatic tadpoles to terrestrial juveniles, they pass through a period of poor locomotor performance and high predation risk, and individuals behaviorally determine when they shift habitats. Red-eyed treefrogs, *Agalychnis callidryas*, alter when they move onto land in response to aquatic giant water bugs and semi-terrestrial fishing spiders. We conducted predation trials and behavioral experiments at multiple stages to assess changes in the interactions of *A. callidryas* with each predator through metamorphosis. In aquatic trials, *A. callidryas* reduced activity with both forelimb emergence and chemical cues from water bugs. Nonetheless, forelimb emergence substantially increased the predation rate. In semi-terrestrial trials, conducted in shallow water with dense floating vegetation, metamorph activity increased as tails were resorbed, and metamorphs did not reduce activity in the presence of a spider. Predation by spiders increased as metamorphs resorbed their tails. Close observation in small venues revealed that most spider attacks occurred after metamorph movements, and attack rates on shorter-tailed metamorphs were higher. Longer-tailed metamorphs were, however, less likely to escape from attacks. Thus, the ability of metamorphs to behaviorally compensate for morphological constraints on escape ability appears to be better out of the water. Nonetheless, in natural ponds, the effect of activity on the rate of encounters with pond-associated predators will depend on how rapidly metamorphs leave the environs of the pond.

#### **5. Fibroblast growth factor 22 contributes to the formation and maturation of retinogeniculate synapses**

*Rishabh Singh<sup>1\*</sup>, with Jianmin Su<sup>1\*</sup>, Justin Brooks<sup>1</sup>, Hisashi Umemori<sup>2</sup>, Michael A. Fox<sup>1#</sup>*

*<sup>1</sup>Department of Anatomy and Neurobiology, VCU/MCV. <sup>2</sup>Department of Biological Chemistry & Molecular and Behavioral Neuroscience Institute University of Michigan Medical School*

The human brain has approximately one quadrillion ( $10^{15}$ ) synapses— each one stereotypically formed between two specific neurons. At least three forms of intercellular signaling are required for the generation of such precise connections between appropriate neurons. First, growing axons must recognize and adhere to a correct postsynaptic target cell, a process called synaptic targeting. Trans-synaptic cues must then organize the transformation of the axon and dendrite into a functioning synapse, a process called synaptic differentiation. Finally, a period of activity-dependent refinement strengthens some synapses and eliminates excess synapses. One region where these processes are being actively studied is the dorsal lateral geniculate nucleus (dLGN), a thalamic nucleus that relays information from the retina to the cortex. While we know much about the targeting and refinement of synapses in this nucleus, molecules that direct synaptic differentiation in dLGN have not yet been elucidated. To identify such cues we explored changes in the expression of synaptic organizing molecules during dLGN

synaptogenesis by microarray. While increased expression of ~10 synaptic organizing genes (out of >100) coincided with synapse formation, the expression of one gene in particular stood out: *fgf22*, the gene encoding Fibroblast Growth Factor 22 (FGF22), was highly upregulated in postnatal dLGN. Since FGF22 has already been shown to play roles in excitatory synapse formation in the hippocampus, cerebellum and at the neuromuscular junction, these findings lead us to question whether it plays similar roles in regulating retinogeniculate synapse formation in dLGN. Using targeted *fgf22*<sup>-/-</sup> mutant mice we explored the development of retinogeniculate synapses in the absence of FGF22. Qualitative and quantitative results reveal a significant delay in the formation and maturation of retinogeniculate synapses (but not other synapses in the dLGN) in the absence of FGF22. Based on these results, these studies are the first to identify some of the molecular mechanisms contributing to synaptic differentiation in the dLGN.

## **6. Julie Taymor's The Lion King and its Transcendence of Corporate Broadway**

*Andrea Willcockson, Theatre Performance, with Jason Coats, Dept. of English*

The Lion King, as staged on Broadway, is inarguably a musical full of spectacle: actors and dancers adorned with colorful, beautiful masks, costumes and headdresses that transform their bodies from human to animal and African jungle. However, it must also be noted that this glorious work of storytelling is associated with Disney, a corporation which has installed itself onto Broadway in other ways, producing shows that exist primarily to make money. Because of this, an internal struggle presents itself: If The Lion King is so beautifully told through the creative works of Julie Taymor, a woman with outstanding credentials such as studying immensely in shamanistic theatre, having had immersed herself in experimental theatre, and many other qualities, can the show truly be lumped with the other Disney profit-producing productions? *The Lion King* is such a unique, creative production, that it stands alone, separate from Disney and the money-making machine Broadway has become, as a beautiful work of art and storytelling.

## **7. Examining Perceptions of Beauty and Methods of Measurement**

*Lauren Colie, Print Journalism, with Mary Boyes, University College*

Visual arts offer a reflective source for understanding the processing of aesthetics and beauty that is significant to an awareness of brain function and the human psyche. Evaluating and determining what factors are integral to the experience of aesthetics holds value for understanding deeper psychological implications of perception. I conducted a survey of Western portraiture determined to be famed through repeated Internet searching of "famous art" and best-selling prints for the purpose of examining the works for mathematical attributes proposed to cause the experience of visual pleasure. While mathematical principles and patterns can be found within each example of portraiture, the overarching issue encountered is the validity of the methods that are present in the research that declares the merit of the principles and patterns used. As the data suggesting the value of the attributes sought in the works is flawed, so too is any conclusion based upon it. The ability to quantify the qualitative in an objective manner does not yet exist. Therefore, it is invalid and reductionist to assert the experience of visual pleasure as relates to fame is based on a singular attribute that cannot be

empirically established. Attempts to discover adequate methods are not wasted, as it is the discussion generated by inquiry into the experience of aesthetics that offers positive philosophical and critical thinking applications that are integral to the furthering of human intellect.

## **8. What Causes the Immunotherapy Gap in Multiple Sclerosis Testing?**

*Karthika Solai Venkatesh Babu, Dept. of Chemistry, with Prof. Mary Boyes, University College*

Multiple sclerosis is a disease that affects the central nervous system. The use of murine animal models in order to test therapies for MS has helped make many leaps in treatment of the disease. This paper will focus on the murine EAE, or experimental autoimmune encephalomyelitis, model. Several drugs and useful insights on the pathways and chemical reactions at work in MS have been produced using this model. However, there is an “immunotherapy gap” between the animals used for testing and human MS patients. This gap is defined as “problems in translating new treatment concepts from animal models to the patient” (t Hart et al., 2011, p.119). Where do these problems come from and how can they be solved? Although there are some inherent differences between EAE and MS, much of the immunotherapy gap seems to be created by experimental procedure. Research practices used with the murine model do not always parallel research practices for human MS patients. Several things can be done in order to shrink the immunotherapy gap. Blinding, randomization, power calculations, toxicology reports, proper medicating periods, and ethics reviews must be made standard for murine model testing, just as they are required for human tests. By changing these experimental practices, scientists could reduce the immunotherapy gap.

## **9. Flashbulb memory is just a special name for a vivid emotional memory**

*Hannah Rodriguez, Dept. of Chemistry, with Prof. Jeff Lodge, Department of English*

Flashbulb memories are a type of emotional memories that are long lasting and consistent memories for specific details made during the time that news of an event was learned. They are different for each person, such as details of location, ongoing activities, and even small, unimportant or insignificant details of anything around the individual at the time. They do not have to be related to the actual event that triggered the flashbulb memory. The purpose of the study was to see if they are fundamentally different from an everyday emotional memory. Information from ten different scholarly articles was compiled to investigate the question. One of the primary results found was that, contrary from popular belief, flashbulb memories are no more accurate than everyday emotional memories even though the confidence in the accuracy of the memory stays very high compared to everyday emotional memories. This result led to the conclusion that flashbulb memories are no more than a strong emotional memory and should not be treated special. This means that they cannot be used to enhance memory or for any other applications. However, research in this field is far from complete so more studies and experiments need to be done to come to a solid conclusion.



## **10. The United Nations Security Council and its Preservation of International Human Rights in Light of Southern Sudan**

*Marah Archer, Cinema and Spanish with Prof. Mary Mullins, University College*

This research project scrutinizes the limitations of the effectiveness of the United Nations Security Council to inhibit infractions of international human rights. Based upon intense research of international documents and the UN's attempts to quell the violence in Southern Sudan from 2003-2007, the Security Council failed to relieve the Sudan of terror and mass murder. In May 2004, one million Sudanese were killed, raped, displaced, or malnourished. In June 2005, 300,000 Sudanese died. In 2007, 500,000 Sudanese died. Although the *Charter of the United Nations* establishes the Security Council as the chief body to carry out the purpose of protecting fundamental human rights, it cannot because of the lack of definition of international human rights and the Security Council's absolute authority, which are demonstrated by the Security Council's reactions to the violence in Southern Sudan at the beginning of the twenty-first century. The *Universal Declaration of Human Rights* and the *Responsibility to Protect* were ratified to help define and enforce human rights. But the veto powers of the permanent members of the United Nations Security Council prevent any ratified resolution from forcefully reacting to the massive murders that were committed in the Sudan. After analyzing critical documents, like the *Charter of the United Nations*, the *Universal Declaration of Human Rights*, and the *Responsibility to Protect*, that set up the function and powers of the United Nations Security Council, the information reveals that from its formation, the United Nations Security Council cannot protect fundamental human rights because its permanent members are interlocked with vetoes and self interest.

## **11. Fingerprint Analysis as a Method for Determining Postmortem Intervals of Decomposing Bodies**

*Aryn McClain, Dept. of Forensic Science, with Prof. Mary Boyes, University College*

It is essential that forensic pathologists and medical examiners are able to identify postmortem intervals as accurately as possible, especially if time of death is to be used as evidence in court cases. Some current methods for determining postmortem intervals, including analysis of rigor mortis and internal body temperature, are dependent on external variables of the scene environment, such as environmental temperature, humidity, and animal or insect activity. Similarly, analysis of rigor mortis and livor mortis are limited to the position and conditions of the body, such as tautness and physical fitness. Dependency on external and body conditions limits the types of methods forensic investigators can use for determining postmortem intervals of decomposing bodies. Because current methods are dependent on uncontrollable variables, a new supporting method for determining postmortem intervals would help improve accuracies of postmortem interval estimates of decomposing corpses. Because the skin begins to stretch and swell as bacterial putrefactive gases are released inside the abdominal areas of a decomposing body, fingerprinting may be a way to improve accuracy of postmortem interval estimates. In order to better understand how changes in fingerprints can be measured, experiments must be designed to prove or disprove the hypothesis that the swelling and stretching of the skin causes the valleys between fingerprint ridges to expand in a predictable way and that the change in width can be measured to estimate a postmortem interval. If these experiments prove that fingerprint analysis is a plausible additional method for determining postmortem intervals, then fingerprint analysis would allow forensic pathologists and medical examiners to obtain more accurate postmortem interval estimates for decomposed corpses.



## **12. One Week Test-Retest Reliability of Subjective and Physiologic Response to 7.5% CO2 Breathing**

*Thien Thanh Khanh Nguyen, Biochemistry, with Jacob York and Dr. Roxann Roberson Nay, Dept. of Psychiatry*

Subjective and physiologic response to the carbon dioxide (CO<sub>2</sub>) challenge test shows promise as a method for studying panic in the laboratory. No reliability data currently exists for CO<sub>2</sub> challenge methods using lower concentrations of CO<sub>2</sub> (e.g., 5%, 7.5%) that are breathed for prolonged periods. Because CO<sub>2</sub> sensitivity is hypothesized to be a biologically based trait marker of panic attacks and panic disorder, it is important to determine whether this trait is reliably expressed. This study examined subjective and physiologic reliability in a sample of young healthy adults using the maintained 7.5% CO<sub>2</sub> breathing test. Subjects were monitored during three phases including a 5-minute baseline, 8 minutes of CO<sub>2</sub> breathing, and a 5-minute recovery. Subjects completed a self-rating of anxiety (i.e., SUDS) and symptoms using the Diagnostic Symptom Question, which maps onto DSM-IV panic attack symptoms. A SUDS rating and the DSQ were obtained before attachment of the breathing mask. SUDS were obtained every two minutes once the mask was attached and the DSQ was administered four times including before mask attachment, during baseline, 7.5% CO<sub>2</sub> breathing, and recovery. Subjects returned approximately one week later to complete the test a second time. We examined reliability for repeated measurements. Data collection is ongoing, with results based on a preliminary analysis of 43 subjects. Results for SUDS assessed during baseline indicated a correlation range of .46-.66 (Time 1: Mean=24, SD=20; Time 2: Mean=21, SD=17). During 7.5% CO<sub>2</sub> breathing, SUDS correlated .47-.70 (Time 1: Mean=45, SD=23; Time 2: Mean=41, SD=26). The recovery phase yielded correlations ranging between .49-.70, with SUDS returning to near baseline levels (Time 1: Mean=30, SD=18; Time 2: Mean=27, SD=17). We are currently analyzing the physiologic data and will present these data. Overall, our results suggest moderate levels of reliability for repeated measurement of subjective anxiety and symptoms during respiratory stimulation via 7.5% CO<sub>2</sub>, indicating that CO<sub>2</sub> sensitivity is a reliably expressed phenotype.

## **13. Captivating the World with Mystery and Ambiguity: Analyzing the Mona Lisa**

*Heather Thomas, Art Foundation, with Prof. Mary Boyes, University College*

The contextual, historical, and visual aspects of various famous paintings have been studied, with a focused inquiry regarding Leonardo da Vinci's *Mona Lisa*, in order to ascertain the factors which most contribute to the success and perpetuity of the appeal of *Mona Lisa*. The interpretation of the socio-historic and visual aspects of this famous painting will be conducted in such a way that the factors, which contribute the most to the overall appeal of this famous work of art, will be revealed and explained to the audience. In order to get a well-rounded view of the painting and its various interpretations, it was necessary to examine writings and reviews of the paintings. By organizing and interpreting the writings of various authors and the implications of the writings, a generalized list of the factors which heighten the appeal of *Mona Lisa* were determined. Additionally, the researcher provides her own interpretations of the painting and the material. It is the existence of several key elements in the painting which provides for its enduring fame. The aforementioned elements include: the

utilization of techniques, such as *sfumato*, *chiaroscuro*, and aerial perspective to create a naturalistic yet ambiguous image, and of the composition of the painting, including the positioning of the figure and the landscape; the flexibility of interpretation of the painting's content, achieved through the figure's indeterminable expression and personality; and the inclusion of darker imagery, which stimulates interest, creates a subconscious discrepancy, and heightens reverence for the content. All of these ingredients contribute to the occupation of the mind by the painting.

#### **14. MAST CELL-MACROPHAGE INTERACTIONS ALTER INFLAMMATORY CYTOKINE PRODUCTION**

*Tenchee D. Lama Tamang, Dept. of Biology, with Nicholas Pullen and Dr. John Ryan, Dept. of Biology*

Increased levels of mast cells and macrophages are seen at the tumor microenvironment. Mast cells are associated with tumor progression, and macrophages have been observed to induce cancer cell motility and angiogenesis. Like mast cells, macrophages produce inflammatory cytokines such as TNF, IL-13, IL-6 and MIP-1 $\alpha$ . The individual role of these cells are well-recognized, but very little is known about their potential interactions in this microenvironment. Our preliminary studies demonstrate that co-culturing mast cells with macrophages elevates inflammatory cytokine production. Cultures of IgE-sensitized, antigen stimulated mast cells mixed with macrophages produced higher concentration of inflammatory cytokines than either cell population alone. These data demonstrate the possibility that communication between mast cells and macrophages may alter one another's functions, especially cytokine secretion. These studies will help us gain a better understanding of the role of mast cell-macrophage interactions and how they may contribute to both normal and pathological immunity. This work was supported by VCU-Minority Access to Research Careers, NIH R01.

#### **15. Highly Sensitive Biosensors Based on Nanotip Enhanced Surface-enhanced Raman Scattering**

*Ariel Nash, Dept. of Physics, with Dr. Dexian Ye, Department of Physics.*

Due to the complexity and weak signal of biological molecules, detection can become almost impossible. Surface enhanced Raman Spectroscopy (SERS) is an efficient and powerful method for identifying and amplifying these molecular signals as well as enhancing any differences between structures. Nickel nanorod arrays were fabricated on a silicon (100) substrate by using the dynamic oblique angle deposition with substrate rotation technique. The substrate was tilted such that the depositing flux approached the silicon surface at an angle of 85° with respect to the surface normal. Single-crystal nickel nanorods were formed with well-defined pyramidal nanotip geometry due to the construction of facets during the deposition process. A thin layer of silver film (~ 20 nm thick) was further deposited on the surface of these facets. These silver coated nanotips were able to localize and enhance the electromagnetic fields, as demonstrated by the finite-difference time domain calculations. Surface-enhanced Raman scattering of insulin and cytochrome-c proteins ranging from millimolar (10<sup>-3</sup>M) to picomolar

( $10^{-12}$ M) were demonstrated in experiments on the aforementioned hierarchy nantip arrays using a confocal Raman microscope with magnifications of 10x and 100x. Future experiments will investigate whether a shift in the Raman spectra can be detected between different aggregate stages of each protein as well as misfolded aggregates due to heating.

## **16. The Collective Influence of Sociocultural Factors in Understanding the Hispanic Health Paradox as Applied to Mexican Americans**

*Merit George, Dept. of Biology with Prof. Mary Boyes, University College*

Despite the broad array of research that exists on the Hispanic health paradox, no single explanation has been marked as the dominant reason for the disparities in life expectancy that exist between Mexican Americans and other Hispanic and non-Hispanic ethnic groups. This indicates that researchers must adopt a more open perspective that examines the influence of multidimensional factors which integrate culture, religious tradition, and lifestyle. The purpose of the current study is to 1) suggest a transition from exploring statistical explanations of the paradox to critically assessing health-related behaviors and influences; 2) explain the protective role of familial bonding on Mexican American health that is non-apparent in other ethnic groups and 3) elucidate the unique secondary health system of *curanderismo* and its implications on Mexican health and 4) discuss factors that bolster the effects of folk medicine, unique to Mexican Americans. The Hispanic health paradox is related to observable health-related influences, rather than statistical misrepresentation or misclassification. The phenomenon is best seen when studying the Mexican American population; they comprise the subculture that holds the lowest socioeconomic status yet has the highest life expectancy rates. Familial structure is one component that results in better physical health among members of this ethnic group. Still, similar familial bonding in Cuban American and Native American culture has *not* resulted in similar health outcomes, indicating additional factors behind the health advantage. The presence of an alternative-health care system with a more emotionally significant practitioner-client relationship is the main factor that separates Mexican Americans from the other ethnic groups, and results in tangible disparities in sleep and stress-coping styles. In turn, this distinctive system, referred to as *curanderismo*, has a positive impact on both physical and mental health, and is bolstered by consistent family and community systems. Consequently, by capturing the Hispanic health paradox in a holistic analysis of the existing explanations in current literature, researchers can categorize different reasoning and begin to conceptualize which factors have a greater contribution to the advantageous health outcomes of Mexican Americans relative to other influences. Further research should focus on closely examining the psychological implications of belief in *curanderismo* and its related folk practices on the individual, especially those linked to mental health. In addition, it is necessary to systematically analyze the many treatments proposed by *curanderos* to their patients, so as to scientifically determine any physical benefits that might arise from using the herbs and supplements prescribed. Lastly, it is imperative that additional research be done concerning the extent to which *curanderos* blend both traditional Mexican folk practices and contemporary western medicine when considering treatment decisions for their clients.

## **17. Why more research should be done on the use of illicit drugs for psychotherapy and how the “War on Drugs” is hindering this research.**

*Tasha Barber, Dept. of Fashion Merchandising with Prof. Jason Coats*

While it is common knowledge that many of the drugs known for their involvement in the “hippie” counterculture were illegalized and placed on the DEA’s list of Schedule I substances, many do not realize that when made Schedule I, substances that showed great potential to benefit psychotherapy patients could no longer be researched or used to treat patients. If substances such as MDMA, LSD and Psilocybin remain illegal, they cannot be used as treatments for conditions to which they are the best-known remedies. Some of these conditions include cluster headaches, anxiety related to life-threatening cancer, post traumatic stress disorder (PTSD), and ironically, intractable drug dependence. These conditions could best be treated with drugs that are currently illegal and therefore, due to our current drug policies, patients are not receiving the finest possible care. If these drugs were decriminalized, research could be done upon them to improve their medical uses and patients could receive treatment for the conditions that they are already known to remedy.

## **18. Placebo Administration to Depressed Patients: An Analysis of the Ethics of Placebos in Clinical Practice**

*Sahil Aggarwal, Dept. of Biology, with Prof. Mary Boyes, University College*

The placebo forms the backbone of nearly all clinical drug trials by functioning as a control to assess the efficacy of an active drug. The administration of the placebo in clinical *practice* has stimulated controversy within the medical community because, often, physicians deceive patients to extract the placebo effect. The American Medical Association’s guidelines for administering placebos in clinical practice—which state that using placebos without informed consent is a threat to the doctor-patient relationship—are contradictory and may inhibit the promotion of a placebo effect. A greater comprehension of clinical placebo administration will allow the medical community to assess if the benefits of the placebo can be harnessed without compromising the traditional values of medicine. This review focuses on the placebo effect in patients with depression. After analyzing previous studies from academic databases, I examine three primary aspects of the placebo effect: The strength of the placebo effect, the mechanisms by which the placebo effect occurs, and the ethics of placebo use in clinical practice. My review finds that the response rates of patients in the placebo groups for antidepressant trials are high, thus lending the possibility that the placebo could be clinically beneficial to depressed patients. The two primary contributing factors to the placebo effect seem to be the doctor-patient relationship and a neurological mechanism of action. Furthermore, because treatment with a placebo would be only part of any therapy for depressed patients, I conclude that the placebo should be considered an ethical treatment option for depressed patients. In order for physicians to minimize the issue of deception when administering placebos, my research supports that informed consent can be obtained without compromising the benefits of the placebo effect. Further research should focus on administering placebos without deception to depressed patients, ensuring representativeness by studying large sample sizes.

## **19. The Rise of Technology and the Fall of Copyright Law**

*DJ Jaini, Dept. of Criminal Justice with Dr. Jason Levy, Wilder School of Government and Public Affairs*

This research will focus on how advancing technology undermines the intellectual property law process, specifically copyright law. This research will also discuss the history of copyright law, the procedural aspects in which copyright law operates, and the future challenges of protecting this law. Through investigation of scientific studies, academic research, and case law, this research will examine how intellectual property law has been unprepared for the new and complex facets of technology. This research will also examine how this failure to adequately address this issue of technology has led to financial losses to individuals, corporations, and society. The spotlight on these failures, coupled with case law, will highlight the growing issue of copyright law in the domain of technology. This research will bring to light the impact on future dealings with how society governs technological issues such as quantum computing, app-building, etc. and also with internet issues such as Wikipedia, Facebook, YouTube, etc.

## **20. Zoning to Ameliorate Urban Poverty: Richmond Virginia's Church Hill Community**

*Wyatt Carpenter, Depts. of Environmental Science and Urban Planning with Prof. Mary Boyes, University College.*

Urban poverty is caused by homogeneous housing in suburbs that *exclude* lower-income residents, dwindling employment opportunities in the urban core, and a lack of adequate public transportation to move low-income workers to and from jobs located increasingly far away from concentrations of low-income housing. Disparities in the quality of education between high and low-income areas makes it harder for low-income students to attain jobs with higher salaries, creating a cycle of poverty in which many low-income urbanites become trapped. This paper investigates and examines the theory behind what causes urban poverty, especially in relation to zoning. Richmond Virginia's Church Hill community has transitioned from a mostly white middle-class community in the early 1900's to a mostly low-income African American community by the mid 1940's. This change can be attributed, in part, to "white flight," —wealthier white residents moving out of the decaying urban core to surrounding suburbs, leaving a higher concentration of low-income minorities in Richmond. Limited access to good public education, a slimming job market in the City of Richmond, and poor transportation to jobs in Richmond's suburbs compound urban poverty Church Hill. This paper suggests possible amendments to zoning regulations in Richmond's most recent downtown master plan in order to stimulate economic growth in the Church Hill community and proposes and explains the need for a regional urban containment policy that would apply to the entire state of Virginia. Urban Containment reigns in urban sprawl and concentrates growth back into urban areas. Urban containment in Richmond and the rest of Virginia would mitigate urban poverty in Church Hill by creating a mix of low- and high-income housing in Richmond's core and by redirecting economic expansion to Richmond, to the benefit of Church Hill and other low-income neighborhoods in Richmond.

## **21. Comprehensive two-dimensional liquid chromatography (LCxLC)**

*Ibrahim Ahmad, Dept. of Chemistry, with Dr. Sarah Rutan, Dept. of Chemistry*

Comprehensive two-dimensional liquid chromatography (LCxLC) systems are used to separate the components of very complex biological samples. Although LCxLC is still in its infancy, it is a rapidly growing field, and there is a strong need for accurately quantifying compounds separated using LCxLC systems. A method for automated peak detection in two-dimensional chromatography was proposed by Peters et-al in 2005. They use statistical algorithms to process the data, and outlined a ground up approach to quantify the two-dimensional peaks. The data is smoothed using the Savitzky-Golay and Durbin Watson functions applied to each 1<sup>st</sup> dimension chromatogram. The peak regions, peak maxima, and peak positions are found using the smoothed data, the first derivative, and second derivative. The 2D peaks are found by merging consecutive 1D peaks following specific criteria. Peters et-al. applied their method to comprehensive two-dimensional gas chromatographic data. Our implementation of the method is applied to LCxLC data sets, and the performance of the algorithm is characterized.

## **22. Why Is It Important to Protect Artifacts on The Moon?**

*Ellen Heberling, Dept. of Anthropology, with Prof. Jessica Gordon, University College*

There has been a recent flare in the interest of the privatization of space travel. For instance, companies like Google and Space Adventures are sending people who pay/have enough money to travel to the Moon. Historic preservationists and archaeologists fear this will negatively affect the artifacts found on the Moon. A number of groups and corporations are challenging the importance of protecting these artifacts. Why protect an American flag when we have millions back in the U.S.? I have been researching to try and answer this question. I have studied two treaties specifically, the Outer Space Treaty and the Moon Agreement. They are both concerned with ownership of the land on the Moon and the legalities surrounding this unprecedented issue. There are many loopholes and debates related to these two treaties and their vague guidelines, and I have been researching to try and understand these. My research also seeks to illuminate the nature of artifact preservation on Earth and how it connects to the preservation of artifacts that are extra-terrestrial in origin.

## **23. Development of coagulopathy after significant haemorrhage secondary to traumatic injury in a swine model**

*Alan R. Ottarson<sup>1,4,5\*</sup>, with Jason C. Newton<sup>3,4,5</sup>, Bruce D. Spiess<sup>3,5</sup>, and Kevin R. Ward<sup>2,3,5</sup>*

Departments of Biology<sup>1</sup>, Emergency Medicine<sup>2</sup>, Biochemistry<sup>3</sup>, and the VCU Coagulation Advancement Laboratory<sup>4</sup> and VCU Reanimation Engineering Science Center<sup>5</sup>, Virginia Commonwealth University, Richmond, Virginia, USA

**Purpose:** Major multisystem traumatic injuries often lead to a condition known as trauma induced coagulopathy (TIC). Prompt detection and reversal of TIC is essential for improved patient outcomes in the emergency department. Currently, the standard assays for diagnosis of coagulation abnormalities are Prothrombin Time (PT), activated Partial Thromboplastin Time (aPTT), and fibrinogen concentration. It is the purpose of this study to identify the usefulness of Thromboelastography (TEG), in conjunction with standard coagulation assays, for early diagnosis and treatment of TIC in a swine model.

**Methods:** Swine were surgically prepared and subjected to a soft tissue injury and long-bone (femur) fracture in order to simulate injuries often found in the field. These subjects were then haemorrhaged until the presence of shock was confirmed. Baseline and end of haemorrhage blood samples were tested for haemostatic function via TEG and Rotational Thromboelastometry (ROTEM), as well as standard PT, aPTT and fibrinogen assays.

**Results:** N = 17, with 14 *complete* sets of data collected, not including ROTEM parameters. TEG clot formation parameters (R and K) displayed a significant decrease from baseline to end of haemorrhage ( $p < 0.05$ ), however, corresponding clot strength characteristics (MA) did not show any significant changes. The sole protein-based assay to show significant changes after haemorrhage was PT, demonstrating the inaccuracy of these assays by themselves in the clinical setting. All blood gas values (pH, pCO<sub>2</sub>, pO<sub>2</sub>, Hgb, Lactate, Glucose) showed significant changes as shock progressed.

**Conclusion:** In a traumatic haemorrhage swine model, TIC can be more quickly and accurately diagnosed with the addition of TEG analysis. Protein-based assays alone do not provide an accurate picture of clotting activity, especially when multiple values are viewed together.

## **24. The Expression of KIF2C During Early Zebrafish Development**

*Rachel Troch, Dept. of Biology, with Dr. Robert Tombes, Dept. of Biology*

Previous research in the Tombes' lab has characterized the role and expression of CaMK-II, also known as the Ca<sup>2+</sup>/calmodulin dependent protein kinase II. Using tandem mass spectrometry, kinesin-13 was identified as a binding partner of CaMK-II. KIF2C, also known as MCAK, is a member of the kinesin-13 family which depolymerizes microtubules. Previous studies have shown that over expression of  $\gamma$  CaMK-II suppresses KIF2C activity in cell culture. In addition, over expression of KIF2C is known to decrease flagella length. In zebrafish embryos, downregulation of CaMK-II causes shortening or loss of cilia in ciliated tissues. In an attempt to examine whether CaMK-II and KIF2C collaborate during ciliogenesis, and to gain a better understanding of KIF2C, many experiments can be performed. In particular, this study will characterize the expression of KIF2C in early zebrafish development using *in situ* hybridization. This technique was previously used in this laboratory to localize CaMK-II (Rothschild, 2006). It is expected that KIF2C expression will appear in ciliated tissue. Expression has been seen in the eye, fin, brain, and kidney. Such findings will help elucidate information on KIF2C's role in cilia formation and in embryonic development.

## **25. The Biomedical Applications of Nanoporous Gold**

*Jay Patel, Dept. of Biology, with Dr. Maryanne Collinson, Dept. of Chemistry*

Nanoporous gold serves as a useful material for the construction of gold electrodes for biomedical applications. In biological fluids, it is necessary that the nanoporous gold electrode resist biofouling, the decrease in the rate at which the exchange of electrons between the electrode and the surrounding solution takes place. Nanoporous gold electrodes, which have pores that range from 10-50 nanometers are made through exposure of 12 karat gold leaf to



nitric acid. The nanoporous gold leaf is captured on a flat gold slide backing; a copper lead is attached along with Teflon tape with a one-eighth inch diameter hole in it, and then wrapped with parafilm. A combination of cyclic voltammetry (CV) and scanning electron microscopy (SEM) were used to determine whether these electrodes were appropriate for use. Successful electrodes were tested, using CV over a period of time, in bovine serum albumin (BSA), porcine plasma, and porcine blood, to determine the extent of biofouling on these electrodes. Over a given time period, CVs for electrodes exposed to all three biological fluids showed minor deviation from the CVs of electrodes not exposed to the biological fluids. These results led to the conclusion that nanoporous gold effectively resists biofouling and allows electrochemistry measurements to be made in such complex solutions. The purpose of constructing nanoporous electrodes is to have a sensor that effectively measures reduction-oxidation potential (open-circuit potential) in a sample of blood as a means to diagnose patient illness. Current and future studies include making a smaller, more practical system that requires a smaller volume of biological fluids to conduct these tests.

## **26. PVC Tygon Tubing – an Unlikely Introduction to Fick’s Second Law of Diffusion**

*Daniel Johnson, Dept. of Chemical Engineering with Dr. Kenneth J. Wynne, Dept. of Chemical and Life Science Engineering*

Dioctyl phthalate (DOP), a plasticizer present in poly (vinyl chloride) (PVC), is used to lower the glass transition temperature,  $T_g$ , and increase flexibility. DOP migrates from Tygon tubing when immersed in hexane, with the extent of migration being time dependent. The kinetics of DOP migration was investigated using attenuated total reflectance infrared spectroscopy (ATR-IR). Analysis of ATR-IR spectra showed a decreasing amount of DOP as immersion time in hexane increased. Solvent assisted diffusion of DOP (SADD) was faster than the back diffusion from the bulk to the near surface. The behavior of DOP migration from Tygon tubing was described by Fick’s second law with a diffusion coefficient of  $2.6 \times 10^{-12} \text{ cm}^2/\text{s}$  using a Ge crystal and  $1.2 \times 10^{-11} \text{ cm}^2/\text{s}$  using a diamond crystal.

## **27. Examining the Current Model of Sober Living Houses**

*Alexis Fergusson, School of Business, with Prof. Jennifer Smith, University College*

This paper examines current models of sober living houses and halfway houses. While they all share the common mission of endeavoring to help the sober addict or alcoholic to maintain sobriety and achieve self-sufficiency, many of these models do little more than provide residents with a few basic restrictions and a place to live alongside other struggling addicts and alcoholics. By failing to engage residents in active involvement in their sobriety and in their growth toward becoming productive individuals within society, many of these efforts do not meet the needs of their residents. Many sources cite the struggle for addicts and alcoholics to gain and maintain sobriety. In the article, *An empowerment process: successful recovery from alcohol dependence*, Fen Fang Horng, et al., explain that “the abstinence-from-alcohol process is, reportedly, full of pain and contradiction [to] for alcoholic individuals” (924). The period in early sobriety during which addicts and alcoholics live in these houses is a crucial time, as it can spell the difference between a relapse and return to their previous life or the first steps in the beginning of their new sober life. By understanding this demographic’s complex set of needs and then grouping them into four main categories – relapse prevention during early

sobriety, peer support and social skills, vocational skills, and long-term sobriety maintenance and life skills - a new sober living house model can be created based on addressing these needs through an active cooperation between the house and its residents. The new model will consist of a sober living house combined with a gardening business, and will include mandatory, regular meditation practices and daily focus groups. The proposed model will guide residents toward responsibility and growth opportunities and thus more successfully prepare them for reintegration with their families and communities.

## **28. Richmond's Rain People**

*Christine Stoddard, Depts. of Film and English, with Prof. Jeffrey South, School of Mass Communications*

I am proposing an interdisciplinary writing and photography project called "Richmond's Rain People." I would like to create a 24-page print photo comic and 1800-word, non-fiction essay that focuses on the folklore of the Mixteco community living in Richmond, VA. I would write the essay and conduct my research in collaboration with Zack Budryk, a Mass Comm (Print Journalism) student. The Mixtecos are an indigenous group numbering over 1,000 people in Richmond alone. They have emigrated from Mexico to Richmond since 1999, occupying a spattering of mobile homes off of Jefferson Davis Highway in Southside, specifically Manchester. According to a story that ran in a local Richmond publication back in August 2011, Mixtecos experience ostracism from both Anglos and Hispanics. Many Mixtecos do not speak fluent English or Spanish, therefore limiting their job and social opportunities in Central Virginia. Their culture also cannot be defined as Anglo or Hispanic; instead it is distinctly their own mix of indigenous Mexican traditions and American immigrant survival tactics. I would spend time observing, interviewing, and otherwise interacting with Mixtecos to get a sense of their folklore and lifestyle. After receiving signed release forms from all willing participants, I would digitally photograph Mixtecos simply doing what they do everyday as well as on special occasions and holidays. I would also take notes and audio recordings during conversations with Mixtecos about their traditions and folklore to use for inspiration in writing my photo comic, ensuring that they have a chance to tell their story in their own way. The photo comic would show the Mixteco's history with Richmond, their folklore, and their lifestyle, but also how they interact with the rest of Richmond. (They are, after all, Richmonders just like the rest of us.) I would put the comic up on my online magazine, *QuailBellMagazine.com*. Additionally, I would make the photo comic available for download as a PDF. In doing my research, I would want to gain a sense of the Richmond Mixteco narrative, as well as their conflicts in living as immigrants. I am, however, particularly interested in their folklore.

## **29. Binge drinking on a college campus: User characteristics and beliefs**

*Brenna Posner, Dept. of Psychology with Caroline Cobb, MS, Dept. of Psychology*

Binge drinking is responsible for over half of an estimated 80,000 average annual deaths resulting from excessive drinking in the United States. Binge drinking is also associated with many other health risk behaviors including using illicit drugs, smoking cigarettes or cigars, attempting suicide and being a victim of dating violence. This indicates the importance of surveying binge drinking behaviors on college campuses. In 2011, an online survey of 593 students at Virginia Commonwealth University (VCU; 53.8% ≤ age 19, 57.8% women, 46.7% non-white) revealed 83% past 30-day drinking and among those who drank in the past 30

days, 50% reported typically binge drinking when they consumed alcohol (4 or more drinks for women; 5 or more for men). Compared to non-binge drinkers, binge drinkers have been drinking for more months ( $p<0.01$ ) and drink more days per month ( $p<0.001$ ). More binge drinkers reported alcohol as having high social acceptability ( $p<0.01$ ) compared to non-binge drinkers. Binge drinkers were significantly more likely than non-binge drinkers ( $p<0.001$ ) to have used alcohol in combination with energy drinks in the past 30 days. Binge drinkers and non-binge drinkers also differed in their perceptions of the addictiveness of alcohol when drinking by oneself ( $p<0.01$ ) but not when drinking socially ( $p=0.264$ ). These results indicate that binge drinkers display heavier drinking characteristics compared to non-binge drinkers which may make them more likely to engage in other health risk behaviors. These results suggest that prevention and intervention programs should focus on challenging perceptions of social norms concerning alcohol among binge drinkers. Perhaps if these perceptions of social acceptability are reversed, binge drinking among college students will be reduced.

### **30. Characterization of individual and total subunit expression of cytomegalovirus endocytic entry mediators.**

*Mary Gallagher, UROP Summer Fellow, Dept. of Microbiology and Immunology, with Dr. Michael McVoy, Dept. of Pediatrics, Microbiology and Immunology*

While it is known that the pentameric complex gH/gL/UL128-131 is required for the endocytic entry of cytomegalovirus (CMV) into epithelial cells, little is known about the importance of the individual subunits in comparison to the total complex. The purpose of this study was to detect antibodies to gH/gL/128-131 expressed individually or as a complete complex. Plasmid DNA for gH/gL/UL128-131 was transformed and purified, and DNA from each individual subunit and all subunits was transfected into 293T cells and lysed 48 hours post-transfection. Western blots were performed using the 293T lysates and antibodies from both human sera and rabbit sera. Expression of the individual subunit proteins versus expression of the total complex with different antibodies was analyzed. Our findings suggest that expression of UL130 and UL131 in the presence of the other proteins did not alter the processing of the proteins or the expression level. Expressing gL in the presence of the other proteins altered processing but not the expression level. We were not able to adequately express UL128 or gH. In the future we hope to successfully express gH by transfecting it with gL, as the findings suggest that gH degrades in processing without gL.

### **31. Genomic Analysis of Novel Mycobacteriophage Redno2: A Cluster J Story**

*Sahil Aggarwal<sup>1</sup>, Manal Alessa<sup>1</sup>, Jasmine Allen<sup>1</sup>, **Azhar Bashir<sup>1</sup>**, Cailin Becker<sup>1</sup>, Jonathan Farag<sup>1</sup>, Mandi Feinberg<sup>1</sup>, Merit George<sup>1</sup>, Sindhu Karnam<sup>1</sup>, Rone Parent<sup>1</sup>, Shahroze Abbas<sup>1</sup>, Kristen Wade<sup>1</sup>, Kaleigh Hedges<sup>1</sup>, Abdallah Abdel Maksoud<sup>1</sup>, Allison Johnson<sup>2</sup>.*

*<sup>1</sup>Students in BNFO/LFSC 252: Phage Discovery II. <sup>2</sup>Center for the Study of Biological Complexity, Virginia Commonwealth University, Richmond, VA.*

Mycobacteriophages are viruses that infect specific mycobacteria hosts, including those that cause tuberculosis and leprosy. Phages have the ability to lyse infected host bacteria, allowing them to be a potential alternative therapy for antibiotic resistant bacterial infections. The Howard Hughes Medical Institute sponsors Phage Discovery Lab at VCU, which gives students

the opportunity to isolate and characterize novel mycobacteriophages. During the Fall 2011 semester, the only phage isolated through direct plating was mycobacteriophage Redno2 (see poster #\_). The genomic DNA of Redno2 was sequenced and annotated to cite putative genes and document their potential functions. BLAST sequence alignment confirmed Redno2 as most closely related to J cluster phages, most similar to the mycobacteriophage Thibault. The genome is 108,297 base pairs in length with a 60.9% GC content. There are an estimated 243 open reading frames (ORFs) based on GeneMark and Glimmer predictions in DNA Master. Additionally, 1 tRNA was predicted using ARAGORN. Comparative genomics was used to further analyze the genomic features/products of mycobacteriophage Redno2.

### **32. Isolation and Investigation of Novel Mycobacteriophages from VCU Phage Hunting Laboratory**

*Sahil Aggarwal<sup>1</sup>, Manal Alessa<sup>1</sup>, Jasmine Allen<sup>1</sup>, Azhar Bashir<sup>1</sup>, Cailin Becker<sup>1</sup>, Carine Binyam<sup>1</sup>, Jonathan Farag<sup>1</sup>, Mandi Feinberg<sup>1</sup>, Merit George<sup>1</sup>, Matthew Graham<sup>1</sup>, **Sindhu Karnam<sup>1</sup>**, Yanilda Martinez-Vega<sup>1</sup>, Rone Parent<sup>1</sup>, Gil Rubia<sup>1</sup>, Manon Shankle<sup>1</sup>, Sarah Williamson<sup>2</sup>, Danielle Renner<sup>2</sup>, Rachael Walstead<sup>2</sup>, Allison Johnson<sup>3</sup>*

*<sup>1</sup>Students and <sup>2</sup>Preceptors in BNFO/LFSC 251: Phage Discovery I. <sup>3</sup>Center for the Study of Biological Complexity, Virginia Commonwealth University, Richmond, VA.*

As part of a nationwide phage genomics collaboration sponsored by the Howard Hughes Medical Institute, fifteen students in the Fall 2011 VCU Phage Discovery Lab collected various soil samples and purified unique mycobacteriophages. *Mycobacterium smegmatis*, a non-pathogenic relative of bacteria that causes tuberculosis and leprosy, was used as a model host for this investigation. Fifteen novel mycobacteriophages were isolated from environmental soil samples collected from across Virginia and Maryland. Lysogen formation and immunity testing were performed to identify the putative life cycle (lytic or temperate) of the phages, and to predict potentially related phages. Transmission Electron Microscopy (TEM) was then used to visualize phage morphology. Finally, students purified the phage genomic DNA and performed comparative analysis with other phages by using restriction digest patterns. The genomic DNA of phages Redno2, Saal, and NelitzaMV was sequenced for genome annotation and comparison (see poster #\_). Analysis of mycobacteriophage genomes can help scientists study their evolutionary history, diversity, and gene products.

### **33. Islamophobia in the United States**

*Adam Dourafei, School of World Studies, Dept. of Religious Studies*

Introduction: Since the terrorist attacks of September 11<sup>th</sup>, 2001, the United States has struggled to face numerous challenges, both foreign and domestic. During the past decade, a steady growth in anti-Islamic sentiment and contempt has swept the nation taking a devastating toll on the civil rights of countless Muslim Americans. Islamophobia is defined as a prejudice against, hatred, or irrational fear of Islam or Muslims. The term dates back to the 1980's but has become much more commonly used since 9/11. The topic of Islam has become a political tool for right wing conservatives and media pundits who seek to

inspire fear in the American public for personal/political gains. Thanks to tireless and often zealous determination to broaden anti-Muslim rhetoric, a staggering forty nine percent of Americans view Islam unfavorably, according to a recent Washington Post poll.

**Purpose/Goal of Study:** My goal in researching Islamophobia in the United States is to demonstrate the growing need for education and cross-cultural dialogue to curb the growth of dangerous intolerant beliefs. This “metastasizing social cancer” (Esposito) must be reversed in order to avoid such devastating incidents as the July 2011 Norway massacre. Anders Behring Breivik committed the shooting, a Norwegian man whose actions brought attention to his 1500 page manifesto that details the growing Islamic xenophobia spreading throughout Europe.

**Methods/Resources Used:** For my research I used a variety of online resources, including news articles and scholarly research. Research for this topic mainly focused on recent incidents involving Islamophobia, such as the “Ground Zero Mosque” and the events surrounding the Islamic Center of Murfreesboro, Tennessee.

**Significance of Research:** As the United States struggles to reconcile the many faiths and traditions found in this country, strong efforts must be made to combat the spread and support for anti-Islamic beliefs. During this period of economic uncertainty and international strife, there is absolutely no time to waste creating hateful divisions in our society.

### **34. Terror Management and Forgiveness in Close Relationships**

*Jacob M. Waymire<sup>1</sup>, Chelsea A. Reid<sup>1</sup>, Daryl R. Van Tongeren<sup>1</sup>, Dept. of Psychology, with Jeffrey D. Green<sup>1</sup>, Dept. of Social Psychology, Everett L. Worthington, Jr.<sup>1</sup> and Don E. Davis<sup>2</sup>*

*Virginia Commonwealth University<sup>1</sup>, Georgia State University<sup>2</sup>*

The present research extends terror management theory (TMT) to the investigation of forgiveness in close relationships. Undergraduate students ( $N = 69$ ; 26 females, 38 males, 5 not reported) in an introductory psychology course at a large, public, mid-Atlantic university participated for partial course credit. Participants were randomly selected to write about their own death or intense physical pain prime then asked to recall a transgression from a close or distant other. Finally, participants completed a measure to assess unforgiveness motivations. In this experiment, mortality salience (MS) elicited more unforgiveness toward distant, dissimilar offenders, whereas it elicited somewhat less unforgiveness toward close, similar offenders. Individuals may be less forgiving toward offenders with whom they are not close or may be dissimilar, but they may be more forgiving to those offenders with whom they are close and similar in order to defuse the reminders of one's own death. This finding adds to some initial theorizing suggesting more positive responses to mortality salience (Martin et al., 2004).

### **35. Primary Cilia: Moving towards a better understanding of lung cancer**

*Dilawar S. Khokhar, Dept. of Biomedical Engineering with mentors: Sagar Patel (Graduate Student, Department of Biomedical Engineering) and Dr. Rebecca Heise (Assistant Professor, Department of Biomedical Engineering)*

*Source of Funding for Research: Jeffress Memorial Trust and American Cancer Society Institutional Research Grant through the Massey Cancer Center.*

Lung cancer is one of the most deadly forms of cancer. Each year it claims more lives than breast, colon, and prostate cancer combined. There are two general forms of lung cancer, which are non-small cell lung cancer and small cell lung cancer. The most common form of lung cancer is non-small cell lung cancer. Cancer cells in the lung are subjected to a variety of mechanical forces, some of which are part of the normal lung environment and others associated with the pathology of lung cancer. Mechanical forces play a vital role in the development and growth of a cell and recent studies have shown that the mechanical environment of a cancerous tumor may influence tumor development and metastasis. One mechanism by which a cell may interact with its mechanical environment is the primary cilia. Primary cilia are non-motile, “antenna like” cellular structures that consist of microtubules. We hypothesized that the formation of primary cilia are part of the response of lung cancer cells to mechanical stimuli and play a fundamental role in the 3 hallmarks of tumor progression: proliferation, migration and epithelial mesenchymal-transition. To test this hypothesis two commercially available lung adenocarcinoma cell lines, A549 and SKLU1 (ATCC), were tested in vitro. A549 or SK LU1 cells were grown on silicone bottom Flexcell plates and exposed to cyclic stretch levels of 15% change in surface area for various amounts of time (1 – 4 days). Cells from both cell lines were grown with as well as without the inhibition of primary cilia. Small Interfering RNA (siRNA) was used in some experiments (A549) to silence the gene IFT88, primarily responsible for the formation of primary cilia. An MTT assay was used for quantification of proliferation and survival. Protein and RNA expression was analyzed for key indicators of the epithelial or mesenchymal phenotype. Scratch wound healing assays were also performed to quantify cell migration in the presence and absence of stretch as well as the presence and absence of primary cilia. The results of these experiments indicate that A549 cells form primary cilia, that primary cilia enhance the survival of A549 cells, and that they strongly influence the rate at which A549 cells migrate. Preliminary findings suggest that SK LU1 cells form primary cilia as a response to mechanical stimulation and that these primary cilia, like those present in A549 cells, play a crucial role in cell viability and migration. Additional MTT assays, scratch wound healing assays, and treatment with siRNA will be performed on the SK LU1 cells to acquire more data on primary cilia in this cell line. The data obtained on primary cilia in both the A549 and SK LU1 cell lines supports our initial hypothesis of primary cilia being formed by lung cancer cells in response to mechanical stimuli as well as playing a fundamental role in the 3 hallmarks of tumor progression: proliferation, migration and epithelial mesenchymal-transition.

### **36. Marijuana and Binge Eating**

*Tara Kelley<sup>1</sup>, Sweta Shah<sup>1</sup>, Natalie Petrizza<sup>2</sup>, and Rajbir Chaggar<sup>1</sup> with Dr. Danielle Dick<sup>3</sup> and Dr. Stephanie Davenport<sup>1</sup>.*

<sup>1</sup> VCU Dept. of Psychology, VCU Dept. of Anthropology, Department of Psychiatry, Psychology and Human and Molecular Genetics<sup>3</sup>

Marijuana is one of today’s most widely and frequently used illegal drugs in the United States. Although marijuana is commonly associated with a short period of insatiable hunger, there is little to no research available on the relationship between these two variables. This research study is assessing the correlation between marijuana use and binge eating, also controlling for

covariates such as age and gender. This study, which is part of the Spit for Science project, sampled 3,623 college freshmen age eighteen and older at Virginia Commonwealth University. As part of this project, participants answered questions about their marijuana use and binge eating. Spearman's Correlational Coefficient showed a weak positive correlation between ( $r=.066$ ,  $p < .05$ ) between cannabis use and binge eating episodes. We also found a weak positive correlation between ( $r=.069$ ,  $p < .05$ ) sex and cannabis use. Our findings show there is very little correlation between sex or binge eating and cannabis use.

### **37. QUANTIFICATION OF MARKERS OF GENOMIC INSTABILITY IN HUMAN PLURIPOTENT STEM CELLS BETWEEN PASSAGE METHODS**

*Virgie Fields, MARC Student Researcher, SRO Leadership, Dept. of Biomedical Engineering, with Marion Riggs and Dr. Raj Rao, Dept. of Chemical and Life Science Engineering.*

Genetic abnormalities in undifferentiated human pluripotent stem (hPS) cells have been reported in many studies and continue to be a substantial challenge for the stable propagation of therapeutically safe cells in necessary quantities. Prior work from our lab has suggested that enzymatic passaging may induce chromosomal aberrations, whereas manual dissection may promote maintenance of a normal karyotype. Standard methods for measuring genomic instability include conventional G-band karyotyping and more recently developed high throughput platforms, such as array comparative genomic hybridization and single nucleotide polymorphism arrays. However, each of these lacks sensitivity to determine the number of mutant cells at passage level resolution. Abnormal segregation of chromosomes at mitosis is a major contributor of aneuploidy, and centrosomal amplification is a well-established cause of genomic instability. Thus, we sought to quantify the number of centrosomes per cell to monitor the level of genomic instability between passage methods and varying culture conditions. Our first goal was to establish the baseline level of centrosomal anomalies for each cell. Then, we wanted to determine which passage methods and culture conditions affect centrosome number. Results from this investigation suggested that some hPS cells may be more prone to mitotic instability than others and that in at least one hPS cell line, enzymatic passaging may induce mutational pressure that can be detected by centrosomal errors. Future work will focus on improved methods for detecting centrosomal amplification that reduces labor intensity, increases sensitivity, and can be applied to any harvested hPS cell population.

### **38. Longevity, Trust, and Communication: Are "Committed" Relationships safe from STIs?**

*Marie Vergamini, with Sona Kaur, Alison Burgujian, Dept. of Psychology, with Dr. Natalie Shook and Kristina Hood, Dept. of Psychology*

Research suggests that couples in long-term committed relationships are less likely to continue using condoms (Macaluso et al., 2000). Consistent condom use decreases as the commitment status becomes more defined, stable, and intimate. Santelli and others (1996) determined that factors, such as cohabitation and partner support, could be used as predictors for condom use because partners instilled trust in each other to be STI and HIV free. The current study sought to determine how longevity in close, romantic relationships affected condom use among college students in dating relationships. We also looked at the couple's perception of each other's attitudes towards condoms and whether the couples were having discussions about their sexual history. Eighty-nine participants completed a battery of questions about their current dating relationship, condom use, and sexual experiences. Results showed that couples in long-



term committed relationships were less likely to continue using condoms. This behavioral trend was affected by age, whether the couples lived together, and students' academic rank. Although condom use decreased as the couple stayed together longer, couples did indicate using other forms of contraception to prevent pregnancy. Results also showed that though partners trust each other, there is a lack of communication about getting tested and whether either partner had STIs from previous relationships. Overall, although longevity produces trust to decrease condom use, not communicating or defining monogamous relationships can still put a couple at risk of STI and HIV transmission.

### **39. The Effects of Self-Esteem & Beliefs About Violence on Youth's Aggression & Delinquency**

*Farren Larson, Eva Passalacqua, & Chelsea Wilkinson, Dept. of Psychology with Dr. Wendy Kleiwer, Dept. of Psychology, Clark-Hill Institute for Positive Youth Development Prevention Research Lab*

It has been well documented that levels of self-esteem impact the frequency of problem behaviors in adolescents. However, there is no consensus on the nature of this relationship. Often, it is found that low levels of self-esteem lead to higher levels of aggression and delinquent behaviors. Yet there is also evidence that a child with extremely high self-esteem may feel stronger desires to be assertive, thus engaging in more aggressive or delinquent behaviors. Self-esteem paired with beliefs about the use of violence could possibly explain another underlying factor in how problem behaviors manifest in adolescence. Through the use of regression analyses, and using data from Dr. Kliever's longitudinal study Project COPE, this study aims to confirm that high self-esteem increases the frequency of problem behaviors, and that the child's beliefs about the use of violence can also contribute to this higher frequency.

### **40. Body Awareness and Emotion Facilitation: Revisiting the Facial Feedback Hypothesis**

*Laura Peters, Dept. of Psychology, UROP Summer Fellow 2011, with Dr. Vivian Dzokoto, Dept. of African American Studies*

According to Adelman and Zajonc's (1989) Facial Feedback Hypothesis, muscular activity involved in facial expressions influences the experience of emotions. For example, when an individual's facial muscles are consistent with the muscle configuration used in the smiling, he or she is more likely to be happier than when the muscle configuration is consistent with frowning, where they are more likely to feel sadness. To date, support for this theory has primarily come from western cultural settings. The aim of the current study is to test this hypothesis in a West African setting, and explore whether Body Awareness - the degree of awareness of internal and external sensations (Anderson, 2006) - impacts self reports of emotions. A sample of 178 college students from Ghana, West Africa completed a series of questionnaires and rated a cartoon while holding a pen with their teeth, lips or hand to induce either a smile or a frown, or act as a control during the summer of 2011. Results showed a significant difference exists between those who held the pen in their mouth and those who did not when rating the cartoon. Participants who held the pen with their teeth rated the cartoon both funnier and more amusing than participants who held the pen with their lips. The results provide support for the Facial Feedback Hypothesis. Also, results showed that participants with a high level of inner body awareness had more intense ratings of the funniness of the cartoon than participants with a low level of inner body awareness, which confirms our hypothesis that those with a higher level of body awareness would have more intense ratings of the cartoon than those with a low level of body awareness.

#### **41. An A-Kinase Anchoring Protein, AKAP200, influences ethanol sensitivity in *Drosophila***

Scarlett Coffman, Dept. of Biology, with Dr. Mike Grotewiel, Department of Human and Molecular Genetics

Our laboratory and others at VCU recently showed that mutations in *Chloride Intracellular Channel (Clic)* genes alter ethanol sensitivity in fruit flies (*Drosophila melanogaster*), worms (*C. elegans*) and mice (Bhandari *et al.*, 2012). Clic proteins have several possible functions including the regulation of A-kinase anchoring proteins (AKAPs) (Shanks *et al.*, 2002). Together, these published studies support the hypothesis that AKAP proteins might regulate ethanol sensitivity as do Clic proteins. To address this hypothesis, we are performing molecular, genetic and behavioral studies in strains of *Drosophila* harboring several independent alleles of an AKAP gene, *Akap200*. After confirming the insertion sites of multiple transposon insertions in *Akap200*, we found that expression of this gene was reduced in flies homozygous for the transposons *EY012242*, *d01782*, *d03938*, and *c01373* and in flies heterozygous for the transposons *EY012242*, *EY04645* and *d07255*. Additionally, we found that sensitivity to the sedating effects of ethanol was blunted in homozygous *EY012242*, *d01782*, *d03938*, and *c01373* mutants. These data indicate that partial loss of function in *Akap200* decreases ethanol sensitivity as do mutations in *Clic*. Furthermore, these studies are consistent with a model in which *Clic* and *Akap200* function in concert to influence ethanol sensitivity in flies. Ongoing studies will determine whether the altered ethanol sensitivity in *Akap200* mutants is associated with changes in ethanol uptake or metabolism and whether specific transcripts from the *Akap200* locus are important for changes in ethanol-related behavior. Future studies will investigate whether *Akap200* orthologues in mice and humans influence the behavioral responses of ethanol. Our studies raise the possibility that AKAP genes might be important genetic determinants of alcohol abuse or possible be novel therapeutic targets suitable for treatment of alcoholism.

#### **42. Synergistic effect on Binary Solvent mixtures**

Tran Ngo, Dept. of Chemistry, with Dr. Sally Hunnicutt, Dept. of Chemistry

The synergistic effect of binary solvent mixtures on the photochromism of a spiropyran is investigated. When spiropyran is irradiated, its structure changes from trans to cis. The spiropyran is thermally isomerized back to trans from cis, and the rates of cis-trans isomerization in three solvent mixtures (ethanol - 2-propanol, acetonitrile- ethanol and acetonitrile- 2 propanol) are measured. In the absence of synergism, it is expected that the rate constant would be the average of the constants in the two pure solvents. With synergism, the mixtures are expected to have rates that differ from the average values. We observed synergism in mixtures of ethanol – acetonitrile and 2-propanol –acetonitrile but not mixtures of 2-propanol –acetonitrile. These results will be explained based on the chemical structures of the solvents and the spiropyran. Even though synergism is well-known in biology, not many chemistry experiments explore synergism. Thus, this experiment will be developed for chemistry coursework.

#### **43. Combination therapy with MiaPaca, a Pancreatic carcinoma line**

*Nisan Hubbard, MARC Student Researcher, SRO President, Dept. of Biology with Hossein Hamed and Dr. Paul Dent, Dept. of Biochemistry and Molecular Biology*

Cancerous cells are characterized mainly by uncontrollable cell growth and resistance to cellular apoptosis. These cells also alter certain pathways in order to maintain immortality. These pathways include the MAPK/ERK pathway, which promotes cellular proliferation, and the BCL pathway which promotes pro-survival proteins ensuring maintenance of the mitochondrial membrane. Sorafenib, TRAIL, and Vorinostat are drugs used to manipulate the pathways responsible for apoptosis by either inhibiting or promoting processes responsible for the induction of cell death. Sorafenib, a tyrosine inhibitor, acts to target the RAF/MEK/ERK pathway which is involved in cell proliferation, cell cycle control, and apoptosis. TNF-related apoptosis inducing ligand (TRAIL) uses the ligand to bind to the death receptors of a cell (DR4 and DR5) to induce the caspase cascade (Caspase 8/Caspase 3/Caspase 6/Caspase 7) that causes apoptosis, while Vorinostat is a histone deacetylase (HDAC) inhibitor that allows acetyl groups to bind to DNA, thus leading to transcription of death substrates needed for apoptosis. To see how these drugs affect these cells, we utilized Trypan Blue assays and Western blot techniques to analyze cell viability and protein alterations within the cells. It was found that combinations of the drugs used, instead of single agents, will induce more cell death. This leads to the conclusion that from these preliminary results that combination therapy is a viable and effective way for the treatment of cancer cells.

#### **44. Sublethal pathology and apoptotic death induced by HIV-1<sub>SF162</sub> and morphine in cultured striatal neurons.**

*Brandon Layne, Dept. of Biomedical Engineering, with Dr. Pamela Knapp, Dept. of Neurobiology*

HIV-infected microglia possess the glycoprotein 120 which disrupts the chemical processes of neurons; chief among these processes is the ability for stem cells to differentiate into new neurons, potentially leading victims in a persistent vegetative state through lack of memory functions. A test was done to verify if co-exposure to opium from morphine enhanced the lethal effects of HIV-1 Tat on neurons. By injecting varying amounts of morphine into cultured striatal neurons in vitro over the time span seventy-two hours with analysis taken every twenty-four hours with computer-assisted live digital imaging. Neurotoxicity was measured by taking data from: a) the percentage of apoptotic marker + neurons; b) the % neuron death in time-lapse; c) MTT analysis ( $A_{576}$ ); and d) reduction in neuritic arborization using the Sholl analysis technique. There was an increase in neuron death over a range of p24 levels ( $\leq 500$  pg/ml) by all measures. Neurons infected with HIV showed a reduction in primary processes and in the complexity of dendritic fields/arborization. Most significant of all, the HIV-mediated neurite loss was reversible up to 12 h of exposure at p24 = 25 pg/ml.

#### **45. Kinetic Hydrogen Isotope Effect**

*Kevin White, Dept. of Chemistry, with Dr. Sally Hunnicutt, Dept. of Chemistry*

We will present a study on the kinetic effects of an isotope on the reaction rate in order to understand the reaction mechanism. The results will show how much the activation energy of a reaction depends on the atomic mass of the reactants. The reaction studied is the corrosion of magnesium metal by hydrochloric acid. The rate was measured by the pressure difference caused by hydrogen gas produced in the reaction. To probe the kinetic isotope effect, deuterium (atomic mass 2 amu) is substituted for hydrogen (atomic 1 amu). Preliminary results show the  $k_H/k_D$  equals  $2.68 \pm 0.04$  suggesting that hydrogen plays a direct role in the rate limiting step of this reaction. The activation energies of the reaction will be reported. These results will be compared to calculated values for the activation energy based on the harmonic oscillator model.

#### **46. Analysis of Outcomes in a Large General Education Science Class**

*Christina Beeman, Dept. of Mathematical Sciences, with Dr. Sally Hunnicutt, Dept. of Chemistry*

College students are required to take a number of general education classes during their college career. This study examined students' performance in a general education science class to determine what factors are helpful in predicting success in the course, i.e. success on quizzes and final examinations. Four primary factors were analyzed: engaged attendance, homework scores, GPA, and a student's major. Preliminary analysis showed that homework scores, GPA, and the student's major were useful predictors of the final exam grade. GPA proved to be the most powerful predictive variable. Attendance was not found to be useful in predicting quiz or exam grades on its own; however, analysis showed a combination of engaged attendance and strong homework performance to be more beneficial to students with low GPAs. These results appear to be supported by preliminary factor analysis. We will also report the results of tracking student attendance and homework performance through the semester and how this affects the student's success in the course.

#### **47. Mnemonic Neglect and Individual Difference**

*JK Stringer, Dept. of Psychology, with Anthony Coy and Dr. Jeffrey Green, Dept. of Psychology*

Individuals process large quantities of both self- and other-related information on a daily basis and this information may be both positive and negative. The mnemonic neglect model (Green, Pinter, & Sedikides, 2005) proposes that individuals are less likely to process negative self-relevant information that could be threatening to central aspects of their self-concept. This study extends the past research by assessing personality factors that contribute to the processing or neglect of self-relevant information. Participants completed an online survey in which they were asked to recall behaviors about either themselves or another person "Chris." Three predictions were made: 1) individuals exhibiting high levels of narcissism would recall fewer negative central behaviors about themselves but not Chris; 2) individuals exhibiting high levels of self-compassion would recall greater numbers of negative central behaviors about themselves but not Chris and; 3) high levels of self-esteem would be associated with the recall of fewer negative central behaviors about themselves but not Chris. Results showed that highly narcissistic individuals processed fewer negative central behaviors and that highly self-compassionate individuals recalled more negative central behaviors, but only when these behaviors referred to the self. These results indicate greater acceptance of negative feedback in self-compassionate individuals and a similar lack of acceptance in highly narcissistic individuals.

#### **48. Electronic Garbage**

*Simone Biasuzzi, Depts. of International Relations and French, with Prof. Thaddeus Fortney, University College*

There are a multitude of electronic products that have been discarded and are converted into electronic waste, or e-waste. The areas highlighted in this paper look at what happens to e-waste in the recycling stage, what impact current policies have on guarding ewaste, and where lies the responsibility of the issue. The majority of e-waste is shipped to electronic waste towns, or e-waste towns, in poor areas of China, Africa, and India that establish e-waste recycling workshops as a business. E-waste exportation is a problem because recycling workers are exposed to hazardous conditions and toxic fumes without safety measures set in the countries where the workshops are established. Other problems concerning e-waste that require attention are: the substances used in the production of electrical products and the rate at which they become obsolete, the lack of toxicology and environmental studies in the subject, the necessity of more reliable testing of replacement metal components, acting inefficient polices and the lack of changes in policies to guard the increasing quantity of electronics and electronic waste, as well as improving risk management in recycling systems. Research acknowledges that change is imperative because the hazardous compounds in e-waste cause toxic conditions in recycling areas. The research found within this paper concludes that the current inefficient methods are causing detrimental health effects to inhabitants in e-waste towns. With that, I have found that global policy initiatives are crucial to reduce negatives effects of e-waste recycling and implement progressive change.

#### **49. Examining Youths' World Schema as a Mediator between Family Expressiveness and Child Anxiety Levels**

*Katherine Miller, Kendall Pettaway, Mohsin Ali, Dept. of Psychology with Dr. Wendy Kliewer, Department of Psychology*

Research suggests that families characterized by more positive emotion expressiveness and encouraging parenting styles have youth with lower reported anxiety symptoms. However, little research has examined the processes by which family emotional expressivity leads to lower anxiety levels. This study will add to that literature in examining youth's world schema as a mediator of the relationship between parental emotion expression and adolescent reported anxiety. Participants were drawn from Project COPE, a four-year longitudinal study of risk and protective factors for exposure to community violence and substance use. This sample consisted of primarily urban African American youth and their female caregivers within high violence neighborhoods in Richmond, VA, interviewed annually for up to four years. At the first wave youth participants were either in the 5<sup>th</sup> grade or the 8<sup>th</sup> grade. For this study we looked at a 266 families who participated in the first three waves of data. Preliminary findings suggest that youth world schema is a partial mediator of the link between family emotional expression and youth reported anxiety. The implications for these findings in the prevention and treatment of youth anxiety will be discussed.

## **50. Block Scheduling versus Traditional Scheduling: How does it affect education?**

*Kakim Fung, Depts. of Computer Science and Mathematics, with Prof. Tara Bray, University College*

Often times, a school can be operating on a schedule that may be non-optimum for its students. 4x4 block scheduling is a system where students take 4 courses every semester for 90 minutes each. A/B block scheduling is a similar system, but students take the courses every other day rather than for one semester. Traditional scheduling is where students take their courses everyday for about 50 minutes for each course. Each of these systems have their benefits and flaws, the problem is, how do these systems affect the environment that students learn in. Specifically, this research project focused on analyzing the effects of these scheduling systems on the preparation of students for college; such programs include Advanced Placement and Dual Enrollment Programs.

## **51. Who's Talking About Safe Sex?**

*Alison Burgujian, Sona Kaur, Marie Vergamini, Dept. of Psychology, with Dr. Natalie Shook, Kristina Hood, Dept. of Social Psychology*

Previous research has shown a link between sexual communication with partners and safer sexual practices, including condom use (Sheeran et al., 1999). Furthermore, Zukoski et al. (2009) argued that condom use is an “interdependent behavior”, meaning condom use is generally a decision made jointly by both partners. The current study sought to determine whether communication about safe sex differed between racial groups among college students ( $N=89$ ) and if those disparities led to a difference in attitudes toward condom use. The average age of the participants was 20.5 years ( $SD = 3.5$  years) with the group being 20% African American, 57% Caucasian, and 22% ‘other’. African American students tended to communicate more with their sexual partners about condom use, had less animosity towards using condoms, and discussed preventing STDs and pregnancy more than their Caucasian counterparts. When the power of decision making in the relationship is taken into consideration, African Americans tended to have more traditional values than Caucasians in regards to sex. For example, African Americans were more likely to report that premarital sex was against their religious beliefs, that sexual behavior prohibits the growth of true love, and that premarital sex is only acceptable when in a committed relationship. No significant differences were found for the group ‘other’ (which consisted of Latino and Asian participants) in these analyses. Future studies should include a more racially diverse population in order to explore cultural differences in sexual attitudes and communication. Taking participants from within the community rather than solely from a college population would provide a greater range in ages which would allow for different levels of sexual experience and developed attitudes.

## **52. Queer sexuality in the Harlem Renaissance**

*A. Dae Newman, Dept. of English with Prof. Cristina Stanciu, Dept. of English*

The Harlem Renaissance is highly regarded as a pivotal period for African American literature and culture in the United States. What receives less attention, however, is the fact that the Harlem Renaissance also contributes to intersectionality between African American literature and gay, lesbian, and bisexual literature. Works such as Claude McKay's *Home to Harlem* portray sexuality and sexual politics as they existed in 1920s Harlem, including the presence of queer sexuality. The question I seek to answer is how African American and queer identities come together and influence each other in McKay's life and work, as well as in other works of literature or music from the Harlem Renaissance, and how these works portray queer sexuality in the context of 1920s and 1930s Harlem.

## **53. The Significance of Nucleus Accumbens Core Astrocytes in Drug Seeking Behavior**

*Wahab Syed, Depts. of Mathematical Sciences and Biology, with Dr. M. Scott Bowers, Dept. of Psychiatry, Pharmacology, and Neuroscience*

Addiction is a growing problem among both adolescent and adult age groups. According to the National Institutes for Drug Abuse, approximately 40-60% of people medically treated for addiction eventually relapse. The desire for alcohol increases during abstinence, which can lead to relapse and induce long-lasting changes in neurochemistry and brain circuitry. Accordingly, much research has focused on the neuronal basis of addiction and relapse. This neurocentric focus has largely ignored the fact that astrocytes, non-neuronal brain cells, outnumber neurons 10:1 in humans. Consequently, little is known about the role that astrocytes may play in drug and alcohol addiction. This neuronal bias is rooted in the historical understanding of astrocytes as passive cells that do not propagate classic action potentials or release neurotransmitters. It is now known that astrocytes actively respond to and shape neuronal communication, in part, by neurotransmitter release. Intriguingly, alcohol-mediated release of the neurotransmitter dopamine within the Nucleus Accumbens Core brain region (NAcore) is mediated by astrocytic release of taurine. Dopamine release is critically important in reward and alcohol-seeking behavior. Since NAcore astrocytes can release taurine through gap channels, we hypothesized that NAcore astrocytes actively modulate rat alcohol-seeking behavior. This hypothesis was tested, in part, by examining astrocyte packing density in the NAcore of rats during alcohol abstinence and potential correlations of astrocyte density to the motivation to seek alcohol. We found that NAcore astrocyte packing density increased during abstinence (3wks) from alcohol consumption (20% v/v). This increased packing density was positively correlated with the motivation of these rats to seek alcohol. Intriguingly, NAcore astrocyte packing density decreased following 3wks abstinence from sucrose (2% w/v) self-administration. Next, gap channel blockers (dose 18- $\alpha$ -glycyrrhetic acid or dose mefloquine) were microinjected into the NAcore and the motivation to seek either sucrose or alcohol assessed after abstinence. NAcore gap channel blockers for astrocytes selectively increased the motivation for alcohol but did not affect sugar. These data suggest that NAcore astrocytes modulate alcohol-seeking behavior in rat relapse models.



#### **54. The link between childhood ETS exposure and increased risk for neurobehavioral and cognitive problems**

*Hiyab Yohannes, Dept. of Biology, with Dr. Andrew Ottens, Dept. of Anatomy and Neurobiology*

Nearly one-in-five children in the U.S. continue to be exposed to environmental tobacco smoke (ETS) in the home. Indeed, the rate of childhood exposure has remained fixed over the last decade despite significant anti-smoking efforts. Concern is mounting over the link between childhood ETS exposure and increased risk for neurobehavioral and cognitive problems. In particular, inattention, hyperactivity, impulsivity as well as language and learning deficits have been correlated with childhood ETS exposure, which speaks to cerebellar involvement. Yet, it is undetermined whether there are biological effects of early ETS exposure underlying long-term functional deficits in behavior and cognition as seen in exposed children. The Ottens' lab has developed a model of ETS where animal were exposed during the vulnerable period corresponding to cerebellar development occurring postnatally in children. Using selective cellular and synaptic and immunohistochemistry methodology, I conducted immunofluorescence microscopy experiments to assess morphometric change in the cerebellum of exposed relative to unexposed animals. To date, these results in combination with others from the Ottens' lab have revealed significant cellular and synaptic change particularly in the cerebellar molecular layer. Immunofluorescence measures suggest an increased interneuron population, an reduction in glial processes size and abnormal synaptic organization and function. Childhood ETS exposure has a dramatic impact on the developing cerebellum, which potentially will perturb a wide array of functional domains as seen in children. In particular, our results suggest disturbed organization and function of the cerebellar-cortical circuitry, which would result in disturbed control of neocortical functions normally regulated by cerebellar feedback. In the near future, I will expand assessment to other brain regions to evaluate effects elsewhere in the closed-loop circuitry with cerebellum as well as in alternative circuits.

#### **55. The Impact of Undergraduate Teaching Assistants On Student Engagement**

*Kara Wilson, Dept. of English, and Scott Jarman, Dept. of Criminal Justice, with Dr. Melissa Johnson, Focused Inquiry*

The goal of this study is to measure student engagement in faculty led discussion and in discussion led by Undergraduate Teaching Assistants. Data was compiled based on student attendance, willingness to participate in class discussion, homework completion, misuse of technology, and participation or lack thereof in smaller group activities to demonstrate the impact of Undergraduate Teaching Assistants in the classroom. This study is in preliminary stages as well as on an extremely small scale. Data was collected from two classes taught by the same professor and therefore does not seek to evaluate the Undergraduate Teaching Assistant program as a whole. Further research must be done to fully examine the effects of Undergraduate Teaching Assistants on class engagement.

## **56. Postemergence learning in males of *Cotesia congregata* (Say) differs with respect to host-plant origin**

*Megan Ayers, Dept. of Biology, with Dr. Karen M. Kester, Dept. of Biology*

Olfactory learning is known to occur in many insects, particularly the honey bees and parasitic wasps. With one exception (Villagra *et al.* 2008), investigations of olfactory learning in parasitic wasps have focused on the use of plant cues for host location by females. Female wasps learn to associate plant cues through oviposition (e.g., Turlings *et al.* 1993), postemergence (“early adult”) experience on the host natal plant (Kester & Barbosa 1991), or in one case, preimaginal learning (Gandolfi *et al.* 2003). Although post-emergence learning is known to occur in females of the braconid wasp, *Cotesia congregata* (Kester & Barbosa 1991, Lentz & Kester 2008, in revision), it has never been studied in males. This species attacks sphingid caterpillars that mostly have narrow foodplant ranges. Because males may disperse to locate females for mating, post-emergence learning in males could facilitate assortative mating on host plants. To test the hypotheses that males of *C. congregata* can learn plant cues through post-emergence experience and that males differ in learning capacity with respect to host-plant complex, I compared searching responses of males originating from *Manduca sexta* on tobacco (“MsT”) or *Ceratomia catalpae* on catalpa (“CcC”) with post-emergence to tobacco or catalpa, or without postemergence experience (control), to each of the two plants. Results provide evidence of postemergence learning in both MsT and CcC males. However, CcC males displayed a generalized positive response to plant experience in that postexperience with either tobacco or catalpa increased searching responses to both plants. In contrast, MsT males with tobacco experience searched longer on tobacco than control males, and males with catalpa experience showed increased responses to catalpa and decreased responses to tobacco. Learning responses for MsT males are similar to those reported previously for MsT females (Kester & Barbosa 1992). My M.S. thesis project will investigate the effects of postemergence experience on dispersal and mating success with respect to differential selective pressures experienced by MsT and CcC wasps.

## **57. Laminar Distribution of Inputs to Rostral Posterior Parietal Cortex of the Ferret**

*Timothy Fiore, 2011 UROP Summer Fellow, Dept. of Biology, with Dr. Alex Meredith, Dept. of Anatomy and Neurobiology*

Much of what we know about the brain is related to unisensory areas; these areas are inhabited by neurons which respond to a single sensory modality, such as vision. Unisensory neurons are generally driven by a thalamo---cortical pathway (Thomson, and Lamy 2010). Our research focuses on multisensory areas, which contain neurons that respond or are significantly influenced by more than one sensory modality. In contrast to unisensory areas, studies suggest that the neurons of multisensory areas are driven primarily by cortico---cortical pathways (Foxworthy *et al.* 2010). The rostral posterior parietal cortex (PPr) of the ferret was previously found to be a multisensory area since the majority of neurons in PPr were bimodal according to electrophysiology data. In the present experiment, neuronal tracer was injected into PPr and, after processing, retrogradely labeled neurons were identified in numerous cortical regions. The greatest number of labeled neurons were identified in the somatosensory area SIII and visual area PPc. To assess the terminations of these inputs to the PPr, these two unisensory areas were injected with an anterograde tracer. After processing, labeled boutons were plotted across the laminae of the PPr. Layers II and III showed a greater bouton density in

comparison to the other layers. ANOVA followed by Tukey tests showed a significant difference in bouton density between layers II/ III and layers I, IV, V, VI ( $p < 0.05$ ). Determining the distribution of boutons in PPr arising from SIII and PPc provides further information on the connectional basis of multisensory regions in general. Understanding the nature of these multisensory areas may lead to better treatment and diagnosis of cognitive disorders such as autism (Kwakye 2011).

## **58. Historic Socialist Architecture in Modern Interpretation: Nazi Architecture in 21st Century Germany**

*Ilijana Soldan, 2011 UROP Summer Fellow, Dept. of Interior Design, with Prof. Roberto Ventura, Dept. of Interior Design*

Architecture has a great presence in the story of humanity. Societies and civilizations are shaped by the structures that compose them. The National Socialist movement of WWII Germany continues to shape contemporary architecture and historic buildings through the influences of Hitler, his main architect Albrecht Speer, and the idea of Ruin Theory. I expected to find a lot of changes within interiors of buildings in Berlin built during this time, while still being fairly untouched on the exterior. I also expected that contemporary works in Berlin would reflect the historical neoclassical style of the older architecture. By doing initial research of the classics in Italy, and eventually evaluating three main buildings in Berlin, I found this to be both true and false. The Olympic Stadium of 1936, Topography of Terror, and Federal Ministry of Finance, previously the Ministry of Aviation, all show signs of how effective Albrecht Speer was in applying the Ruin Theory to continue its influence in modern day Germany. While all three buildings differ greatly, each either honors or harnesses the ruins left after the war, thereby making Hitler's ultimate empirical fantasies somewhat of a reality. Major historical events are strong enough to influence our surroundings, including our built environment. Although the National Socialist movement of Germany is a unique case, it shows how much architecture can continue to affect our thoughts and our surroundings even after an event has passed. Architecture keeps history alive.

## **59. Undergraduate Teaching Assistant Program: VCU Focused Inquiry Department**

*Reginald Mattingly, Biology and Chemistry Major, Brandon Hambricht: Creative Advertising Major, Will Moran: Biology and Education Major, Habiba Shah, Kyle Rafaels, Danielle Burkhardt*

The role of undergraduate teaching assistants (UTA) is changing from course management to a practice of active participation in class with students. This is especially true in classrooms that are discussion-based rather than those with a more traditional lecture structure. In the Focused Inquiry classes at VCU, UTAs have a very active role in such discussion-centered classes; participating in/leading class discussions, presentations, and helping with instruction of the class. They also provide additional channels of communications for students. Based on research collected through student evaluations from Fall of 2010 and Fall of 2011, we have discovered the following benefits: UTAs serve as a primary resource for the class, as students benefit from a UTA's credible perspective of an assignment and its requirements; the UTA also sets an example of the ideal student through collaboration, cooperation, and providing successfully completed assignments as a model of effective work. One-on-one workshops with UTAs reported to be highly beneficial, as most students described this as an opportunity to ask questions, hear opinions on and receive suggestions about their work that they otherwise would be unable to obtain. The active participation that a UTA models is the agent that entices

students to participate. This gives UTAs a greater responsibility than to solely assist an instructor, but rather to focus on student engagement and class participation.

## **60. Approaches in the Utilization of Human-Animal Chimeras in Xenotransplantation**

*Huynh Nhu Ong, Dept. of Biology, with Prof. Tara Dacey, University College*

There have been an abundant number of people that need kidney and liver transplants, but there have not been a sufficient amount of donors present. Patients and their families are burdened from what seems like waiting for an indeterminate of time waiting for transplants which in turn has led to a decline of hope. Human transplants coming from a different species of animal, such as a pig or a sheep, has helped relieve the demand for kidneys and livers. This new innovation would save and prolong more lives by having these organs readily available to the patient population. This would give the patient a sense of comfort knowing that they will get the help that they need. Richard Gray suggests, in his article titled *Pigs could grow human organs in stem cell breakthrough*, that it would be more favorable for a patient to have an organ personally grown in another medium such as an animal capable of producing similarly sized organs. Then, the transplanted organ would have a decreased likelihood of being rejected but so far, scientists have run into complications that would compromise the patient's final outcome. Numerous organs have been grown in animals but the animals' cells start to fuse with the human cells and create a chimeric organ. The most effective solution to this issue would be to acquire a patient's stem cells, graft the cells into organs, and to have those cells fuse with the organs therefore making it functional in a human body.

## **61. Traditional to Modern: The New Bollywood**

*Rohini Basra, Dept. of Pre-Radiation Sciences, with Prof. Katie Hoffman, University College*

It is easy to turn on the television and soak in what is being presented in front of us but does anyone really actually think that whatever they are watching could be negatively or positively influencing them? The mass media itself can influence ones character whether it be from the way that person acts to the way that individual eats. Hollywood which is synonymous with American cinema is a vast movie industry that produces numerous numbers of movies each year. Not only has Hollywood impacted American society but has also reached overseas to places such as India and its Bollywood film industry. My research is based on books, articles from credible authors, and analyzing older movies with newer ones on how Hollywood and the Western hemisphere have negatively impacted Bollywood. Culture and tradition are both valued in India and with the influence of Hollywood the culture and traditions are seen less and less. I narrowed my research to the traditional values, dance styles, and the role of women in Bollywood and how they have become more modern because of the influence. Bollywood's tradition and culture is what makes it unique. It separates itself from other industries and helps its audience retain their cultural identity. By narrowing on Bollywood specifically I wanted to show how Hollywood and the western hemisphere have such a great impact on society and its people. It is known that change is inevitable but Bollywood producers should be careful with how much they draw from Hollywood. They should continue to set themselves

apart by remaining true to their culture and keeping their cultural identity alive which is something that should be valued.

## **62. Chronic Nitrogen Deposition and Forest Nitrogen Retention Capabilities – Establishing an Ideal Level of Nitrogen Input for Forest Carbon Sequestration**

*Christopher Gayler, Dept. of Biology, with Dr. Christopher Gough, Biology Department*

The objective of this research project is to quantify forest nitrogen retention from a chronic depositional source in terms of its effect on net primary production. The effect of chronic nitrogen amendments on biomass, growth rates and productivity will allow for a better understanding of forest carbon sequestration in response to elevated nitrogen deposition levels. It is hypothesized that initial nitrogen amendments will increase net primary production and therefore carbon sequestration, but that growth rates will taper and groundwater leaching will increase as biomass pools become nitrogen saturated. The results of the study will be useful in determining forest management plans for carbon sequestration and for determining the extent to which nitrogen is retained or leached from soils surrounding a chronic point-source deposition. The sewage and wastewater disposal systems at the VCU Rice center and Department of Game and Inland Fisheries (DGIF) facility utilize bacteria, sand filters and ultraviolet light to disinfect sewage. Disinfected sewage is then sprayed into the forest via a system of sprinklers. This provides a unique source of chronic nitrogen deposition that can be monitored and contrasted with areas that are not receiving nitrogen amendments, thereby serving as a chronic N amendment treatment. There are 5 total sprinkler heads – 2 at the Rice center and 3 at the DGIF facility. Each sprinkler is the center of a treatment plot, which is paired with a control plot. The center of the control plots are approximately 30 meters apart from the center of their paired treatment plot and are comparable in drainage, soils, topography and vegetation. All trees within the radii of the treatment and control plots have been tagged for identification and had their Diameter at Breast Height (DBH) recorded. Leaf litter has also been collected for each of the plots using an array of open containers arranged around the center of the plot at cardinal points in order to collect an indicative sample of falling leaf litter from the canopy. Precipitation collectors and PVC wells have also been set up to determine atmospheric nitrogen inputs and groundwater nitrogen composition. Data collected will be used to quantify net primary production (and therefore carbon sequestration) and soil nitrogen content between the plots. The data is expected to show an initial surge in net primary production and tree growth rates followed by a decrease in growth rate and a leveling off of net primary production. The relationship between nitrogen input and tree growth rates over time is expected to be roughly sigmoidal.

## **63. Expression of the 1-propanol metabolic pathway from *T. fusca* in *E. coli***

*Allison Yaguchi, Dept. of Chemical and Life Sciences Engineering, with Dr. Stephen Fong, Dept. of Chemical and Life Sciences Engineering*

The objective of this project was to successfully express a metabolic pathway that is found in *Thermobifida fusca*, a thermophilic, cellulolytic actinobacteria, in *E. coli*. This pathway directly converts raw plant material into 1-propanol, a precursor to propanol, which can be used as a biofuel. This was done by transforming a single gene from *T. fusca* into *E. coli* to complete the equivalent metabolic pathway already present in *E. coli*. The production of 1-propanol will be chemically analyzed using high performance liquid chromatography and then compared against the rate of transcription, which will be found using real-time PCR. This data will determine the proper route to be taken to optimize the gene in order to increase 1-propanol production. Even though microbes are an optimal option for the production of biofuels due to their low cost and space requirements, there is currently no efficient way to produce biofuels using microbes. This project would provide a novel method to produce a large ratio of biofuel production per microbe.

#### **64. Peer drug use, personality type, and individual drug use among VCU students: Findings from the Spit for Science project**

*Waimin Khuu, Biology, Sarah Rice, Psychology, Rose Bono, Psychology, Melanie Willing, Forensic Biology, Heesub Jang, Chemistry,*

*Team Supervisor, Megan Cooke     Faculty Mentors, Dr. Danielle Dick, Virginia Institute for Psychiatric and Behavioral Genetics and Dr. Jessica Salvatore, Virginia Institute for Psychiatric and Behavioral Genetics*

A significant change in an adolescent's life is the transition from the multitude of parental boundaries to the contrasting life of an independent young adult, in many cases coinciding with the advent of a college or university lifestyle. A new setting containing a dense concentration of peers coupled with an individual's personality traits can create a high risk environment for substance use. Using results from the Fall 2011 online survey from the Spit for Science research project, which explores environmental and genetic influences on mental health and substance use, the undergraduate research team will use independent samples t-tests and other statistical tests to determine the relationships between peer drug use, personality type, and individual drug use. It is hypothesized that if an individual scores high in the Big Five personality category of Neuroticism and low in the categories of Conscientiousness and Extraversion, and/or has high levels of association with peers who use illicit drugs, then the individual will express increased illicit drug usage (in the categories of Cannabis, Sedatives, Stimulants, Cocaine, and Opioids) compared with individuals with trait levels opposite of those aforementioned. In order to assess the impact of the Big Five personality traits (openness, conscientiousness, extraversion, agreeableness, neuroticism) an independent samples t-test was run for each drug type (cannabis, sedatives, stimulants, cocaine, opioids). Students who reported having ever used opioids scored significantly lower on agreeableness,  $t(1960) = -4.48$ ,  $p < 0.01$ , and conscientiousness,  $t(1986) = -6.68$ ,  $p < 0.01$ , than non-users. Opioid users also scored significantly higher on neuroticism,  $t(1992) = 2.91$ ,  $p < 0.01$ , and openness,  $t(1991) = 2.97$ ,  $p < 0.01$ , than non-users. Participants reporting cocaine use demonstrated lower scores on conscientiousness,  $t(1980) = -3.21$ ,  $p < 0.01$ , than students who had not tried cocaine. For students who reported stimulant use the scores for neuroticism,  $t(1989) = 3.31$ ,  $p < 0.01$ , and openness,  $t(1987) = 4.68$ ,  $p < 0.01$ , tended to be high than non-users, while conscientiousness scores were lower,  $t(1982) = -6.26$ ,  $p < 0.01$ . Reported sedative use results in lowered agreeableness,  $t(1959) = -3.65$ ,  $p < 0.01$ , and conscientiousness,  $t(1985) = -5.96$ ,  $p < 0.01$ , scores and higher neuroticism,  $t(1991) = 3.37$ ,  $p < 0.01$ , and openness,  $t(1989) = 3.11$ ,  $p < 0.01$ , scores than those students who abstained from sedatives. Students that responded that they had

tried cannabis tended to score high on openness,  $t(1974)=5.28$ ,  $p<0.01$ , and extraversion,  $t(1968)=4.37$ ,  $p<0.01$ , measures but lower on conscientiousness,  $t(1969)=-6.34$ ,  $p<0.01$ , than students who had not tried cannabis. Overall, students who reported trying any of the 5 illicit drugs we looked at tended to score lower on conscientiousness measures of the Big Five personality traits. These results may later be used to build better intervention to substance use in a population of transitioning independent adults.

## **65. Political Ideology, Racial Diversity, and Roommate Relationships**

*Lindsay Coleman<sup>1</sup>, Boglarka Vizy<sup>1</sup>, Alexandra Tozzi<sup>1</sup>, Maryum Ijaz<sup>1</sup>, Russ Clay<sup>1</sup>, Natalie J. Shook<sup>2</sup>*

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The extent to which college roommates interact with one another is influenced by a variety of factors. Previous research has shown that White students interacted less with an African-American roommate (interracial room) compared to White students living with a White roommate (same race room; Shook & Fazio, 2008). Although it is unclear what specific factors influence these differences, political ideology may be one. According to Hiel and Mervielde (2004), individuals with a conservative ideology are less open to new experiences. If living in an interracial room qualifies as a new experience, students with conservative ideologies might spend less time with a roommate of a different race compared to students with liberal ideologies. We predicted that interracial roommates with conservative ideologies would spend less time with their roommate than those with liberal ideologies. VCU students who were randomly assigned a roommate of the same race ( $n = 55$ ) or different race ( $n = 60$ ) participated in research sessions during the first and last three weeks of their freshman year. In each session, participants completed questionnaires that measured their political ideology and the amount of time they spent with their roommate. Participants in same race rooms reported spending more time with their roommate than participants in interracial rooms in the beginning of the academic year. However, this difference was not found at the end of the year. Time spent together between participants in interracial rooms [at both sessions] did not differ as a function of political ideology. The initial hypothesis was not supported; therefore, further investigation is needed to explain possible causes for differences in time spent together between same-race and interracial roommates.

## **66. Examining How Therapeutic Touch Could Transform Prisons**

*Jennifer Fjelsted, Dept. of Biology with Prof. Tara Dacey, University College*

Thomas Porter is a current Death Row inmate in Virginia who's experiences with physical violence, anticipation of violence and lack of positive touch, tie in closely to research done on the effects that these factors have on a person physically, mentally and behaviorally. Experiencing touch is a physical need that is widely neglected in American society. A lack of physical touch and witnessing physical violence during childhood can lead to criminal behavior later in life. The sense of touch and the nervous system are intimately linked. Brain hormones can play a heavy role in the regulation of aggression. Prison is a place where physical touch is



reduced and the anticipation of violence is constant. These factors can lead to changes in brain chemistry that may lead to aggressive behavior. Studies have shown that massage therapy can reduce hormones that may contribute to aggression such as norepinephrine, testosterone and cortisol. It may also increase hormones that help reduce aggression such as serotonin. Through telephone interviews with Thomas Porter and studies done by various researchers it seems that the cycle of violence that contributes to an individual's incarceration is only furthered behind bars, compounded by the lack of positive touch, and inhibits rehabilitation. Since experiencing positive touch interactions may help reduce violent behavior, prisons should consider implementing touch therapy for inmates to reduce prison violence.

## **67. Concussions in the National Football League: An Investigation of the Causes and Recommendations for Modifications**

*Arjun Venkatasubramanian, Dept. of Biology with Prof. Mary Boyes, University College*

Concussions have become a serious problem in the National Football League. Even though sources and researchers cite different statistics regarding the actual number of concussions and which positions suffer more concussions, the clear fact is that reform needs to take place immediately if we are to save this sport from becoming a breeding ground for life threatening injuries. In order to tackle this problem, the NFL governing body needs to implement a holistic series of changes: enforcement of current and new rules, innovative helmet design, and methods of tackling. These three amendments would need to be applied to practices, scrimmages, and games because research has shown that concussions occur just as frequently or even more in practices than games. The current trend in attempting to solve this crisis has been focusing on helmet design as seen by Riddell's new Revolution helmet and Xenith's X1. The setback with that approach is that no helmet will be able to prevent all types of head injuries. Implementing a variety of alterations to the game is the best approach because the entire sport is dissected and the flaws are found. NFL players have voiced their discontent against Commissioner Roger Goodell because hefty fines have been issued and the notion that the fundamental rules of the game are being modified. However, these players must understand that without immediate reform, this sport will be soon known as a notorious game of violence.

## **68. Obstacles to Living a Healthy Life: A Focus on HIV Prevention and Condom Use**

*Sukhjit Kaur; Marie Vergamini; Alison Burgujian, Dept. of Psychology, with Kristina Hood and Dr. Natalie Shook, Dept. of Psychology*

The most common way a female contracts HIV/AIDS is through unprotected sex with a male partner carrying the disease (Kennedy & Jenkins, 2011). The current study takes a qualitative approach in investigating themes that arise in discussions regarding HIV prevention and condom use. Seventeen African-American females ( $M_{age} = 21.29$ ,  $SD = 2.34$ ), who were not currently enrolled at a college or university participated in the study, receiving a payment of \$20 for their time. Participants took part in discussions about their experiences and opinions regarding HIV prevention and condom use. These discussions revealed prevalent themes common amongst seven focus groups. Specifically, a lack of knowledge, traditional gender norms, and a woman's sexual assertiveness were common themes during the discussions.

Participants felt that a lack of knowledge of the risks associated with sexual activity and proper preventative measures contributed to their beliefs about why HIV was spreading in the community. For example, although almost all new mothers seem to be aware that pregnant women can pass along HIV to their unborn children, a much smaller proportion of American women are aware that breast milk is a mode of transmission transferring the virus from mother to child (Klitsch, 2001). Along with an unawareness of risks associated with sex and HIV, participants also expressed the effect of traditional gender views on their sexual decisions. Gender role attitudes have traditionally endorsed social norms awarding males more power than females, causing some women who internalize these norms to leave vital sexual decisions up to their male counterparts (Shearer et al, 2005). Therefore, often the male sexual partner decides whether a condom is used, opening up the potential for risks and infections resulting from unprotected sex. Lastly, staying consistent with gender roles, participants felt that a woman's sexual assertiveness, or lack thereof, accounted for the spread of HIV/AIDS and inconsistent condom use. In order for a woman to reduce her risks for HIV and other infections, she must be able to assert herself within her relationship with her male sexual partner (Kennedy & Jenkins, 2011). When assertive, a woman can feel empowered to argue for her male partner to wear a condom during intercourse, or refuse to have sex with a man whose sexual history she is not aware of. Overall, the themes found in these discussions indicate important issues that prevention efforts should aim to address to decrease the spread of HIV/AIDS and increase condom use.

## **69. Evaluations of Expressive Writing Therapy in Non-Clinical Populations: An Analysis of Fragmentation and Information Processing**

*Lauren Jimenez, Therese Verkerke, Andrea Konig, Dept. of Psychology with Dr. Scott Vrana, Dept. of Psychology*

The present study aims to explore the potential for translating exposure therapies from clinical to nonclinical populations. Previous research has shown that personal narratives provide valuable insight into the nature of autobiographical memory, perhaps increasing the ability of the individual to process the event. In the principal analysis developed by Foa, Molnar and Cashman (2005), fourteen female sexual assault victims were provided with cognitive-behavioral treatment for assault-related PTSD. Recognizing the lack of literature available to review fragmentation and information processing, Foa and colleagues utilized this data to create a coding framework that would investigate the ways in which autobiographical information were pieced together by trauma victims, finding an increase in utterance units representative of deeper emotional processing. Experimenters of the current study strive to extend this scope of research to non-clinical populations that may depict a mixed presence of severe trauma and mild stressor events. A longitudinal study using three ongoing periods of data collection was used to capture the progression of personal trauma narratives. Participants included 246 undergraduates from a large southeastern university, with a mean age of 21 years old. Respondents of self-report demographics identified as primarily female (72%) and Caucasian (48%). Participants were recruited from a non-clinical population and were not formally screened for having previously experienced a traumatic event. Utilizing key elements of the original coding framework, researchers of this study developed a new framework introducing utterance variables generalizable to non-clinical populations to better assess a larger spectrum of stressful stimuli and the manner in which they are processed. Similar to the pilot study, results indicated greater levels of emotional processing in the form of higher organized thought utterances with an initial mean of 14.5 ( $SD=9$ ) to a final session mean

of 22 ( $SD=9.9$ ). Contrary to the original framework, the present study placed greater attention to the category of details and event descriptors, highlighting the key role these utterances play in the initial construction of the traumatic or stressful memory. The data also suggests that individuals are able to experience a greater comprehension and rationalization of the traumatic event by initially focusing on more detail-oriented, descriptive fragments of the incident.

## **70. Young Adult Fiction and Teenage Perceptions of Romance**

*Victoria Shampine, University College, with Prof. Faye Prichard, University College*

How do romantic conventions in young adult literature shape contemporary teenager's expectations regarding romance? This issue concerns what values and cultural identities the next generation will adopt, and therefore, how society overall is shaped. I researched a number of academic articles and case studies and found that although sexualization and objectification present in YA literature have the *potential* to partially influence teenage perception, they do not necessarily do so, because readers have the power to accept or reject ideas present in what they read based on previous or additional perceptions they have.

## **71. Plumage Coloration of the Prothonotary Warbler (*Protonotaria citrea*) as an Indicator of Territorial Dominance and Seasonal Variation**

*Kathryn Rubis<sup>1</sup>, Alice Besterman<sup>2</sup>, Tiffany Wise<sup>1</sup>, Lesley Bulluck<sup>1,3</sup>* <sup>1</sup>*Department of Biology,*  
<sup>2</sup>*Center for Environmental Studies,* <sup>3</sup>*Life Science, VCU*

Plumage color in songbirds may vary due to several factors including territorial dominance and season. In many avian species, bold plumage can be a function of carotenoid content in the feathers, pigments that are derived from a bird's diet. Consequently, carotenoid content within the feathers has been related to overall body condition and ability to acquire resources. We examined feather reflectance of Prothonotary warblers (*Protonotaria citrea*), a neotropical migrant that winters in Panama and breeds in the eastern United States. We compared feather reflectance of birds in young versus mature mangroves, and breeding versus non-breeding birds in Virginia and Panama, respectively. We also compared peak reflectance shifts in the UV between breeding and non-breeding birds. Feather samples were collected, spectrally analyzed for reflectance using Ocean Optics Jaz™ spectrometer, and coloration was quantified using established indices. We found that non-breeding birds inhabiting mature mangroves had statistically higher carotenoid content, indicative of territorial dominance. Additionally, non-breeding birds had higher UV reflectance and carotenoid content than breeding birds, suggesting that feathers may degrade over time.

## **72. Monitoring the Kinetics of Substitution Reactions between Sulfoxides and Planar Amine Groups of [Pt(diethylenetriamine)](R<sub>1</sub>R<sub>2</sub>SO)]<sup>2+</sup>**

*Russell G. Wilson, Daniel E. Lee, Samantha D. Tsotsoros, and Dr. Nicholas P. Farrell, Dept. of Chemistry*

Platinum diethylenetriamine compounds of the configuration [Pt(dien)(L)]<sup>2+</sup>, where L is a nucleobase, have been reported to have antiviral properties due to their ability to form noncovalent interactions with retroviral proteins [1]. These compounds have been synthesized

in the past through the displacement of the chloride ligand on platinum using  $\text{AgNO}_3$  activation. Alternatively, bulky sulfoxides have been shown to be good leaving groups on Pt, despite the sulfur binding [2]. It is the aim of this study to consider alternative routes to the synthesis of isostructural platinum-planar amine compounds through the substitution of sulfoxides. The reaction kinetics will be monitored by  $^1\text{H}$ NMR Spectroscopy.

**Figure 1** Reaction scheme for the substitution reaction between  $[\text{Pt}(\text{dien})(\text{R}_1\text{R}_2\text{SO})]^{2+}$  and planar amine group.

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### **73. Wedded Woes: Luxury Weddings in Our Society**

*Zemmie Brown, Dept. of Biology, with Prof. Tara Bray, University College*

Since Queen Victoria and beyond, weddings have been a part of communal society. It is a form of rite of passage for both the bride and the groom. It is a day to remember and each moment is to be cherished. Normally, in Western culture, the bride is active in the preparation of the details hoping to get everything perfect. But, lately, it seems that things get chaotic between “Will you marry me?” and “I do”. In the attempt to make everything memorable, weddings are tailored to the brim with high, fancy, and even exotic furnishings. From the dress to the venue, it seems that society is more caught with the event than the holy matrimony. This research will focus on how pre-wedding planning affects the couple’s relationship in order to better understand the dangers of getting lost in the thrills and frills of the event rather than the meaning of the occasion. Also, emphasis will be made on wedding commercialization and its mutual effect with media on young adults.

### **74. Preventative measures of prenatal and germ line gene therapy**

*Matthew Spencer, Dept. of Biology with Prof. Jessica Gordon, University College*

Gene therapy is one of the most exciting and promising medical technologies developing today. The field of somatic gene therapy has been advancing rapidly in accordance with its therapeutic promise. However, it is infinitely preferable to prevent genetic disease from ever manifesting in an individual than to treat them after the fact. This paper uses research gathered from other authors to argue in favor of the preventative measures of prenatal and

germ line gene therapy. Possible methods of treatment are discussed and the many ethical arguments surrounding each are explored.

## **75. The Experiences of Spanish Speaking Individuals in the Health Care System**

*Yeimarie Lopez, School of Social Work, 2011 UROP Summer Fellow, with Prof. Mary L. Shelden, Focused Inquiry*

This research focuses on exploring the unique experiences of Spanish speakers when navigating the health care system and the services it provides. The interviews conducted with Spanish speakers addressed their overall access to medical care, knowledge and access to cancer education and screenings, and whether any assistance was received from social workers. Up to this point, common barriers include access to services in Spanish and challenges related to understanding how the health care system functions. This knowledge is a stepping stone in better understanding the distinct experiences and sometimes difficulties that Spanish speaking individuals face when interacting with the health care system.

## **76. What the BEEP!: The Role of Gender in Profanity**

*Sukhjot Kaur, Psychology, Criminal Justice, with Prof. Tara Dacey, University College*

"I'm tough, ambitious, and I know exactly what I want. If that makes me a bitch, OK" (Fisher, 1995). These infamous words, spoken by international pop legend Madonna, have helped females express themselves as strong-willed, fierce individuals who are not concerned with others' perceptions of them. However, many object to using terms such as "bitch," along with other profanities, as a part of their every day language and conversations. Even more, many contend that there are clear gender issues impacting who curses, in what settings, and with what types of people. Jay and Janschewitz (2008) suggest that many individuals use profanity when they are around people of the same gender. Men can often become influenced by friends of the same gender when spending time together, often mimicking how they think, act, and talk. Therefore, it is easy to understand how spending time with people of the same gender, who are more relatable, can cause one to pick up on certain behaviors, such as language use. While it is true that members of both genders use curse words, there are apparent differences in the types of profanities males and females engage in. In a study intended to assess the meanings of obscene words as understood amongst a community of undergraduate college students, results indicated that male and female participants held differing views on what types of swear words were appropriate. Specifically, terms that reflected "vaginal references," were considered more obscene by females, who therefore refrained from using them because such terms made them feel like "pieces of meat" (Stapleton 2003). Females may believe that men who use foul language in regards to women are disrespecting them, while males may downplay their negative connotation by arguing that "everyone says it." This project will focus on the development, growth, and acceptance of profanity in today's language to understand its influences on men and women. Such gender differences are important in understanding how males and females view profanity as a means of communication amongst each other and members of the same sex group.

## **77. How is Your Hair perceived in Society?**

*Sachpreet Bajaj, Dept. of Biology, with Prof. Tara Bray, University College*

If viewed through history, hair and body hair has changed in multitudes of ways while other hair-related factors remained constant such as perceptions of beauty associated with hair. Furthermore, religious denomination and cultural associates have affected the way one maintains one's hair. From the East to the West, both males and females alter their hair and body hair to fit in with societal expectations. But, if the alterations are not met in that society than it gives a distinct identity to that person as he/she exists outside of the societal norms. The covering of hair with a cloth like a hijab or turban gives deeper meanings that anthropologists and scholars have been analyzing in different contexts from sexuality to suppression. The covering of hair is also associated with political issues which further ascribe significance toward the meaning of styled hair. Particularly, this paper will analyze how societies perceive hair and problems that develop when hair styles and are imbued with deeper cultural and religious meaning.

## **78. Write from Day One and Conquer the World**

*Alexandra Hailey, Dept. of English, with Prof. Jessica Gordon, Dept. of English*

Writing is an important part of learning and life. How are we going to better ourselves as writers? How will we reach a deeper meaning within subject matter? How will we gain fluency in our writing if we aren't taught to write like writers? What I mean is, writing isn't just something we do for other people, we write for ourselves as well. If we're sliced to pieces by teachers who nitpick at every misspelled word and force us to write the way they think is *right* no one is going to grow as a writer, whether it's inside or outside of school. Writing is a very important aspect of education across the curriculum, yet K-12 students often have a difficult time producing writing; if all students had the opportunity to experiment with various approaches to the recursive writing process and practice expressive writing regularly to gain fluency starting at a young age, the techniques and strategies used would aid them in writing across the fields of transactional and poetic discourse. Different forms of writing are used in different situations. Throughout my research I have come to terms with my own definitions for the three types of discourse. Starting with the organic form we have expressive writing, which is closest to speech, an informal account of the writer's perceptions and interpretations, and what he or she has to say about the world. Transactional writing gives form to a writer's knowledge and skills; its purpose is to communicate with others. Poetic writing is written to communicate with others as well, but it is written in a form of art; poetic writing includes all genres of literary writing: poetry, fiction, drama, lyrics and creative nonfiction. Although these forms have different final products, we write in a recursive process, rather than linear, in order to reach the poetic. We, as writers, are always drafting, going back, editing, revising, re-writing. It would be impossible to start at point A and finish at point B without backtracking between these tasks during the writing process. Learning to write isn't just something that happens once. Writing is thinking. When we write, we are taking ideas, knowledge and self-made conclusions and weaving them together on paper. So how will we teach students to appreciate the art of writing across the curriculum and the forms of discourse?

## **79. Role of SphK1 in CD40 Signaling**

*Evelyn Valencia, Dept. of Biomedical Engineering with Dr. Sarah Spiegel, Dept. of Biochemistry and Molecular Biology*

Cluster of differentiation 40 (CD40), a member of tumor necrosis factor (TNF) superfamily, promotes immune response through activating antigen-presenting cells and triggering immunoglobulin class switching in B cells. Autoimmune diseases, such as thyroiditis, type 1 diabetes, multiple sclerosis, and Grave's diseases, are associated with CD40 signaling malfunctions. CD40 trimerizes upon binding to its ligand, CD154, and recruits TNF receptor associated factor 2 (TRAF2) and TRAF3 to its cytoplasmic C-terminal tail along with cellular inhibitor of apoptosis 1 and 2 (cIAP1/2). Within this complex, TRAF3 functions as an anchor. In order for the complex to be released, TRAF3 needs to be proteasomally degraded by cIAP1/2. The release of the complex allows for the propagation of downstream NF- $\kappa$ B pathway and mitogen activated kinase (MAPK) pathway signaling (Matsuzawa et al., Science 321: 663, 2008). Furthermore, TRAF2 plays an important role in activating cIAP1/2. Recently, our lab discovered that sphingosine-1-phosphate (S1P), produced by sphingosine kinase 1 (SphK1), is an essential cofactor for TRAF2 in activating NF- $\kappa$ B pathway during TNF- $\alpha$  signaling (Alvarez et al., Nature 465: 1084, 2010). Therefore, we hypothesized that SphK1 could also play an important role in CD40 signaling. We discovered that treating human embryonic kidney (HEK) cells stably expressing mouse CD40 (HEK-CD40) with SK1-I, a pharmacological inhibitor of SphK1, inhibited  $\kappa$ B  $\alpha$  phosphorylation, and partially suppressed c-Jun N-terminal kinase phosphorylation and I $\kappa$ B kinase phosphorylation. Silencing SphK1 also resulted in inhibition of both NF- $\kappa$ B and MAPK pathways. Additionally, stimulation of CD40 led to the recruitment of SphK1 to the membrane, as visualized by confocal immunofluorescence microscopy. These findings suggest that CD40 activates SphK1 and that SphK1 is required for activating NF- $\kappa$ B and MAPK pathways. If substantiated, SphK1 will emerge as a potential new target to inhibit CD40 signaling and alleviate autoimmune diseases.

## **80. The Role of Motives as a Mediator in the Alcohol Use of Adolescents with Symptoms of Depression**

*Betis Sorto-Sanchez, Jessica McCauley, Steven Brokob, with Tess Drazdowski and Dr. Wendy Kliewer, Dept. of Psychology.*

Underage drinking is a widespread problem in the United States, with nearly 50% of adolescents having tried at least one alcoholic drink by the time they reach 8<sup>th</sup> grade. This phenomenon can lead to grave consequences, such as a higher risk for alcohol dependence in adulthood, brain damage, alcohol related car accidents, sexual assault, poor school performance, and even death. This topic is important to study because previous research suggests that the influence of close friends is significant in determining drinking behaviors. Teenagers with psychological afflictions such as depression are especially at risk, as they often turn to alcohol in order to feel "normal" or to fit in with their peers. This study considers the role that motivation plays in instigating youth with symptoms of depression to drink alcohol. **Methods:** Using a longitudinal design, 358 adolescents in either 5<sup>th</sup> or 8<sup>th</sup> grade (ages 9-16, 54% female) and their maternal caregivers were interviewed annually over the course of four years. **Results:** The findings show that social motives significantly mediated the relation between depressive symptoms and alcohol use, while self-enhancement and affect regulation motives did not. This indicates that adolescents suffering from symptoms of

depression may drink in order to help them fit in with others, be more sociable or to make social gatherings easier or more enjoyable. **Conclusion:** Social pressure or anxiety is an important risk factor in underage alcohol use in adolescents suffering from symptoms of depression. Increased efforts to treat depression in adolescents to reduce early drinking behaviors are necessary to minimize possible negative consequences involved with drinking at a young age. Offering supervised social alternatives may be an option for decreasing this phenomenon of social inspired drinking.

## **81. How did the Arab Conquest of Persia Change the Persian Language?**

*Pouria Rahini, Dept. of Biology/ Pre-Dental Track*

I am studying the impact of the Arab conquest of Iran on the Persian language because I want to learn how the language differs now from what it was in the past in order to help my readers understand the greater national Iranian identity. From this, I've developed the following research question: in what ways has the Arab conquest of Iran changed the Persian language, from Middle Persian to modern day New Persian? Research in response to the question falls into these categories: the historical background of the invasion and subsequent conquest of Iran by the Arabs, how the writing of the language changed, what aspects of vocabulary were affected and the changes that occurred and continue to occur in more recent times as a result of the conquest. The historical background encompasses the history of both Arabic and Persian as they are understood today. The Persian history follows the development of Old Persian into Middle Persian, during which the Arab conquest took place and as a result led to an influx of Arabic words into the language, leading to the development of Modern (New) Persian. The history of Arabic focuses more on the origin of the language that developed into the Classical Arabic that would influence the Persian language. In addition, the history covered analyzes the state of both the Bedouin Arabs and the Persian Sassanids and the events that led to their ultimate confrontation. The main body of research involves how the writing style and vocabulary of Middle Persian evolved into the language that exists today in several countries in the Middle East and is a major second language among Iranian diaspora populations found in the western world. Causes for the development of the language and sources of major influence are examined for their effectiveness in causing changes and for how deep their impact was. This research rounds off with a look at the modern changes in the Persian language that occurred as a result of a backlash to the Arab domination of Persian government and culture for centuries. The Farhangestan, an Iranian governmental organization, was tasked with purposefully editing the Persian language of the twentieth century to weed out words of foreign origin, including French and English, but particularly Arabic. Ironically, a similar attempt was undertaken by the current regime in Iran in the latter twentieth and early twenty-first century into making Persian incorporate more Arabic words, an obvious reflection of the heavy Influence of Islamic ideals that currently dominate Iran's political atmosphere. The changes that the Persian language has undergone throughout the centuries have been great, but despite them the language has retained its status as a symbol of the Persian cultural identity.



## **82. Assimilation: The Most Beneficial Approach**

*Mrinmayee Takle, Dept. of Biology, with Prof. Bonnie Orzolek, University College*

Immigrants make up approximately ten percent of the population in the United States, and many of them come from Asian countries such as China, India, Japan, Korea, and more. When they immigrate into America, they bring in many aspects of their own ethnic culture – food, parenting styles, clothing, and more. It is then when they have to decide how to face immigration and determine which acculturation attitude to take: assimilation, separation, marginalization, or integration. This research examines the four attitude choices for Asian immigrants and which is the most beneficial, leading to the least psychological distress and intergenerational conflict. Reviews of literature (surveys, interviews) and research in psychology databases show that assimilation, the attitude through which the immigrant family completely adopts the host country's culture and gives up on the ethnic culture, is the most positive approach. The other acculturation attitudes such as separation (a complete retention of the ethnic culture and ignorance of the new culture), marginalization (leaving behind the ethnic culture and not making an effort to embrace the new culture), and integration (blending the old and new cultures) lead to the unnecessary distress and conflict. Upon first glance, it seems as if integration is ideal. With further consideration, it is shown that blending all the values is difficult as some are too rooted or different. This leads to selective acculturation – choosing which values to keep and which to change. However, the deeper values are kept, which eventually creates intergenerational conflict. This can lead to psychological distress such as depression, low self-esteem, and stress signifying why immigrants should study and decide an attitude prior to coming to America in order to choose the most beneficial one and lessen conflict. Though there is much research proving why assimilation is the most positive, conflict is inevitable, and further research is necessary to look into coping mechanisms for psychological distress.

## **83. Predictors of Forgiveness from a Workbook to REACH Forgiveness**

*Quandrea Harper, Dept. of Psychology with Dr. Everett L. Worthington, Psychology Department,*

To deliver forgiveness interventions efficiently and determine personal characteristics of most successful respondents, I conduct two intervention studies. Wave one (N = 80) uses a forgiveness-promoting workbook compared to an assessment only condition. In addition, eight predictors of change are investigated. Wave two (N = 30) uses the forgiveness workbook in a waiting-list treatment x attribute design (investigating the two strongest predictors from wave one). The studies will contribute to clinical science by being the first to investigate workbook interventions, and will contribute to potential widespread dissemination of forgiveness interventions. Unforgiveness is costly to individuals and to society. Researchers have shown that holding grudges and experiencing unforgiveness of a transgression for long periods is related to poorer (a) physical health (Worthington, Witvliet, Pietrini, & Miller, 2007), (b) mental health (Toussaint & Webb, 2005), (c) relationships (Rusbult et al., 2005), and (d) spiritual health (Davis, Worthington, & Hook, 2012). The present study occurs in two waves. That allows replication of findings in wave one and a focus on the two strongest predictors of success. In wave one, a workbook for promoting forgiveness (Worthington, Lavelock, & Scherer, 2012) is compared to assessment only. I hypothesize that there will be a treatment x time(S) interaction with those completing the workbook forgiving the most and maintaining the gains at the follow-up. For the workbook condition, personality and situational predictors are examined to

determine which ones most strongly predict forgiveness. The two predictors identified during wave one as the strongest will be continuous variables in a replication that serves as wave two. I hypothesize that people high in those two characteristics will respond most strongly to the treatment and will maintain the gains.

#### **84. See, Think, and Do: Role of Dopamine in Cognition and Decision Making**

*Sindhu Karnam, Depts. of Biology and Psychology, with Prof. Bonnie Orzolek, University College*

The decisions that people make characterize them. Impulsive people make rash decisions, whereas cautious people weigh the consequences of each choice first. Every decision is influenced by how the brain interprets what it sees, yet two people given the same circumstances don't always make the same choice. One of the major neurotransmitters that plays a role in the decision making process is dopamine. This research seeks the answer to what kinds of decisions dopamine affects. Originally just thought to be involved in the hedonistic pathway, scientists have recently found that dopamine actually has a much further range of function. A combination of animal and human studies as well as fMRI scans were used to gather data in the different studies. A review of the literature shows that brain structure strongly relates to the action of dopamine. The Val Met polymorphism, an evolutionary adaptation to the COMT enzyme, is responsible for the degradation of extrasynaptic dopamine in the prefrontal cortex. This genomic development influences a person's gambling mindset. Research has also found that dopamine affects cost/reward analysis and "effortful" decisions. Higher levels of dopamine in the brain lead to quicker decisions regardless of whether they yield a higher reward. Higher levels also lead to a greater willingness to make decisions that require more effort. Low levels of dopamine on the other hand create a preference for larger, delayed rewards and decrease the willingness to apply effort. The literature shows that the effect of brain lesions on decisions regarding dopamine action is very location specific. Lesions due to both injury and substance abuse were investigated. In addition to better understanding the decision making process, learning more about dopamine's various methods of action can help scientists develop better treatment methods for other disorders such as ADHD which are caused by dopamine pathway malfunctions.

#### **85. Uncertainty and Individual Differences in Anxiety Related Psychopathology**

*Glendon Kemp, Dept. of Psychology with Dr. Kirk Warren Brown, Social Psychology Department*

Uncertainty is a ubiquitous aspect of daily living that can profoundly impact thoughts, feelings, and behavior. States of uncertainty have been shown to increase physiological arousal, both under pleasant circumstances, such as when one anticipates opening a gift, or unpleasant circumstances, such as anxiety one may feel about unclear future outcomes. While uncertainty is not inherently unpleasant, the tendency to associate uncertainty with aversiveness is central to worry and a key feature of anxiety disorders. The present study sought to explore whether individual differences in anxiety-related psychopathology are related to the ways certainty and uncertainty cues impact downstream affective states. After completing a battery of self-report measures, participants viewed a series of images that varied in terms of valence (neutral vs.

unpleasant). The display of each image was preceded by one of three cues that conveyed certainty or uncertainty regarding the valence of an immediately subsequent image. The present study found higher levels of generalized anxiety, social anxiety, depression, worry, and neuroticism were significantly related to heightened unpleasant moods following aversive stimuli and more pleasant moods following neutral stimuli under conditions of uncertainty. This suggests that people with higher levels of anxiety may be more sensitive to aversiveness under conditions of uncertainty, and may also feel more relief when expectations of uncertainty are not followed by a negative experience. People who expect uncertainty to end in negative outcomes have a heightened sense of relief when those outcomes are not unpleasant.

## **86. Retinoic acid induced-1 (RAI1) has a conserved role in *Xenopus* development.**

*Raiha Tahir, Dept. of Bioinformatics (Center for the Study of Biological Complexity) with Dr. Sarah Elsea, Ph.D., FACMG (Depts. of Human Molecular Genetics and Pediatrics) and Dr. Amanda Dickinson, PhD. (Dept. of Biology)*

Haploinsufficiency of transcription factor *Retinoic acid induced-1 (RAI1)* is the primary cause of Smith-Magenis Syndrome (SMS), a rare congenital disease marked by mental retardation, craniofacial abnormalities, obesity, and an inverted circadian rhythm. In the present study, we characterize the expression of *Rai1* during embryonic development of *Xenopus* using whole-mount *in situ* hybridization. Furthermore, we reduce the dosage of *Rai1* during development using an antisense morpholino and analyze the resulting craniofacial structure using cartilage staining. The induction of *Rai1* expression by retinoic acid is also elucidated using qPCR. Our work demonstrates that *Rai1* is expressed in facial and dorsal region of frog embryos, and that a disturbance in *Rai1* dosage during development can lead to significant craniofacial abnormalities.

## **87. Head of Bed Elevation in Prevention of Ventilator Associated Pneumonia in the MRICU, STICU and NSICU.**

*Manisha Sigdel, Chemistry major, Biology minor, Brittany Russell, Nursing Major, Spanish Minor, and Hadja Diallo, Nursing Major, International Studies Major, French Minor, VCU School of Nursing.*

*Mary Jo Grap PhD, RN, FAAN, Angela Bataille, MS, RN, VCU School of Nursing*

Head of bed elevation to thirty degrees in critically ill patients who are intubated is recommended to reduce the incidence of pneumonia. Head of bed elevation reduces pulmonary complications by decreasing pooling and aspiration of respiratory secretions and gastric contents. Aspiration can lead to introduction of bacteria into the respiratory tract. The recommendation is to maintain the head of bed angle to a minimum of 30 degrees for intubated patients in the Intensive Care Units (ICUs) who are at greater risk for ventilator-associated pneumonia (VAP). The Skin Integrity and Backrest Elevation (SIBRE) study is currently being conducted at the VCUHS in three intensive care units; Medical Respiratory (MRICU), Neuroscience (NSICU) and Surgical Trauma (STICU) and has as its primary aim to describe the impact of backrest elevation on pressure, shear force and skin integrity in critically ill patients requiring mechanical ventilation. This presentation is using data obtained from the SIBRE study to describe backrest elevation in the study target units. Backrest elevation was documented using inclinometers, created by VCU Biomedical Engineering Department, which

allows the continuous monitoring of head of bed (HOB) elevation in the ICU. A total of 119 patients' inclinometer observations were analyzed. Daily HOB data was available for a minimum of 1 to a maximum of 9 ICU days. The average HOB angle for all patients was 27.3 with a minimum average of 8.5 and a maximum average of 50 degrees. Average HOB over the patient's stay in the ICU was similar between units (29.0 for 50 MRICU patients, 27.5 for 32 NSICU patients and 25.0 for 37 STICU patients). On average, 40.7% of daily HOB measures were above 30 degrees for all 119 patients. By ICU, daily HOB measures were above 30 degrees for 44.3% of the days for the 50 MRICU patients, 49.7% of the days for the 32 NSICU patients and 28.0% of the days for the 37 STICU patients. There can be confounding factors that limit the use of higher backrest elevations such as hemodynamic instability, nursing care procedures, or medical conditions. This presentation is to describe the use of backrest elevation in the critically ill and highlight its relationship to the development of ventilated associated pneumonia.

## **88. How Women Perceive their Lifetime Risk for Breast Cancer: Data from the Kin Fact Study**

*Sarah Rice & The Kin Fact Team, Department of Psychology & Department of Human and Molecular Genetics*

**Background:** How individuals perceive their risk for developing cancer may have important implications for screening and prevention practices. Literature has shown that women tend to overestimate their risk of developing breast cancer. For instance, Black et al. (1995) demonstrated that healthy women between 40-50 years of age with no previous history of breast cancer greatly overestimated their risk of developing breast cancer within the next 10 years. Suggested reasons for these differences include innumeracy and lower education, which may have implications for patient-physician communication. Furthermore, in a sample of Ashkenazi women with a personal or familial history of breast cancer, over half of women overestimated their absolute risk of developing breast cancer (Apicella, et al. 2009). Less is known about whether the format of a question influences responses. The present study examined sets of responses from differently formatted risk perception questions about breast cancer in a diverse group of women. **Method:** Adult female patients attending an urban women's health clinic were recruited for participation. 490 women completed baseline measures as part of the Kin Fact study, an ongoing randomized controlled trial examining the effects of an intervention to increase family communication about hereditary breast and colon cancer risk. Mean age of participants was 33.39 ( $SD = 11.96$ ). Over half of women reported their race as African American (58.6%). To examine perceived risk, women were asked to categorize their breast cancer risk in three distinct formats: (1) free-response, (2) multiple choice using fixed percentages, and (3) multiple choice using descriptive qualifiers. Free-response answers were re-coded to match the multiple choice options, and differences amongst these variables were calculated. Paired-samples t-tests were performed to assess differences between the risk perception free-responses and multiple choice responses as well as differences in free-response and descriptive perception questions. **Results:** Consistency in answering the free-response and multiple choice (using percentages) risk perception questions was found to be low, with women giving consistent answers only 34.6% of the time. Furthermore, the mean estimate for the free-response question ( $M=4.42$ ,  $SD=2.19$ ) was significantly higher than the mean estimate for the multiple choice question ( $M = 3.07$ ,  $SD=2.09$ ),  $t(474)= 13.913$ ,  $p<0.05$ . Thus, when given a free-response option, women tended to elevate their risk compared to when

they were presented with fixed categories of risk. There was also a significant difference in responses when comparing the free-response option and descriptive risk perception (low, moderate, or high),  $t(474)=19.59$ ,  $p<0.05$ . We found that women answered consistently only 30.1% of the time. Women who rated their risk as “low” tended to give free-response answers that were significantly higher than established risk guidelines for low risk,  $t(276)=19.08$ ,  $p<0.05$ . There was also a similar trend for women who responded that their risk was moderate,  $t(167)=11.56$ ,  $p<0.05$ . **Conclusions:** Overall, women gave higher estimates when asked to provide a free-response answer for their risk of developing breast cancer than when asked to choose among multiple choices. One plausible explanation for this overestimation could be the high visibility of breast cancer in the media, producing an inflation of risk. It is also possible that women relayed their risk on the survey differently based on question format. Low numeracy and literacy may provide additional explanations for these differences. Findings suggest a tailored presentation of risk information may lead to more accurate understanding of cancer risk information. Providers may need to spend more time discussing cancer risk estimates with their patients, potentially leading to patients’ better understanding of their own cancer risk.

## **89. Fractal Antenna Design**

*Jason M. Phillips, Department of Electrical Engineering and Department of Physics, 2011 UROP Summer Fellow, with Dr. David Chan, Department of Mathematics*

Applying fractal geometry to the design of multiband antennas is a growing area of research. Such antennas are optimal for devices such as cell phones which require the use of several different radio frequencies simultaneously. The ability of linking physical aspects of an antenna such as size, shape, fractal iteration, or other transformations to its electrical performance would allow the design of an antenna to fit the desired performance. In this research we take a step toward that goal. During this research 6 Sierpinski triangles and 18 box fractal antennas were manufactured on printed circuit boards manually, using photo etching and mask transfer methods. The antennas were tested using a network analyzer from 1MHz to 6 GHz. Each antenna contained a unique shape transformation or fractal iteration. The phase shift, magnitude, and input impedance of each antenna was then compared. The results have shown that a complex relationship between physical transformations and electrical performance exists, though this relationship is non-trivial to model. The most distinct effects are achieved by changing the iterations of the fractal or the overall size of the antenna. The box fractal, unexpectedly, did not show significant change from stretching transformations. Further research might explore polarity characteristics, radiation patterns, and more fractal shapes in order to gain a fuller understanding of designing fractal antennas.

## **90. Women’s Health Care and the Prison-Industrial Complex**

*Abstract A: Stephanie Stapleton*

The lack of education, financial status, racial and gender equality women of color constitute a large number of impoverished individuals in the United States, succumbing to low socioeconomic status and limited health care benefits, which raises concern for women’s health as they enter the prison system or re-enter society from prison. The number of incarcerated women has grown 203% nationally, though the number of specialists such as obstetricians and gynecologists are limited in correctional systems, along with the frequent shortage of other

medical staff and examination space. With a history of exploitive and experimental procedures, African American, Latina, and Native American women represent the majority of those who suffer from health issues outside and inside prison walls. This has translated to an increased risk for diseases such as HIV (Human Immunodeficiency Virus), pelvic inflammatory disease and/or infertility. With state regulations originally designed for male bodies, problems specific to female incarceration, such as pregnancy, childbirth conflicts, cervical cancer, breast cancer and menopause multiply. The mass incarceration of women of color obstructs their ability to obtain reproductive health and implements the cyclical practice of classicism, racism, and sexism within the prison industrial complex.

## **91. Is the Prison-Industrial Complex the “New Jim Crow”? Examining the Links between Structural Racism and Mass Incarceration and its Effects on Families**

*Abstract A: Veronica Archer*

Despite the decline in crime rates nationally, African Americans’ rate of incarceration has steadily increased since the “War on Drugs” was declared by Ronald Reagan in the 1980’s. Over the course of history, African Americans have been considered low-class, worthless, and inferior to whites. The big question is how can society condone the consistent devaluing, dehumanizing, and the violation of the rights of its citizens? Mass incarceration has radically altered the lives of black male and female convicts, ex-offenders, and their families. This paper will explore the over-policing of the poor/black communities, lifetime brands, surveillance, stigma, and labeling of felons, and how these practices reflect an intersection of race, gender and class as well as how the PIC affects the African American family.

*Abstract B: Tenika Matthews*

From a psychological perspective, I examine the relationships that incarcerated mothers share with their children, both during and after incarceration. I look at prison nursery programs and examine the effects of these programs on the children of incarcerated mothers within these programs. In situations where the child is taken away from their mothers due to incarceration, I examine how this separation affects the mental health of both mother and child. My project focuses on how these two approaches (prison nurseries and separation) produce long-term effects on family structures and behavior.

*Abstract C: Semira Gebretsadkan*

For most of us, including myself up to this point, the fact that there are hundreds of thousands of mothers caring for their children from a prison cell goes ignored. According to the Nation Women’s Law Center’s report on Mothers Behind Bars, today there are more women in prison for drug related crimes than there are men and most of these women are first-time offenders. This means that there are hundreds of thousands of children being parented by a parent in prison. This cycle will lead for most of the kids whose mothers are in prison to grow up and be tangled in the same predicament as their parent. The one binding similarity among women who are incarcerated is that they have been prone to sexual violence since and throughout girlhood. For the greater half of these girls who are being sexually and physically abused by their

caregivers, psychotherapy and medical attention is a luxury they cannot afford. Most of them will resort to what is easily accessible and familiar which are illegal self-medicating substances. Instead of being treated for rape, trauma, depression and so forth these women are hauled to prison where some of them will be expected to be good role models to their children. Furthermore, the reason why women in general and women of color in specific, including mothers, are being incarcerated in such large numbers is not because of violent crimes but because of drug-related offences. This is largely due to the no tolerance policies and the war on drugs that the government is so aggregately and blindly pushing. The extensive incarceration of women who have been convicted of non-violent crimes has a grave impact on their families and her societies. Women of color who are simply being swept out of the streets are creating hollowing gaps in their families and communities. I address more extensively the reasons why the numbers of incarcerated women especially women of color has risen so quickly. In addition to that, I discuss how this is affecting the women who are mothers, most of whom who are single mothers. Finally I argue how mothers who are incarcerated especially for non-violent drug offences can be treated more justly to be better parents because this will led to better children and a safer tomorrow.

## **92. Mental Health Concerns within the PIC**

*Abstract A: Lori Geer*

Incarcerated people with mental illnesses are rarely treated for their disorders. As Angela Davis found, most mentally disordered prisoners are usually given high doses of psychiatric medications but are rarely seen by psychologists. Being in prison itself can bring upon and/or exasperate psychological diseases due to a number of reasons including, but not limited to, maltreatment, isolation, gender, sex and race. Fundamental to this study is the work of Dr. Terry Kupers as he theorizes mental health disparities within prisons. Female prisoners often face sexual assaults and rape, bringing about a number of issues including depression and PTSD. Minorities with illnesses are especially disregarded and unaccounted for; both male and female prisoners of color face racism on a daily basis, causing emotional breakdowns, fear, anxiety, hopelessness and anger.

The aim of this paper is to argue the effects of incarceration on the mental health of women and other minorities. The intention is to also determine any possible changes which can be made within and outside of the prison industrial complex to improve conditions for these greatly marginalized people.

## **93. The Question of Rehabilitation: An Examination of “Re-Entry” Programs and Alternative Models to the PIC**

*Abstract A: Christina Leslie*

I will be looking at rehabilitation programs in relation to mental health to see how the mental health of imprisoned people can improve with rehabilitation programs and worsen without them. Without rehabilitation programs, when people who have been imprisoned return to the world outside prison walls, they have a harder time adjusting to life outside of prison. The lack of rehabilitation programs, both inside and outside the prison, should be of great concern to proponents of the prison-AS-rehabilitation.

*Abstract B: Izzie Comphel*

The aim of this research paper is to explore the impact of policing and enforcement violence on communities that are marginalized including: people of color, people who identify as lesbian, gay, bisexual and transgender (LGBTQ), sex workers, and immigrants. According to the organization *Incite! Women of Color Against Violence*, enforcement violence is, "...an analysis that includes police brutality by local, state, and federal police as well as immigration officers, Border Patrol, private security and Military forces." The paper addresses different types of violence and laws that are targeted within each community. In this analysis, transformative justice is framed as an alternative to the current punitive measures that dominate our justice system. According to Kershner et al. (2007) the core principles of the transformative justice model are, "liberation, shifting power, safety, accountability, collective action, honoring diversity, and sustainability."

#### **94. Policing (Inter)National Bodies: Linking Immigration Rights to Prison Abolition**

*Abstract A: Roschell Small*

The War on Drugs has become a war on race, class and citizenship status. It systematically targets persons of color, especially those in African American neighborhoods and those of immigrant status. This war further perpetuates stereotypes, racial profiling and the exclusion of rights for many people who fall victim to the prison industrial complex. In a race to accumulate more and pay out less, industries have taken a high stock in prisons, for the labor is cheap (Davis, 2003). This further fosters a need to maintain a suitable number of people in prisons across America. African Americans and immigrants of color make up most of this number, and this, in part, is due to laws that are set up and enforced to target them. An insightful critique and analysis of government laws/policies and subsequently the institutions established to enforce said policies, can further support the central idea that the prison industrial complex has caused an array of problems for those whom society deems as inferior. This project will incorporate the works of scholars such as Michelle Alexander, who argues that mass incarceration in the United States is a system of racialized control and Angela Davis, who calls for the complete abolition of prisons since they do little to help. With a closer look at these issues affecting African American communities and immigrants of color, it becomes ever more clear that the government has provided for society a discriminative system of laws and punishment that should be reconsidered and abolished.

*Abstract B: Nicole Gore*

"Illegal" immigrants often cross the US border in hope for better opportunities for their families and themselves. They trudge through war torn corrupted countries and risk their lives walking across the deserts to the US border in hopes of attaining the American Dream. Thousands of immigrants don't make it, whether it is because they are caught and deported, or they perish within the harsh elements of the unforgiving desert. The lucky few that do survive are in for a surprise awakening as what they thought America stood for, a beacon of hope and opportunity,



is no more than a distant dream. Once arriving here, immigrants are exposed to the harsh realities, and have to learn rather quickly the tools to survive in such an unforgiving society. The P.I.C has had such an overpowering effect on the Hispanic population. According to Michele Alexander and her book “The New Jim Crow” Latinos make up the highest percentage of prisoners within the P.I.C. The majority are caught and arrested for minor crimes, while some are detained and deported back to their respective countries where they will be further punished and criminalized. These individuals live in constant fear upon entry, and they have every right to feel so. In a government where they make it crystal clear that immigrants are not welcomed, or law enforcement agencies that target them specifically through racial profiling, it is no wonder why thousands immigrants have been deported. I argue that through the dismantling of the P.I.C and the removal of these “immigrant” detainment facilities, along with a reform of immigration policy, minority groups will have a better chance of survival and our communities will improve.

## **95. Popular Culture and the PIC**

*Abstract A: Marianna Campano*

Examples of how the prison industrial complex and mass incarceration affect African Americans are everywhere: the news, advertising, politics, the media, etc. These sources tend to offer biased evidence; they are typically controlled by white, patriarchal systems. However, there are other sources that show the effects through a different point of view—hip hop is one of them. Hip hop gets a bad rap (pun intended), and gets it from all angles. African American scholars distance themselves from it out of fear that it perpetuates stereotyping. The patriarchal heteronormative society has disdain for hip hop because it has such transgressive themes and potential. Michael Eric Dyson’s book, Know What I Mean? Reflections on Hip Hop serves as an initial inquiry. Through exploring the essentials of hip hop culture, one can see the intricacies of the hip hop scene and see how the PIC has made such an impact on young African Americans and thus how it has impacted, or even produced, hip hop itself.

## **96. Economic Motives for the PIC**

*Abstract A: Bethany Ayers*

With the construction of prisons on the rise, mental health as industry to the Prison Industrial Complex is an area of increased research and discussion. This paper will provide an overview of Deinstitutionalization and capitalism as two extraordinary influences on mental health and the Prison Industrial Complex. Marxist theory, aligning with the argument in this paper, is that punishment overwhelming preys on those most poor, disadvantaged and vulnerable. This occurs as a means of social control. Displacement of people who experience mental illness in prison, leads to increased crime and, inevitably a more disheartened and mentally unstable society. “Mental illness, crime and violence: Risk, context, and social control” by Fred E. Markowitz offers an overview of Deinstitutionalization’s effect on both individuals and communities, while giving hedge way into the path that leads those with mental illness into a life in and out of jail and prison rather than in a psychiatric care facility or some other therapeutic space. Not only are populations of people forced into harsh conditions which amplify their disorder/s, but stakeholders are economically skyrocketing due to the exploitation of others. This research will explore this social justice issue using a Marxist

framework, particularly Marx's book, "Capital" which explores exploitation of labor as the motivating force of capitalism.

*Abstract B: Jara Connell*

In recent decades America has declared domestic "wars" on both crime and drugs. These wars, fought on streets of our inner cities by law enforcement officers and young men of color, have intentionally resulted in the explosion of the US prison system in both size and influence. This expanded prison system's intersection with capitalism has produced the prison industrial complex (PIC). The PIC is capitalist in nature; it cannot exist without capitalism because it has been designed as a tool for capitalism. Some of the ways that this partnership is currently manifesting itself is in the form of private prisons and immigration detention centers, which are having a very negative effect on the "justice" aspect of our criminal justice system. Using case studies like ex-Governor of Virginia Jim Gilmore's massive prison construction project and the June 1995 uprising at the immigration detention center in Elizabeth, New Jersey I examine how capitalism functions within the PIC to pervert our justice system. For-profit prisons and contracts that pay per prisoner encourage the increased criminalization of marginalized populations, longer and harsher prison sentences for nonviolent crimes, corruption within law enforcement agencies, and a myriad of human rights abuses.

## **97. Trans\*embodiment and the PIC**

*Abstract A: Aaron Kemmerer*

An anti-racist queer and trans\* movement for prison abolition is building. Trans\* folks are subjected to state-sanctioned and interpersonal violence through the prison industrial complex (PIC) in specific ways, from increased policing of queer and trans\* communities to lack of adequate medical care; from harassment to sexual and physical violence while incarcerated. The policing of gender and sexuality are deeply connected to the police state and system of mass incarceration. The way power is enacted in each prison mirrors the oppressive forces of the larger society; particularly, trans\* prisoners experience transphobia most acutely while incarcerated. While cultivating a concrete understanding of the violence inflicted upon trans\* bodies, through surveying the theoretical and political work of queer and trans\* PIC abolitionists which uses a Foucauldian analysis, I imagine a world beyond prison and a world beyond the gender binary as interdependent visions. The framework of this analysis is intersectional, focusing on how the PIC, structural racism, sexism, transphobia and homophobia interlock to inflict violence upon many bodies, but especially brutally upon the bodies of trans\* and gender variant people.

*Abstract B: Shawn McNulty*

Trans- and genderqueer identified voices are often silenced and their bodies treated as secondary throughout discourses regarding violence, as noted by Eric A. Stanley, Kate Bornstein, Michel Foucault, Judith Butler, and others. These liminal bodies are convergent sites of violence, (heteronormative, patriarchal, racist, and classist) stemming from the overlapping codes of multiple regulatory institutions: medicine, military, education, and prisons, as well as the complicit roles of the Non-Profit and the Homoelitist Conservator

Industry (a specialized function of the heteronormative aspect of all institutional violence perpetuated by many of the LGB political community) . Understanding how these industries come to dominate, manipulate, coerce, ignore, dismiss, erase and generally neglect those living trans- and genderqueer lives helps to humanize a population whose identities are crafted through the violent lenses of society's most entrenched institutions. This work seeks to begin to establish an understanding of institutional violence convergence in trans- and gender queer identified bodies in Richmond, Virginia and the ways in which the population internalizes, reproduces and is damaged by violent institutional oppression.

## **98. The PIC AS Structural Violence: Linking Anti-Violence Movements to Prison Abolition**

*Abstract A: Adrian Kunemund*

The number of prisons and the rate of female incarceration have been increasing over the past century in the United States leading to the formation of the Prison Industrial Complex (PIC). This industrial complex's reinforcement of structuralized violence against women is endemic in its system and illustrates how fundamental aspects of the PIC are a reflection of the greater patriarchal-heteronormative-white supremacist societal structure of American culture. Citing feminist theorists such as Angela Davis, Vicotria Law, and Temima Fruchter this paper is a theoretical analysis of how the foundation and basic principles of the PIC are directly related and work to perpetuate the discriminatory and violent culture in which it was formed. Ultimately concluding that reform of the prison industrial complex is not adequate and only complete abolishment will suffice.

## **99. Investigating the Role of *RAI1* in Early Onset Childhood Obesity**

*Royena Tanaz, Dept. of Biology, 2011 UROP Summer Fellow, with Catie McConnell, and Dr. Sarah Elsea, Dept. of Human and Molecular Genetics and Pediatrics*

Obesity is worldwide epidemic that increases an individual's chances of cardiovascular diseases, cancer, diabetes, and many other ailments. Obesity is not only associated with environmental factors such as diet, exercise, and socio-economic status but genetic factors, as well. Few genes are known to be singly causative of obesity. One gene of interest is *retinoic acid induced 1*, or *RAI1*. Mutations and deletions in the *RAI1* gene are responsible for the phenotype in Smith-Magenis syndrome (SMS). SMS is a complex intellectual disability disorder that includes behavioral, physical, and developmental features. Individuals with SMS display early-onset childhood obesity, with ~90% of males and females at or above the 90<sup>th</sup> percentile for weight by age 14. Because of the potential role of *RAI1* in childhood obesity, we are investigating the possibility that *RAI1* may be a factor in the development of this condition by investigating whether single nucleotide polymorphisms (SNPs) in *RAI1* are associated with obesity in a non-SMS population of children with early-onset obesity. We have assessed 13 SNPs and a trinucleotide CAG repeat in the *RAI1* gene in 50 patients with early-onset childhood obesity by Sanger sequencing and Taqman genotyping. The samples assessed were obtained from children enrolled in the VCU TEENS weight management program affiliated with the VCU Department of Pediatrics. We have assessed the frequency of each SNP and CAG repeat length in comparison to the normal, non-obese ethnically appropriate population in a

case-control study. Initial results revealed some differing allelic frequencies between the obese and non-obese populations and the identification of novel variants, both of which add to the potential significance of *RAI1* in early-onset childhood obesity. Further investigation of specific SNPs in a larger population is warranted based upon these data.

## **100. SHRNA MEDIATED KNOCK-DOWN OF ATAXIA TELANGIECTASIA MUTATED**

*Jasmine Allen, Dept. of Biology with Dr. Sarah Golding, Dept. of Biology and Dr. Kristoffer Valerie, Dept. of Radiation Oncology*

Glioblastoma multiforme (GBM) is a very deadly cancer with a life expectancy of only 12-15 months even with extensive treatment. There are many difficulties when it comes to treating brain tumors due to the radio-resistance inherent to this kind of tumor. Hence, there is a critical need for new drugs to make radiation therapy more effective. Ataxia telangiectasia (A-T) patients are extremely sensitive to radiation. The protein mutated in A-T, ATM (A-T mutated), controls the cells' response to radiation. Thus, attempting to reproduce the extreme radio-sensitivity of A-T cells inhibiting ATM with small molecule inhibitors is appealing. An ATM inhibitor, KU-60019, was designed to block the DNA damage response initiated by ATM. In order to validate target specificity of this drug we generated human glioma U1242 cells stably expressing a lenti-viral expressed shRNA against ATM. These cells were infected with the lenti-virus and then cloned by dilution followed by Western blotting for ATM expression. Four out of six clones showed almost complete knock-down of ATM expression, with two showing 99% reduction when normalized against GAPDH expression. In order to determine that the ATM signal was gone cells were exposed to 5 Gy of radiation and two downstream ATM phosphorylation targets, p53 and histone H2AX, were analyzed by Western blotting. As expected, the shATM expressing cells showed blunted ATM signaling. Therefore, we have successfully created glioma cells with stable ATM knock-down. Future studies will validate target specificity of KU-60019 by cell survival and also explore the role of ATM in glioma migration and invasion. This work was supported by the IMSD summer research program.

## **101. A Tactile-Thermal Display for Rendering the Style and Mood of Paintings to the Blind and Visually Impaired**

*Victoria Hribar, Dept. of Biomedical Engineering, 2011 UROP Summer Fellow, with Dr. Dianne Pawluk, Dept. of Biomedical Engineering*

This work explores a potential method to render tactile and thermal information through a haptic display in order to provide access for individuals who are blind and visually impaired to digitized paintings found in art museums. In particular, we considered conveying aspects of the painting that convey its style and mood, which are difficult to convey with words and tend to be personal in interpretation. Three parameters which are important to relay this information are: brushstroke, intensity contrast and color temperature. We investigated the use of tactile rendering to describe brushstroke size and intensity contrast, and thermal rendering to describe color temperature. A prototype system was developed consisting of a moving tactile pin display for one hand and a static thermal display for the other hand to rendering local tactile information under the moving hand. Several experiments were performed in order to assess the perception of parameters of brushstroke size, intensity contrast, and color temperature with our system including. We obtained adjectives to describe

these parameters visually and then examined the effectiveness of our tactile rendering methods for brushstroke size and intensity contrast simultaneously using the tactile display and examined the effectiveness of our rendering method for color temperature using the thermal display. Results show that future investigation is needed to explore the relationship between brushstroke and intensity contrast and to develop an effective way to portray both intensity contrast and color temperature.

## **102. RNA Purification through Fluorous Affinity**

*Aruna Anbazhagan, 2011 UROP Summer Fellow, Dept. of Biology with Dr. Matthew Hartman, Dept. of Chemistry.*

Although large quantities of purified tRNA are often required for various studies relating to translation and genetics, only a few types of completely purified tRNAs are commercially available. Just in *E. coli*, there are 43 different types of tRNA, highlighting the problem of isolation. Most labs resort to laboriously producing their own purified tRNA from total tRNA through a series of several chromatographic steps. We envision a new method for tRNA purification based on fluororous tagging. Highly fluorinated organic compounds are both hydrophobic and lipophobic, preferring instead to associate with other fluorinated substances. For example perfluorohexane is insoluble in both water and hexane. Organic molecules that have both an organic domain and a perfluoroalkyl domain are known as fluororous molecules and may be separated from non-fluororous molecules by interaction with fluorinated separation media such as Fluoro-Pak columns. The basic idea behind this new method will be to selectively tag certain tRNAs with a fluororous tag so that they can be captured on a fluororous column and then eluted.

## **103. Do tumors activate mast cells?**

*Jonathan Fletcher, 2011 UROP Summer Fellow, Dept. of Biology, with Dr. John Ryan, Dept. of Biology*

The link between inflammation and cancer is a long-standing observation more recently supported by a substantial amount of evidence. Many cancers are associated with specific inflammatory conditions, including colorectal cancer, which is associated with inflammatory bowel disease (IBD); Crohn's disease, associated with chronic ulcerative colitis; pancreatic carcinoma, which is linked to chronic pancreatitis; and lung carcinoma, associated with bronchitis<sup>1</sup>. Additionally, infectious agents causing chronic inflammation are also linked to increased cancer incidence. For example, the gram negative bacteria *Helicobacter pylori* is a recognized carcinogen and is the world's leading cause of gastric cancer and infection, while the Hepatitis B or C viruses promote hepatocellular carcinoma<sup>1, 2</sup>. Illustrating the strong link between inflammation and cancer is the fact that long-term use of non-steroidal anti-inflammatory drugs such as aspirin, which inhibits the cyclooxygenase (COX)-1 and COX-2 enzymes, reduces the risk of cancers of the colon, breast, lung, and stomach<sup>3</sup>. COX-2, frequently over expressed in many types of cancer, is responsible for the conversion of arachidonic acid to prostaglandins, which promote inflammation in damaged tissues<sup>1, 4-7</sup>.

## **104. Bullying and the PRAV Experience: "Peer Relational Aggression Victimization"**

*Camille Richards, School of Nursing, with Dr. Melissa Gomes, School of Nursing*

Youth violence is increasing at an alarming rate among adolescents, especially among girls. At the same time that arrests for physical assault are increasing in girls, they are decreasing for boys. Between 1996 and 2005, the number of girls arrested for simple assault increased 24% compared to a 4% decline for boys <sup>(1)</sup>. Peer (girl-girl) relational aggression victimization (PRAV), is known to be a precipitating factor in the occurrence of violent activity among girls <sup>(2)</sup>. PRAV, defined as rumor spreading, backstabbing and social isolation, is a form of bullying that harms interpersonal peer relationships by damaging social networks and peer connections. The goals of this project are to utilize a service learning environment to create collaboration among community members, and academic researchers to design and implement program aimed at increasing the capacity of the community to intervene in the PRAV experience. Specific Aims: The specific aims of this proposal are to: 1) Assess the knowledge level, attitudes and beliefs about bullying among youth, parents, and counselors 2) Illuminate the pattern of bullying among vulnerable adolescents. Methods: This will be a mixed methods study consisting of a survey and focus group sessions. In order to gain a full understanding of the nature of the phenomenon for this population in the club, all (100) students enrolled in the Salvation Army Boys and Girls' Club of Churchill (SAGBC) afterschool program will be approached and asked to fill out surveys about the pattern of bullying. Some students will also participate in a focus group. It is expected that a total of 3 focus groups will be conducted (one early 6-9, one middle 10-13 and one late adolescent 14-18, 8 participants per group). Focus groups will be conducted to assess the youths' knowledge level, attitudes and beliefs about bullying. Separately, the youths' parents/guardians and SAGBC counselors will be sought for a brief survey and focus group. Three parent/guardian (8 participants per group) and one counselor (6 participants per group) focus group will be conducted. ---you will need to modify the numbers for the actual participation numbers that we have had.

## **105. Perceptions of Autism Spectrum Disorders**

*Virginia Cox, Dept. of Psychology, with Prof. Mary Mullins, University College*

The way people with autism spectrum disorders are viewed varies drastically across countries and cultures. Often times these perceptions of the individual isolate them from the community. In the Jewish ultraorthodox religion in Israel, members follow strict guidelines set by their religious text, and do not often make exceptions for individuals who violate these strict norms of conduct and religious rules, for example a person with autism. One ultraorthodox mother questioned the humanity of her autistic child:

There is a synagogue here behind my house. And he would undress and go stand next to the people saying their prayers. I would almost die of embarrassment. And this is how I know that he was possessed with a spirit. That spirit would do it, would stand in front of those who were praying. (Shaked 2193).

Seeing the boy as being possessed by a demon illustrates the drastic dissimilarities in interpretation of the disorder. Autism is defined by the Diagnostic and Statistical Manual of Mental Disorders as a spectrum disorder of neurologic development that is characterized by impairments in socialization, communication, and behavior. Autism is classified as a spectrum because individuals can show varying degrees of severity, but still be diagnosed as autistic. The

cause of autism is not completely understood, but it is generally believed to be a genetic condition that affects brain development. The prevalence of autism is increasing, however it is not clear whether this is due to an increase in the numbers of people with this disorder or if it is due to an increased awareness of autism resulting in more people being diagnosed. While the majority of trained health professionals in industrial countries can recognize autistic behaviors, the majority of the public has a very poor understanding of autistic individuals. My hypothesis is that this poor understanding of autism results in discriminatory treatment of people with autism. I also believe that a universal interpretation of autism disorders used by all countries would help prevent discrimination. I looked at the representation of individuals with autism in the public school system, public housing, and employment in various parts of the world. I found that the overall interpretation of autism and the way individuals with autism are treated varies drastically from country to country. My results show that if there were to be an international act, such as an International Autism Bill of Rights, the way individuals with autism are treated would be humane, but still allow for cultural aspects and traditions to exist in the society.

### **106. Mark and Pattern: A Visual Reference of Maori Art and Technique**

*Tobias Wilbur, Dept. of Graphic Design, with Meaghan Dee and Jamie Mahoney, Dept. of Graphic Design*

In a society with an oral tradition, the marks and patterns used often contain the same communicative value as typographic marks in Western society. When applied as a system, these patterns are used to decorate objects, imbue them with special properties, or make historical notes of great people and events. As a global community we depend on a social understanding of the written language to document our history and to educate future generations. The Maori people of New Zealand used mark making and pattern to achieve these same goals and how pattern can connect people to the events that create their ideologies. This project was an attempt at documenting a handful of these patterns and the stories they have carried from one generation to the next and to share the methods and techniques used to create such patterns. This process helps to provide insight as to how Maori art was the basis of a visual language as effective and vital as written language. As a graphic communicator, this notion of a visual language being the primary vessel for the proliferation of culture has deepened my appreciation for and desire to produce effective, relevant, and socially understood design.

### **107. Marketing Automobiles to Women: Comparing Historical Biases to Market Realities in Order to Meet Primary Consumer Expectations**

*Eliza Barry, Dept. of Public Relations, with Prof. Mary Boyes, University College*

The practical implications of changing marketing strategies could alter the landscape of market share by shifting demand to the most powerful purchasing group —women. This project examines the lagging response to the changing female marketplace in the auto industry through an analysis of marketing and advertising campaigns from the 1940s to the present. It was found that women have been historically considered disinterested in cars, leading to their use as decoration in advertisements and a gross misunderstanding of the market by agencies and manufacturers. In truth, women purchased 60% of new cars in 2011 and were influential in 85% of all car purchases. However, to this day, cars are primarily made for and marketed to men, from manufacturing to closing at the dealership. The goal of this project is to examine modern marketing through a historical lens in order to divine strategies to better target women and meet their expectations of the automobile industry.

### **108. Historical Racial Discrimination and its Relationship on the Risk of Low Birth Weight among African American Infants**

*Priscilla Owusu-Mensah, Dept. of Community Health Education, with Prof. Mary Boyes, University College*

African American women have a much greater risk of having low-birth-weight infants compared to women from any other ethnicity in the United States. This may be due, at least in part, to the stress induced by historical and ongoing racial discrimination. Infants who are born with low-birth-weight have a high risk of health problems, such learning disabilities, mental disorders, or even death. There is a tendency for policy makers, who address the issue of low-birth-weight infants in the African American community, to solely focus on proper diet and prenatal care. While nutrition and prenatal care influence low-birth-weight, after analyzing different statistical and scholarly peer-reviewed data, I was able to conclude that segregation, racial inequalities, and the perpetuated African American cultural view of marriage are factors that have create a stressful environment that in turn affects the biological and physiological state of African American mothers. Since the cause of low-birth-weight is of a socio-cultural nature, solutions to this problem should include educational programs about the benefits of marriage, and that incorporate the aims of higher learning. These types of educational programs should be incorporated in school curriculums, especially in inner-city schools. Eliminating low-birth-weight will require culturally appropriate public health initiatives, community support, and equitable access to quality health care.

### **109. 3D Technology and Archaeological Theory**

*Courtney Bowles, Dept. of Anthropology, with Dr. Bernard K. Means, Dept. of Anthropology*

With continuing technological advancements, such as 3D scanning, archaeologists have a viable solution to prevailing curation issues. During an era of decreasing funds and space within existing collections, 3D scans allow for the development of “virtual” curation. The applications of 3D scans are vast, ranging from precise documentation of small artifacts to much larger scans of features, sites or even buildings in jeopardy of decay and/or destruction. Virtual curation acts as a repository for accumulated data and allows collections to become accessible to a much larger pool of researchers, archaeologists, and laymen alike. With the seemingly inevitable embracement of 3D scanning within the archaeological world, will “virtual curation” act as a unifying methodology for various theoretical approaches?

### **110. It's the Small Things**

*Kristen Currey, Dept. of Anthropology, with Dr. Bernard K. Means, Dept. of Anthropology*

Both digital microscopic photography and three-dimensional scanning have benefits when it comes to the digital management of archaeological collections. Though the 3D scanner is able to capture all surfaces of an object, it often cannot capture very small details. On the other hand, the digital microscope, which has a magnification of up to 200x, is able to photograph small portions of an object in great detail, which allows for those details that are too small for the three-dimensional scanner to record. The compilation of the 3D scans of artifacts, as well as their microscopic photographs will be extremely beneficial to those in the future that will access our digital archives. With the 3D scans, people will be able to view an artifact in its entirety, but will not miss out on what may be very important small details, without ever having to touch the physical artifact.



### **111. Ferry Farm in Three Dimensions: How 3D scanning enhances our understanding of historic artifacts**

*Allen Huber, Dept. of Anthropology, with Dr. Bernard K. Means, Dept. of Anthropology*

A major problem archaeologists face today is the curation of artifacts and other materials recovered from archaeological sites.. Historic artifacts hold a wealth of information that is crucial not only to researchers, but also to the public. The Virtual Curation Laboratory at VCU has traveled to various historic sites including Colonial Williamsburg and Jamestown to create 3D models of multiple artifacts that provide insight into our country's history. I present here research of digital models of artifacts from George Washington's boyhood home, Ferry Farm, as a case study into the significance of virtual curation for the historical record.

### **112. Facing the Past: The Benefits of 3D Scanning for Analyzing Iroquoian Effigy Face Rim Sherds**

*Rachel Hulvey, Dept. of Anthropology, with Dr. Bernard K. Mean, Dept. of Anthropology*

The advent of three-dimensional digital representations of artifacts promises new opportunities for research regarding Iroquoian effigy faces on ceramic vessels. Project V.C.U.-R.A.M.S. is creating digital avatars of these effigy faces. With a digital database of these effigy face sherds, scholars have easier access to many artifacts, and can recognize trends within the ceramics of a community, between ceramics of different Iroquoian groups, and with the presence of effigy faces on other media—such as pipe bowls. Digital representations open new avenues to showcasing this research to the general public. Anyone interested can virtually manipulate sherds that are too fragile for excessive handling and feel more involvement with archaeological research.

### **113. 3D @ VCU: Digital Scanning of Organic Artifacts by the Virtual Curation Unit for Recording Archaeological Materials Systematically**

*Dr. Bernard K. Means, Clinton King, Courtney Bowles, Victoria Valentine, Kristen Currey, Daniel Sullivan, Allen Huber, Rachael Hulvey, and Beth Reid*

The Virtual Curation Unit for Recording Archaeological Materials Systematically team will demonstrate the application of 3D digital object scanning on a range of organic materials, both archaeological and contemporary. This technology has the potential for preserving fragile organic remains, and the information that they retain. The 3D digital topological models can highlight features that are not readily visible to the naked eye. These 3D digital models can also be readily shared with researchers across the globe. Interactive work stations will be available for individuals to manipulate existing 3D digital topological models.

### **114. the Virtual Curation Unit @ VCU: for Recording Archaeological Materials Systematically**

*Victoria Valentine, Dept. of Anthropology, with Dr. Bernard K. Means, Dept. of Anthropology*

Archaeology is not invulnerable to the mounting dependency on multimedia in modern society. The barriers between real and virtual worlds are increasingly becoming more indistinguishable. The V.C.U.-R.A.M.S. team is actively unfolding the curtain between archaeology and the general public. Utilizing 3D technology, Project V.C.U.-R.A.M.S. is creating a virtual database of ancient and recent artifacts. Our 3D scanning project is moving beyond simply creating digital models of artifacts. We are integrating our virtual models into a broader multimedia enterprise, allowing members of society to become more familiar with archaeological materials artifacts.

### **115. Interpretative Considerations and the Virtual Curation Unit**

*Beth Reid, School of the Arts, with Dr. Bernard K. Means, Dept. of Anthropology*

The 3D scanner at the Virtual Curation Unit is an innovative tool for recording artifacts in order to make artifacts available to other scholars in digital format. The artifacts scanned are archaeological finds such as pottery sherds, bits of pipes, and stone tools. These objects inform us about societies that no longer exist, so interpretations must be made to integrate the archaeological remains into our understanding of past cultures. Using the scanner to document objects made in the current time period in the globalized American culture addresses this system of interpretation and throws into question the way we analyze the remains of a material culture and judge its significance. Things that we today regard as trash may be re-imagined as coinage or as ceremonial objects or may even be reconstituted into recognizable archaeological and art historical works. This last concept addresses also how we interpret the values of a society through their visual depictions and aesthetic preferences. Use of the 3D scanner to immortalize these ephemeral objects serves to scientifically legitimize their consideration in an archaeological context.

### **116. Comparison of Pro-Life Advocacy and No-Kill Animal Shelters in the United States**

*Michael Barber, Depts. of Biology and Chemistry, with Prof. Mary Boyes, University College*

Euthanasia is the leading cause of death in cats and dogs in the United State due to animal shelters. Some shelters have adopted the policy to never euthanize, being a no-kill shelter. Although an unrelated issue, pro-life groups have a similar goal: trying to stop human abortion. This study examined the ways no-kill shelters and pro-life groups try to advance their causes and how philosophically similar their ethical systems are. Pro-life groups use interest groups to maintain abortion as a political issue, while no-kill animal shelters try to set an example. They are both an issue of conflicting interests of a person and non-person, but one is political and one is not. The difference may illustrate the difference of value between humans and animals in the United States.

### **117. The Common Psychological Characteristics of a Prostitute and How This Can Influence Her Life Choice**

*Kathryn Kirchoff, Depts. of Biology and Psychology, with Prof. Bonnie Orzolek, University College*

Prostitution is a widely controversial topic attracting attention from multiple disciplines. However, the psychological factors underlying prostitution are relatively understudied. The goal of this research was to uncover whether female prostitutes share basic mental characteristics, with the anticipation of finding prostitutes collectively similar, differing in psychological makeup from the non-prostitute population. Psychiatric and psychological studies were obtained via online databases and library resources, and analyzed for evidence. Sources including information on prostitution in relation to drugs, mortality, sexual experiences, adolescence, and sociology were also consulted. Studies indicate that prostitutes may be grouped into different types based on method of operation, each with its own distinct psychological traits. Although there may be specific types of prostitutes classifiable as mentally stable, prostitutes are generally psychologically dysfunctional, many showing signs of serious mental disorders. On average, prostitutes experience higher than normal rates of mood and personality disorders, and tend to exhibit more impulsive sensation seeking and a skewed self image. These findings have implications in the current legal policies regarding prostitution, notably the handling of convicted prostitutes. Prostitution should not be approached as a crime stemming from poor decisions, but rather an indicator of underlying psychological problems that require treatment.

### **118. The Effect of the Loss of Vision on the Development of Compensatory Skills in the Blind**

*Nidhi Desai, Dept. of Chemistry, with Prof. Bonnie Orzolek, University College*

The purpose of this study was to determine whether the loss of vision accounts for the development of compensatory skills in the blind. For many decades, the effect of a loss of vision on the remaining senses of the body has been an important issue in neuroscience. Those believing that the blind have perceptual disadvantages argue that all senses are strongly dependent on visual cues, so without proper visual cues, the blind are not as proficient at using their other senses. Others argue that a lack of overpowering visual cues results in less interference in conceptual processing. Hence, people suffering a sensory deficit develop stronger abilities in other senses. Although studies have found contradictory results, the majority of literature now indicates that the blind develop a wide range of compensatory skills including superior hearing, touch, odor discrimination, and numerical estimation. These compensatory skills seem to most likely develop due to enhanced selective attention and memory. Moreover, blind subjects have shown significantly faster reaction times in discriminating between stimuli suggesting enhanced cognitive processing. Determining whether the blind possess compensatory mechanisms will not only improve the understanding of brain functioning, but will also help to determine whether the blind are actually better at performing certain jobs in the work force. Based on these results, employers may be less likely to discriminate or doubt the abilities of blind job applicants. More research is needed however to determine what exactly accounts for the development of such compensatory mechanisms in the blind.

### **119. Media Depiction of Somali Pirates and US Humanitarian Aid**

*Ali Salman, Dept. of Biomedical Engineering, with Prof. Mary Boyes, University College*

Since the collapse of its government in 1991, Somalia has endured many crises, including famines, wars, and, more recently, illegal piracy. This research could help the reader to shake off television biases and donate their money where it is needed most. Piracy has been denounced by US television media and this view has largely hindered attention to the current famine in Southern Somalia. As a result, hundreds of thousands of Somalis have died and millions more are at risk. In this study I evaluated three major US television networks' coverage of Somali pirates in a single week and compared adjectives to find out whether the coverage can be considered 'negative'. Twenty four articles were also analyzed and it was discovered that piracy off the coast of Somalia has received hugely negative coverage. However, a significant increase in civilian casualties as a result of famine received only a small increase in media coverage. This study can bring attention to the people suffering from the famine in the Horn of Africa by dispelling the stereotype that all Somalis are pirates.

## **120. Revisiting the US Homeless Crisis**

*Amber McNeal, University College, with Prof. Bonnie Orzolek, University College*

Beginning in the 1980's, the United States has been passing legislation and initiating programs to try and deal with the rising homelessness crisis. Beginning with Housing Readiness and then Housing First, the United States tried to help the homeless by placing them into affordable houses, with other programs serving to prevent low-income families from becoming homeless. It has been noted however that these programs have been serving less and less people due to underfunding and a limited understanding of the specific needs of a homeless person. At the same time as the Anti-Homelessness legislation was being passed, individual cities began passing laws that limited and criminalized many behaviors of homeless people, such as sitting or sleeping in public. The United States contradicts itself, having in place laws that help and laws that hurt the homeless population. Based on the successes and failures of the United States' methods to deal with the homelessness crisis, it can be concluded that there is an effective solution to the problem, one that is based on current pathways research that focuses on prevention, education, and access to support-services.

## **121. Teaching and Learning: Elementary Art Education in the US and China**

*Emma Scarvey, University College, with Prof. Jason Coats, University College*

The cultures of East Asian and Western countries are frequently compared for their contrasting approaches to childrearing and education. The Western hemisphere is recognized for its more fluid educational methods, while many East Asian countries emphasize structure and technique. Especially after the 1964 census that first illustrated the performance gap in math between Chinese and American students, numerous studies have been conducted to determine the most effective educational philosophy. However, an important but less examined subject is art education in Chinese and American classrooms. Studies have shown a correlation between art classes and success in other areas of academic study due to an increase in creativity and cognitive ability. Considering the role of the visual arts in both cultures, this paper examines the varying teaching and learning methods of elementary art education in China and the United States. Furthermore, it assesses how these different methodologies reflect and influence mental development of children. Ultimately, this paper concludes that the fine arts are a valuable component of early childhood education and development. Both Chinese and American classrooms would benefit from adopting different aspects of each other's methods for children to gain the most from an education in the visual arts.

## **122. Body Language and Gesture in Newspaper Comic Strips: How the Women's Rights Movement of the 1970s Has Influenced the Portrayal of Female Characters**

*Catherine Cozzi, Dept. of Gender Studies, with Prof. Mary Boyes, University College*

Art and media heavily utilize body language and gestures to communicate both conscious and unconscious messages. From the 1940s to the 1980s, especially with the advent of the women's movement of the 1970s, the portrayal of and interaction with female characters in syndicated newspaper comic strips has greatly changed. With each decade, predominant patterns or themes in the portrayal of women appear. Although research has been done on body language and gesture in other forms of media, such as film and advertising, and on the overall appearance and portrayal of women in media and entertainment, not much research has been done on body language and gesture in newspaper strips specifically, which have served as a widely-read medium. Based on studies of the portrayal of women in other forms of media, such as film and advertising, over time, and on primary research into body language and gestures in syndicated newspaper comic strips from the 1940s to the 1980s, it can be concluded that, while women by the 1980s were no longer portrayed in the roles or stereotypes common in previous decades, their portrayal does not show a generally positive improvement. Women in the 1980s were often pictured as unengaged with others and their surroundings—no longer mere housewives or overly sexualized beings, but not making a great mark on their world either.

## **123. Anorexia Nervosa: The Spiritual Road to Recovery**

*Sarah Moniz, University College, with Prof. Bonnie Orzolek, University College*

Anorexia nervosa is a widely misunderstood and misinterpreted mental disorder. It is most commonly viewed as nothing but an extreme desire for thinness and something to be looked down upon for its vain and obsessive qualities. Most medical professionals believe that anorexia is a clearly definable psychological disorder, a progression involving obsession, starvation, and habit. A strictly medical approach is most frequently used to treat the disorder. However, this alone is evidently not effective enough: anorexics who receive clinical treatment for their illness see up to a 63% relapse rate after leaving the hospital. The predicament with this medical method is that, in its prescribing of pills (such as selective serotonin reuptake inhibitors, or SSRIs), isolation from the outside world in hospitals, and sometimes forcing of anorexic patients into treatment, it almost completely disregards the heart of anorexia: the struggle for identity. Anorexia is a spiritual journey. It involves an intricate relationship between near-starvation, spiritual discoveries, and recovery. Anorexics usually restrict their food intake in order to assert control over their lives that they feel they do not have in any other situation, and through their obsessive eating behaviors and the mental and spiritual extremes that result, they come to know no other way of living. For this reason, the transformation of the identity of anorexics must be considered the most vital aspect of treatment. It requires the realization of an anorexic that he or she will be able to live a fulfilling life outside of the disorder through the breaking of his or her mentally and physically unhealthy habits. This transformation has been more successfully initiated when medical treatment is supplemented and even gradually replaced by forms of treatment like art therapy and yoga therapy.

Treatments that allow anorexics to address their thoughts and feelings, through movement and creativity, are more competent in their techniques, as they incorporate social connections (in group therapy), positive experiences, and cognitive stimulation. If the efficacy of these more spiritually- and mentally-positive treatments were more valued by the medical community, doctors could increase treatment options for their patients and, in turn, the patients may be more willing and open to try these new kinds of treatment that take place outside of the sometimes-intimidating medical environment. Most likely, the success rates of treatments would increase and a decrease in relapse rates would be observed. An integration of more spiritually apt methods into standard medical treatment could lead to an improved understanding of anorexia across all fields of study and social boundaries, as well as aid in the prevention of the disorder. Self-expressive therapeutic methods serve to better spiritually and mentally prepare an anorexic for the steps to recovery.

## **124. Understanding Sexual Consent**

*Suzanne Kirby, University College, with Prof. Bonnie Orzolek, University College*

Some may assume people have a shared understanding of sexual consent. However, consent itself is easily misinterpreted, especially when communicated in a vague, inexplicit manner, sometimes resulting in date/acquaintance rape. In order to better understand sexual consent and how it is perceived, I compared existing literature that attempts to define, measure, and analyze consent. These studies generally examine how subjects judge a given scenario in terms of being consensual. One of the most influential factors in the interpretation of sexual consent is the longevity of the relationship. Across all of the studies, research suggests that as a couple's intimacy increases, the perceived need for explicit consent decreases. Particularly in long-term relationships, consent is often assumed, even when it has not been given. Similarly, alcohol use may inhibit an individual's ability to interpret the presence or lack of consent. In addition, most subjects preferred to use inexplicit, nonverbal communication to express sexual consent, rather than have a direct conversation with their partner. This lack of open communication can lead to ambiguous situations in which consent is unclear and result in traumatic date/acquaintance rape. Often, victims of these cases blame themselves or do not report the incident, especially when a clear "no" was not given. In order to prevent date/acquaintance rape particularly in a college setting, it is crucial to both promote open discussions about sex, and understand the meaning of sexual consent itself.

## **125. How a Female's Fear of Blushing Interferes with Social Interactions**

*Ashley Tran, Dept. of Biology, with Prof. Mary Boyes, University College*

Blushing is a spontaneous reddening or darkening of the face, ears, neck, and upper chest that occurs in response to perceived social scrutiny or evaluation. Charles Darwin refers to it as "the most peculiar and most human of expressions." Many people who suffer from chronic blushing also develop a fear of blushing, especially if the person is really concerned with how they are regarded by others. Because there hasn't been much research done on fear of blushing, this research specifically studies how a female's fear of blushing interferes with her social interactions and whether or not there is a way to control facial blushing by synthesizing and analyzing current research. After synthesizing various research, it is most likely that self-consciousness has a strong correlation to chronic blushing and can interfere with social interactions.

## **126. Grafitti and the Palestinian Resistance Movement**

*Lina Silverman, University College, with Prof. Bonnie Orzolek, University College*

The West Bank barrier was erected by the Israeli government as a security measure against the Palestinians and as possible borders for a Palestinian state. The barrier has since become a canvas for political graffiti supporting the Palestinians in this conflict. Not only has the barrier attracted renowned graffiti artists, like Banksy, but also common citizens as well as tourists. Although graffiti is often regarded as a form of urban decay, the unconventional use of images and words reflects the zeitgeist of a nation, such as Israel. This research examines how the psychology of graffiti allows the Palestinians to form a more effective resistance movement against the Israeli government. History has taught us that in order to overcome a dominating force, the opposition needs to be cohesive. David Hanauer, an English professor at the Indiana University of Pennsylvania, described the graffiti on the West Bank barrier as an “intervention in a relationship of power.” The hierarchical nature of the Israeli government and its unfair control over international news media has created an “absence of voice” (Hanauer, 2004) amongst the Palestinians. Various studies state that the anonymity and illegality of graffiti allows graffiti ‘writers’ to create a more confident, open dialogue. This dialogue is necessary since it challenges traditional media, forcing them to provide more commentary. This in turn could force more progressive legislation from the Israeli government. The unregulated dialogue serves as a method of organizing like-minded individuals even in the midst of chaos.

### **127. The Influence of Societal Perceptions of Aesthetics on Neuroaesthetic Arguments**

*Ankita Dosaj, University College, with Prof. Bonnie Orzolek, University College*

Neuroaesthetics is an emerging field limited by the implications of science and art to quantify the aesthetic experience of visual arts perception. Many theories on aesthetics or neuroaesthetics have been developed, but there is no certainty in research involving visual arts, perception, or aesthetics. Before any piece of artwork is perceived, they are transferred from the view and technical abilities of the artist. Furthermore, perception from the viewer’s mind is based on individual understanding of aesthetics or appreciation. Perception is generally based on changing societal views on aesthetics. Some of the recurring limitations in research are the disregard of time, style, and the lack of defined terms. Vilayanur Ramachandran and William Hirstein first introduced a theory consisting of eight principles based on physiology, evolutionary biology, and neurological deficits in 1999. It has been largely discredited over time due to limited parameters. Helmut Leder et al established another model from a psychological perspective in 2004. Christoph Redies created a model of aesthetic experiences based on sensory coding in 2007. Any research on visual art comes back to the essential question of what is art. Since there is no basic similarity in the perception of the researchers toward art, there is no conjunction in the field of neuroaesthetics as well. Thus, while neurologists attempt to make sense of art, artists purposely violate conventionality in their work. The purpose of this investigation is to evaluate whether a possible universal theory on visual arts perception will be credible over time with respect to changing perceptions on aesthetics.

## **128. How the Muslim Portrayal in the News Media Has an Impact on Muslim Children's Perspective of Themselves and Islam**

*Ananya Michera, Dept. of Biology, with Prof. Mary Boyes, University College*

In a post September 11 era, Muslims are targeted as selfish, violent, and harmful individuals by many in the United States. To reflect upon the majority of the nation's ideas, the media also plays a role in negatively portraying Muslims. By using certain derogatory words such as "terrorist" in headlines and in news stories, the news media has a great hand in the nation's perception of Muslims today. The news also reaches children who are listening to it in the car or watching it on the television with their parents. It is important to see how the negative portrayal of Muslims in the media inhibits the way American-Muslim children perceive themselves and Islam. Although there is research on how the media's portrayal of Muslims post 9/11 affects Muslim adults, there is limited research on how it affects Muslim children's perception of themselves and their religion. To complete my research I analyzed 19 academic journal articles about the separate topics of self-perception in children and the news media portrayal of Muslims post September 11. I also analyzed the Nielsen Ratings to predict how many children are being exposed to news media. The fairly negative portrayal of Muslims in the news media has an effect on the self-perception of children because ideas and images not only reach them through the media but through communication with other children as well. Having poor self-perceptions can lead to a non-optimal mindset which is not accepted by society and later leads to poor judgment and wrongful actions. As children absorb the negative images of Muslims, it could lead to the formation of vengeful Muslim adults with poor judgment and a negative perception of America.

## **129. Genetically Modified Foods: FDA Keeps Consumers in the Dark**

*Megan Kemmey, Dept. of Biology, with Prof. Bonnie Orzolek, University College*

Genetically modified foods are increasingly appearing in the food supply throughout the world, especially in the United States. These products are created by seed developers using molecular biology and genetic engineering techniques in order to enhance certain desired traits. Unlike conventional methods, genetic engineering allows specific traits in a product such as when a food begins to ripen or resistance to a specific herbicide to be expressed. In the United States, the FDA is responsible for monitoring the production and safety of all food, with the safety of consumers their primary goal. However, the FDA appears to have very relaxed regulations, for example not requiring the labeling of these products, and many, such as tomatoes, corn, and soybeans, are used in the production of other processed foods, such as a packaged corn tortillas. Moreover, seed developers and producers, such as the international company Monsanto, often seem to play a larger role in the market of GM foods than the FDA, whom most would think played the largest role as a regulatory agency. Because of the FDA's looser regulations and monitoring, consumers are negatively impacted as they are left unaware of the existence of GM products in the market and their effects. Often, they consume them without even knowing, and consumers' lack of knowledge increases the fear of risk towards GM products. It is imperative that individuals come to understand the existence of GM foods and the changes that are made in these products using genetic engineering in order to actively form opinions and decisions towards the production, sale, and purchase of them in the United States.



### **130. Loudness War**

*Perry Twill, University College.*

The term Loudness War denotes the negative effects that any sound producing machinery has on the human ear. One of the most common sound-producing technologies that individuals listen to is music, and thus this recreational activity can take a proportional toll on people's health. Why does it take such a toll on someone's health? Well there are various reasons for why heavy-music loving individuals are at risk of developing a hearing condition. Is it possible for individuals to achieve the same euphoric status from music but without the risks of being diagnosed with a hearing condition? What are some ways in which individuals can practice safe and fun ways to enjoy their music? I plan to explore and venture into the realm of our society's composed music and how listening to certain sounds will affect people through the use of conducted experiments along with psychologists, doctors, and peers with understanding and knowledge on the subject matter.

### **131. U.S. Perceptions of Prostitution and Human Trafficking**

*Rebekah Rifareal, University College, with Prof. Mary Boyes, University College*

The issue of human trafficking has increasingly gained attention every year since the 1990s, yet trafficking still continues to grow as one of the most lucrative criminal industries. The majority of these cases are sex trafficking cases involving young women between the ages of 15-20 that are kidnapped or coerced into prostitution. Sex trafficking continues to grow despite the inhumane ways that the women involved are treated. This study examines the general perspectives on prostitution that exist in America, particularly the perspective of those who consider prostitution to be synonymous to "modern day slavery" in contrast to those who believe that prostitution is mainly made up of women who are involved by choice. To assess the influence of both of these perspectives, this study compares and contrasts the effect of different portrayals of prostitution on awareness of trafficking in America along with interviews and narratives of women involved in the trafficking industry. It was concluded that neither perspective gave an accurate picture of prostitution, but instead over-exaggerated, misconstrued or glamorized the lives of women trafficked into prostitution. This observation is important because it reveals that people often avoid directly addressing the core problems behind controversial, sensitive issues, thus fostering misconceptions and hindering appropriate solutions to the issue.

### **132. Enhancing Treatment in Diabetic Patients with Pancreatic Cancer via Natural Therapies**

*Sidrah Alam, Depts. of Biology and Psychology, with Prof. Mary Boyes, University College*

A study published in 2011, conducted by researchers at Lund University, found a possible connection between diabetes and cancer. Doctors have seen that people with diabetes have a greater chance of developing cancer, particularly pancreatic and colon cancer. The reason the two diseases are connected is because the gene responsible for diabetes, the TCF gene, deactivates the gene that suppresses tumors, the p53 gene. The TCF gene which is overexerting itself to try to balance the insulin production in the body, turns off the p53 gene and thus encourages tumors to form and cancer to develop. This is where it becomes a bigger problem for diabetics because their p53 gene is naturally turned off. It seems that natural treatments have been very beneficial but are used less and less as more artificial drugs are made. Chemotherapy uses artificial drugs to kill the cancer cells in one's body. However, these drugs also negatively affect normal cells. If natural treatments simply help activate the gene that

suppresses tumors, this could kill the cancer cells without harming other cells. Analyzing current literature led to the research question how could natural treatments be used to enhance cancer treatments in diabetic patients. Berries have been found to contain ellagic acid which can activate the p53 gene. The ellagic acid helps regulate the cell cycle and activates the gene to induce apoptosis in the cancer cells. This is a major development in cancer research. If berries can be supplemented with other cancer treatments, this would increase the success rate in diabetic patients with pancreatic cancer.

### **133. Sex-Positive Feminism; What it is and How it Will Positively Affect Women in Society**

*Annelise Padro', Fashion Merchandising, with Prof. Mary Boyes, University College*

Sex-Positive Feminism is a kind of feminism that is unknown to most. Those of us who are well versed in the varying genres of women's rights are well aware of it, but to those who are not I offer a simple explanation. Sex-Positive Feminism is the idea that women should be able to openly embrace their sexuality without being looked down upon or perceived as someone of loose and poor morals. One must not get confused and think that Sex-Positive Feminism is a completely different approach, for it is very similar to basic feminism. One must understand that it is an extension of the already existent feminist ideals. For ages women were seen as erotic and sensuous creatures, but the thought of ever enjoying that title was something shameful. Even in modern times if a woman openly discusses her sexual relations she is seen as a slut, hussy, vamp, etc., while men only receive praise when discussing their sexual conquests. This is clearly wrong because women enjoy sex as much as men do and deserve to be on equal ground when it comes to the bedroom. Proof of this claim would be the fact that during this past economic depression the sale of vibrators has stayed consistent and unaffected. Women do in-fact invest in sex toys, pornography, lingerie, and sexually oriented magazines such as *Cosmopolitan*. Recent studies have proven that women who label themselves as feminists or adhere to certain feminist principles have a greater amount of satisfaction in bed. Sex-Positive Feminism also helps to open up discussion about women's sexual health and safety. By accepting our sexual thirst women will be able to easily discuss common health issues such as birth control and venereal disease prevention without feeling ashamed or fear judgment. This form of feminism was the fuel behind the recent *SlutWalks*; the *SlutWalk* protests defied those who felt that when a woman gets raped she must have been "asking" for it in some manner. Sex-Positive Feminism enforces the idea that women should not be taught to avoid rape yet that men should be taught not to rape women. No woman deserves to undergo the grotesque act of rape and be blamed on it because she decided to wear a mini-skirt that day. People must work together to realize that women enjoy sex as much as men, whether one chooses to save it for marriage or not, and that we must condemn anyone (regardless of gender) who continues to enforce the sexual double standard that exists in this world. Sex is a very human act and by not allowing women to enjoy it, it implies that we might as well be animals; caged animals for that matter unless action is taken. Sex-Positive Feminism promotes women to be open about embracing their sexuality without being perceived in a negative light. If men don't have to feel shame about their sexual acts, then why should women? Sex-Positive Feminism demands equality for men and women not just in everyday life, like the workplace, but also in the bed. Just because a woman enjoys the act of sex does not mean she should be seen in a negative light but only in a positive light, Sex-Positive for that matter.

### **134. Effects of Induced Embryonic Stem Cell Therapy on Retinitis Pigmentosa**

*Aneesh Patel, University College, with Prof. Mary Boyes, University College*

Stargardt's disease and Dry Age-Related Macular Degeneration were both previously incurable diseases before clinical trials were performed using embryonic stem cells. The embryonic stem cells were able to replace the damaged RPE cells from the retinal degeneration in both diseases. A similarity in both these disease is that they both involve degeneration of retina, resulting in damaged RPE cells and they both were able to be treated using induced embryonic stem cells to replace the damaged RPE cells. Another disease, retinitis pigmentosa, is also an ocular disease that involves retinal degeneration and is incurable. Hence, it is hypothesized that due to the strong similarities between the three diseases, retinitis pigmentosa could be cured using the same method of using induced embryonic stem cells that had been used in the treatment of Stargardt's disease and Dry Age-Related Macular Degeneration. Numerous clinical trials and academic articles on all three diseases as well as induced embryonic stem cell therapy to treat them was looked and connections were made between different articles to develop a conclusion to the problem at hand. Based on the techniques used in Stargardt's disease and Macular Degeneration, the method of using induced embryonic stem cells should be able to be effective in retinitis pigmentosa because the use of the embryonic stem cells in replacing the damaged RPE cells would be the same in all three diseases. However, in the case of retinitis pigmentosa, replacing the damaged RPE cells may not be able to cure the disease because it is not the only problem associated with retinitis pigmentosa, but the use of induced embryonic stem cells would definitely be able help hinder and slow down the ocular disease. This conclusion could lead to more research on using induced embryonic stem cells and it could possibly lead to clinical trials to test what the actual effects of induced embryonic stem cell therapy to replace damaged RPE cells in retinitis pigmentosa would be.

### **135. Neoadjuvant Methods of Treating Breast Cancer**

*Lawrence Talej, Dept. of Biomedical Engineering, with Prof. Mary Boyes, University College*

Breast cancer affects hundreds of thousands of women across the world. Currently, there is no cure, but methods of treatment exist which drastically improve life expectancy. However, there is much room for improvement in current methodologies. The goal of this research is to extrapolate the best possible neoadjuvant (preliminary) treatment method for breast cancer from existing methods and research in an effort to create the most effective approach to breast cancer preliminary treatment. The procedure for investigating this topic involved the analysis and interpretation of 25 different, but relevant peer-reviewed scientific journals. Several different compiled lists of relevant database indices provided most of the journal entries that substantiated this research. Each source was carefully examined for content relevancy, statistical backup, and for as little bias as possible. The authors of the respective scientific journals underwent a thorough investigation process to verify his/her credibility. As a result of my research, it became evident that both radiation and chemotherapy should be applied in a neoadjuvant fashion to help increased the life expectancy of the patient and reduce recurrence rates. Depending on the size and location of the tumor, radiation and

chemotherapy should be alternated before primary surgical treatment. If the patient is healthy enough, exposure to both treatments in the same period is optimal given the proper size and location of the malignant tumor. Research has revealed that while radiation may pose some risks in inducing more cancer in the patient, those risks are low and often times the risk-to-benefit ratio is in favor of the patient. Thus, neoadjuvant breast cancer therapy should involve both radiation and chemotherapy to better the chances of breast cancer survival, breast conservation, and lower recurrence rates.

### **136. Confirmation Bias and the Sexual Double Standard**

*Tara Powell, School of Engineering, with Prof. Mary Boyes, University College*

Researchers agree that historically in western culture, and arguably presently as well, women's sexuality has been suppressed through both cultural and legal means. There is a lack of analysis though on how women view this suppression and their fellow women's sexuality in general. To explore this complex concept, I compiled sources in the fields of psychology, women's studies, and cultural views of sexuality. This research revealed that female sexuality is not suppressed in actuality as much as it is perceived to be by western society and that confirmation bias prolongs the perception of a sexual double standard. Another interesting finding is that women are in fact the ones who uphold the suppression of sexuality in other women significantly more than do their male counterparts. This suggests that focus should be guided away from men as the perpetrators of sexual suppression and more focus should be on why women suppress their own genders sexuality in order for women to express their sexuality more healthily and freely.

### **137. Bilingual education/language immersion programs as a method of revitalizing endangered Native American languages**

*Mariam Bello, School of Business, with Prof. Faye Prichard, University College*

The rate at which languages are declining has been a topic of concern among linguists and Native communities for many years. For many Native American communities, the problem is becoming increasingly evident as members realize that most of the Native speakers remaining are either adults or the elderly and that few children are being brought up fluent in their Native American language, being socialized in English instead. This realization has led to an increase in efforts to reverse this language shift, and prevent a large number of Native American languages from dying out over the next few decades. Native American communities are now turning to schools to help revitalize the language by creating a new generation of Native language speakers through language immersion or bilingual education programs. While there are case studies of successful Native American language programs, such as the Hawaiian, Navajo and Cherokee immersion programs, there is no set model for other Native communities who want to undertake the same efforts to follow. By looking at such case studies and other relevant research, such as language policy, this study aims to identify the conditions that need to be in place for the success of Native American bilingual education/language immersion programs. It also aims to serve as a model for Native communities to follow or use as a guideline, while leaving room for adaptation to the specific circumstances of each community. Successful language programs will help reinstate the Native language as a form of everyday communication in the community.

### **138. Natural Sourcing a New Class of Antibiotics**

*Susanna Pent, University College, with Prof. Faye Prichard, University College*

Multi drug resistant bacteria are gaining an increasingly dangerous advantage over antibiotics through adaptation and mutation. Our current method of research and administering antibiotics is ultimately selecting for a super disease resistant to all current bacteria and for which we will have no cure. I wanted to know how we could circumvent this threat and once again begin making progress in antibacterial research. In vitro screening of plant natural products and evaluation of different metabolites within the sample allows scientists to determine what compounds are most effective in overcoming bacteria. I used studies from several qualified scientists that looked at plant compounds, metabolites, and existing antibiotics to determine where the antibiotic potential lies. The scientists participating in these studies worked in labs around the world studying this very subject and publishing articles and reviews on their findings throughout the years. My paper is a pooling of their research into a summary of what they collaboratively found. The experts agree that the future to antibiotics lies in a renewed focus on searching for new classes of antibiotics from natural sourcing. Because of the harsh bacterial and fungal environment that plants are immersed in in the soil and the air, they must develop strong mechanisms to overcome the bacteria. If scientists can identify and isolate these mechanisms, they can create new and better antibacterials for our own use. In addition to whole classes of antibiotics, plants also have secondary metabolites which target specific mechanisms in bacterial cells that contribute to resistance, one of the most effective of these being efflux pumps. The collaborative research agrees that synergy of natural antibiotics with natural secondary metabolites is the most effective way of fighting bacteria. By changing our method of research and returning to nature, we can discover new and more effective antibacterials and avoid the super disease threat. A thorough study of plants and their method of fighting bacteria will provide scientists with their own plan and solution to bacteria. Extracting the compounds responsible for antibacterial work in the plant and using them in synergy with existing antibiotics will both improve existing antibiotics, as well as allow for the discovery of new antibiotics.

### **139. Does Creatine Protect against Traumatic Brain Injury (TBI)?**

*Kaitlyn Parkman, Life Sciences, with Prof. Faye Prichard, University College*

After spending quite a bit of time in the gym, I found that many students used different supplements to enhance their workouts. I was interested in the safety of these dietary supplements, so I decided to do a bit of research. While browsing a variety of sites, I found that one of the most popular supplements amongst high school and college athletes in particular is creatine. Creatine, simply enough, increases the efficiency of workouts and increases overall muscle mass. To my surprise, I continued to come across a statement about creatine and its effect on the brain. Scientists agree that creatine does in fact have a neuroprotective effect on the brain. My goal is to determine to what extent creatine helps protect against traumatic brain injury (TBI). The answer to this question could ultimately lead to a possible treatment plan or drug for patients who experience TBI. Current experimental research shows that creatine produces a positive measurable neuroprotective effect on TBI in the lab. Scientific journal publications of experiments discuss human trials that have shown an increase in recovery rate and a decrease in symptoms in TBI patients supplemented with dietary creatine. Ultimately, many more human trials will need to be run to fully understand

creatine's neuroprotective possibilities, to determine amounts of creatine necessary to be optimally effective on the patient, and to discover how creatine actual functions as a neuroprotectant at the cellular level. Based on current literature, however, creatine holds many promises for the future of medicine.

#### **140. Globalization and Antimicrobial Resistance: A Comparative Analysis**

*Gireesh Reddy, Dept. of Biomedical Engineering, with Prof. Faye Prichard, University College*

Antimicrobial resistance is one of the most dangerous health and policy concerns that the world faces today. The therapeutic antimicrobial drugs were mostly discovered or synthesized in the latter half of the 20th century. They include antibacterials, antifungals, antimalarials, and antiparasitics. Many antimicrobial drugs, such as penicillin or tetracycline, have become hallmark drugs used in the treatment of infectious diseases. The clinical use of antibiotics has become just as commonplace in a health care environment as checking for a fever or measuring weight. Antimicrobials play a vital role in the regulation of human health and are one of the foundations upon which modern medical practices are based. With such importance vested in antimicrobials, it becomes almost blatantly obvious the necessity to preserve the efficacy of such drugs. Antimicrobial resistance is the ability of a targeted microorganism to survive exposure to an antimicrobial agent. With the advent and acceleration of globalization, it seems as if antimicrobial resistance is growing at an alarming rate. My research question is 'How does globalization play a role in the rate of antimicrobial resistance?' Through a comprehensive review of literature, it becomes clear that population mobility, a key statistic of globalization, is an important correlate of antimicrobial resistance. Furthermore, the practice of medical tourism, another emerging feature of a globalized society, is implicated in the rise of antimicrobial resistance. Ascertaining the influence of globalization on the rate of antimicrobial resistance has undeniable benefits for human health, both domestic and global. This research has potential applications in global health policy and appropriate measures should be taken in order to minimize the spread and impact of antimicrobial resistance.

#### **141. Differential Expression of the Nance-Horan Syndrome (NHS) Family Genes in Zebrafish Embryos**

*Adrien Mann, Dept. of Biology, with Dr. Gregory Walsh, Dept. of Biology*

Nance-Horan Syndrome (NHS) is a disease of unknown gene action mechanism, characterized by congenital cataract, craniofacial and dental anomalies and mental retardation. Affected individuals have null mutations in a novel gene, NHS, typically resulting in premature truncation of the protein. Elucidating the function of this gene family will be an important first step towards understanding the molecular basis underlying this human disorder. In vertebrates, the Nance-Horan Syndrome (NHS) family includes three members: Nhs, Nhs11 and Nhs12. The members of the NHS family show a high degree of sequence conservation between members and likely have paralleled functionality. Zebrafish possess two copies of each member (eg., Nhsa and Nhsb) due to a genome duplication event in the teleost lineage. To shed light on the role of NHS family members during development, we have characterized the NHS genes in zebrafish. Here, we conducted RT-PCR to analyze the temporal expression pattern of all 6 zebrafish NHS family members. We then analyzed the spatial expression pattern of selected NHS family members, NHSa, Nhs11a, and Nhs11b. The spatial and temporal patterns of these genes suggest that they occupy a role in nervous system development. In addition, Nhsa, and

Nhs11b are expressed in early mesoderm during gastrulation indicating that they may play a role in early morphogenetic cell movements during vertebrate development.

### **142. Exploring the subcellular localization of Scribble and Nhs11b in migrating neurons of developing zebrafish embryos.**

*Emily Clowdus, Dept. of Biology, with Dr. Gregory Walsh, Dept. of Biology*

An essential feature of a developing brain involves the migration of neurons from their place of origin to their final position where they perform their specific function. The migration of Facial branchiomotor neurons (FBMNs) in the hindbrain are an ideal model system with which to study the molecular mechanisms controlling directed cell movements of neurons during early development. FBMNs are a subclass of cranial branchiomotor neurons that proliferate within rhombomere (r)4 and migrate caudally into r6 and r7 in the zebrafish. These form the facial motor nucleus that will innervate muscles in the head that are derived from the second branchial arch. Two proteins, Scribble and Nhs11b, have been identified as essential cell-autonomous components for the migration of FBMNs. Nhs11b has been shown to genetically interact with Scribble during FBMN migration and can physically bind to Scribble *in vitro*. The goal of this project was to determine whether endogenous Scribble and Nhs11b co-localize in FBMNs during migration *in vivo*. The underlying hypothesis of this study is that the co-localization of Scribble and Nhs11b at the leading edge of migrating FBMNs is a critical factor promoting migration. To address this, we characterized two mouse monoclonal antibodies for their suitability in whole-mount immunohistochemistry for the subcellular localization of endogenous Nhs11b and Scribble. Optimal conditions for immunohistochemical detection of Nhs11b and Scribble were first identified. Scribble was membrane localized to the membrane of most cell including FBMNs, whereas Nhs11b was localized to the membrane protrusions of FBMNs. We are performing double immunohistochemistry to detect the co-localization of Nhs11b and Scribble in the same neuron.

### **143. Listeria Monocytes in the Current Broiler Chicken Industry**

*Caitlyn Kremp, University College, with Prof. Faye Prichard, University College*

In the 1930's the developed world began using industrial food animal production systems to have more controlled conditions under which production could be magnified and the livestock could be protected from pathogens. Consumer demand has increased to such a degree, however, that these growth facilities house an overabundance of animals, which have become breeding grounds for bacteria. It is important to identify immediate threats of these bacteria in regards to poultry house workers. Chicken meat, as a healthier meat choice, has become a staple in our diet on a global scale but this meat, in the current production environment, could become detrimental to our health. I studied worker regulations and sanitation requirements from developed countries to understand the conditions of the current broiler chicken industry. I then formulated a thesis from multiple research articles published by leading officials performing research through the United States Food and Agriculture Organization along with the United Nations' Food and Agricultural Associations to identify bacteria imposing health risks in the work environment. The information supports that bacteria such as listeria monocytes are almost inevitable in broiler chicken growth facilities even with heavy safety and sanitation requirements. I conclude that workers are highly susceptible to contracting avian transmitted pathogens that can spread throughout communities and become fatal. With

the large global population, that is continually increasing, people have become densely concentrated. This close proximity coupled with the risk of avian related pathogens leaching into communities has the potential of influencing a global pandemic.

#### **144. Feminist Attitudes in 20<sup>th</sup> Century Science Fiction**

*Grace Rose, Dept. of Cinema, with Prof. Faye Prichard, University College*

Despite its subject matter being the potential future, science fiction has the tendency, perhaps even more so than other genres, to be highly reflective of the contemporary culture of when a particular work originated. In fact, the genre was and is used to comment, either directly or indirectly, on social changes occurring or standards typical of the times. This is particularly true when it comes to the way that women have been portrayed in science fiction works in the United States. Through studying various analyses of science fiction works, originating from various points throughout the latter half of the 20<sup>th</sup> century, as well as my own analysis of three works: two works from the 1950's, *It Came from Beneath the Sea* and Isaac Asimov's *I, Robot*, and a film from 2004, *I, Robot*, which presents an alternate interpretation of a character from Asimov's novel, I have come to the conclusion that the portrayal of women in science fiction is less directly reflective of women's *actual* position in contemporary United States society, but more so of feminist attitudes of the same. Studying these works has demonstrated that science fiction media, whether the works were intended by their creators to be feminist in nature or not, can reveal just as much about the feminist attitudes during a particular era in United States history as actual feminist paraphernalia.

#### **145. Socioeconomic Class, Race, Gender and Eating Disorders**

*Sallie Bailey, University College, with Prof. Faye Prichard, University College*

Stereotypically, eating disorders seem to affect young, upper class, Caucasian women more often than any other group of people. Many people assume this statement to be true without making an effort to understand exactly what reasoning lies behind this stereotype. Failing to comprehend the reasons behind a person's development of an eating disorder leads to confusion and the inability to help the people in need. If people could understand what affects a person's susceptibility to developing an eating disorder, they could make an effort to change how their cultures view and contribute to eating disorder development. In order for people to understand how eating disorders develop, they must understand how socioeconomic class, age, race, and gender affect a person's susceptibility to developing an eating disorder.

#### **146. Advertisements and the Human Psyche**

*Daniel Salazar, University College, with Prof. Faye Prichard, University College*

The human mind can confront a situation, analyze it and react upon it before a person can even count to one. But what processes does the human psyche go through when it decides what to do in these situations from typing on a keyboard to shopping in a mall? More specifically, upon what does the human mind base its decisions when it processes the contents of an advertisement being read in a newspaper or seen on a television? Is there more than one way to process the information being received when you are watching the ad? This paper will go into the details of the effects of advertisements to the different processes that work in sync together to create our human psyche.



### **147. Sk8 or Die: How has gender effected the subculture of skateboarding and how has women's involvement redefined a traditionally masculine sport?**

*Kelsie Conley, School of Arts, with Prof. Bonnie Orzolek, University College*

Due to the socialized assumption that all skateboarders are male- gender has become a means of exclusion, keeping female participants from succeeding in the sport. This exclusion is perpetuated by the construction of female stereotypes of helplessness, a lack of representation of women skateboarders in the media- and the sexualization and trivialization of those featured- and the overwhelming male-dominated majority of the sport. In this research paper, the techniques males use to bar female skateboarders such as; language, heteromascuine standards and lack of support, are examined as well as the ways women appropriate these techniques as a means of empowerment and initiative to change the dynamics of the sport. A number of one-on-one interviews, personal accounts and self-publications have been studied in order to highlight how women navigate through the subculture of skateboarding despite its gendered nature.

### **148. Has Abstract Art Become Irrelevant?**

*Carmen Smith, School of Arts, with Prof. Faye Prichard, University College*

Abstract art is praised in the art world and so are those who create it; however this art genre may be rather irrelevant because it does not communicate as profoundly as representational art. Since art communicates with an individual in a visual form, what the artists of abstract works are trying to communicate through their non-representational work warrants some attention. After analyzing works spanning different disciplines such as metaphysics, neurology, and philosophy it can be surmised that most abstract art appeals to the brain's basic function of interpreting lines and its tendency toward logical fallacy rather than intellect or emotion because artists are ultimately unable to tell the observer anything worth communicating. This conclusion was influenced by the works of Derek Hodgson in his article "Graphic Primitives and the Embedded Figure in 20th-Century Art: Insights Neuroscience, Ethology and Perception" who outlines the science behind the brain's interpretation of abstract images, the work of Abstract Expressionists in particular. Also, the work of Tsion Avital in *Art Versus Nonart: Art Out of Mind* philosophically takes the point that the fallacy of affirming the consequent leads viewers to believe abstract art is "real art" in the first instance and a form of communication when it only contains elements of communication and therefore fails to ultimately communicate. In addition, works such as Antoon Braekman's "From the Work of Art to Absolute Reason: Schelling's Journey Toward Absolute Idealism" pointed to the artist communicating his inner self, yet, in the view of Francis Schaeffer's book *The God Who Is There* in the section "The Intellectual and Cultural Climate of the Second Half of the Twentieth Century", he has a lack of information to convey to the viewer or what he wants to convey is quite devastating. So an artist can only hope to appeal to the basic function of the visual brain with his empty soul bankrupt in the way of communicating anything of any significance. In this author's view the implication of all this is as time and culture have changed, the public does not need empty appeals to primitive neurological functions or emotions, but art that compels them to think, live, and communicate which abstract art ultimately fails to do.

### **149. Why do those with Attention-Deficit/Hyperactivity Disorder have a comorbid tendency to develop anxiety as well?**

*Cyrelle Fermin, University College, with Prof. Faye Prichard, University College*

My question is “Why do those with Attention-Deficit/Hyperactivity Disorder have a comorbid tendency to develop anxiety as well?” In my research, I found a correlation among ADHD, comorbid anxiety, negative peer relationships and maternal overprotectiveness. The symptoms of ADHD gave rise to aggressive and impulsive characteristics in the children, which caused difficulty when gaining peer acceptance. They also did not have social competency to realize their behavior was different from others. Those with ADHD were more prone to become bullies or to be bullied by peers. I hypothesize that this lack of acceptance by peers could affect the child psychologically and open the door to a disorder like anxiety. Children with ADHD also experienced a high amount of authoritarian parenting style, especially on the part of the mother. This could lead the child to believe that he or she was not capable of taking on the problems of the world. The child could also take this overprotective nature into a classroom with his or her peers, causing a negative relationship with them. Such psychological feelings could make the child prone to a comorbid disorder. This has implications into the type of parenting that should be used when dealing with children with ADHD. Although parents may think that an overprotective style will help their child deal with things, but it is actually counter-productive. This also has implications as to how children with ADHD view their relationships. In interviews, the children did not see any issues with their peer relationships, but teachers and fellow classmates saw that the relationship was not as harmonious as the child thought.



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