



Poster Symposium

For Undergraduate Research and Creativity



Wednesday April 20, 2011
Commonwealth Ballrooms
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
- Jacqueline Smith-Mason, Ph.D., Assistant Dean & Director of Undergraduate Research, The Honors College
- Reed Mason, Chili's @ VCU
- The Honors College, Student Council
- Department of Psychology
- Wythken Printing
- Undergraduate Research Opportunities Program (UROP)
- Beverly Warren, Ph.D, Interim Provost
- Laura Westmoreland, VCU Libraries
- Keith Rafter, VCU Athletics
- Faye Prichard, University College
- Research Week 2011 Task Force
- Amy Randolph, Barnes and Noble @ VCU
- Department of Chemistry
- Ted Carter, Graduate Assistant, Honors College
- School of Engineering

The posters presented were supported by the generosity of many VCU, governmental and private funders, including:

AD Williams Trust Funds
American Heart Association
Amgen Summer Scholars Research Program
British Academy
Honors Summer Undergraduate Research Program
Howard Hughes Summer Scholars Program
Jeffress Memorial Trust
Levehulme Trust
National Institute on Drug Abuse
National Institutes of Health
National Science Foundation
Ronald McDonald Charities
VCUarts Grants for Undergraduate Students
VCU Clinical Research Center
VCU Department of Biology
VCU Department of Psychology
VCU General Clinical Research Center
VCU School of Education Research Grants Program
VCU School of Engineering
VCU School of Social Work
VCU Undergraduate Research Opportunities Program (UROP)
VCU University College
Virginia Institute for Psychiatric and Behavioral Genetics
Virginia Premier Health Plan
Virginia Tobacco Settlement Foundation
U.S. Army Prostrate Cancer Research Program

The Advisory Committee for Undergraduate Research Opportunities

Dr. Ann Nichols-Casebolt – Associate Vice President for Research, Committee Chair

Herb Hill – Coordinator of Undergraduate Research Opportunities, Assistant Chair

Dr. Suzanne Ameringer Asst. Professor, School of Nursing

Dr. Suzanne Barbour Professor of Biochemistry and Molecular Biology, Director Research Core, VCU Center on Health Disparities

Dr. Alison Baski Professor and Chair, Physics Department

Mary Bramley Coordinator, Research Training Programs, Center on Health Disparities

Virginia Casanova Assistant Director, School of World Studies

Dr. Jan Cheblowski Associate Dean of Graduate Education, School of Medicine

Cory Colbert Coordinator Math Student Scholars, Department of Mathematics

Dr. Vennie Filippas Associate Dean for Undergraduate Studies, School of Engineering

Dr. Lee Franco School of Education, Health and Human Performance

Niyant Jain SGA Representative, Undergraduate

Dr. Allison Johnson Assistant Director, Center for the Study of Biological Complexity, HHMI Scholars, Phage Lab

Dr. Shelly Lane Assistant Dean of Research, School of Allied Health Professions

Dr. Jason Levy UROP Coordinator, Wilder School, Community Engagement and Disaster Risk Reduction Group

Dr. James Mays Assistant Dean Undergraduate Academic Affairs, College of Humanities and Sciences

Dr. Shannon Mitchell Associate Dean of Undergraduate Studies, School of Business

Ananda Newmark Director BSW Program, School of Social Work

Faye Prichard Director UNIV 200 Research Writing, College of Humanities and Sciences

Daphne Rankin Associate Vice Provost for Instruction, University College

Dr. Suzanne Ruder Graduate Director, REU Program Director, Department of Chemistry

Dr. Sarah Rutan Department of Chemistry

Dr. Chris Saladino Director Undergraduate Honors Program, Wilder School

Dr. Nancy Scott Associate Dean, School of the Arts

Sarah Seashols Undergraduate Program Director, Department of Forensic Science

Dr. Jackie Smith-Mason Assistant Dean, Director Undergraduate Research, Honors College

Dr. Linda Zyzniewski Director Undergraduate Programs, Department of Psychology

All Abstracts Organized by Poster Number

The Placebo Effect located on Main Floor

Cameron Robinson, School of the Arts

The placebo effect is a term that has exceeded the boundaries of meaning. Today it applies to anything from social incidents to political phenomena. In my piece "Placebo Room" I sought to re-create the placebo effect through an interactive experience with the viewer, thus opening up space for a larger discussion on the nature of deception. The real foundation of the work lies in the physical hologram in the center of the installation- a small pill floating innocently on a table. When the viewer attempts to touch the pill, they realize they are only perceiving the image, and their fingers close around air where the pill would seemingly be. This effect is achieved through the use of two parabolic mirrors laid atop one another, the topmost mirror cut to reveal an almost perfect circle roughly 3 inches wide where it meets flush with the table. The reaction of light to these mirrors causes anything placed in the bottom to re-appear at the zenith (in this case "on the table"). The table itself can easily stand alone as a sculpture in space, and in fact was intended on its creation to be more of a catalyst for conversation than an art object to be criticized. It is the end-product of a month and a half research project on the nature of placebos and the human brain. I began by asking, why is it that we are so easily deceived? Why do we have physical reactions to mental stimuli? And how can these questions help us better understand the human brain? Through a series of physical case studies using mirrors and normal pills, I crafted a piece that aims to materially represent the results of my research. It seems the mind is more powerful a deceiver than anything we can think up.

Human Performance: Gender, sexuality, and the observer

located on Main Floor

Carla Joseph, School of the Arts, with Dr. Noreen C. Barnes, Arts, Theatre Dept.

In everyday human life there is always a level of performance that all take part in. These performances may pertain to race, gender, and many other levels in which to describe one's self. Through the exploration of gender performance from a theatrical and real life experience going through history, I have come to understand the need and use of the performance. Along with that, how is the performance validated, who validates the performance, and what purposes do these performances serve to the greater spectrum of society and the world. Though I am looking at the idea of transgression through "Drag Kinging", there will be other subtle points made about race, classism, and general human performative nature.

The art of doing Drag King work is part of a long history from both real life and theatrical cross dressers. Diane Torr has worked for a long time developing male characters that she plays. This work offers it's self up to the critique from the observer; being analyzed for authenticity of male impersonation, the physical score of playing male, and the ability to pass as male. Though I will not have the extent of study as she has had, I am striving for the details of the performance. How can these characters be translated into real life? Can I fool the observer enough for them to believe the performance? Am I authentic enough that, I, believe my

performance enough, and do I need the observer's approval to believe that? Answering these questions serve to better understand human nature and the idea of who we really are and how we allow the world to perceive us.

1. THE EFFECT OF PH MODIFIED SABOURAUD'S DEXTROSE ON THE SELECTIVE GROWTH OF STACHYBOTRYS

Krystina M. Cocco, BS, UROP Summer Fellow 2010, with Emily M. Hill, MS, MLS(ASCP), Ronald L. Sauer, SM(ASCP), MA, SM(NRM)

Stachybotrys, a dematiaceous mold, is an environmental threat that grows in water damaged structures, such as those affected by natural disasters. As it grows, *Stachybotrys* releases spores containing dangerous mycotoxins that can cause symptoms in humans such as allergies, malaise, and possible neurological issues. On Sabaroud's Dextrose media (pH 5.5), *Stachybotrys* is typically outgrown by more robust and fast growing molds. Sabaroud's Dextrose media was made in a range of more alkaline pH values (6.0-8.5) to simulate the preferred growth conditions of *Stachybotrys*. *Stachybotrys*, along with two other environmental molds *Penicillium* and *Chaetomium*, were planted on Sabaroud's Dextrose media at each of the modified pH values, as well as a control plate with a pH of 5.5. When plated individually, *Stachybotrys* grew better on pH 8.0 and 8.5 but *Penicillium* and *Chaetomium* were not inhibited at the higher pH values, as was expected. *Penicillium* and *Chaetomium* outgrew the *Stachybotrys* when all 3 molds were plated together.

2. COMPARISON OF BIOMARKERS IN BLOOD AND SALIVA

Sarah Williamson, School of Nursing

Drs. Cindy Munro, Mary Jo Grap, Rita Picker and R.K. Elswick, Jr., Faculty Mentors, School of Nursing

Funding provided by the Center for Biobehavioral Clinical Research funded as P30 NR011403 (2009-2014), Center of Excellence for Biobehavioral Approaches to Symptom Management; National Institute of Nursing Research, NIH. Partially supported by the HHMI Science Education Project (HHMI Summer Scholars).

Many biobehavioral researchers measure biomarkers as a reflection of patient health status or outcomes of interventions. While blood is generally regarded as the best body fluid for evaluation of systemic processes, there are potential risks associated with venipuncture. Substitution of saliva samples for blood would be less invasive and pose fewer risks to subjects, but the concentration of specific biomarkers may differ between blood and saliva. There are few data comparing biomarker levels in blood and saliva. The objective of this study was to compare levels of 27 representative cytokines in plasma samples (blood gold standard), passive drool saliva samples (saliva gold standard) and filter paper saliva samples in healthy adults. Following IRB approval, 50 healthy adult subjects were recruited by convenience sampling at VCU. Three samples were obtained from each subject, collected in the following order: saliva by passive drool over 30 seconds, venous blood (5 ml) by venipuncture, and saliva from the sublingual space collected on filter paper over 1 minute. Blood was centrifuged to obtain plasma. Plasma and saliva were stored at -20 degrees Celsius until assays were performed. Samples were analyzed in the same experiment using Bio-Rad Multi-plex suspension array technology to detect 27 cytokines in each sample. Data were analyzed using

JMP statistical analysis software. Both untransformed and transformed (log) measurements were analyzed. Descriptive statistics, scatterplot matrices, and pairwise correlations were generated. The sample was 52% male and 74% white. Mean age was 26 (range=19-63 years, sd=9.7). There was little correlation between the plasma and passive drool saliva samples. The most consistent and highest correlations were between the passive drool and filter paper saliva samples, although relationships were dependent on the specific analyte. Based on these findings, it may be possible for future studies to use a saliva sample to measure target analytes. However, caution should be used in substituting saliva for blood.

3. Richmond Poetry Miscellany

Addison Herron-Wheeler, Dept. of English, UROP Summer Fellow 2010, with Dr. Joshua Eckhardt, Professor, Dept. of English

The Summer Research Fellowship Project that I embarked on last summer was the creation of the *Richmond Poetry Miscellany*, a DIY, 'zine-format chronology of Richmond Poetry from pre-colonial times to the present. This involved finding key poets and their specific poems about Richmond to feature, printing the poems along with illustrations to accompany them and logos designed by an artist, writing a blurb for each poem outlining the significance of each author, and finally, obtaining additional art and gluing the whole thing together as a magazine. In order to portray this theme on a poster, I plan to create a collage-style, cut-and-paste poster board that conveys the visual properties of a 'zine on a flat, accessible format. I will use a large, cardboard, tri-fold poster, and attach to it a copy of my original project proposal, midterm report, the blurb that I used as the intro to the miscellany, a list of all the poets involved in the miscellany, and a newly written short piece containing background info about the world of 'zines and miscellanies, and how and why I managed to make them collide into one project. After attaching all of this informative writing, I will go back and decorate my poster with images of the poets featured, and the subjects they wrote about. Erin Willet, the artist who designed logos for the poet names in my 'zine, is doing an original art piece to be featured as the central visual attraction of the poster, and the rest of the pictures will be fastened on in a collage-like style. When presenting this poster, I will talk briefly about the history of 'zines and miscellanies, and why I decided to combine them in this project. I will give a rundown of Richmond history via the poets and poems featured, and tell listeners about the individual authors that interest them. I will also point out the larger works by these authors, and let the audience know why I chose particular people, and what amount of work went into creating the 'zine. Finally, I will give out copies of the miscellany while they last, and if they run out, I will take names of people who wish to receive a copy. I think that this will be an overall informative presentation, and I hope that my poster will reflect the DIY-yet-professional vibe of my creation.

4. The Impact of Interracial Roommate Relationships at VCU

Shanice Coleman, Dept. of Psychology, UROP Summer Fellow 2010, with Russ Clay and Dr. Natalie Shook, Professor, Dept. of Psychology

Generally, interracial roommate relationships are less satisfactory and less successful than same-race roommate relationships (Shook & Fazio, 2008). However, there are benefits. White students living with an African American roommate displayed a reduction in prejudice after

one semester. The current study examined the impact of interracial versus same-race roommate relationships on student life. Specifically, the purpose of the project was to determine whether roommate satisfaction, academic identity, and academic performance would differ by room type and/or participant race. Participants were VCU freshmen, who were randomly assigned to their dorm roommate. Participants completed questionnaires at the start of Fall 2009, end of Fall 2009, and end of Spring 2010. There was no effect of room type or race on roommate satisfaction. Participants in interracial rooms did not view their roommate relationship as less satisfactory than students in same-race rooms. With regard to VCU identity, white participant's VCU identification decreased significantly between Session 1 and Session 2, but stayed constant for Session 3. For minority students, VCU identity did not change over time. However, by Session 3, minority participants had a significantly higher VCU identification than white participants. Also, minority participants in interracial rooms had a higher identification than minorities in same race rooms during Session 2. There were no significant differences in Fall GPA based on room type and/or race. However, participants in interracial rooms had higher Spring GPAs than same-race room participants. Thus, interracial roommate relationships are important and could possibly affect school performance and university identity.

5. Discovering Multicultural Connections in the Classroom

Virginia Driggers, Dept. of Art Education, UROP Summer Fellow 2010, with Dr. Jan Johnston, Dept. of Art Education

The context of this research took place at an art center in Midlothian, Virginia, ArtAdventures, and a school in the rural highlands of Guatemala, Chuicavioc, where the students took part in the same small art course incorporating the themes of culture, recycling and time. In this project the students were to exchange works of art and follow the exact same lessons, guideline, criteria and expectations. The power of cultural communication and appreciation lies in the teacher's hands as they conduct an Art Exchange. However when produced rapidly with poor communication and expectations to the projects a group of students might just as quickly lose appreciation for another culture. The importance of researching how to create an exemplary model for Art Exchanges is necessary for those teachers who wish to bring little bias, student discovery, art and multiculturalism to the classroom. The three stages of lesson proceeding research studied other art exchange programs that vary from close to open participant procedures. By breaking down the system of these varying art exchange which range from privately owned organizations with little teacher participation to larger government contributed organizations such as the Fullbright Teacher Exchange. The second stage featured interviews with a small amount multicultural exchange experts. Some of which were high school teachers who created an art exchange with another school in the county to students interacting with school from China, Japan, India and Ghana. After reviewing the common struggles and becoming aware of the successful processes to an art exchange, the lesson plan structure and steps to preparation were created while keeping a pool of advice from experts who had experienced these lesson structures. The Third stage studied what materials the art projects should be made with and why. Looking at the drastic resource difference between the two populations there was a need for an easily obtainable and purposeful medium. This led to the choice of using recycled materials to represent the themes of culture and time. Naidus explains recycled art as an avenue for "The question of the public realm can be pursued from a broad interdisciplinary perspective" (Naidus, 2009). This public realm allows students to look at their own world and reflect on culture while communicating to others. The research behind teaching this material led to articles on teaching purposeful art and books by major educators

who teach recycled art as a conceptual way to enhance the trust in environment and students designing personal associations to their culture.

6. Video Games as a Means to Fulfill Psychological Needs in a University and African American Sample

Rakim Reid, Dept. of Psychology, with Dr. Micah McCreary, Dept. of Psychology

Video games are an increasingly popular entertainment medium in today's culture (Ryan et al, 2010). Video game characters such as Super Mario, Pikachu, and Halo's Master Chief have become instantly recognizable. Additionally, the \$20.2 billion in sales in 2009 is something that is not easily ignored (NPD, 2010). The industry's rise to prominence has brought a number of concerns. Notably, the function of video games in our lives and the reasons people play them has come under scrutiny. The media traditionally has spotlighted the numerous research linking violent video games to aggressive behavior. But little information exists on games impact on game motivation. In fact, few motivational theories have been applied to examine this issue (Ryan et al, 2010). No studies have looked at how game motivation and Self-Determination Theory together apply to African Americans. The present study aims to apply Self-Determination Theory to game motivation and to investigate its influences on participants' use of it to fulfill their psychological needs and impact on their well-being. That is, their need to have control over their environment, interact with others, and the ability to make choices in video games. In addition, we seek to see if any differences exist between how and why African Americans use video games to fulfill their psychological needs in comparison to a university population. The proposed project aims to: 1) Apply Self-Determination Theory to game motivation in a college-aged sample and African American male sample; 2) Investigate if game players use video games to fulfill their psychological needs, to make up for a lacking areas in life; 3) Investigate whether video game play relates to participants' well-being; 4) Discover any differences that exists in this area between the university sample and an African American male sample; and 5) Learn more about African American males perspective on video games.

7. Differential Stress Resistance: Targeting Cancer Cells with Caloric Restriction Mimetics During Chemotherapy

Molly Grover, Dept. of Biology and Dept. of Psychology, with Prof. Mary Boyes, University College

In the United States, over 11.7 million people are living with cancer and 50% of these cancer patients are treated with chemotherapy. Oncologists can potentially improve chemotherapy by delivering medication directly to cancer cells without the constraining effects generated by oxidative damage. Studies show reduction in caloric intake through water fasting and caloric restriction induces differential stress resistance (DSR) in healthy cells, thus creating a protective barrier against oxidative stress for non-cancerous cells. Patients who fasted 48 hours before undergoing chemotherapy reported a reduction in fatigue, nausea, vomiting, weakness, and mouth sores. However, a severe reduction in caloric intake is impractical for cancer patients because of the nutritional deficit fasting creates. Like fasting, caloric restriction mimetics down-regulate the metabolic pathways TORC1 and AKT by mimicking starvation effects in the body, but do not create an actual nutritional deficit in the patient. I hypothesize that caloric restriction mimetics may protect healthy cells from free-radical damage by generating DSR in non-cancerous cells, thus creating greater endurance in cancer patients

undergoing chemotherapy. Drugs that lower glucose and insulin levels, such as metformin, and inhibit stress-signaling pathways qualify as caloric restriction mimetics. Caloric restriction mimetic drugs have been studied for diabetes; therefore, these drugs could be adopted immediately and the administration of caloric restriction mimetics would permit patients to consume a healthy diet while producing similar benefits to fasting. I hypothesize that caloric restriction mimetics, unlike other chemotherapeutics, would reduce the negative side effects of chemotherapy as well as increase the efficacy of the treatment by directing it to target only cancer cells.

8. Attachment Theory, Exploration, and Pet-Human Relationships

Kirandeep K. Chahal, Department of Psychology, with Anthony E. Coy, M.S. & Dr. Jeffrey Green, Associate Professor of Psychology

An attachment theory states that bonds formed as a child with caregivers will serve as a model for future relationships. This has been fruitfully applied to adult romantic relationships. Attachment avoidance and anxiety have been linked to different degrees of careseeking and less effective caregiving. We applied attachment concepts to individuals' relationships with their pets. We developed a survey to assess pet-human interactions and included a common attachment measure. Participants were recruited from local humane societies and other local pet adopting events. Three hundred fifty-five participants completed an online survey. Individuals high in attachment anxiety and individuals high in attachment avoidance preferred to turn to pets rather than humans for emotional support, though this link was stronger for avoidant individuals. Similarly, avoidant and anxious individuals expressed a greater preference for pets that did not require too much time or attention. Also, anxious individuals reported worrying about what their pets think of them. Future research will investigate whether this concern leads anxious individuals to spoil or poorly train their pets.

9. Reforming Medicare fee-for-service payment systems: A hybrid solution integrating payment bundling and Accountable Care Organizations

R. Allen Crump, with Prof. Mary Boyes, University College

The fee-for-service payment system, under which Medicare currently operates, inadvertently promotes the delivery of lower-quality health care and reduces efficiency. Following Medicare's lead, this same fee-for-service reimbursement model is used by most private health insurance providers. The fee-for-service model perpetuates inefficiency and causes physicians and health care providers to engage in such practices as running redundant diagnostic tests on the same patient for the same incident of illness. The fee-for-service model is in need of a dramatic structural change. Those calling for such payment reform often offer solutions in a very cut-and-dry way; suggesting that a single reform model will remedy the problems which the fee-for-service model now perpetuates. This paper investigates the steps that should be taken to reform the Medicare reimbursement system and the implications of such reforms on physicians and hospitals. In order to achieve higher quality care and lower costs to the Medicare system and to taxpayers, Medicare must: (1) immediately implement payment bundling (paying a predetermined rate for reimbursement based on the condition being treated) as an interim solution and (2) transition to an Accountable Care Organization model (paying set amounts of reimbursement to a coalition of hospitals and/or physicians based on the amount per capita

that coalition spends on health care) as a long-term solution. This integration of reform models will ease the fiscal and logistical burden on health care providers so that these providers could create the infrastructure necessary to effectively administer the most sustainable solution using Accountable Care Organizations.

10. Extending a 2008 Gerdemann Result

Cory Colbert, Dept. of Mathematics

We extend a 2008 result of Gerdemann, which establishes a correspondence between algebraic Fibonacci identities and algebraic Golden Ratio identities, to all quadratic irrationals and their sequences of continuants. We also establish asymptotic results for the average number of terms in a continuant sequence needed to represent an arbitrary natural number.

11. Feeding rates of the nemertean *Prosorhochmus americanus* (Hoplonemertea) on two species of gammaridean amphipod

Serena Caplins, Dept. of Biology with Dr. J.M. Turbeville, Dept. of Biology

Ribbon worms (nemerteans) are carnivorous predators with a global distribution and are found primarily in marine environments. The intertidal hoplonemertean *Prosorhochmus americanus* is a common inhabitant of the fouling community of rock jetties of the southeast coast of the United States. We undertook a laboratory investigation of the feeding rate of this nemertean, which is a suctorial predator of amphipod crustaceans that co-occur in abundance in the fouling community. While submerged in water (simulating high tide), worms fed on the tube-building amphipods *Jassa falcata* and *Corophium* cf. *insidiosum* at rates of 0.19 amphipods nemertean⁻¹ day⁻¹ (n=10) and 0.26 amphipods nemertean⁻¹ day⁻¹ (n=14), respectively. Our results and those of other laboratory investigations suggest that nemerteans that prey on amphipods feed at a rate of ~0.2 prey items nemertean⁻¹ day⁻¹, but under natural conditions this rate may not be obtained because of limited feeding time, longer foraging distances, and emigration of prey from regions of high nemertean activity.

Manuscript Reference

Caplins S.A. and Turbeville J.M. 2011. Feeding rates of the nemertean *Prosorhochmus americanus* (Hoplonemertea) on two species of gammaridean amphipod. *Invertebrate Biology*. 130(1): 34–42.

12. Female sexual selection in Prothonotary Warblers

Maria Byggmestar, Dept. of Biology, with Dr. Lesley Bulluck, Dept. of Biology

The aim of my undergraduate research project is to study female sexual selection in Prothonotary Warblers. The Prothonotary Warbler is a small song bird that nests in cavities, one out of only two warblers to do so, in bottomland hardwood forests. There is a long-term

study of Prothonotary Warblers along the Lower James River that was started by Charles and Leann Blem through Virginia Commonwealth University in 1987. Their goal was to increase the breeding success of the local population as well as to study the long term reproduction of this species. More than 450 nesting boxes are installed along in the freshwater tidal region of the James River and its tributaries, and these boxes are monitored annually during the breeding season of the Prothonotary Warbler, which runs from mid-April to late July. The installment of nesting boxes has increased the number of Prothonotary Warblers nesting in eastern Virginia. During the 2010 breeding season we collected outer tail feathers from Prothonotary Warblers, banded and recorded reproductive data across four different sites in eastern Virginia. As a part of the HMMI Summer Scholar program in 2010, I used the feathers collected to research female sexual selection in Prothonotary Warblers.

Sexual selection is widely accepted as an evolutionary explanation for extravagant ornaments in males, but ornamentation in females has received little attention. Female ornaments have most often been considered non-functional and due to genetic correlation to male showiness. However, because the development and upkeep of ornaments are costly to an organism there should be some sort of selective advantage that explains why they persist. My research focuses on measuring the area of the white outer feather tail spot in Prothonotary Warblers and determining if there is a relationship between the size of the patch and reproductive success, body condition, or age. Other research done in the area of ornaments in female birds suggest that highly ornamented female birds may be reproductively more successful, have better body condition and start building their nest earlier in the season. It is also thought that tail spot size may be related to dominant behavior.

In my research I have been looking at female ornaments as indicators of quality in male choice by analyzing reproductive data collected in the field and relating it to the area of the outer feather tail spot. If tail spot area is related to reproductive success, then males may be able to use these ornaments as a signal of high mate quality. My objectives are to relate tail spot area to clutch size, total number of eggs laid in one season, nest initiation date, age and body condition, as well as to compare the size of the tail spot in females and males.

13. The Relationship between Religiosity and Stress among African American Emerging Adults

Joshua Brevard and Anjela Tynes Dept. of Psychology, with Kristina Hood, MS, Dept. of Psychology

The “Black church” has long been the foundation of the African American community, serving as a protective factor for a number of risk factors. For emerging adults leaving home for the first time for college or the work force, this transition can be an extremely stressful time. The present study explores whether young adults would continue to use the church or another religious institution as a resource during stressful times and whether there are gender differences in the levels of stress experienced and the degree of religious involvement. Previous research has found that religious activity can reduce the negative effects of stressful life circumstances and produce positive emotions (Gillum & Griffith, 2010) and that religious activity increases with age (Colbert et al, 2009). Twenty-nine African American young adults enrolled in a longitudinal study investigating social and cultural factors that influence smoking tobacco and other drug use participated in the current study. Preliminary results found that while both males and females reported using religious coping and religious involvement as resources when experiencing stress, African American women were found to attend church

more than men. There were also gender differences regarding the frequency of participation in religious activity since high school, with males having higher levels of religious involvement after high school than females. Additionally, a higher percentage of African American males reported experiencing higher levels of past 30 and 90 day stress than African American females. These results demonstrate that church or religious activity can serve as a protective factor for African American emerging adults as they use it as a resource for coping with stress.

14. Evaluating the “Mercy Scale”

Lauren Allport, with Aubrey Gartner, MS and Dr. Everette Worthington, Positive Psychology Research Group, Dept. of Psychology

Concepts such as mercy and forgiveness are beginning to be more fully developed by psychologists in recent years. A scale measuring the construct of mercy was developed for use in future experiments. This measure was validated using many different assessments, such as the forgiveness scales and the altruism scales. It is hypothesized that there will be a positive correlation between the mercy scale and the emotional and decisional forgiveness scales, and a negative correlation between the mercy scale and the state and trait anger scales. These correlations would show that the mercy scale is a valid measure of the construct 'mercy.'

15. Examining Treatment Fidelity in Motivational Interviewing

Lauren Almond and April Hafer, Dept. of Psychology with Dr. Melanie K. Bean, Dept. of Pediatrics

Pediatric obesity is a significant public health concern. Motivational Interviewing (MI) is a brief, patient-centered counseling style for exploring and resolving ambivalence about behavior change, which may be an effective component of obesity interventions. However, among the few studies examining the efficacy of MI in pediatric obesity, treatment fidelity is rarely examined or reported, limiting interpretation of findings. MI Values is a randomized controlled trial of MI implemented within an existing multidisciplinary pediatric obesity treatment program, T.E.E.N.S. (Teaching, Encouragement, Eating, Nutrition, Support). T.E.E.N.S. targets 11-18 year old adolescents, with a body mass index (BMI) \geq 85th percentile. In MI Values, we implemented a detailed process evaluation to ensure treatment integrity was maintained throughout the clinical intervention.

Methods: Interventionists completed training in MI and independent raters were trained on administration of the Motivational Interviewing Treatment Integrity Code (MITI) 3.0, a coding system for measuring adherence to MI. The MITI 3.0 contains global scores (e.g., empathy, collaboration, evocation, direction, and autonomy/support), which measure the extent to which the clinician adheres to the “spirit” of MI, and behavior counts (e.g., open vs closed question; simple vs complex reflection). Guidelines provided in the MITI 3.0 were used to determine clinician adherence to MI throughout the study. Intraclass correlations (ICC) were used to determine inter-rater reliability at study initiation and throughout the intervention. Feedback based on these MITI 3.0 ratings was provided to interventionists in weekly supervision to reduce therapist drift. MI Values participants complete two 30 minute MI sessions, at weeks 1 (T1) and 10 (T2) of T.E.E.N.S. Raters also attended weekly group ratings to reduce rater drift.

Results: A total of 80 MI sessions (T1=46, T2=34) were conducted and coded. Interventionists met or exceeded competency thresholds at both time points, with the exception of one indicator, Reflection:Question ratio (0.94 at T1, 1.06 at T2). ICC's for independent raters ranged from 0.6 to 1.0 across MI global scores and behavior counts, indicating adequate interrater reliability.

Discussion: Although labor intensive, this strategy for measuring treatment adherence throughout the intervention period enhances internal validity thus increasing confidence in MI Values' findings. As such, examining outcome data from MI Values will further our understanding of the efficacy of MI in the treatment of pediatric obesity.

16. Unveiling the Façade of the American Criminal Court System

Jaclynn McKay, Dept. of Forensic Science, with Prof. Jennifer Smith, University College

Law and Order has successfully dominated pop culture, with twenty seasons and three successful spin-offs. These types of shows have instilled a perception in the American public that all Americans have a trial by jury when they are charged with a crime. This could not be further from the truth. 90-95% of all cases are decided through plea bargaining and never end up going to trial. Plea bargaining is a negotiation between a prosecutor and a defendant in which the defendant pleads guilty to a lesser crime (charge negotiating) or pleads guilty in order to receive a more lenient sentence than he or she would receive by going to trial (sentence negotiating). Through investigation of scientific research, academic journals, books, and scholarly television documentaries, dating between 1985 and 2010, I will examine how plea bargaining affects the U.S. criminal justice system in order to provide a proper presentation of how the criminal court system actually works. Research indicates that plea bargaining is a necessary component of the American criminal justice system because it is used as a way to devote trial resources (i.e. time and money) to the most necessary cases and without it the system would crumble due to an excessive caseload. Through my research and poster, I will analyze the constitutionality of plea bargaining, the criminality of misdemeanors, and the role prosecutors, judges, and defendants play in the process. Plea bargaining is a dominant and essential process in the American criminal court system; therefore it needs to be brought to the public's attention.

17. Compassion Fatigue and the Caring-Killing Paradox

Harper Lorencki with Prof. Catherine MacDonald, University College

It is no secret that in the United States there are more companion animals than there are people willing to provide homes for them. While pet overpopulation results from the larger societal problem of uncontrolled and unchecked companion animal breeding, a small and specific population is charged to deal with its real-life consequences: the employees of animal shelters. Shelter employees enter the field out of compassion and love for animals, yet they regularly face the task of euthanizing unwanted pets, a phenomenon that contemporary psychologists have labeled the caring-killing paradox. A direct consequence of euthanizing unwanted companion animals is a form of post-traumatic stress disorder known as compassion fatigue. Those afflicted by compassion fatigue feel emotionally drained and

depressed from the pressure of being constantly empathetic. Other professionals such as social workers and clinical psychologists also commonly suffer from the disorder, but only employees of open-admission animal shelters face the unique “moral stressor” of the caring-killing paradox: euthanizing the animals they care for. This research project explores and synthesizes the available literature on this subject in an attempt to determine the pervasiveness of this disorder among shelter employees and discover how compassion fatigue can be both prevented and treated in the animal-sheltering field.

18. Hidden Secrecies of Brotherly Bonds behind Hazing

Geneda Parker, with Prof. Jennifer Smith, University College

Statistics show that between 1995 and 2000, there were half a million incidents involving college students being victims of hazing. Hazing is a popular, but illegal activity that many college fraternities and sororities engage in. Despite the consequences of being caught it frequently occurs as Greek-letter organizations induct more perspective members. The research I am choosing to focus on is how hazing is justified by the members of Black Greek Letter Organizations. Hughey argues that the “secrecy of the process helps to solidify an in-group/out-group symbolic boundary, the fostering of a community that is seen as both as institutional and longitudinal, creation of self respect, and the search for a collective sense of meaning and self identity that is reified through and intense mental and physical process” (Hughey, 2006). My topics of issue are the mental, physical, and psychological aspects to hazing. The research looks at the effects hazing has on the pledge, the purpose as told by those conducting the process, and actual end results when taken too far. This topic is extremely important because this is a college campus full of different Greek-Letter Organizations, many people want to join fraternities and sororities, but are not fully aware of the actual process. To put an end to this dangerous and potentially deadly activity, not only do schools need to be held accountable for incidents that come to light, but they need to severely crack down on the organizations and individuals who partake in it. If schools become more involved and closely monitor these organizations, we could all possibly put an end to the controversial issue that has engulfed our college campus for centuries.

19. Information Needs for Cancer Patients and Trust in Physician

Emily Hardt, with Dr. Robin K. Matsuyama, School of Medicine

Literature suggests that low interpersonal trust between a patient and a physician is a significant predictor for high information discrepancy (Neumann et al. 2010). The aim of this study was to assess whether there is a relationship between cancer patients’ information needs and information received and their trust in their physicians. It was expected that cancer patients with higher levels of trust in their physicians would have lower information discrepancies. A longitudinal study was conducted including three surveys with a total of 106 newly diagnosed, Non-Hispanic White or African American patients with solid tumor cancers, stages 2-4. Participants were asked to rank what types of information were important for them to know, and what type of information they actually received. Information discrepancies were

calculated as instances where patients did not receive information that they ranked as important, and this was compared with the patients' trust in physician. Over time, patients' trust in physician increased, but different types of information discrepancies showed different trends: treatment and disease information discrepancies increased over time while physical and total information discrepancies decreased over time. This reveals that it is important to study and compare different types of information needs instead of generalizing information needs into one large category. Knowledge of the types of information cancer patients need can help physicians assist patients in treatment decision making and coping.

20. Caffeine and alcohol usage and attitudes among undergraduate students

Kade Jentink, Dept. Psychology, with Caroline Cobb, MS and Dr. Melissa Blank, Dept. of Psychology

Media outlets and public health officials report that the use of caffeine in combination with alcohol is an emerging health crisis. Despite recent warnings of caffeine/alcohol-related injury and death, many young adults continue to drink these potentially dangerous cocktails. The purpose of this survey was to report on the use of and attitudes toward caffeinated beverages alone versus with alcohol among undergraduate students at Virginia Commonwealth University (n=1,172, 63.7% freshmen, 93.7% < 23 years old, 64.6% female, 53.4% white). Approximately 94% of respondents reported past 30-day use of caffeine: daily (47.4%), weekly (35.9%), monthly (5.2%), and periodically (11.6%). Common reasons for caffeine consumption included "need energy (in general)" (51%), "studying for an exam or to complete a major project" (42.4%), "driving car for long period of time" (26.8%), "tastes good" (22.4%), "insufficient sleep" (18.2%), and "perform better physically" (7.6%), as well as "drinking them with alcohol while partying" (14.4%), "drink them before heading out to drink alcohol" (6.1%), and "to treat a hangover" (5.9%). About 34% of students reported past 30-day use of alcohol/caffeine combinations, specifically manufactured caffeinated alcohol drinks (48%), caffeinated soda self-mixed with alcohol (25%), and/or caffeinated energy drinks self-mixed with alcohol (18.2%). Reasons for using these combinations included to "drink less and get drunk" (20.3%) and "stay alert while drinking" (11.6%). These results demonstrate that a significant proportion of students consume caffeine regularly, including during times when they are also consuming alcohol. Notable is the number of students who endorse the dual use of these drugs, seemingly due to the belief that caffeine may counteract the depressant effects of alcohol. More work is needed to understand the beliefs about caffeine/alcohol concoctions underneath the hype.

21. Analysis of Fluid-Solid Characteristics of an Idealized Human Respiratory Airway

Alex N. Dimen, with Dr. Guoquan Su and Dr. Ramana M. Pidaparti, Dept. of Mechanical and Nuclear Engineering

Understanding the interaction between air flow patterns and airway wall stress in the human respiratory system is a helpful exercise in the prevention of ventilator associated lung injury. Computational analysis results help to broaden the understanding of how ventilator associated lung injuries occur, ultimately giving medical professionals the tools to reduce or prevent such

dangerous complications. In this study, the magnitudes and locations of stresses in the airway wall were investigated for a range of flow rates and tidal volumes relevant to the use of a mechanical ventilator for the actuation of the human lung. These results were pursued by means of a computational analysis of the interaction between the fluid and solid mechanics acting on lung airways during ventilation. The simplified airway model used for the study has increased accuracy due to orthotropic material properties specified in the simulation and approaches the highest nodal resolution allowed by the finite element analysis program. The results from this study revealed information useful in determining the ways in which a mechanical ventilator can induce or exacerbate lung injury. Specifically, airway stress and strain were explored as functions of flow rate, tidal volume and ventilator waveform. The waveforms and flow rates simulated are then ranked by the amount of stress and strain they induce in the lung airways and thus their potential to cause damage.

Acknowledgement

The authors thank the U. S. National Science Foundation for sponsoring the research through grant CMMI-0969062.

22. Cigarette smoking prevalence and attitudes among college students

Gabriela Millard, Dept. of Psychology with Caroline Cobb, M.S., and Dr. Thomas Eissenberg, Dept. of Psychology

Cigarette smoking continues to be the leading cause of preventable disease and death in the United States. According to the American Lung Association, approximately 85% of current adult smokers began smoking before the age of 21, which may indicate how behaviors acquired during adolescence and young adulthood can affect individuals throughout their lives. Surveillance of tobacco use prevalence and attitudes toward smoking among college students are an important facet of public health monitoring. In 2010, an online survey of 465 Introduction to Psychology students at Virginia Commonwealth University (VCU; 77.5% < age 19, 58.7% women, 43.7% non-white, 93.5% U.S. citizen) revealed 71.2% lifetime, 58.5% past year, and 42.8% past 30-day cigarette smoking. When compared to individuals who had not smoked cigarettes in the past 30 days, past 30-day cigarette smokers (n=199) were significantly ($p<0.001$) more likely to rate their peers smoking cigarettes as "cool" or "more cool", but in spite of this difference, almost half (49.2%) of current smokers rated their peers smoking cigarettes as "not cool". Interestingly, there was not a significant difference in perceptions of ultra-light and light cigarette harmfulness between past 30-day smokers and individuals who had not smoked cigarettes in the past 30 days; a majority (73.8—80.9%) in both groups rated these products as equivalent or more harmful compared to a regular cigarette. In addition, at least half (50.3%) of past 30-day smokers would be interested in a less harmful cigarette. These results suggest that about half of current smokers hold negative views of smoking behavior and have an interest in less harmful tobacco products, and most are informed about the dangers of ultra-light or light cigarette smoking. Future tobacco information campaigns may benefit from knowledge of these prevalence rates and current attitudes among past 30-day smokers.

23. The Up-Regulation of Telomerase: Preventing/ Reversing Diseases Associated with Aging without causing the Cancerogenesis in the Regulated Cell

Augustin Joseph, Dept. of Physics, with Prof. Mary Boyes, University College

Telomere shortening as a result of aging has been shown to be responsible for many age related diseases. The shorter the telomeres of the aged, the more prone the aged seems to be to age related diseases. Telomerase is the major contributor to the reversal of telomere loss. By the up-regulation of telomerase, it may be possible to reverse the effects of telomere loss, thus reverse the effects of aging. Conversely though, the up-regulation of telomerase has a strong association with cancerogenesis. However, the dual regulation of telomerase and the cancer suppressing genes have may prove to be effective in preventing/reversing diseases while preventing cancerogenesis.

24. Separation of over-the-counter drugs (acetaminophen, diphenhydramine, and doxylamine succinate) using amine-modified HP-TLC plates

Michael Marin, with Dr. Maryanne Collinson, Dept. of Analytical Chemistry

High performance thin layer chromatography (HP-TLC) is an easy and quick chemical separation method for qualitative and quantitative analysis. Resolution between analytes in HP-TLC is generally accomplished through the manipulation of mobile phases. In this presentation, a new technique is demonstrated in which we are able to separate certain analytes while allowing other analytes to continue to elute by strategically modifying the stationary phase with an amino-propyl silane. Additionally, we are able to manipulate the density of amino-propyl silane on the stationary phase to improve the resolution between analytes. To incorporate a practical element of toxicology, over-the-counter drugs typically found in case work were used as analytes.

25. Spinal Manipulation and Exercises as a Conservative Treatment for AIS

Erin Satchell, School of Business, with Faye Prichard, Dir. of Research Writing, University College

In the conservative treatment of adolescent idiopathic scoliosis (AIS), bracing is commonly believed to be the most effective method. However, braces often provide inconsistent results and can damage the self-esteem and body image of young patients. Little research has been done on other conservative therapies like spinal manipulation and specific exercises, so they are often overlooked during treatment. If proved effective, these alternate conservative methods could be the answer to avoiding surgery when bracing fails, or could eventually replace the bracing method to take the emotional stress off of adolescent patients. This paper reviews and

compares the small amount of studies done on spinal manipulation and exercises, yet it finds that more attention and funding are needed to provide more reliable data. It also looks at studies that explore the negative emotional effects of bracing on adolescents with scoliosis. Although there is no solid evidence on AIS methods other than bracing, spinal manipulation as well as exercises prove promising in stabilizing early curves, reducing matured curves to prevent surgery, and at least can aid in the bracing process; therefore, these methods should be further researched and tested in order to provide a better understanding and hopefully an alternative method to the unpleasant experience of the back brace. Health professionals need to turn their attention to treatments that can be effective while not sacrificing the patients' well-being.

26. Continuous Lateral Rotation Therapy in the mechanically ventilated: Utilization practices in NSICU, STICU and MRICU

Manisha Sigdel, Dept. of Chemistry and Camille Richards, School of Nursing with Mary Jo Grap PhD, RN, FAAN, Angela Bataille, MS, RN, Lisa Sievers, MS, RN, VCU School of Nursing

Continuous lateral rotation therapy (CLRT) is frequently used in the critically ill to reduce pneumonia risk. CLRT reduces pulmonary complications by mobilizing secretions and improving the match between ventilation and perfusion. Protocols outlining the use of CLRT vary among Intensive Care Units (ICUs) but recommendations encourage early initiation of therapy with a goal of 18 hours of rotation each day. Studies focusing on evaluating CLRT as a continuous therapy have found it to be difficult to achieve the recommended 18 hours of CLRT per day. The Skin Integrity and Backrest Elevation (SIBRE) study is currently being conducted at 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. A subset of data from the SIBRE study was used to describe utilization practices of CLRT among the three study ICUs during the first and second days after initiation of mechanical ventilation. CLRT levels were obtained from the standard ICU bed, the Total Care Connect bed (Hill-Rom, city, state), which provides continuous rotational therapy to all patients in these ICUs. Sixty-eight subjects were included in the analysis. The NSICU had the highest daily level of rotation on the first day followed by STICU and then MRICU. The STICU had the highest daily level of rotation on the second day followed by NSICU and then MRICU but all were less than the recommended 18 hours of CLRT. Numerous factors may affect use of CLRT in these units, but knowledge of CLRT levels per day may be a first step in moving toward greater levels of CLRT use. Supported by NIH/NINR #NR010381; MJ Grap PI

27. Modeling Seasonal Solar Thermal Energy Storage in a Large Residential Building

Luca T. Terziotti, School of Engineering, with Marshall L. Sweet and Dr. James T. McLeskey, Jr., School of Engineering

Space heating, primarily using fossil fuels, is a major component of US energy consumption. Over-consumption of nonrenewable energy is a major hurdle in overcoming many of the problems facing the United States. Seasonal solar thermal energy storage (SSTES) provides a method to store solar thermal energy collected in the summer to use for heating in the colder

months. Solar collectors are used to heat a sand bed, which retains its thermal energy through the winter. That energy is then sent into the building via radiant floors for space heating use. A sand-based storage bed SSTES system for a new five story student housing complex at Virginia Commonwealth University is modeled using TRNSYS Version 16 software. A total of 15 simulations of various storage bed locations and configurations as well as building efficiencies are modeled to determine whether a system is feasible for an urban environment. Substantial energy savings are possible within the small footprint required by city lots. Up to 91% of energy for this large building can be provided by the most efficient SSTES system.

Research was conducted in the Energy Conversion Systems Laboratory in VCU's Department of Mechanical Engineering. It was funded by the Honors Summer Undergraduate Research Program with equipment provided by Richmond BySolar. A poster will document the project's findings.

28. Middle Eastern Artistic Movements Can Bridge Gaps Between Eastern and Western Cultures

Erin Myers, Art History, with Jason Coates, Dept. of English

With all of the political unrest in the Middle East over the past decade, a new interest in Middle Eastern culture has emerged. Westerners have sought after a greater understanding of this region and turned to the arts to further their insight. But even as we look to the arts to promote cultural understanding, we may only make matters worse if we don't proceed sensitively. The standard Western practice of interpreting and viewing Oriental art is in itself problematic as it is often seen as inaccurate to critique Eastern art with Western methods. Political agendas and ideas of colonialism have been the driving force in exhibiting and exposing Eastern art. With these concerns in mind, however, Westerners should challenge themselves to invent a new way of looking at the Middle Eastern visual arts that does not reinforce the hegemony of their Western culture on the Eastern art world. By encouraging art in the Middle East and promoting discussion of the difference between the two cultures, Eastern art can once again be elevated to an esteemed level in the global art context. Without modern Middle Eastern artists and their resulting contemporary visual arts this change in the Western way of thinking cannot evolve. It is a necessity for Western cultures to mindfully aid in a Middle Eastern artistic movement that can in turn bridge cultural and artistic gaps between the Eastern and Western cultures.

29. Dirty Sex: Venereal Disease as a Catalyst for Change in Attitudes Regarding Sexual Activity in the Late Nineteenth Century

Nicole Brugel, Dept. of English, with Jason Coates, Dept. of English

It is popular belief that Victorians were sexually repressed, though there is some contention about that in certain scholarly communities. This quite contrasts with the open sexuality supposedly enjoyed by people during the eighteenth century, which is often perceived to have been a time of bawdy promiscuity. While much research has been devoted to resolving whether or not Victorians were actually repressed, I seek to solve the question of what instigated this sharp change in societal mind-set about sexual mores. I propose that the widespread fear of

new and dangerous venereal diseases prompted attempts to control contamination by relegating sexual activity to the confines of marriage with the express purpose of procreation. Also, the association of sex with the repellent symptoms of venereal disease struck fear in those uninitiated to sexual rites of passage, thus leading to reluctance to engage in sexual activity on an individual basis, as is well exemplified by Freud's case study *Dora*. I will first establish that Victorians were indeed repressed, next go on to explain how venereal disease was spread and describe relevant legislation, and then discuss how venereal disease was abhorrent to both government and society at large, as well as individuals on an emotional and psychological level, and how that affected sexual expression. I will then explain the more global effects of this analysis by comparing Victorian sexual mores to those of modern Western society.

30. The Reality of Combat-related Post-traumatic Stress Disorder: A Biopsychosocial Approach to Understanding Combat-related PTSD

Blair Cooke, School of Nursing with Prof. Jeffrey Lodge, University College

As of 2008, over 1.6 million American men and women from the U.S. Armed Forces have been deployed to either Iraq or Afghanistan as members of Operation Iraqi Freedom or Operation Enduring Freedom. As of 2009, more than 22 percent of those deployed have been diagnosed with post-traumatic stress disorder, but as many as 30 percent experience its symptoms. Through scholarly study, the purpose of this research is to comprehend the many ways in which these military members and veterans are affected by combat-related PTSD. A biopsychosocial approach was chosen to represent the disorder's manifestations, as combat-related PTSD has biological effects on certain body systems, psychological effects related to behavior and thoughts, and social effects related to interpersonal interaction and emotions. Biologically, the two main systems of stress containment in the body, the HPA axis and part of the sympathetic nervous system, are both permanently altered in patients with combat-related PTSD, resulting in an inability to properly manage substances in the body which induce symptoms of stress. Psychologically, combat-related post-traumatic stress disorder is presented through certain conditioned and unconditioned behavioral responses to stressful stimuli and through intrusive memories or flashbacks of the trauma experienced. Socially, there are a number of factors linked with combat-related post-traumatic stress disorder that affect the lives of those with it, such as a difficult readjustment to civilian life, the consequences of intrusive memories, avoidance of treatment because of anger, aggression and stigmas, and emotional numbing. Combining the biological, psychological, and social aspects of combat-related post-traumatic stress disorder is essential to understanding its significance and to begin a successful plan of treatment.

31. Genomic Analysis of the Mycobacteriophage Wally

Katie Blankenbaker¹, Sarah Brusko¹, Ashley Groth¹, Nikita Jathan¹, Sheila Kapyur¹, Joanna Kettlewell¹, Taylor Kiskamp¹, Benjamin Koppenhaver¹, Ryan Loviza¹, Rose Pham¹, Tina Pho¹, Gil Rubia¹, Zalak Shah¹, Angel Slach¹, Raiha Tahir¹, Rachel Walstead¹, Allison Johnson², and Anneke Padolina³.

¹Students in BNFO/LFSC 252: Phage Discovery II. ²Center for the Study of Biological Complexity, and ³Department of Biology, Virginia Commonwealth University, Richmond, VA.

Mycobacteriophages are viruses that infect mycobacteria, such as those that cause tuberculosis and leprosy. Phages have the potential to lyse the specific bacteria they infect, giving them the potential to control bacteria as an alternative to antibiotics. The Howard Hughes Medical Institute sponsored Phage Discovery Lab at VCU, which allowed students to isolate and characterize novel mycobacteriophages. After electron microscopy, it was determined that mycobacteriophage Wally has a contractile tail. After the DNA was purified, the genome of mycobacteriophage Wally was sequenced and annotated to cite putative genes and document their potential functions. BLAST sequence alignment confirmed Wally as a C cluster phage, most similar to the mycobacteriophage Catera. The genome is 155,299 base pairs in length with a 64.7% GC content. There are an estimated 217-229 open reading frames (ORFs) based on GeneMark and Glimmer predictions. Additionally, 34 tRNAs and 1 tmRNA are predicted by two tRNA prediction tools. Comparative genomics was used to learn more about the mycobacteriophage Wally.

32. Isolation and Characterization of Novel Mycobacteriophages from Environmental Soil Samples

Katie Blankenbaker¹, Swathi Bobbity¹, Sarah Brusko¹, Ashley Groth¹, Mesay Habtemariam¹, Nikita Jathan¹, Chetna Jhurani¹, Sheila Kapyur¹, Joanna Kettlewell¹, Taylor Kiskamp¹, Benjamin Koppenhaver¹, Ryan Loviza¹, Sarah McClellan¹, Rose Pham¹, Tina Pho¹, Danielle Renner¹, Erin Satchell¹, Zalak Shah¹, Angel Slach¹, Raiha Tahir¹, Rachel Walstead¹, Ross Campbell², Sarah Williamson², Joe Anderson³, Allison Johnson³, and Anneke Padolina⁴.

¹Students and ²Preceptors in BNFO/LFSC 252: Phage Discovery II. ³Center for the Study of Biological Complexity, and ⁴Department of Biology, Virginia Commonwealth University, Richmond, VA. (confirmation email not sent)

As part of a nationwide genomics collaboration sponsored by the Howard Hughes Medical Institute, twenty-one students in VCU Phage Discovery Lab collected various soil samples and purified unique mycobacteriophage. *Mycobacterium smegmatis*, a non-pathogenic relative of bacteria that cause tuberculosis and leprosy, was used as a model host for this investigation. Eighteen novel mycobacteriophages were isolated from environmental soil samples collected from across Virginia, as well as California and India. Transmission Electron Microscopy (TEM) was used to visualize phage morphology. Lysogen formation and immunity testing were performed to identify the putative life cycle of the phages, which can be either lytic or lysogenic. Students also purified the phage genomic DNA and performed comparative analysis with other phages by using restriction digest patterns. The genomic DNA of several of these phages was sequenced for genome annotation and comparison. Analysis of mycobacteriophage genomes can help scientists to study their diversity, evolutionary patterns, and gene expression.

33. Development and Validation of a Background Subtraction Method for LC×LC -DAD Chromatograms

Mallory John, Dept. of Chemistry with Dr. Sarah Rutan, Dept. of Chemistry

Comprehensive two-dimensional liquid chromatography (LC×LC) is a technique used to separate compounds present in complex biological samples. LC×LC is the preferred technique for working with biological samples over one dimension separation methods because it possesses a higher peak capacity, due to the second dimension of separation. In LC×LC, it is common to use a gradient to increase the peak capacity even further. As a result of the gradient, the refractive index (RI) changes due to the changing solvent concentrations; this is where the major problem lies. The changing RI results in a large background signal that in practice is not very reproducible. This is problematic because it obscures the peaks in the chromatogram, which results in difficulties quantifying and resolving the peaks. By analyzing a blank injection where only the background is present, we are able to characterize the key variations in the background signal, so we can properly subtract it from the experimental chromatograms. This is accomplished by carrying out singular value decomposition (SVD) on a blank injection in order to isolate the background signature in the range of 440-700 nm where the analytes of interest do not absorb. Using this signature, the background can be subtracted from the sample chromatogram. The improvements in peak picking and subsequent peak quantification that accrue from background removal will be presented.

34. Evaluation of dentists' perceptions and their impact on access to dental services for individuals with an autistic disorder.

Tyshika Showell, UROP Summer Fellow 2010, with Dr. Joan M. Pellegrini, School of Dentistry

Management of individuals with an autistic disorder requires skill, training and patience in the dental setting. The accommodations needed for an individual with an autistic disorder may present the dentist with a challenge in comfortably providing care for that individual. This pilot study queried 92 members of the Virginia Dental Association's Southside component. An electronic survey using a 5-point Likert scale was developed to examine the relationship between the dentists' educational/professional training and their comfort level with treating individuals with an autistic disorder. More than half of the respondents agreed that they would be willing to treat an individual with autism. Approximately 42% of the respondents believed their clinical training in managing individuals with autistic disorder was not adequate and 38% of the respondents believed their didactic/lecture-based training was not appropriate. Despite the lack of what the respondents deemed sufficient professional training, the dentists still reported that they would feel comfortable treating an individual with an autistic disorder.

35. The Language of Emotions: Psychology of Profane Language and Society's Tolerance of Swearing

John Cappello, Film with Prof. Tara Bray, University College, Core Education

I am studying swearing because I want to find out how the censorship or labeling of words as being “profane” impedes tolerance in our society and affects us psychologically in order to help my reader understand that profanities are as commonplace as conjunctions and we should use them responsibly rather than ignorantly. There is much speculation but little dispute over what makes one word more vulgar than the other. It’s because these words vocalize taboo subject matter, imprint crude imagery into a listener’s mind, and highlight our animalistic attributes. There are religious, sexual, or other fears of disgust in every person’s mind that is connected to every single curse word. It’s a language of emotions. Steven Pinker suggested that swear words could be used as dysphemisms, abusively, idiomatically, emphatically, and cathartically. Swear words are gauged with differing weight to each person based on their history with the word, but almost instinctively a swear word is registered as an attack against any individual. Legally, we’re only allowed to swear in certain settings and contexts, and with only certain words too. This is a result of restrictions from the Clean Airwaves Act, the FCC, and even private businesses. This project considers the research of several scholars in this field and uses the research to support the view that curse words aren’t black and white and there should be greater acceptance of their use within the general public.

36. EXPLORING THE BENEFITS OF THE UNDERGRADUATE TEACHING ASSISTANT IN THE POST SECONDARY CLASSROOM

Melissa Alston, Dept. of Elementary Education, Benjamin Ballou, Dept. of Psychology, Christopher Dunn, Dept. of Criminal Justice, Lesli White, Mass Communications, with Prof. Jessica Gordon

As pioneers in the Undergraduate Teaching Assistant program, we chose to research what we know best, our jobs. The idea of an undergraduate research assistant (UTA) is a new one in the world of post- secondary education. However, this idea of a “teaching assistant” has been around for quite some time--not only in post-secondary education, but also in primary and secondary school. In order to better understand and research the purpose and use of an UTA, one must look to those who have been doing this for longer. By examining teaching assistants as a whole, one can make connections and draw conclusions about the role of the UTA in a classroom. Studies have shown that the main goal of any teaching assistant is to give a more personal experience to the student. By working with individuals and small groups, while the actual teacher is working with the class as a whole, teaching assistants have the ability to give valuable assistance to the students, particularly those who have trouble with pertinent concepts and skills. Through helping in a more personal way, undergraduate teaching assistants can be incredibly important in the area of post-secondary learning.

37. To Harm or To Heal: A Look at Waste and Pollution by Healthcare Facilities

Shannon Storey, School of Nursing, with Prof. Tara Bray, University College, Core Education

Hospital waste and pollution has become an astronomical problem. The very institutions that are dedicated to treating the ill and diseased are releasing chemicals, toxins, and other pollutants that are harming our ecological system and making people sick. Hospital sustainability can have a global impact on preserving the environment outside and inside healthcare facility's doors. This paper argues that sustainable healthcare facilities are an ecologically friendly and economically superior choice over non-sustainable facilities. Included is research by scientists, architects, economic analysts, and healthcare professionals from around the world who have inspected current practices in the healthcare sector and proposed sustainable alternatives. Specifically, the harm of disposable gowns and drapes is analyzed. Also highlighted are hospitals and healthcare organizations recognized for their efforts to reduce waste and pollution and to operate in an environmentally, patient, and staff friendly manner.

38. Mothers and Malnutrition: South Asia

Soraiya Thura, VCU Life Sciences, Bioinformatics, with Prof. Jeffrey Lodge, University College

South Asia has a higher level of childhood malnutrition than any other region in the world. Several underlying determinants to the extreme level of malnutrition in the region have been researched, with factors being socioeconomic, political, agricultural, and infrastructure-related. Female status in the South Asian region is affected by gender disparities and cultural oppressions, affecting maternal health and education levels. This study focuses on the assessment of women's education and health as determinants of child malnutrition in South Asia, and to what extent that improvements in women's status can reduce the severity of malnutrition in South Asian children. It was proposed that improvements in women's education and health would benefit the health of children, with attention to capacity building in education and female status. Data was collected from several articles focused on public health and economic development, with a main focus on India, Pakistan, and Bangladesh. Four main categories were used to evaluate the extent of influence on child health. The categories were as follows: gender disparities, female/maternal education, maternal health, and agricultural/economic. Results and recent research have shown that maternal health has a direct impact on children, especially through the natal period and post-natal care. Complementary feeding, adequate breastfeeding, and mineral intake on the mother's end have shown to be major aspects that contribute to child health in the first five years of age. The gender disparities in education and health between the female and male populations in the region can be attributed to several underlying social constraints that, in the final analysis, affect the health of families and children. However, more research is needed on the relative strength of all factors in having a positive affect on child's health-no one factor has been shown to be enough to have an affect in the region. This study ultimately creates a foundation for reducing chronic pediatric malnutrition in South Asia by using female status and influence on child's health as a major causal factor for high rates of malnutrition.

39. New Utility to find Love

Brent Weiss, Homeland Security, Criminal Justice, with Prof. Tara Dacey, University College

Individuals will use many measures and resources to find that 'special someone' in their lives. Needless to say, relationships of all kinds are an integral part of a person's daily life. Some of these relationships arise from using the internet, and romantic-based relationships are not exempt from this newfound tool. Some of my research suggests that a huge chunk of marriages and romantic-based relationships are a result of using the internet. There is literature defending the use of the internet and online dating, suggesting that some people are bashful of using a dating website. Two sources claim that relationships are established by society and not the individuals. This makes me ponder perplexing questions. To further complicate things, some of these romantic-based relationships are solely conducted via the internet – there is no physical 'face-to-face' meeting between the couple, and yet the two 'love' each other. One of my sources for this project is a friend of mine that is in one of these exclusively online romantic-based relationships. Psychologists have explored the behavior of traditional 'face-to-face' couples, but not so much with new 'internet' couples. My research aims to explore how this behavior is different from the 'real' world to the 'virtual' world, and why some people may be driven to pursue a completely online romantic-based relationship.

40. The Neurological and Cognitive Effects of Video Gaming

Dilawar S. Khokhar, Biomedical Engineering, with Prof. Tara Bray, University College

With the increasing prevalence of technology in our day to day lives it has become remarkably easy to play video games at almost any time of day at any place leading to a fairly significant increase in the number of people engaging in some form of video gaming over the past years. There is great controversy surrounding the long term and short term effects of video gaming, in particular if engaging in video gaming is beneficial or detrimental to an individual. Recent studies have found that extensive video gaming may in fact have some positive effects such as a more efficient neural network for complex visuomotor tasks, increased multi-sensory temporal processing capabilities, and increased attentional resources. While these positive effects suggest that video gaming may be a worthwhile activity, many studies conducted in the past decade have shown that there is trade-off for these neural enhancements such as a decrease in pro-active cognitive control, becoming more easily distracted due to a "spill over" of excess attentional resources, and of course the ever present danger of addiction. Numerous studies suggest that video gaming uses the same neural mechanism found in alcoholism and substance dependence and that video gamers exhibit behavioral modifications that have also been found in alcoholics and substance abusers indicating that video gaming addiction may in fact be a very real danger. The purpose of this research paper is to evaluate the literature, in particular scientific studies, on the neurological and cognitive effects of video gaming to provide an overview of the effects of video gaming to help dispel common misconceptions as well as provide a basic understanding of the effects of video gaming so an individual may better understand the dangers and benefits of video gaming before engaging in the activity. Preliminary findings suggest that the negative effects of video gaming are primarily due to inability to focus attention and reduced impulse control. This suggests that video gaming in a controlled environment i.e. an environment where gaming time is regulated or some form of discipline is present would minimize the negative effects of video gaming while facilitating the potential for cognitive enhancement, which would essentially make video gaming a fairly beneficial activity for an individual.

41. Development of a Design Strategy Board Game

Sarah Cunningham, School of Engineering, with Dr. Ramana M. Pidaparti, Dept. of Mechanical and Nuclear Engineering

The overall goal of the exploratory project titled "Design Strategy Board Game" is to develop a classroom tool for K-12 education that emphasizes STEM (science, technology, engineering and mathematics) subject matter while introducing the engineering design process. In a recent publication by the NAE (National Academy of Engineering) and NRC (National Research Council) entitled *Engineering in K-12 Education: Understanding the Status and Improving the Prospects* (2009), the engineering portion of STEM subject matter introduced to students in grades K-12 was found to be severely lacking. Among the contributing factors cited in the report were difficulties integrating relatively new content into existing curricula, challenges associated with professional development, and lack of pre-service teacher preparation programs. The proposed board game aims to eliminate some of these challenges by integrating basic engineering fundamentals (such as the design process) with information already included in the science and mathematics curriculum frameworks (per the VA Department of Education). The game allows students to participate in the engineering design process in a fun, innovative manner that fosters independent and creative thinking as well as team working skills.

The presentation will illustrate the development, rules and procedures of the board game in a manner that highlights its educational value to K-12 teachers specializing in STEM subjects.

42. The Impact of Age on African American Women's Views on African American Men

Arielle Butler, Jasmine Abrams, M.S., Kristina Hood, M.S., Dept. of Psychology, with Dr. Faye Belgrave, Dept. of Psychology

Previous research suggests that African American women have played a key role in preserving the existence of their families and communities (Gillum, 2007). However, from 1960 to 2000, the percentage of African American single-parent households has increased from 22% to 53.3% (Cantave & Harrison, 2004). As the number of African American women taking on the role of being single and head-of-household increases it suggest that African American men have become absent in the home (Madyun & Lee, 2010). One reason for this increase may be due to perceptions of African American women have of African American men. This exploratory qualitative study sought to identify prevalent views African American women have about African American men. It also examined whether or not there were perception differences between older African American women and younger African American women. Eight focus groups were conducted using a purposive sample of 44 African American women ranging in age from 18 to 80 and of varying educational and religious backgrounds. Women were asked several questions about their perception of men and women and African American men and women. For this study we were interested in women's perceptions of African American men as captured by their responses to questions such as "What do you think if anything make African American men different from men in other racial/ ethnic groups?" and "When you think of men, what comes to mind?" Findings suggest that younger women were more likely to harbor negative views (i.e. immature, weak, inconsiderate, and etc.) towards African American men

when compared to older women. Older women were more positive in their perceptions as indicated by responses such as African American men being leaders and providers. Further research is needed to explore factors related to opinion differences based on age, family background, and marital status.

43. Look who's talking: Family communication patterns about cancer

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

Sharing family health history about cancer is important. It may lead to earlier screening behaviors and diagnoses. Once relatives are aware of their own risks, they may be more likely to engage in risk-reducing behaviors that increase their overall health. Due to the potential health benefits of sharing family health history information, it is important to examine communication patterns about cancer among family members. Previous literature has suggested race and gender differences in family communication; thus, the present study investigated whether communication patterns about cancer differed by relative's gender and race of participant. We hypothesized that women would report more communication about cancer with female relatives than male relatives. In addition, it was hypothesized that race would influence the extent to which participant's reported communication with different family members.

44. Comparing microbial community structure and function in tidal freshwater wetlands of the Chesapeake Bay watershed in Virginia.

Jaimie Gillespie, Center for Environmental Studies, with Dr. Rima B. Franklin, Dept. of Biology

Wetlands provide billions of dollars in ecosystem services to the United States each year. In an era where there is great concern for global climate change, a wetland's ability to sequester carbon is one of its most important features. Understanding how wetlands function at the microbial level can provide important insight into the preservation and restoration of this crucial ecosystem. Here, we compare soil microbial community structure and function of eleven different tidal freshwater wetlands dominated by *Peltandra virginica*. Bacterial and archaeal community DNA was extracted from five replicate soil samples from each site, and analyzed using terminal restriction fragment length polymorphism (T-RFLP). In addition, extracellular enzyme activity (EEA) was measured to assess community function, and data was collected to describe the soil physicochemistry and the wetland plant community associated with each site. A strong relationship was observed between community structure (T-RFLP), function (EEA), and the environmental parameters. Further, the composition of the bacterial and archaeal communities was strongly correlated. Bacterial community composition appears to be less related to the soil properties than the archaeal communities; the most important environmental factors were above-ground plant biomass, temperature and soil redox

conditions. Of the six EEAs performed, the strongest relationship between community structure and function was for the enzyme phenol oxidase, which is responsible for the break down of more recalcitrant carbon compounds. Ongoing work will examine microbial biogeography, and consider how the community fingerprints vary at increasing scales (e.g. within and between wetlands, along rivers, etc.).

45. The Impact and Importance of Brazilian Music in America

Samuel Sherman, Dept. of Music, UROP Summer Fellow 2010, with Prof. Antonio Garcia, Dept. of Music

The standard jazz repertoire in America has been shaped by many forces since its advent at the start of the twentieth century. Since the Bossa Nova craze of the 1960's, Brazilian music has had a particularly unique influence on jazz in America. Students and performers of jazz music are expected to be familiar with a wide variety of songs that are stylistically derived from Brazilian music (samba, bossa nova and baion, to name a few) both at universities and in live music situations. Despite the obvious sonic differences between Brazilian-based jazz and traditional American swing music, many students at American universities are unfamiliar with the essential musical elements that differentiate these two distinct styles from one another. Through study of written material, as well as primary source research in Rio de Janeiro, Brazil, this project explores the rhythmic, melodic and harmonic components of indigenous Brazilian music and its links to jazz. The goal is to discover and extract some musical concepts that can be implemented by American jazz students in their playing and practice of this music, which will enable them to bring an educated perspective to the music they are expected to perform.

46. Are wealthier countries happier? Happiness in the United States, Germany, Ghana and Peru.

Sonia Haro-Garcia, Dept. of Psychology, with Dr. Vivian Dzokoto, Dept. of African American Studies.

While money has been assumed to be a predictor of happiness, the empirical support for this assumption is mixed. The goal of this study is to explore the relationship wealth and happiness at a national level.

Using data from global surveys on Happiness (such as the World Value survey, Gallup World Happiness Poll and the Pew Survey), levels of happiness in 2 wealthy countries (the United States and Germany), and 2 poor countries (Ghana and Peru) will be explored. We predict that citizens from wealthier countries will be more satisfied with their lives.

47. Classical Ballet: Avoided Boundary Issues

Kaila Pettus, Dance & Choreography with Prof. Mary C. Boyes, University College

Classical ballet at its roots is a Eurocentric aesthetic based on elite stature, uniformity of movement, and grace. Therefore, ballet is dominated by Caucasians of light skin tones. As a result the presence of African American dancers in classical ballet is still limited, or restricted to a handful of African American dancers. In my paper, I'm exploring to find answers that reflect upon the minority presentation of African American dancer's physical and skin tone color by investigating that racism or color boundaries exist in the professional world.

I am looking into the classical ballet form, in particular in ballet's physical and technical aesthetics, to better understand the foundations of classical ballet of how they help or promote the absence of African Americans in modern day classical ballet companies. Examinations of ballet aesthetics and historical African American studies in dance will be examined. It will help to clarify racial implications exist within this dance form. The investigative findings will determine that racial barriers do exist in present day classical ballet companies, even after the Civil Rights Movement. I am drawing to attention to this discussion on ethnicity because it's going to be a major issue due to the fact that more ethnic groups intermingle.

48. African American College Students: Concerns Regarding HIV Testing

Stephen E. Davenport, Dept. of African American Studies and Philosophy, with Dr. Raymond H. Tademy, Psychology

In 2006 African Americans comprised 13% of the US population but accounted for 45% of all new HIV infections in the US (CDC, 2010 and U. S. Census Bureau, 2009). Research suggests African Americans are not getting tested in sufficient numbers to thwart high transmission levels (Campsmith et al, 2010). Three focus groups were conducted at VCU as part of a long-term HIV/Substance abuse prevention program to obtain data about African American college student attitudes toward substance abuse and HIV. The focus groups consisted of a purposive sample of 11 male and three female participants, Participants were African American students currently enrolled at VCU. While data analysis is still being conducted, preliminary findings suggest that African American students may have serious concerns about confidentiality, anonymity, and reliability of HIV testing. Further research should help substantiate these concerns and find ways to overcome these possible barriers to HIV testing. Future intervention and testing programs should include strategies to account for these concerns during development and implementation.

49. Popular Eugenics in Early 20th Century Virginia

Gabriel Fulmer, Dept. of History, UROP Summer Fellow 2010, with Dr. Karen Rader, Science and Technology Studies

The purpose of this research is to determine the effects of key individuals in spreading the message of Eugenics to the general population in from the early 1900s until 1936. Through

the research, I came to the conclusion that locally in Virginia, and in fact in the nation as a whole, Eugenics was spread through the actions of a few men, and their intense lobbying silenced all debate on the issue and made Eugenics into policy. To come to the conclusion much research was done in archives going over the information provided by the state hospitals that performed sterilizations, as well as looking at the correspondence, the speeches, and the pamphlets released by the key figures in my research, Dr. Plecker, Dr. John Bell, and Aubrey Strode. While the question is still open for debate, I found that, especially in the case of Dr. Plecker, his fierce determination to enact racist, eugenic policies and enforce them was the primary cause for such things as the Virginia Racial Integrity Act and the Eugenical Sterilization Act. This research serves as beneficial to the understanding of Virginia racial history as well as a foundation for the history of eugenics in Virginia. Moreover, it highlights the key figures that orchestrated the policies which led to thousands being sterilized. It is important to look at Virginia eugenics as less of a social movement and more of an act guided by individuals onto an ignorant public.

50. How would African American college students prefer to be informed about HIV/Aids?

LyShaun Powell, Criminal Justice, Tanetta Walston, Psychology, Emerald Anteson, Psychology, with Dr. Raymond Tadey, Dept. of Psychology

African Americans may not respond well to prevention services and their infection rates have shown no sign of decreasing (Hodge, M., & Wade, B. H, 2007). Given that conventional intervention methods have had little to no effect upon reducing HIV infection rates among African Americans, we recognize that African Americans may continue to have significantly higher risks of contracting HIV (Hodge, M., & Wade, B. H, 2007). Due to these findings, the goals of this study were to: (1) Determine what would be the best way to provide this information to a sample of African American college students and (2) determine whether or not students felt that the methods we used and the information we provided about HIV was beneficial. The participants in this study included forty-seven African American college students (N=47) who attended a forum for HIV/AIDS awareness. At the forum, entitled *Sex, Drugs, You and Your Boo*, participants were able to hear from a panel of experts ,i.e., the president of aVCU student organization *Queer Alliance*, student representative, and an HIV testing and HIV prevention specialist. The panel also consisted of a person living with HIV and the event also included several skits and an informative multi-media presentation. At the end of the forum, participants were administered a survey that included questions such as: (1) How they learned about the event, (2) what would be the best way to inform them about future events, (3) if the information they received was valuable, (4) if they intended to incorporate what they learned into their lifestyle, and (5) if they would be interested in participating in similar events in the future. Results from the survey revealed that 89.4% of students strongly agreed information received at the forum was valuable, 95.7% of students strongly agreed that they intended to incorporate what they learned into their lifestyle, and 93.6% answered yes when asked if they would be interested in participating in similar events in the future. Although 40.4% of students were informed about the event by word-of-mouth, 44.7% of students would prefer email as the best way to inform them about similar events in the future. We believe there is a need to not only find ways to increase HIV/AIDS awareness among African American young adult populations, but also to identify strategies to address the

significantly higher risk that African Americans have of contracting HIV. We believe our event may have effectively identified key components of these strategies.

51. Helping Former Child Soldiers Find Their Way Back Home

Sheila Kapyur, Bioinformatics with Prof. Jeff Lodge, University College

Currently over 250,000 children all over the world are being utilized as “child soldiers,” a term that is used to refer to children who have been placed in either direct contact with warfare or used by the army for daily chores. These children, some as young as eight years, will be forever haunted by the actions forced upon them that they often end up taking responsibility for. If they are not taught otherwise, their past will always affect their future. In our increasingly connected world, the future of these children can affect our own. Therefore, for the benefit of the children and potentially ourselves, it is exceedingly critical for former child soldiers to undergo reintegration programs that not only reconnect the children with their communities but also aid the community in accepting the children.

This paper strives to convey the crucial need for reintegration programs that provide follow-up support for child soldiers and attempts to model an ideal one. The paper focuses on the importance of the role of the community in the process of reintegration for former child soldiers of Africa. With the assistance of well-developed rehabilitation programs, these children will be able to finally accept their past and find a new future.

52. The Aqueous Synthesis of Gold/Zinc Oxide Composite Nanoparticles and their Use as Catalysts in the Photodegradation of Organic Dyes.

Chelsea Olson, Dept. of Chemistry, with Dr. Mohamed El-Shall, Dept. of Chemistry

Gold/zinc oxide (Au/ZnO) composite nanoparticles are extremely promising for use as catalysts, sensors, electronic and optoelectronic devices. In order to use these particles in applications, a simple, reproducible synthesis route needs to be established. Here, we present a relatively simple method for the aqueous synthesis of Au/ZnO composite nanoparticles using sodium hydroxide, sodium borohydride, sodium citrate, CTAB, gold chloride, zinc acetate, zinc nitrate, and ethanol. UV-visible absorption spectroscopy is utilized to characterize optical properties and indicates particle formation. X-ray diffraction patterns confirm the formation of gold and ZnO crystal structures. Moreover, particle morphology is observed by transmission electron microscopy (TEM). TEM shows composites with various morphologies including star and branched shapes. Photocatalytic ability to degrade organic dyes is evaluated by studying the decomposition of malachite green in the presence of Au/ZnO catalyst and UV light.

53. The Necessity of Standards on Effective Hospital Cleaning Chemicals

Wahab Syed, Dept. of Biology, with Prof. Mary C. Boyes, University College

In modern medical society, a huge emphasis is placed on cleanliness and aseptic medical facilities. It would be safe to assume that the federal or even state governments government would become very involved in the monitoring bacteria in hospitals. Astonishingly, this is hardly the case. The federal and various state governments place mandatory bacteria concentrations and identification tests in all restaurants, meat plants, and even cruiseliners. This power, however, does not extend to hospitals, where cleanliness and a controlled amount of bacteria is vital to health care.

Testing of surfaces for bacteria concentration and identification is crucial in proper disinfection. If the identify or presence of a certain bacteria is unknown on a particular surface, how is it possible to effectively treat it? If the correct chemical is not chosen for the job of disinfection, than there is no guarantee that the area has been disinfected. For example, *Clostridium Difficile* is a bacterium that can spread spores, extending its infectious ability and causing thousands of infections every year. If *C. Difficile* were to be treated with an alcohol based disinfectant, then it would have been useless. That is because *C. Difficile* spores can survive Ethanol applications. The most effective treatment for *C. Difficile* is a Chlorine bleach solution that is applied to the suspected surfaces, which should act as an agent for its removal. If this information was not known to a hospital worker or a hospital in general, than they could overlook the proper disinfection and have *C. Difficile* spores present in their hospital.

The government needs to have established standards for the testing, identification, and treatment of bacteria in hospitals. This paper seeks to explain which chemicals and application methods are most effective against the most common infectious bacteria found in hospitals based on basic science. The goal of this paper is to explain the importance and necessity of national standards on bacterial disinfection in hospitals.

54. Association studies on BDNF Gene with Smoking Initiation and Nicotine Dependence

Juhee Sharma, with Dr. Xiangning Chen, Dept. of Psychology

Brain-derived neurotrophic factor (*BDNF*) is a protein encoded for by the *BDNF* gene, located on chromosome 11 in humans. Research has shown that an upregulation of *BDNF* expression is associated with the abuse of drugs such as cocaine and amphetamine. Tobacco smoking has an extremely detrimental effect on the human body, yet is a preventable health issue facing the world today. While smoking is a complex behavior in which many environmental factors are involved, evidence has shown that genetic factors play a significant role in this addiction. The purpose of our research is to determine whether or not *BDNF* is associated with nicotine dependence and the initiation of smoking. Using the VA TWIN sample from the Virginia Twin Registry, which includes more than 6000 healthy and smoking individuals, we are assessing the genotypes of each individual for the non-synonymous SNPs rs6265 from *BDNF* gene. Genotyping was performed with the TaqMan genotyping method. This included PCR of the

DNA samples. Tobacco smoking and nicotine dependence were assessed by the Fagerström Tolerance Questionnaire (FTQ), and/or the Fagerström Test of Nicotine Dependence (FTND). Association studies of our sample and other genome wide association study (GWAS) samples will be performed using the PLINK program. Finally, a program called GWAMA will be used to conduct a meta-analysis of these samples. Our preliminary data will provide evidence whether the non-synonymous SNP rs6265 from *BDNF* gene is associated with smoking initiation and nicotine dependence.

55. To Bean or not to Bean: The Relationship Between Negativity Bias and Emotional Disorders

Katherine McDonald, Alison Burgujian, with Dr. Natalie J. Shook, Dept. of Psychology

Many questions in psychology focus on understanding the ways in which individuals learn about and evaluate their environments (i.e., form attitudes), and how these attitudes are then generalized to the world around them. Previous research has shown that people generally learn negative information better than positive, i.e., exhibit a negativity bias (Rozin & Royzman, 2001). Furthermore, negativity biases in cognitive style have been found to characterize people with emotional disorders, such as depression and anxiety (Abramson, Metalsky, & Alloy, 1999; Riskind, 1997). We are interested in exploring the degree to which individual differences in predisposition to anxiety and depression correlate with negativity biases in attitude formation and generalization. Fazio, Eiser, & Shook (2004) demonstrated that a computer interface called BeanFest can be used to assess negativity biases in attitude development. Further research using the BeanFest paradigm (Shook, Fazio, & Vasey, 2007) found that negativity bias in attitude formation was associated with negative cognitive style and symptoms of emotional disorders, but the study was focused primarily on attitude formation and limited by having a sample comprised only of undergraduate students. We intend to replicate Shook et al.'s (2007) findings with a more representative community sample and extend the previous work by examining the generalization of learned attitudes to new information. Participants will play the BeanFest game in which they must learn whether stimuli (beans) are good or bad in order to succeed. After the game, participants' learning of the beans (i.e., attitude formation) is assessed, as well as generalization of these newly formed attitudes. Finally, participants will complete a number of measures that assess anxiety and depression. We expect to find that higher levels of anxiety and depression correlate with a greater negativity bias in attitude formation and greater generalization of negative attitudes. We hope that this research will contribute to further understanding emotional disorders.

56. Condom Use: Attitudes and Relationships

Sukhjit Kaur, Rhea Mascoll, Kristina Hood with Dr. Natalie Shook, Dept. of Psychology

Some relationships, whether casual or committed, may encounter a situation where decisions regarding sexual intercourse and condom use are made. Studies suggest that women in committed relationships use condoms less frequently than those who are in non-committed,

casual relationships as a result of perceptions that they are less likely to be at risk for HIV/AIDS and STDS (St Lawrence, Eldridge, Reitman, et al 1998). This is a result of women feeling a sense of security in the relationship and believing that their partners are faithful (Roberts, 1999). Along with the level of comfort in their relationships, women's attitudes towards condom use can also determine their likelihood of using them. Albarracin and colleagues (2001) found that attitudes are strongly related to condom use intentions and have positive effects on condom use behaviors. Similar results were found in a meta-analysis (Albarracin, Durantini, & Earl 2006) where it was suggested that researchers should formulate techniques to increase positive attitudes towards condom use that will further increase behavioral skills in preventing HIV and other diseases. The aim of this study is to better understand how relationship status and attitudes toward condom use influence condom use behaviors. A sample of 73 female African American college students participated in this study at Virginia Commonwealth University. Participants watched a short HIV prevention video and then answered some questionnaires concerning their attitudes, beliefs, and experiences regarding condom use. It is expected that those who are not in a committed relationship and those who have positive attitudes towards condom use will be more likely to use condoms consistently when compared to those who are in committed relationships and those who have negative attitudes towards condoms. There is also an expected interaction effect such that the association between relationship status and condom use will depend upon women's attitudes toward condom use. The results of this study can aid HIV prevention researchers in gaining a better understanding of why some women choose not to engage in condom use consistently and to target interventions toward women in relationships.

57. Phosphorylated tau accumulation in the presence and absence of sulfatide

Jacqueline M. DeLoyht^{1,2,3}, *Anthony Pomicter*¹, and *Jeffrey L. Dupree*¹
¹Department of Anatomy and Neurobiology; ²Department of Biology
³UROP Summer Fellow 2010

During development, oligodendrocyte lineage cells progress from simple bipolar cells to complex, highly branched cells. Interestingly, the transition from this simple to the complex morphology temporally corresponds with the appearance of the oligodendrocyte sphingolipid known as sulfatide. Based on findings from previous *in vitro* perturbation studies, sulfatide was identified as a potential regulator of oligodendrocyte differentiation and morphology. Consistent with these observations, our laboratory has recently reported that mice that are incapable of synthesizing sulfatide maintain oligodendrocytes that exhibit a less complex morphology by extending significantly fewer myelin forming processes than their wild type counterparts. Since cellular morphology is regulated by cytoskeletal elements, we have investigated the expression and distribution of β IV tubulin in the sulfatide null mice. Preliminary findings indicate that levels of β IV tubulin are not altered; however, polymerized tubulin abnormally accumulates in the cell bodies of the sulfatide null cells. In addition, polymerized tubulin is also observed in sulfatide null myelin sheaths. To further our understanding of the role that sulfatide plays in the regulation of the oligodendrocyte cytoskeleton, we have also analyzed the distribution and state of phosphorylation of the microtubule associated protein tau. Phosphorylated tau was not observed in either the oligodendrocytes or myelin sheaths of 15 day old wild type (WT) or null mice. Surprisingly, accumulations of phosphorylated tau were observed in oligodendrocytes of

both WT and sulfatide null oligodendrocytes at 1 month of age. By 7 months of age, the prevalence of tau clusters was maintained in the WT cells but was significantly increased in the sulfatide null cells. Based on our data we propose that phosphorylated tau plays a role in normal oligodendrocyte development and myelination; however it remains to be determined how and why sulfatide depletion results in an increased accumulation of phosphorylated tau in oligodendrocytes.

58. Regulation of differentiation in the cyanobacterium Anabaena PCC7120 by the expression of a noncoding region of the genome

Sahithi Boggavarapu, with Dr. Jeff Elhai, Dept. of Biology

Anabaena PCC 7120 is a filamentous cyanobacterium that forms specialized cells called heterocysts to fix atmospheric nitrogen gas. Anabaena PCC 7120 is a laboratory strain that is unable to form symbiotic relationships but is closely related to cyanobacteria in the genus Nostoc that are capable of symbiotic relationships with several different types of plants. One such relationship has been established with the angiosperm plant Gunnera; however, Nostoc is unable to form symbiotic relationships with staple crops such as corn and wheat. By understanding heterocyst formation and nitrogen-fixation in Anabaena, we hope to better understand how some plants are able to utilize Nostoc in symbiotic relationships.

Deletion of the intergenic region between the genes dmtB and trpD2 results in death caused by heterocyst overexpression. Overexpression of the intergenic region results in heterocyst absence, possibly indicating that transcription of this region is important for heterocyst expression. A 17-nucleotide site contained within the dmtB-trpD2 region is similar to a nucleotide sequence of the same length in the promoter region of hetR, a gene known to be a critical regulator in heterocyst differentiation. To test the possibility of an interaction between the 17-nucleotide sequence in the intergenic region and the hetR promoter, two experimental conditions will be created: one where the 17- nucleotide sequence within the intergenic region is mutated and one where the 17- nucleotide sequence in both the intergenic region and the hetR promoter is mutated. The resultant plasmids formed from each project will be conjugated into Anabaena and the cyanobacteria containing the plasmids will be examined for the presence or absence of heterocysts. The results of heterocyst formation from each conjugation can later be compared to the heterocyst formation in wildtype Anabaena where the 17-nucleotide sequence remains unaltered.

The main aim for this project is to expand our understanding of the role of a seemingly critical 17-nucleotide segment between the dmtB and trpD2 genes in relation to heterocyst formation. The information acquired through these experiments will aid in formulating a better understanding of heterocyst formation.

59. Instructional compliance in a mindfulness induction experiment

Lauren N. Moore, Laura G. Kiken, with Dr. Natalie J. Shook, Dept. of Psychology

Mindfulness is a sustained, receptive attention to and awareness of experiences in the present moment (Brown & Ryan, 2003). Recent research on mindfulness has used laboratory-based procedures for inducing mindful attention in participants and measuring subsequent effects. However, the standard mindfulness practices that are used, such as meditation, may be unfamiliar to many participants because they are not widely practiced. Therefore, participants might not comply well with mindfulness instructions compared to more familiar task instructions. If participants fail to comply with instructions to be mindful, then the instructions will fail to induce a state of mindfulness and the experimental manipulation will not be effective. Thus, the current experiment examined whether self-reported compliance with instructions differed for those who received mindfulness instructions (e.g., “maintain attention on the sensations of each breath”) versus control condition instructions (e.g., “let your mind wander freely”). No significant differences were found for compliance. Further, those who received mindfulness instructions reported significantly higher mindfulness than those who received control instructions. These results suggest that participants may comply with mindfulness induction instructions as well as they comply with other laboratory-based instructions, and mindfulness may be induced successfully in the lab. This helps to support the validity of these mindfulness induction procedures for future research.

60. Haptic Exploration of Art Using a Tactile Mouse

Victoria E Hribar, School of Engineering with Dr. Dianne T.V. Pawluk, School of Engineering

To enable individuals who are blind and visually impaired to feel included and participate fully in the world around them, it is important to make all environments accessible to them. Most art museums do not allow visitors to touch artwork, which limits the experience and participation for those who are visually impaired. Objective: To develop a method to more directly convey the style and expressiveness of a painting by the use of touch. Method: The textures will be conveyed by the haptic display created by Headley and Pawluk (2010). With a usable temporal bandwidth up to 100 Hz and four amplitude settings, variations in the temporal, spatial and amplitude levels were created in order to design two intuitive dimensions to represent brushstroke length and contrast. The device was programmed in MATLAB to execute the different types of patterns based on the location of the tactile device on the workspace. Participants who are blind and visually impaired will be recruited through the Virginia Department for the Blind and Visually Impaired to evaluate the system. We will determine if users can distinguish between several brushstroke lengths and contrasts through touch. Results Expected: It is expected that tactile textures can be effectively used to convey the length of brushstroke and the contrast between adjacent regions of colors. The success of the results will be dependent on there being at least an 80% correlation between the physical dimensions and the perceived painting dimensions and that participants evaluated the methods to be greater than 80% on the system usability survey.

61. An analysis of psychosocial survivorship issues in pediatric oncology.

Eleanor DeShone, Dept. of Psychology, UROP Summer Fellow 2010, with Dr. Marilyn Stern, Dept. of Psychology

With dramatically improved survival rates, adolescents with cancer (AWC) can now anticipate living most of their lives as cancer survivors. Therefore, maximizing positive lifelong adjustment in key developmental domains such as academic and career development has become imperative. Although the majority of survivors adapt adequately to life after cancer treatment, optimal levels of developmentally appropriate functioning can be compromised. AWC have to suspend normative development while dealing with active treatment, thus their negotiation of important developmental tasks may be negatively affected.

Progress made in developing academic/career self-efficacy, or the belief in one's capability of progressing toward such goals, as well as planning for one's academic/career future can be especially vulnerable to the cancer experience. Previous research has found that AWC tend to engage in inadequate career exploration and settle prematurely on career goals, suggesting deficits in career self-efficacy and decision making. One factor thought to be important in this transition is the type and quality of communication between health care providers (HCPs), AWC, and their parents. As compared with healthy peers, AWC will have spent significantly more time with health care providers than other adults and these relationships can serve as crucial emotional and informational supports regarding career.

Qualitative coding is currently underway to examine communication themes. Among the specific issues discussed are effects of treatment on academic performance, career interests, and higher education topics. A 'Recall and Reaction' session where AWCs were interviewed by psychology researchers indicated that academic discussions mostly focus on homebound education or return to school issues, while career discussions center on future career plans.

62. Efficacy of the REACH Forgiveness Intervention on International Participants

Holly Muller, Anna Bezemer, Yin Lin, Dept. of Psychology, with Dr. Everett Worthington, Dept. of Psychology

A wide range of studies are conducted in the United States to test the REACH Forgiveness Intervention but few have tested the efficacy of the intervention on international participants. The current study is to fill the information gap and cross examine two cultures (International and Virginia born) and how they respond to a forgiveness intervention shown to be effective for thousands of people. The participants include women college students ($N=40$) who volunteer to participate in assessments and a six-hour intervention to promote forgiveness for a transgression within a group. The statistical design will employ a 2 (country: foreign extraction vs Virginia) x 2 (Treatment: Immediate Treatment vs Waiting List) x 3 (time, within subjects) design. A secular 6-hour psychoeducational model to help people REACH Forgiveness will be followed. Four cohorts of participants will be run—two cohorts each by one of two female undergraduate group leaders. Each of the four cohorts will be divided randomly into two groups of about 4 to 5 participants each. Random assignment will be constrained in that an approximately equal number of students of foreign-extraction and those who are Virginia-born-and-raised will be assigned to each group. Participants use Sona-systems to access the study and are contacted by email and told of their selection for the study and assigned randomly to

one of the available groups. They are required to complete (a) online personal assessments (b) three online assessments of the target transgression completed two weeks apart (c) attendance of all 6 hours of a Saturday workshop. The participants will receive six hours of research experience credits toward Psychology 101 class research experience requirement.

63. Effect of an oxygen therapeutic agent on systemic parameters of transgenic sickle cell mice

Sami Dodhy, Bjorn Kyung-Suck Song, Aisha Mondal, Amina Parvez, Rizwan Jivani, Soraiya Thura, Wally Smith, with Dr. Ivo Torres Filho, MD

*Departments of Internal Medicine, Biomedical Engineering and Biology; VCU and VCURES
Funding provided by grants from NIH and Sangart, Inc.*

Transgenic mouse models have been developed to mimic human sickle cell disease (SCD) to investigate its complex pathophysiology. Hemoglobin-based oxygen carriers and oxygen therapeutic agents (OTAs) solutions have been developed to allow hemoglobin to circulate in the plasma and enhance oxygen delivery. Because of this oxygen delivery capacity, OTAs may be used as adjunct treatments for sickle cell disease. MP4CO (Sangart, Inc., San Diego) is an OTA that releases carbon monoxide and then circulates as an oxygen carrier. Carbon monoxide might have beneficial effects in sickle cell disease. The purpose of this project is to study the effects of MP4CO on systemic parameters of transgenic SCD mice. Transgenic mice from a colony established at our institution were anesthetized, their neck and left hind-leg shaved and cleaned to prepare for surgery. A mouse pulse-oximeter was placed to measure systemic arterial oxygen saturation. The mice were tracheotomized to ensure proper breathing of inhalant anesthesia (Isoflurane) and their jugular vein was cannulated for fluid infusion. A rectal thermometer, pneumogram, and ECG leads were placed on the mice appropriately to acquire the core temperature, breath rate and heart rate, respectively. The mice underwent fifteen minutes of baseline measurements, one hour of hypoxia at 12% oxygen and one hour of reoxygenation at 21% oxygen. Two different substances were injected during hypoxia: Lactated Ringer's at 8 ml/kg or MP4CO at both 4 ml/kg and 8 ml/kg. Successful experiments required tight control of temperature (maintained at 37.0 ± 0.5 C) and surgical technique. Control experiments were performed in c57b mice. Preliminary data show that Tg SCD mice given a dose of MP4CO at 4 ml/kg had a lower heart rate during reoxygenation and an even lower heart rate with 8 ml/kg during reoxygenation when compared to mice infused with Lactated Ringer's. Breathing rates of Tg mice given MP4CO at 4 ml/kg and 8 ml/kg were respectively higher and deviated less from baseline during both after the infusion and during reoxygenation when compared to Lactated Ringer's. Survival and arterial oxygen saturation were unaffected by MP4CO. The results show that MP4CO affects heart rate and respiration rate but was well tolerated in Tg SCD mice. The physiologic or therapeutic implications of these findings require further study.

64. Charting Complications Resulting from the Rise of Minimally Invasive Surgery

Aruna Anbazhagan, Dept. of Biomedical Engineering, with Prof. Jeffrey Lodge, University College

Due to advances in the science and technology of surgery, the operative experience and training of surgical residents has significantly changed over the last two decades. Minimally invasive surgery was introduced in 1993. Since then there has been a progressive decrease in open operations and progressive increase in closed operations. The following research pinpoints these changes and specific patterns. Many claim that since the introduction to of minimally invasive surgery, open operative surgery has been on a decline resulting in a decrease in experience for residents in training. This lack of experience is affecting many aspects of the surgery experience including intraoperative crisis management and decisions made in trauma cases where open procedures are necessary. It is found that many younger surgeons feel more comfortable with complications in laparoscopy rather than converting over to OC due to their lack of experience with OC. Even after conversion is decided, these operations require longer operative times, exposing the patient to a variety of risk factors. Although the early surge seen in the 1990s has subsided, the incidence of bile duct injury during LC remains between 1 per 200 and 1 per 500 cases, twice that seen in the era of OC (109). This widening gap in experience must be given higher priority through educational policies. It should also be ensured that residents take part in well-balanced and varied operative opportunities, rather than focus on one's own disciplines or interests. Not only do all operations share a common set of skill requirements, but they will also serve to help build the confidence needed for a successful and well-rounded surgeon.

65. Does Early Treatment for Mental Disorders Help or Hinder of the Child?

Alexandria Blackwell, Social Work, with Prof. Jennifer L. Smith, University College

In the United States, one in five children meet the criteria for a mental disorder that is severe enough to disrupt their daily life (Elsevier). When I first learned of this disturbing fact, it shocked me even more to learn that some children never get the treatment needed, while other children get over-treated. That is just one of the many issues surrounding the problem of mental illness in children and treatment for it, which is increasingly becoming more prevalent every day. There are concerns surrounding the age in which young children can be prescribed medication for their disorders, because of how the medication affects their rapidly growing brains. Also, there are more concerns of over-treatment for children, such as are these medications really needed for that characteristic of the child? One of my sources that I learned quite a bit from is that of an article I found in The New York Times called, "Child's Ordeal Shows Dangers of Antipsychotic Drugs" (Wilson). This article tells of a young child, who was put on many different medications for his many diagnoses of mental disorders, starting at the age of 16 months. In the end at the age of six, it was found that he only had attention deficit disorder and only needed one medication to treat it. After telling this story, the article goes on to tell of the risks of wrong diagnoses and treatments for mental disorders in children and how often this happens. There are even more questions to be answered, such as what is the criterion to be diagnosed with a mental disorder as a child? Why is it cheaper to buy

medication than therapy? So many questions to be answered and the risk are pretty high in stake. This matter is definitely time-sensitive, for there are children not getting the treatment needed or on the flip-side, there are children who aren't getting the correct treatment designed for their disorder. I am researching questions, such as what is the criterion to be diagnosed and whether medications for these disorders negatively affect the young child's brain.

66. De-nitration of smooth muscle L-type calcium channel is reduced in colonic inflammation

Huma Khatri, with Dr. Minh Kang and Dr. Hamid I. Akbarali, Dept. of Pharmacology and Toxicology

Ulcerative colitis and Crohns disease are inflammatory bowel diseases characterized by recurrent episodes of colonic inflammation and tissue degeneration. In humans and experimental animal models of intestinal inflammation, the contractile force generated by the smooth muscle is significantly reduced resulting in altered motility due to reduced calcium influx. This occurs as a result of altered modulation of the calcium channel by nitration of tyrosine residues within the carboxy terminus of the smooth muscle isoform of the L-type calcium channel (Cav1.2b). Tyrosine nitration due to enhanced reactive nitrogen species during inflammation reduces the tyrosine phosphorylation of the ion channel. In this study we examined if smooth muscle cells can de-nitrate the C-terminus of hCav1.2b (aa 1809-2138). The GST-fusion protein of the C-terminus (GST-CT) was treated with peroxynitrite and probed for nitration by Western blots using the anti-nitrotyrosine antibody (anti-NY). To test for the presence of denitrase activity in smooth muscle cells, the nitrated GST-CT was treated with cell lysates from mouse colonic smooth muscle for 2 hr at 30°C and examined with anti-NY. Nitration was reduced by 46% that was prevented by heat inactivation of the lysates indicative of enzymatic activity. Nitration was reduced in a time-dependent manner with significant decrease observed by 30 min treatment with cell lysates. Experimental colitis was induced by intracolonic administration of trinitrobenzene sulfonic acid (TNBS). Cell lysates obtained from inflamed mouse colon had reduced denitrase activity. The extent of GST-CT nitration was reduced from 4.6 ± 1.9 to 2.9 ± 1.2 (n=3) in control and inflamed samples, respectively. These findings suggest that tyrosine nitration of the hCav1.2b may be a reversible process due to the presence of denitrase in smooth muscle cells. The denitrase activity appears to be down-regulated in colonic inflammation and may form the basis for reduced muscle contraction in conditions such as Inflammatory Bowel Disease. Supported by NIH DK046367.

67. How do N₂-fixing cyanobacteria penetrate plant cells?

Kim Nguyen, Dept. of Biology, with Dr. Wan-Ling Chiu, Dept. of Biology

Nitrogen-containing fertilizers have been widely used to enhance plant growth. However, the synthesis and application of nitrogen fertilizers are associated with high energy and environmental cost. Interestingly, some plants have evolved the ability to obtain usable nitrogen by forming symbioses with N₂-fixing microbes such as rhizobia and cyanobacteria.

Unlike rhizobia, which interact only with specific plant hosts, cyanobacteria can form symbioses with a wide range of plants. *Gunnera* is the only group of flowering plants that can host cyanobacteria and the only multicellular plant that hosts cyanobacteria intracellularly. Understanding how *Gunnera* initiates and maintains symbioses with cyanobacteria may enable us to extend the benefits of biological N₂-fixation to crop plants.

Cyanobacteria enter *Gunnera* through mucilage-secreting glands on the stem in the form of transiently motile filaments called hormogonia. However, the mechanism through which hormogonia penetrate plant cell walls remains unknown. A search of a gland cDNA library turned up many cell wall modification enzymes, including pectinases, which breaks down the cell wall component pectin, and pectin methylesterase inhibitors (PMEIs), which prevent the solidification of pectin. The actions of both pectinases and PMEIs may facilitate the formation of space within cell walls, which allows hormogonia to enter plant cells. We are in the process of testing this hypothesis by overexpressing PMEIs in plant tissue to see if the resulting plant tissue will allow cyanobacteria to enter plant cells.

68. Male and Female Feather Reflectance in a Nearctic-Neotropical Migratory Warbler: Does it Communicate Fitness?

Nyla Khan, Dept. of Biology and Environmental Studies, UROP Summer Fellow 2010, with Dr. Lesley P. Bulluck, Dept. of Biology

Traditional models of sexual selection emphasize female preference for males that possess particular traits that aid them in intraspecific competition for mating opportunities. In these models, observed differences between the sexes are explained through contests between males for access to females. Amongst many bird taxa, the coloration of plumage plays an important role in sexual selection. The avian eye is sensitive to not only the visible but also the UV spectra. Reflectance of feathers in both spectra has been shown to play a role in mate choice and to indicate the quality of individual male birds. However, few studies have addressed the role of feather ornamentation in females. In this study, we characterize the feather reflectance of male and female prothonotary warblers (*Protonotaria citrea*), a migratory songbird where both sexes show bright yellow plumage and that nests in the lower James River. We also assess the relationship between plumage reflectance and individual fitness by comparing breast, crown, and tail feather reflectance in the UV and visible spectra to measures of reproductive success and body condition. We found that the breast and crown feathers of male prothonotary warblers are generally brighter than those of females but the difference is fairly small in the breast. We found no difference in tail feather reflectance between the sexes. We are currently assessing the relationship between feather reflectance and reproduction and body condition and should have the results in the next couple of weeks. Our results are interesting because we assess the function of feather brightness in females where most research to date has focused on males.

69. Misunderstood Utopia: American Society's Impact on the Decision of Peoples Temple to Exile and Self-Destruct in Guyana

Ava Winckler, Dept. of History, with Prof. Leslie Cohen-Gee, University College

In 1978, Jim Jones and the members of Peoples Temple committed mass suicide/murder of extreme proportions in Guyana. The Jonestown compound had been viewed as a “utopian society” for the members of Peoples Temple who relocated from the United States. While Jim Jones carries much of the blame for the mass exodus of church members from the United States to Guyana, he cannot account for all the reasoning behind the exile. Because Peoples Temple was based on equality amongst all races and backgrounds, at least in the public eye, many political and religious groups pitted themselves against the church because of extreme differences in opinion. Jim Jones also had extremely complicated political ties, some related to communism and socialist viewpoints, making Peoples Temple a target for the far right and conservative demographic. These tendencies towards radical politics, especially during Vietnam and the Cold War period, made the church and its members extremely vulnerable to attacks. Peoples Temple's acceptance of different races during the Civil Rights era continued the dislike for the religious sect. These claims from scholars, government officials, and reporters give reason to believe Jim Jones, while a dangerous man and fearless leader, is not to be held solely responsible for triggering the movement of Peoples Temple to Guyana where they ultimately eliminated their religious sect.

70. Finding Nash Equilibria in Models involving both Continuous and Discrete Decision Variables within the context of Homeland Security and Nuclear Terrorism

Garrett Howe, School of Engineering, UROP Summer Fellow 2010, with Dr. Laura McLay, School of Engineering

This paper aims to find Nash equilibria in resource allocation/decision making models between two adversaries each seeking to maximize their respective objective functions. A game between two teams, labeled “United States” and “Terrorists,” is proposed in which the Terrorists attempt to detonate a nuclear device within the country while the United States attempts to prevent the attack. Each side has certain discrete and continuous variables that they can change that affect the objective function for both their own side and the opposing side. A particle swarm optimization algorithm is set up consisting of two swarms that each try to optimize one of the objective functions using the individual particle positions of the one swarm and the center of the opposing swarm as inputs to each objective function. Due to the highly dynamic solution space, fuzzy logic is implemented to help each particle swarm track the moving optima within the search space.

71. Annotation of Transcription Factors involved in Plant-Cyanobacteria Endosymbioses

Jordan Wong, Dept. of Biology, with Dr. Wan-Ling Chiu, Dept. of Biology

Gunnera is currently the only genus of herbaceous angiosperms known to form a nitrogenfixating symbiosis with cyanobacteria, especially *Nostoc*. *Gunnera* is also the only multicellular plant genus known to host cyanobacteria intracellularly. *Nostoc* differentiate into hormogonia, motile filaments, and enter into *Gunnera* through specialized gland cells on the stem of *Gunnera*. In order to characterize genes involved in gland development and cellular modification, we utilized two second generation sequencing technologies, 454 and Illumina, to sequence a gland cDNA library and obtain a gland transcriptome. Transcription factors, regulators of gene expression, are of particular interest being that their ability to turn on the expression of genes for the entire metabolic pathway or development program. Currently, seventy transcription factor families have been sequenced, the largest transcription factor families include the Myb super family, R2R3 Myb, and AP2-ERF transcription factor families. Some of these seventy transcription factors regulate key genes expressed within the *Gunnera* gland. Utilizing BioBike, a bioinformatics tool, nucelotide sequences obtained from 454 sequence data and Illumina sequence data were combined to obtain full-length cDNA sequences. Expression patterns of transcription factors identified from this project will be analyzed to identify genes specifically expressed in the *Gunnera* gland. These genes may help us to further understand the process of cellular differentiation that allow plant cells to from N2-fixing symbioses with cyanobacteria.

72. Microencapsulation Cell Delivery

Faisal Savaya, School of Engineering, with Dr. Gary Bowlin, School of Engineering

Cell encapsulation was used to protect the cells and growth factors during the delivery stage in cell therapy treatments. Calcium alginate micro beads were synthesized using electro spraying techniques. The process of bead making was studied and a number of different parameters were tested in order to find the smallest synthesized alginate bead size. Alginate biodegradation was also studied and samples of alginate beads were monitored for degradation rate. The degradation rate of alginate beads and the cell release rate are still under study. This experiment was essential in starting a new investigation about spraying beads in an electro spun matrix of fibers (scaffold) and understanding the release and degradation rate with the connection of the scaffold's degradation. The encapsulation will protect the cells from dry conditions during the electro spinning process and the scaffold should have a higher cell population distributed in its matrix.

73. Drug Slang as an Indicator of Social Acceptance for Cannabis in the United States

Rose Bono, Dept. of Psychology, with Prof. Mary Boyes, University College

Illegal cannabis use in the United States has fluctuated along with federal drug policy, and the social stigma regarding the recreational cannabis user has changed accordingly. Cannabis-related lexicon has been an important and changing part of the cannabis-using subculture; the slang generated from cannabis use came about as a result of the criminalization of marijuana. In order to find out how the social stigma surrounding cannabis use has changed and become a part of mainstream culture, the slang of cannabis must be studied. In addition to scholarly articles discussing marijuana slang, dictionaries (slang and standard) and media were analyzed. It was found that slang terms that had originally been used to hide marijuana use from authority figures are used now more as general synonyms to add expressiveness of the language. Secrecy is not as much of an incentive for the creation of new slang anymore; other factors such as marketing and bonding within the marijuana-using community have a more significant effect upon slang. These findings indicate that, because so much slang has been found in standard dictionaries and in popular media meant for general audiences, cannabis use has become somewhat culturally mainstream. This is supported by the statistics indicating cannabis use. Because the use of cannabis, as seen through slang, is no longer part of a deviant subculture castigated by mainstream culture, cannabis policy may be likely to change in the near future.

74. Potentiating the Effect of Irreversible Proteasome Inhibitor Carfilzomib by Combining with Small Molecule Bcl-2 Antagonist Obatoclax

Virag Patel, Dept. of Biomedical Engineering/Psychology, Dr. Steven Grant and Dr. Girija Dasmahapatra, VCU Massey Cancer Center, School of Medicine

Diffuse large B-cell lymphoma (DLBCL) is an aggressive form of non-Hodgkin lymphoma (NHL) and one of the prevalent cases of lymphoma. Previous studies have shown that B-cell lymphoma 2 (Bcl-2) antagonists potentiate the activity of Bortezomib (Velcade), in malignant hematopoietic cells, mantle cells, and other lymphoma cells. Bortezomib was the first FDA approved reversible proteasome inhibitor (PI) however it has shown limited activity DLBCL. Carfilzomib (CFZ) is a next generation proteasome inhibitor which binds to proteasome irreversibly, leading to the more sustained PI activity. Interactions between Bcl-2 antagonist, Obatoclax, and CFZ were investigated in germinal cell (GC-) and activated B-cell Diffuse Large B-cell lymphoma (ABC-DLBCL) cells. Drug effects on cell viability were monitored by using 7-amino actinomycin D staining followed by flow cytometry analysis. Cells were suspended in sterile plastic T-flasks (Corning, NY) in the presence or absence of drugs, incubated, and pelleted by centrifuge for sample collection. CD34+ cells were isolated using an immunomagnetic bead separation technique. CD34+ cells were then suspended in RPMI1640 medium containing 10% FCS and exposed to agents as in the case of continuously cultured cell lines. Parallel studies were performed in primary DLBCL cells obtained from the bone marrow of 3 patients with DLBCL and extensive marrow infiltration. Results showed that

Carfilzomib interacts synergistically with obatoclox in multiple DLBCL cell lines, primary MCL cells but not in Primary CD34+ cells. Combined exposure of DLBCL cells to carfilzomib and obatoclox results in PARP cleavage, JNK and caspase activation. A strategy combining the carfilzomib with obatoclox is active against parental DLBCL cells, including GC- and ABC-subtypes, as well as primary DLBCL cells but relatively non toxic to normal cells. However, activity of this regimen needs to be evaluated in an *in vivo* model and further studies will need to be completed to know the other mechanisms.

75. Undergraduate Teaching Assistants: Engaging the Classroom through Active Participation and Critical Discussion

Brea Mangrum, School of Engineering, with Prof. Michaux Dempster, University College

Unlike the goal of traditional teaching assistant programs, the primary goal of the Focused Inquiry Undergraduate Teaching Assistant's is to foster engagement and promote a positive classroom environment. The Undergraduate Teaching Assistant program is a natural byproduct of the learning-centered and collaborative classroom environment that is central to our curricular goals, generally offered to second year students who were successful throughout their Focused Inquiry experience. Currently, our program has 18 faculty members working with 101 UTA's, as well as third year facilitators who have advanced from the UTA program. UTA's will share their individual participation experiences, along with evidence demonstrating the benefits the program has within the classroom. The presentation will also allow an inside look on the personal experiences of students, through visual displays and individual perspectives. The evidence presented will illustrate benefits for instructors, UTA's, and students, share specific examples of the UTA's role inside and outside the classroom, and encourage conversation about how instructors might adapt this program to meet the needs of their particular courses or departments. For example, in the presentation evidence demonstrating how TA's in the classroom have increased the standard of learning by comparing class averages of the classes that have TA's to the classes that do not. The presentations given by UTA's in the classroom and the students feedback on the effectiveness of UTA's in the classroom will be displayed by video so the audience can get a first hand glimpse of the program.

76. Exploring the complex relationships between stress, sleep, immune function, and aging: the significance of melatonin as a key mediator.

Niyati Patel, Dept. of Psychology, with Dr. Sandra Gramling, Dept. of Psychology

Processes of human physiology are deeply connected through a network of relationships, all of great effect and variety. More specific, then, are the processes involved in senescence. Because of their association with many diseases, certain aspects of aging deserve much attention; understanding what influences aging can lead to potential treatments and interventions for a broad spectrum of illnesses. From a biopsychological approach, stress and sleep deprivation have numerous neuroendocrine and immunological impacts, which can directly and indirectly lead to shorter life span. A key factor within all three of these mechanisms is the circadian hormone melatonin. Recently, much research has been done concerning interactions between melatonin, sleep deprivation, and depression, supporting the significance of melatonin to the

human body. This study aims to review current literature involving the relationships between stress, sleep, immune function, and aging, with a focus melatonin's influence as both an antioxidant and an immunoenhancing agent. Basis for and implications of the endocrine as a potential treatment strategy are also explored.

77. Analyzing how sensations from the cutaneous and kinesthetic receptor systems produce a clear haptic perception

Hiren Mistry, Biomedical Engineering, with Dr. Dianne Pawluk, Biomedical Engineering, VCU Haptic Laboratory

The human brain, when healthy and functioning properly, is able to integrate the sensations from the cutaneous and kinesthetic receptor systems to produce a clear haptic perception of objects in the world around us. How this is done and what areas of the brain are involved in this integration are unknown. Common fate is one principle of haptic mid-level processing hypothesized to integrate information between these two receptor systems. The areas of the brain involved in tactile common fate have been explored, however; different hand configurations, possibly key components for the correct interpretation of the tactile information, have not yet been examined. To design fMRI compatible devices for testing common fate by varying the consistency of dynamics between contact to two adjacent fingers. Two different dynamics are crossed with two different hand configurations, with two of the conditions being consistent and two of the conditions being inconsistent. The device is intended to be used in fMRI experiments to look at which regions of the brain are involved in this process. Computer Assisted Design Programs, such as Solidworks, are being used to design the devices, fabrication of the devices will then follow. Anthropometric data is being consulted and specific design constraints are being followed to help guide the design process. Testing will then be performed on subjects to ensure proper operation and confirm design specifications, in which modifications will be made as necessary. Once a final product has been made, the device will be used to test subjects for fMRI experiments.

78. The Effect of Environmental Changes on the Self Assembly of the Sericin Silk Protein to form Bio-synthetic Structures.

Sudan S. Abdur-Rahman, School of Engineering, UROP Summer Fellow 2010, with Dr. Vamsi Yadavalli, School of Engineering

Designing biocompatible materials that allow for minimal to no invasive work inside of the human body is just one of the many challenges engineers face. Although nature has for billions of years, used a “bottom-up” approach to build wonderfully complex items, such as tissues or entire organisms, engineers have yet to duplicate the process in a similar fashion. The ability to understand, design and mimic materials such as silk and gain their unique properties such as strength are ideal solutions to today's challenges. The question answered here is what can affect the self assembly of the sericin silk protein to form bio-synthetic structures? After creating aqueous solutions of the protein at various concentrations, it was dried on three different surfaces, as well as under different conditions to determine what drives the protein to self-assemble as well as what hampers said assembly. The conditions included a difference in pH from neutral to strong acids and bases, an increase in humidity, vacuum, increased heat, as well as over saturation of the substrate. These conditions have been tested on two of the

three surfaces, those surfaces being glass and mica. The dried samples were in turn examined via an atomic force microscope or a scanning electron microscope. The knowledge is for the ability to engineer the silk proteins to perform in a specific manner by altering the environment. This potentially paves the way to allow for further advancements using silk proteins to build novel materials. It could also determine if an industry's waste product could have a recyclable use.

79. Regulation of differentiation in the cyanobacterium *Anabaena* PCC 7120 by the expression of a noncoding region of the genome

Jessica Anderson, Dept. of Biology, with Dr. Jeff Elhai, Dept. of Biology

The cyanobacterium *Anabaena* PCC7120 is a laboratory strain similar to *Nostoc punctiforme*, which is known to exhibit symbiotic relationships with plants. These symbiotic relationships are of importance due to the nitrogen the cyanobacteria provides for the plant. *Anabaena* PCC7120 produces nitrogen when they form heterocysts, which fix nitrogen gas and are secluded from oxygenic processes. The main aim for this project is to expand our understanding of the role of a seemingly critical 17-nt segment between the *dmtB* and *trpD2* genes, in relation to heterocyst formation. The information acquired through these experiments will aid in formulating a better understanding of heterocyst formation.

80. Neurocysticercosis Treatment: an injectable form of albendazole

Komal Dhir, Business, Premed with Prof. Mary Boyes, University College

Through the ingestion of undercooked pork, people all over the world suffer from neurocysticercosis (NCC). Neurocysticercosis is a parasitic brain infection in which a pork tapeworm, *Taenia solium*, grows in the brain. It is the most common form of acquired epilepsy. The problem is, current treatment is limited to surgery, antiparasitic drugs, or symptomatic treatment like anti-seizure medication or drugs for migraines. These options work as a hit or miss. This research will provide for a new treatment method that may work as a cure for anyone with the disease. Approximately 16 articles and journals were synthesized, and still this research is ongoing, to come to the conclusion of using an injectable form of albendazole directly into the brain to kill the cysts. Albendazole is commonly used for treatment of NCC. It is an antiparasitic drug as well as praziquantel. Studies showed that albendazole is cheaper and more effective than praziquantel which helped conclude that albendazole would be the better choice. Additionally, I saw through research that this medication was administered through chemotherapy and by pill, but it was never injected in any trial, so this may be something that was looked over. The articles ranged from different treatment procedures and outcomes, to background information on how this parasite enters the brain. If this treatment option works effectively, it may lead to a conclusive cure for neurocysticercosis rather than a hit or miss procedure.

81. Energetics of copper (Cu) impurities in cadmium sulfide (CdS)

Ibrahima C. Diallo, Dept. of Physics, UROP Summer Fellow 2010, with Dr. Denis Demchenko, Dept. of Physics

Based on Density Functional Theory (DFT), we study the properties of copper impurities in bulk Cadmium Sulfide (CdS). We investigate defects formation energies in neutral and charged states (-1 , -2) for native defects, isolated copper (Cu) impurities and copper complexes at different crystal sites in CdS wurtzite lattice under cadmium- and sulfur-rich growth conditions. Depending on the position of the Fermi level (E_F) in the CdS band gap, we can observe the donor or acceptor nature of the impurities and their complexes. We notice that isolated Cu impurity substituting for Cd is a single deep acceptor. Our calculations reveal that a high symmetry hexagonal site in the wurtzite lattice is the most favorable for Cu interstitial and generates a single donor state. These results differ from previously predicted octahedral site as the most favorable site for Cu interstitial. Based on the positive/negative lowest energy charged states of isolated defects, we also computed the formation energies of the following complexes: ($\text{Cu}_{\text{hex}2}\text{-Cu}_{\text{Cd}}$) - Cu at hexagonal site with a neighbor Cu substituting for Cd; ($\text{Cu}_{\text{hex}2}\text{-V}_{\text{Cd}}$) - Cu at hexagonal site with a neighbor Cd vacancy; ($\text{Cu}_{\text{Cd}}\text{-Cd}_\text{S}$) - Cu substituting for Cd with a neighbor Cd substituting for sulfur. Our results show that at different E_F , ($\text{Cu}_{\text{hex}2}\text{-Cu}_{\text{Cd}}$) as well as ($\text{Cu}_{\text{Cd}}\text{-Cd}_\text{S}$) can be either a donor or a deep acceptor, while ($\text{Cu}_{\text{hex}2}\text{-V}_{\text{Cd}}$) is always a deep acceptor. We computed the formation diagrams predicting the behavior of these defects depending on the Fermi energy and the sample growth conditions. We conclude that in both Cd and S-rich growing conditions, Cu tends to be isolated in the p-type environment and bounded in the n-type electronic environment.

82. The Contribution of the Appalachian Identity to Marital Success During the Vietnam War: An Analysis of Historical Data

Janie Milliron, Dept. of Biology, with Prof. Bonnie Orzolek, University College

Throughout American society, people from the Appalachian region have been thought of as uneducated, poor and lower class. Their culture has been made into a farce by the media and commonly put down in the eyes of outsiders. However, this view of Appalachia is a complete misrepresentation of a proud and historic culture. Many Appalachian scholars, such as Loyal Jones, show the mountaineers as self-reliant, hospitable, modest and patriotic. While much has been written on the *idea* of the Appalachian identity, little has been done to show how the identity has contributed to changes in the demographics of the region. This research in progress is aimed at testing the idea of the Appalachian identity. To measure the effects of the identity on demographics, a set event in history was studied. Since the Vietnam War and the era surrounding it had a detrimental effect on marriages in America, one way to test the Appalachian identity is to compare the marriage and divorce rates in Appalachia to the rest of America. This research collects and synthesizes data from census records kept during the Vietnam Era; divorce rates in Appalachia were drastically lower than the overall United States' average.

Due to these lower divorce rates this research in process hypothesizes that draft deferments may have contributed to the lower divorce rates. Due to the agricultural nature of Appalachia, it is likely that many men were given an agricultural deferment and did not have to go to war. A careful analysis of census records will show what percent of Appalachian men were farmers in the Vietnam Era. In order to discover if this deferment really is the primary cause of lower divorce rates in Appalachia, the collective divorce rates from farming regions in Texas, Illinois, Kansas and Idaho will be compared to those in Appalachia. If the combined farming regions have similar divorce rates as Appalachia, then the hypothesis that the Appalachian identity played a role in strengthening marriages during the war will be disproved. However, if these other farming regions have divorce rates similar to the United States average, then the hypothesis that the Appalachian identity played a role in impacting marriage survival rates will hold true. Based on this information, the Appalachian identity's effect on marriage will be determined.

83. Suicide and Gender Roles: How Gender Affects Methods of Suicide and How to Utilize Gender in Suicide Prevention and Treatment

Christina Epperson, Dept. of English and Dept. of Spanish

Suicide is one of the top three leading causes of death among adolescents in the United States, males and females alike. While females are more likely to attempt suicide, males are more likely to successfully commit suicide. Research has shown that there are differences in methods of suicide between adolescent males and females, respectively. These differences may be affected by societal gender roles. However, current suicide treatments and prevention programs do not address the differences presented by males and females regarding methods of suicide. The inclusion of treatments specifically pertaining to males and females, respectively, would most likely greatly decrease the suicide rates as well as improving suicide treatments and prevention programs; because gender has been seen to have a significant effect on methods of suicide, it must be assumed that suicide treatments that relate specifically to males and females, respectively, would be more effective than current suicide treatments. In short, this research problem is an examination of the current societal gender roles of adolescents in the United States, and how these gender roles may influence the chosen methods of suicide of males and females as well as how these results may be used to tailor suicide treatments and prevention programs. This research has shown that while it is acknowledged that there are differences in the chosen methods of suicide between adolescent males and females in the United States, current treatments do not take these differences into account. There are not any suicide treatments that pertain to either gender in specific, but it can be inferred that such treatments would be more beneficial.

84. How Misinformed Bias Keeps the Medical Potential of Urine Therapy from Scientific Study

Jason Young, Dept. of Biology, with Prof. Mary Boyes, University College

Urine Therapy has been promoted by independent users, alternative practitioners, and some conventional practitioners as a cheap, readily accessible medicine. Advocates of Urine Therapy claim that it cures a wide range of diseases and conditions deemed "incurable" by orthodox medicine, including many types of cancers, diabetes, HIV/AIDS, acne, migraines, and allergies. Urine is sterile and shows medicinal potential because it contains urea, hormones,

antioxidants, creatinine, glucose, antigens, among many other medically useful elements. The loosely established guidelines for Urine Therapy usually involve consumption of fresh urine in combination with external application as rubs or compresses. Unlike many complementary and alternative medicines, Urine Therapy is biochemically plausible. Yet, its potential for scientific validity has been reduced to “pseudoscience” because Urine Therapy's strongest advocates are alternative practitioners and independent users who often use flawed logic and argumentative fallacies in their literature. Additionally, conventional medical practitioners admit they are uninformed about complementary and alternative treatments in general. In this project, I argue that a general lack of scientific information promotes Urine Therapy's misclassification under pseudoscientific theories of medicine and creates a bias against Urine Therapy. The potential therapeutic value of Urine Therapy has not been studied scientifically. Additionally, social taboos against urine in general play a role in keeping Urine Therapy under pseudoscientific classifications.

85. The U.S. Goat Industry; A Future of Expansion and Sustainable Production

Danielle Viggiani, School of Nursing, with Prof. Mary Boyes, University College

Historically, the United States livestock commerce had been dominated by the beef and dairy cattle industry. Over time this industry has moved away from sustainable practices and been defined by CAFO's and grain-fed cattle that only live long enough to make it to market because of the vast amounts of antibiotics administered to the animals. This paper's aim is to identify why, despite being the most commonly consumed meat in the world, goat has not been competitive in the U.S. consumer market. The emphasis is to evaluate methods goat ranchers can utilize to become more competitive through sustainable practices and niche marketing strategies in order to expand without sacrificing quality care of the animals so that U.S. consumers may understand the value and role of goats as a more prevalent product in the U.S. market.

86. The Economic, Health, and Environmental Benefits of Daylighting, and Why Install it in Harris Hall and the CTE.

Jason Young, Dept. of Biology, Hannah Bell, Margeau Graybill, Dept. of Psychology, and Laroz Nicole, with Prof. Nicole Ellis, University College

Daylighting is a low-maintenance, 1-time investment which works by channeling sunlight in its natural form through high-efficiency reflective tubing capped by a non-invasive light diffuser (similar in function to current fluorescent lighting panels). Daylighting requires no energy conversion from sunlight in its natural form, which allows energy self-reliance in lighting windowless rooms. Because this technology runs independent of electrical energy, it promotes reductions in the pollution and environmental destruction inherent to fossil fuel-based energy dependence. Additionally, daylighting technology has been demonstrated to provide benefits to students and teachers in academic performance and health: including improvements in retention, productivity, motivation, absenteeism, and in health with the reduction of Seasonal Affective Disorder (S.A.D) and depression. The four classrooms and the Center for Teaching Excellence on the 5th floor of Harris Hall have no windows and are entirely dependent on electrical lighting. These rooms are used by the Focused Inquiry program to teach all incoming students critical thinking and the foundations for academic research and writing. We argue 3 things: (1) that there is a need to implement daylighting at VCU, (2) that daylighting is

economical, and (3) that these 4 classrooms and in the Center for Teaching Excellence are the best location for installation.

87. Winning Strategies for a Simple Game on Graphs

Matt Harris, Depts. of Mathematics and Political Science, with Dr. Lon Mitchell, Department of Mathematics and Applied Mathematics

We define a *LM-Game* on a graph G between two players as a game in which each player, in turn, chooses and removes a vertex, accumulating points for the number of vertices adjacent to the chosen vertex. We are interested in finding a winning strategy for any given graph G . This research explores a winning strategy for paths and cycles. We find that player one's score will always be greater than or equal to player two's score provided that player one follows a greedy strategy. Therefore, on a path, player one can win by at most two, but will at least tie. We use induction to show that for arbitrary collections of small paths (less than length six) we can determine by how much player one will win if he/she pursues the best strategy based on the number of different sized paths in the graph. Additionally, we conjecture that the parity of a path determines the score of the game if both players pursue the best strategy. This result allows us to determine a best winning strategy for a cycle.

88. Silicone Gel Sheets: A Mechanoreceptor -Related Mechanism of Efficacy

Tiasha Bhowmik, Dept. of Biology, with Prof. Mary Boyes, University College

Few humans reach adulthood without experiencing injuries that result in scars. It is well established that severe and disfiguring scarring is associated with significant psychological stress and impairment of quality of life. Keloids are one of the most disfiguring scars in existence. Thought to be a result of an abnormal proliferation of the fibroblast in the inflammatory phase of the wound healing cycle, keloids are conventionally treated with surgery and radiation, cryotherapy, laser removal, or steroid injections—all invasive procedures with a high rate of keloid recurrence. An over-the-counter treatment, Silicone gel sheets are a cost-efficient, safe, and non-invasive alternative that not only works in reducing keloid size but can also prevent keloid formation post-surgery. However, since their discovery in 1981, no one has been able to pinpoint the exact processes by which silicone gel sheets work. This lack of scientific assessment is the main reason silicone gel sheets are not a clinically accepted, first-line of treatment for keloids. Objective: To review the literature to find out why has no one been able to reach a conclusion about silicone gel sheets' and to determine the best supported theories for the mechanisms of efficacy for silicone gel sheets. The body of research has been plagued with problems of small sample sizes, bias, and lack of controls. Out of all the studies, the two theories of the mechanism of action that are best supported on a cellular level are the theory of the Hydrated Environment and the theory of Occlusion. Pinpointing the mechanism behind silicone sheets is crucial to the clinical acceptance and prescription of silicone gel sheets in the field of dermatology. In addition, in order to improve research on silicone gel sheets, a standard animal model and a universal language for the various areas of the keloid scar that contain distinctly different cells should be established. Without clinical trials on an

animal model, this effective, non-invasive, and cost-efficient treatment for keloids will not be prescribed to the 11 million people who suffer annually from this skin disorder.

89. HOW WORDS CARRY WEIGHT: The Effects & Influences of Family Communication on Eating Disorders

Anna Tate, Dept. of English, with Prof. Mary Mullins, University College

Eating disorders now affect as many as 24 million Americans each year. According to the National Association of Anorexia Nervosa and Associated Disorders, anorexia nervosa is the third leading chronic illness among adolescent females, and the Association estimates that about fifty percent of anorexics will or have already developed bulimia nervosa. Many are quick to blame media forces—advertisements from the fashion, cosmetic, fitness and diet industries—as a primary cause for these disorders. However, studies of eating-disordered women’s behaviors suggest that family messages are just as—if not more—powerful and causal factors than media messages. In the family setting, a child first learns to perceive messages about herself, including messages that she will later encounter from peers, media and advertising. Every family environment has its own style of communication that impresses upon a child a variety of psychosocial and communicative values. Some family communication styles can result in negative behavioral and thought patterns, such as self-doubt, hostility, unreachable expectations and the need for perfect performance, which are all associated with the development of an eating disorder. Via close examination of theories and studies on eating-disordered women and family communication, this effort aims to identify which specific patterns and messages in family communication are conducive to the development of an eating disorder. We deflect our attention from the media, which is resistant to change, and focus instead on personal factors that can produce direct benefits in the treatment of eating-disordered adolescents and help parents raise girls who are less vulnerable to harmful messages about body image and thinness.

90. Rap Music and the African American Woman

Maya Simpkins, Dept. of Gender, Sexuality and Women’s Studies, with Prof. Mary Mullins, University College

Bitch, ho, trick, jezebel and sapphire are common terms used by male rappers to refer to women in their songs and videos. The rap music industry is dominated by African American men and African American women are usually the targets of lyrics and images that are viewed as misogynistic because of the degradation used to describe women. Research has shown that people who listen to misogynistic lyrics in rap music are more likely to accept misogynistic standards towards women viewed in the music videos. (Dixon, Zhang, & Conrad) When African American males use sexist lyrics and images in their rap songs and videos when referring to African American females, what is the impact on African American women? The rap music industry is dominated by African American male rappers but statistics show that young white males are the biggest consumers of rap music. Does their influence disseminate to other groups of people? How do these lyrics and images affect their attitudes about African American women and women in general? In this project, I explore the impact of misogynistic lyrics and

images on African American women and on women as a whole. My research explores the effects of sexist slurs used by Black men against their racial counterparts, the role of skin color in slurs and the context of cultural attitudes about masculinity and femininity. I will be examining both psychological and sociological studies that explore different aspects of rap music including the artists, consumers and culture that are affected. I will also explore the implications of young white males being the dominant consumers of rap music and the dissemination of misogynistic standards in society.

91. How Americans Use Coffee Shop Patronage to Fashion Personal Identity

Cassandra Collins, Art Foundation, with Prof. Mary Mullins, University College

Everyday, millions of Americans go to coffee shops for, ranging from large chains like Starbucks to eclectic local stores. As of 2004, there were over 14000 free standing coffee houses in the United States, and in 2010 Starbucks alone had a net income of 998,600,000,000 dollars (Forbes.com). What prompts people to visit coffee shops so often, multiple times a day even? Are the cappuccinos really that good? Tufts University professor James Tillotson states that Americans "increasingly [define] themselves by their consumption and purchases" (*Fast Food (and Beverages)- Starbucks and Our New Caffeine Culture*). Perhaps the experience of the coffee shop and the construction of personal identity is even more alluring than the decadent drinks served in coffee houses. This project seeks to uncover how buying coffee shops' products and the consumers' experiences in the stores themselves influence American consumers' personal identities. Theories concerning identity formation, American consumer culture, and the marketing strategies of the coffee shop industry will be used to explore how the atmospheres of coffee shops facilitate social interaction and influence customers' beliefs about the quality and exoticism of their products, as well as how patrons' use choice of both establishment and product to represent themselves.

92. Interlinking the Research of Autism and Brain Plasticity as a Result of Musical Therapy: A Holistic Approach

Basil Mathews, Dept. of Biology, with Prof. Bonnie Orzolek, University College

In the last three decades, research has established the usefulness of music therapy in its treatment of several neurodegenerative disorders such as Alzheimer's disease, dementia, depression, and schizophrenia. Due to rising numbers of autistic cases within the last few years, there has been speculation about the feasibility of treating autism with music therapy as well. Among the five to ten studies that make this speculation, most of them are limited both in their research methodology and in establishing a baseline of autistic symptoms prior to therapy in order to test efficiency post-therapy. Autism itself has an undefined medical history, and these limitations prevent a definitive conclusion that autism can benefit from music therapy. On two varying levels, there is a vast amount of work produced on the effects of music and its effect on brain plasticity; there is likewise a great deal of research relating the exact regions of the brain impacted by autism. Interestingly, when correlating the studies from these two perspectives, several music and brain plasticity studies have stated that similar regions of the

brain that are stimulated by music are highly dysfunctional within the autistic population. Despite these remarkable results, no researcher has corroborated all of this research regarding the therapeutic values of music, neurological science of brain plasticity, and the biological understanding of chemical and physical brain morphology together. The purpose of this multidisciplinary study is to create awareness that there is still a possible link between music and its treatment of autism.

93. RETHINKING THINKING: NATIVE AMERICAN EDUCATION REFORM

Diana Subkhangulova, Social Work, with Prof. Mary B Mullins, University College

Thousands of years of communally accumulated and transferred knowledge have yielded a truly rich and mystifying culture of the Native Americans. Although manifestations of Native American culture are diverse among tribes and have an inherent transient quality, their exclusively oral tradition is united by common underlying themes and practices which have historically been challenged by Western cultures, whose beliefs and values still remain at odds with indigenous philosophies. Distinct parallels can be drawn between the cognition and worldviews of the two populations and the respective educational traditions which sustain them, and yet the unique cultural perspective of Native American students is perpetually jeopardized by the overwhelmingly dominant culture of the United States and its modern, institutionalized education system. The basic absence of ethnographic and socio-culturally relevant consideration of teaching methodologies, literature selections, student assessments, and overall curricula in the modern school system is rooted in the vast differences between the cultures, especially in respect to their perceptions and expectations of educators and students. As statistics of disproportionately high rates of dropouts and low standardized test performances indicate, these discrepancies considerably hinder Native American students. The investigations and insights of cognitive psychologists, education researchers, individuals, and communities who recognize this trend have facilitated educational reform in Native American schools to challenge these disparities. Analysis of schools, teacher study groups, and alternative teaching systems in which these socio-cultural considerations have been implemented reveal notable positive changes such as improvements in student motivation, performance, and learning experience. Educational revisions such as these encourage indigenous students to retain their distinct cultural identities and consequently help supplement the efforts to preserve indigenous cultural heritage and support native language survival and revitalization.

94. Does Vitamin C supplementation help reduce the severity, duration, and occurrences of the common cold?

Donald Jessup, Dept. of Forensic Science, with Faye Pritchard, Dir. Of Research Writing, University College

Vitamin C and its effects on the common cold have been a source of debate in the medical community for roughly 60 years now. The purpose of this study was to analyze the results from the last 60 years of vitamin C research to see if supplementing at on-set with mega-dose or prophylaxis with mega-dose levels would positively affect the duration, occurrence, or severity of the common cold. No studies were included if no placebo comparison was used. Only meta-

analysis that examined studies using greater than the daily recommended intake of vitamin C were used. The analysis examined approximately 13967 subjects between seven meta-analyses and one highly controlled study. Of the materials examined the majority of studies concluded that no significant reduction in occurrence or severity was observed when vitamin c was used as either a prophylaxis or therapy. However a small demographic of subjects training in sub-arctic environments was observed by most studies to have a significant reduction in severity, occurrence, and duration of colds when using vitamin c as a prophylaxis of 200mg per day. Furthermore while most studies concluded that occurrences and severity of symptoms were largely unaffected most did agree that duration of colds could be positively, although only slightly affected by both prophylaxis and supplementing at on-set in doses greater than or equal to 200mg. Further research is warranted in regards to vitamin C's effectiveness against the common cold among children as current research on the matter is very light.

95. Examining the cost-effectiveness of long-term music therapy on patients with mental disorders.

Shivani Deopujari, Biology and Spanish, with Prof. Bonnie Orzolek, University College

In a world permeated and ruled by music, it's natural to wonder about its effects on humans and our psyche. This research examines music's effect on the brain and the potential it offers as a treatment method for patients with mental disorders. It further questions the cost-effectiveness of music therapies in order to determine if it is a practical form of long-term therapy. A thorough review of the literature shows that music therapy has indeed been proven to decrease tension, hostility, and symptoms of depression, and has been shown to increase feelings of contentment and well-being. The typical music therapies sessions studied in the research included spontaneous music, where the patients composed and created their own musical tunes. At some point after the sessions, researchers checked for levels of contentment, aggression, depression, and other biological indications of mental disorders. Interestingly, however, researchers never specified the time frame or intervals for the testing of the symptoms, nor did they state if they conducted a follow-up weeks or even months later. In addition, researchers have pointed out that there were many methodological flaws in all experiments involving music therapy, including small sample sizes, lack of a detailed procedure, and no standardized definition of "behavior," as most experiments sought to change behavioral problems with the music therapy. These methodological problems in the research make it questionable whether music therapy is a practical and cost-effective form of long-term therapy. While music therapy has been found to be an effective form of short-term therapy, more research needs to be conducted surrounding its cost-effectiveness and potential to be used as a long-term therapy.

96. CMI Millenium Problems and the Shape of Society to Come

Gregory Palmer, Dept. of Mathematics, with Prof. Meriah Crawford, University College

On May 23 and 24, 2000, the Clay Mathematics Institute brought attention to seven mathematical problems. These problems were selected by a panel of renowned mathematicians from around the world and presented as the most important unsolved problems of our time. They were dubbed the "Millennium Problems." Their importance and their placement on the list is largely uncontested. Each problem is incredibly difficult and there is a \$1,000,000 prize

attached to each problem. Even though these abstract and seemingly impractical questions were selected with regards to their significance to mathematics, the solutions and work done on them will become the underpinnings of the technology and lifestyles of the future. The Millennium Problems were announced at the turn of the century in honor of David Hilbert's speech and the twenty-three problems he put forth in 1900. Hilbert's problems had a profound impact on the development of science and mathematics in the 21st century. In order to understand the importance of the Millennium Problems, it is important to first understand the importance of mathematics, itself. Mathematicians typically make new discoveries for their own sake, rather than searching for a solution to some real-world problem. However, this does not undermine the importance of their work. Number theory, once thought to be the most "useless" branch of mathematics, now has numerous applications, including public-key cryptography which allows us to have secure internet connections. For the presentation, I will show how the Millennium Problems will shape human society in the years to come.

97. Connections Between Parenting Styles and Dissociative Disorders

Heidi Imperio, Dept. of Psychology

The following research is focused on parenting styles and how using one style could influence dissociation on children. Dissociative disorders are mainly characterized by out of body (or mind) experiences where memories/events are fragmented. Not much is known about the etiology or the treatment of such disorders. However, it is noted in several studies that causes can be traced to one's childhood memories. Sexual, physical and emotional childhood abuses are linked to be the main causes. Because of this, it is possible that the children's parents (their parenting behaviors) are responsible for influencing such a disorder. My research focus on these disorders developed during my Psychology of the Abnormal class lecture. With this research I plan to inform the public – especially parents – effective ways to modify one's parenting style in order or even develop effective intervention programs to provide a supporting yet realistic environment for one's children or future children/child.

98. Who Down with G-A-Y?

Huma Haq, Pre-Medicine, with Prof. Tara Bray, University College

At first or even second and third glance viewers of hip hop music and culture see nothing but a heterosexual black male dominated subculture. Kanye West was quoted saying that "*gay* has become an antonym to *hip-hop*". How can anyone disagree, when flashy chains, luxury cars and abundance of eager women, smother viewers with a one dimensional idea of what hip hop is. With artists like Eminem, Busta Rhymes, and Biggie Smalls to name just a few releasing explicit lyrics that target gays, homophobic tones are prevalent to say the least in hip hop. Also with the fairly new "Down-low" subculture and "Homo-hop" one begs the question of why homosexuality in hip hop is such a taboo. I embarked on journey to answer that question and came to understand that the answer to this question comes from deep rooted values in Black culture and history including the influence of the black church in the hip hop community. These deep rooted values may be the reason why homophobia has become a norm in hip hop, artists like Nicki Minaj and Kanye West speaking against homophobia certainly challenges this. My research provides sufficient evidence that there is a cause-effect relationship between

negative perceptions of homosexuality in hip hop culture and the influence of traditional Black cultural values.

99. The “Star Wars Trilogy” as an American National Epic

Zachary Coffman, Dept. of Computer Science, with Faye Pritchard, Dir. Of Research Writing, University College

Epic poems and narratives have been an important part of many cultures throughout history. However they seem to have been significantly more prevalent in ancient civilizations like Greece and Rome while appearing to be almost non-existent in newer civilizations like the United States. Although there is no official or widely recognized epic for the United States, does not mean that one does not exist. The original *Star Wars* film trilogy appeared to be epic in nature at a glance as well as one of the most well-known movies in America. Historically, epics are widely known stories that embody particular values of a culture. My interest in stories that perform this task such as *The Iliad* and *The Aeneid* as well as my interest in history in general in addition to my previously stated observation and general enjoyment of the *Star Wars* films inspired my research. These interests led me to ask the question, “Does the original *Star Wars* film trilogy follow the format and contain necessary components of the epic narrative and how does this presentation make the trilogy a source of American nationalism?” After synthesizing several sources by experts from relevant fields including history and literature I have concluded that the original *Star Wars* trilogy is an American national epic because of its format and intellectual substance and it acts as a source of American nationalism because of parallels with American history including the Wild West and Imperialism.

100. Racial sentencing disparities between crack cocaine and powder cocaine and the effect on society

Emilija Motivans, School of Nursing, with Prof. Jessica Gordon, University College

In the United States there is a mandatory minimum sentence of at least five years in prison for being caught possessing five grams or more of crack cocaine. However, a person caught with five grams or more of powder cocaine is not eligible for a mandatory minimum sentence in federal prison. I believe that the crack cocaine and powder cocaine sentencing legislation is unjust because of the disparities in sentencing of different racial groups. After looking at all the research, the harsh anti-crack legislation is targeted at lower class African-Americans. Based on the research, my recommendation would be that powder cocaine should have higher sentences or crack cocaine should have lesser sentences to even out the disparities. Discriminatory drug laws, for example crack cocaine mandatory minimums, against African Americans have a wide circle of evidence so that even the incarceration of one black man can influence so many things in the community potentially including his family, his workplace, and everything else he contributed to society. Those who are in the lower rungs of society are often the ones who end up paying the price for drug offenses. An honest approach is the best way to go about solving a problem and that open communication about race should be a big part in finding the solution to discriminatory drug laws.

101. What physiological and psychological differences exist between running on treadmill, and running on the ground, and which has better psychological and physiological benefits for an amateur runner who has no bodily injury or defect?

Ameya Chumble, Dept. of English, with Faye Pritchard, Dir. Of Research Writing, University College

Obesity and heart disease are growing as public health concerns that have been likened to epidemics of infectious disease of the past. Treating both of these conditions at the individual level usually involves some form of exercise that induces cardiovascular stress for an extended period of time in order to strengthen that system. Running is one popular form of exercise around the world because it requires little equipment, can be done almost anywhere, and is the basis upon which many other sports build. Because of the convenience it provides, the treadmill has become a popular apparatus used by runners for recreation, physicians for physical tests, and scientists for research. However, a swathe of conflicting research from many fields has been conducted over the past three decades about whether running on the ground and on the treadmill are similar enough to be used interchangeably by amateur runners, physicians, and researchers. Because of the disagreement, this meta-analysis was conducted to investigate the similarities and differences between running on the ground and on the treadmill from different perspectives, focusing on physiology and psychology. Data from relevant physiological and psychological comparison studies from as far back as the early 1980s was compiled and analyzed. Physiological factors included biomechanics, such as joint angles and moments during the running cycle (kinetic and kinematic measures), and cardiorespiratory variables, such as blood lactate level, oxygen debt, and heart rate. Psychological studies took into account not only the differences in perceived physical exertion between the treadmill and the ground, but also the differences of exercising indoors against outdoors. It was concluded that there are fundamental differences between running on the treadmill and on the ground, and these differences benefit those amateur runners who choose to run on the ground outdoors in terms of the quality of the workout both physiologically and psychologically.

102. The Reflection of Society in Horror Films

Andrew Thune, Dept. of Psychology, with Prof. Jessica Gordon, University College

The genre that is horror has been seen as a reflection of society since its debut in culture, and through cultural advances these reflections were able to be immortalized in literature, art, and cinema. My research focused on how horror cinematography is a representation of society. I first began my research by looking at horror films and analyzing how they have evolved over the past century. I noted several differences like the use of the damsel in distress, the use of monsters, and the appearance of the supernatural would appear in some generations but not in others. As I continued my research I found that one aspect within horror films that has changed the most often is the form in which the main antagonist is portrayed. My research showed that the monster/main antagonists of horror films were and still are a representation of a specific time periods fears. I have also found that fears one generation has may not be shared with another generation for example people in the fifties were afraid of nuclear war which is shown in movies such as *Godzilla*, *Them!*, and *Attack of the Fifty Foot Women* while people in the eighties were more fearful of other human's rather than supernatural creatures which can be seen in horror films like *The Shining*, *Stepford Wives*, and *The Omen*. Knowing that horror films are a representation of society allows the viewer to have an insight on the fears and the culture during which the movie was created.

103. Is Christianity in America causing our environmental crisis?

A. Gabrielle LaTora, Dept. of Biology, with Prof. Tara Dacey, University College

From the arrival of the first settlers, America was conceived on a foundation of Christian values, and today, most Americans will agree that Christian tenets are integral to the American identity. Some Christian beliefs, such as the belief that God resides in an extra-worldly heaven, encourage a spiritual focus aloof to the physical world on Earth and motivate the idea that man and nature are two entirely separate entities. This idea also stems from the Christian notion that humans, in their replication of God's image, possess logical, emotional, and spiritual capacities nonexistent in nature, causing humans to see the natural world as a sea of resources created for man's use alone. Humans, however dominant they perceive themselves, use religion as a tool to compensate for a lack of control over the randomness and mystery of nature's processes. Religion also serves as a tool to answer questions about morality and life that cannot be answered empirically through any man-made mechanism. This reliance on religion inevitably produces fundamentalist ideologies that, several of the sources agree, encourage less interest in environmental stewardship and lead humans to assume a more domineering role over the environment. Although fundamentalist Christianity doesn't pervade American society entirely, 78% of Americans are self-proclaiming Christians, say Straughn & Feld in a 2010 survey investigating America's religious identity. Some sources argue that Christianity actually encourages environmental stewardship and sustainability, although America's consumptive habits somewhat discredit this notion. In a global society with highly unsustainable lifestyles, America leads the way through its power and influence, and I can only hope that some Americans may see the correlation between traditional, long-standing Christian principles and a lack of environmental interest and seek to overcome these personal assumptions in light of modern environmental issues.

104. Academic Entitlement in College Students and Relations to Future Work Mentalities

Taylor Smith, Dept. of Spanish, with Prof. Boyes, University College

Teachers have often complained about difficult students, especially those who believe their work deserves a higher grade for some reason or another. This mentality is called academic entitlement and has been growing in prevalence over the past few decades. This study brings to light that academic entitlement is a longitudinal mentality; it starts in childhood and progresses into an individual's work life. Several researchers have barely scratched the surface of understanding academic entitlement and the effect it has on college students and their future careers. By drawing attention to this issue, this mentality can be combated by parents, teachers, and employers to create a more efficient work force in the future.



VIRGINIA COMMONWEALTH UNIVERSITY
IS AN INSTITUTIONAL MEMBER OF THE
COUNCIL ON UNDERGRADUATE RESEARCH

Learning Through Research