



# **PROGRAM SCHEDULE WITH ABSTRACTS**

**APRIL 19, 2011**

**University of Mary Washington  
Fredericksburg, Virginia**



UNIVERSITY OF MARY WASHINGTON  
IS AN INSTITUTIONAL MEMBER OF THE  
COUNCIL ON UNDERGRADUATE RESEARCH  
Learning Through Research



# Schedule of Events

## April 19, 2011

<b>Researcher Registration/Poster Set-up</b> The Great Hall	<b>8:30 am - 9:30 am</b>
<b>Oral Sessions</b> Woodard Meeting Rooms 1, 2, 4 & Red Room	<b>9:30 am-4:30 pm</b>
<b>Poster Sessions</b> The Great Hall	<b>12:00 noon – 1:00 pm</b> <i>refreshments served for all</i>
<b>Researcher Registration, continued</b> The Great Hall	<b>12:00 noon – 1:00 pm</b>
<b>Additional Exhibits and Sessions</b> Melchers Hall Combs Hall Room 001 Room 139	<b>3:30 pm-5:00 pm</b>  <b>9:30 am-10:45 am</b> <b>2:00 pm-3:15 pm</b>
<b>Poster Pick-up</b>	<b>4:00 pm</b>





## Sessions in Melchers Hall

### 9:30-10:45, Room 001

**Session Chair: Prof. Tim O'Donnell (English, Linguistics, and Communication)**

"Freedom Riders": Class Reflection  
*cross-listed with Kemp Symposium*

### 2:00-3:15, Room 139

**Session Chair: Prof. Anand Rao (English, Linguistics, and Communication)**

Documenting Social Movements: Videos Documenting the Events of the Freedom Riders  
*cross-listed with Kemp Symposium*



## Session in Melchers Hall

### 3:30 -5:00, Room 207

**Session Chair: Dr. Joseph Dreiss (Art and Art History)**

Emma Max, "Form Follows Mission: Richard Meier's Getty Center and the role of the Contemporary Museum," (Joseph Dreiss)

Victoria Miller, "An Opinion of Beauty," (Joseph Di Bella)

Tess Buccigrosso, "Universal Art: Explorations in the Human Experience," (Rosemary Jesionowski)

Katey Kerns, "Explorations in Bookmaking," (Rosemary Jesionowski)

Lauren Scott, "Humanism: An Approach in Study," (Rosemary Jesionowski)





## Oral Sessions – Woodard Campus Center

**9:30-10:30**

### **Meeting Room 1**

#### **Session Chair: Prof. Debra Schleef (Sociology and Anthropology)**

Sarah Bostaph, "Health Care and Latinos: Shifting Attitudes and their Significance Today," (Eric Gable)

Thalia Halert Rodis, "Border Control: Immigration and Homogeneity in Greece," (Eric Gable)

Aaron Chandler, "Why Banks Fail: An Analysis of the Total Capital Ratio and the Bank Failure," (Margaret Ray)

Anum Shaikh, "Effects of Combined Vitamin E and C Treatment on Plaque Formation in Alzheimer's disease," (Deborah O'Dell)

### **Meeting Room 2**

#### **Session Chair: Prof. Elizabeth Lewis (Modern Foreign Languages)**

Lauren Hartwell, "Young Women Going All the Way: What Predicts Hook Ups and Casual Sex in College," (Mindy Erchull)

Lauren Guzinski, Carley McCready, Lucia Morey, Christian Vega, "Women and Charity in Spain (1786-1939)" (Elizabeth Lewis)

Rosana Marzullo-Dove, "Emotional Intelligence and the Effects of False Feedback on Decision-Making," (Denis Nissim-Sabat)

**10:45-11:45**

### **Meeting Room 1**

#### **Session Chair: Prof. Robert Rycroft (Economics)**

Gibran Parvez, "Dulles Airport: An Embodiment of American History," (Gary Stanton)

Matthew C. Baker, "The role of State Abortion Legislation in the United States" (Robert Rycroft)

Meagan Smith, "Exploring Silchester: A Journey of Space," (Liane Houghtalin)

### **Meeting Room 2**

#### **Session Chair: Prof. Zachary Whalen (English, Linguistics, and Communication)**

Sarah Kountz, "The Three Empires Resurrected," (Zachary Whalen)

Lourdes Elena South, (English/Spanish) "The Three Empires Resurrected," (Zachary Whalen)

Isabel McLoughlin, "Geospatial and Statistical Modeling of Artisanal Miners in West Africa," (Brian Rizzo and Peter Chirico)

Alexandra Zelin, "Is Everybody Doing It? Comfort and Perceived Comfort in the College Freshman Female Population," (Mindy Erchull)

**12:15-1:00**

**Red Room**

**Session Chair: Prof. Carole Creque (Business Administration)**

PANEL: "My Box" (Dr. Carole Creque)

Megan Kent, Amanda Tennyson, and Benjamin Newman

**1:00-2:00**

**Meeting Room 1**

**Session Chair: Dr. Julius Esunge (Mathematics)**

Geoffrey Diskell, "A Comparison of Two Derivations of the Black-Scholes Option Pricing Model" (Julius Esunge)

Erin Burke, "The Gender Gap: Effects in Special Education," (Leslie Martin)

Nilab Sadat, "Plight of women in Afghanistan" (Constance Smith)

Lauren Redding, "Women and Gender in Sociology," (Kristin Marsh)

**Meeting Room 2**

**Session Chair: Prof. Leo Lee (Mathematics)**

Sarah Mendelsohn, "Mothers on the Street: What Support Do Pregnant Women and Their Unborn Babies Receive and What Impact Does It Have on them?" (Leslie Martin)

Kathryn Christian, "Mathematical and Numerical Solutions for a Heat Conduction Model" (Leo Lee)

Matthew Alfano, "UMW Campus Preservation Plan: A Laboratory Course Project" (Andrea Smith)

**Meeting Room 4**

**Session Chair: Prof. Susan Matts (Physics)**

Brigitte Arlaud, "Understanding Life Through Death: Choctaw Mortuary Rituals 1540-1812," (Eric Gable)

Aaron Chandler, "A Case Study of Crazy Stupid or Crazy like a Fox: An analysis of Escalating Commitment Going Right and Lessons Learned from the Residential Mortgage-Backed Securities and Banks during the 2007 Recession," (Wei Chen)

Peter Wingrove, "Doing Well by Doing Good?: The Net Present Value of the Investment to Become a Doctor," (Robert Rycroft)

**Red Room**

**Session Chair: Dr. James Gaines (Modern Foreign Languages)**

Sarah E. Bergstresser, Michelle V. Bondesen, Barbara B. Chitty, Rachel L. Martin, "Students Compose Germanic Myths," (James Gaines)

**2:15-3:15**

**Red Room**

**Session Chair: Prof. Federico Schneider (Modern Foreign Languages)**

Kaitlin Aquino, Alessandra Askins, Travis Bice, Brian DeMott, Stacy Peros, Mazi Moinian, "Become the Renaissance" (Federico Schneider)

### **Meeting Room 1**

#### **Session Chair: Prof. Debra Steckler (Psychology)**

Kristin Magill, "An Analysis of Juvenile Sexual Violence and Subsequent Drug Abuse," (Debra Schleef)

Bethany Mastroilli, "Parental Influences on Emerging Adulthood," (Debra Steckler)

Stanley Greidinger, "Following the 'Colt' of Gun Collecting," (Eric Gable)

Sarah Dawes, "Digital Storytelling --Why I Chose UMW," (Alan Dean)

### **Meeting Room 2**

#### **Session Chair: Prof. Surupa Gupta (Political Science and International Affairs)**

Jenna Kincaid, "A Beekeeper's Dystopia: Race and Class in 20th Century Bee Culture," (Steven Harris)

Joseph Calpin, "Chinese Character Reform and the Hundred Flowers Movement," (Susan Fernsebner)

Priyanka Bajaj, "Agriculture, the World Trade Organization and the Least Developing Countries Paradox," (Surupa Gupta)

Amanda Johnson, Jeanine St. Lawrence, and Dolly Suarez. "Weapons, Fights, & Adolescence: How Does Community Support Affect School Aged Violence," (Debra Schleef)

### **Meeting Room 4**

#### **Session Chair: Prof. Keith Mellinger (Mathematics)**

Sadie Terrell Smith, "John Pearce on James Farmer: An Oral History," (Jess Rigelhaupt)

Kevin Doubleday, "Applications of Markov Chains to Stock Trends," (Julius Esunge)

Kelsie Snyder, "c-Dominating Sets for Families of Graphs," (Keith Mellinger)

## **3:30-4:30**

### **Meeting Room 2**

#### **Session Chair: Prof. Angela Pitts (Classics, Philosophy, and Religion)**

Nicole Kappatos, "The Oral History of Kefalos: A Greek Heritage Organization in Norfolk, Virginia," (Jess Rigelhaupt)

Tekla Taylor, "Perilous Ambiguity: The Cultural Meaning of Hermaphroditism in Antiquity," (Angela Pitts)

Anne Cosby, "The Autism Question: An Exploration into Expectation and the Culture Recovery," (Virginia Mackintosh)

### **Meeting Room 4**

#### **Session Chair: Prof. Constance Smith (English, Linguistics, and Communication)**

Alexandra Atkeson, "Sex, Pills and Education: A Qualitative Study on Contraceptive Use Among College Males," (Tracy Citeroni)

Jeanine St. Lawrence and Tatiana Haywood, "Attitudes Towards Marriage Readiness among College-Aged Females in Monogamous, Committed Relationships," (Tracy Citeroni)

Annie Truslow, "The Virginal Body: A Cross-Cultural Perspective of Hymenal Intactness and Socially Constructed Notions of Virginity," (Tracy Citeroni)

**Red Room (*bilingual session Spanish/English*)**

**Session Chair: Prof. Jeremy Larochelle (Modern Foreign Languages)**

Emmanuel Carreño-García, (in Spanish) "Human and non-human connections in Amazonian Cosmologies and Recent Writing from the Amazon," (Jeremy Larochelle)

Lourdes Elena South, (Spanish/English) "Sirens, Amazons and Pink Dolphins: Gender Roles in Amazonia," (Jeremy Larochelle)

Session followed by original video footage from the Amazonian region



**Poster Sessions – Great Hall**  
**12:00 noon – 1:00 pm**

- Charlie Devine, "GSI and Remote Sensing Applications for South Western Forestry" (Brian Rizzo)
- Lindsay Walker, "A Centennial Record of Paleosalinity Change in the Tidal Reaches of the Chesapeake Bay" (Neil Tibert)
- Chelsea Wegner, "Sedimentation Rates and Trace Metal Input History in Chincoteague Lagoon-Marsh System Derived from Pb-210 and Cs-137 Chronology" (Ben Odhiambo Kisila)
- Andrew Snyder-Beattie, "Are Gas Prices Random? A Stochastic Analysis of Energy Markets," (Julius Esunge)
- Annie Unger, "Benefits and Consequences of Creating a Monetary Union: A Comparison of the Debt Crises in Greece and Ireland" (Surupa Gupta)
- Elena Fernandez, "Development of a Reliable Sample Preparation Method for Estrogen ELISA Assay," (Kelli Slunt)
- Emily Alberto, "Analysis of Alarm Cue Composition in the Crayfish *Orconected rusticus*," (Abbie Tomba and Kelli Slunt)
- Ellen Bikowski, Louis Kartoudi, and Katherine Morris, "Enzyme Immunoassay detection of heat shock proteins in the Tufted Titmouse: a new tool for evaluation Chronic Stress in birds,"
- Kelsey Voss, "Identifying Target Genes in the ERRy Pathway Resulting from BPA Exposure in Breast Cancer," (Deborah O'Dell)
- Meigan Mukhtarzada, "Anatomical Comparison of Caenorhabditis Species," (Theresa Grana)
- Anum Shaikh, "Effects of Combined Vitamin E and C treatment on Plaque formation in Alzheimer's disease," (Deborah O'Dell)
- Jessica Sine, "The Effects of Atrazine on the Thyroid Axis in Zebrafish," (Dianne Baker)
- Kristen Lewis, "The Effects of Atrazine on Gene Expression of Appetite-Regulating Neurohormones in Zebrafish, *Danio rerio*," (Dianne Baker)

- Sarah Tryon, "The Effect of Dietary Fat on the Expression of Appetite Hormones in Zebrafish, *Danio rerio*," (Dianne Baker)
- Thien Phan, "Mycobacteriophage Genomic of Venkman" (Lynn Lewis)
- Sarah Almahdali, "Synthesis of Modified Copper Electrodes for the Electrocatalytic Reduction of CO<sub>2</sub>," (K. Nicole Crowder)
- Patrick Wood, "Modification of Gold Electrode Surfaces with a Ruthenium Based Alkanethiol for the Reduction of CO<sub>2</sub>," (K. Nicole Crowder)
- Benjamin Burrus, "Physical and Photochemical Characteristics of Fractionated NOM," (Charles M. Sharpless)
- Jonathan Williams, "Exploring Direct Photolysis Mechanisms of Polycyclic Aromatic Hydrocarbons in Non-Polar Solvents," (Charles M. Sharpless)
- Mary Catherine Thompson, "Analysis of Copper from Indian Bone Ossuary," (Leanna Giancarlo)
- Julianne Burton, "Biostratigraphic and Paleogeographic Implications of the Cretaceous Nonmarine Ostracodes from Southwestern Utah, USA," (Neil Tibert)
- Ian Pope, "Soil Erosion and Sediment Fluxes Analysis: A Watershed Study of the Ni Reservoir, Spotsylvania County, Virginia," (Ben Odhiambo Kisila)
- Robin Ayers and Isabel Moore, "Acid Mine Drainage Effects on Sediments and Surrounding Soils of Contrary Creek, Virginia," (Melanie Szulczewski)
- Katlin Cataldi and Kelly Welch, "Trace Metal Analysis in Fredericksburg City Cemetery Soils," (Melanie Szulczewski)
- Emma Jones, "Shoreline Change in Stafford County, Virginia, from 1937 to 2010," (Jackie Gallagher)
- Nathaniel Winston, "Foraminifera Populations and Trace Metal Concentration Trends in the Potomac Estuary," (Neil Tibert)
- Rosana Marzullo-Dove, "Effect of Native and non-native Accent on Perceptions of Attractiveness and Intelligence," (David Rettinger)
- Melissa Patterson, "Two Perspectives on Refugee Resettlement Policies in Virginia," (Nora Kim)





# Abstracts

Listed Alphabetically By Student Researcher

**Student Researcher: Emily C. Alberto**

**Major: Biological Sciences**

**Research Mentor(s): Profs. Abbie Tomba and Kelli Slunt**

**Project Title: Analysis of Alarm Cue Composition in the Crayfish *Orconectes rusticus***

Chemical cues provide a variety of information to animals including the presence and location of food, mates and danger. Alarm cues are damage released chemicals that indicate danger and induce a behavioral change in conspecifics. In crayfish, alarm cues reduce time spent moving and feeding. However, the chemical composition of the alarm cue is unknown. Research on the crayfish *Procambarus clarkii* indicates that the chemical is a polypeptide smaller than 5 kDa. Through use of a behavioral assay and biochemical analysis we aim to confirm that low molecular weight fractions produce the most pronounced alarm response and further classify the chemical causing the alarm response in the crayfish *Orconectes rusticus*. We used fractional centrifugation to fraction hemolymph by molecular weight. Crayfish were exposed first to food odor and then to either fractioned hemolymph or a tap water control and monitored for two minutes. Results show that fractions smaller than 100 kDa induce a behavioral change, including greater time spent in defensive postures and less time spent feeding. Preliminary results also suggest that the chemical is smaller than 50 kDa.

**Student Researcher: Mathew B. Alfano**

**Major: Historic Preservation**

**Research Mentor(s): Prof. Andrea Smith**

**Project Title: University of Mary Washington Campus Preservation Plan**

The purpose of the historic preservation plan for the University of Mary Washington campus is to evaluate the significance and integrity of each of the buildings and areas on the campus and to create recommendations based on those evaluations. We are accomplishing this by creating a contextual history of the campus, individual histories of each of the buildings, and histories of the green spaces on campus. We also distributed a survey to gather student sentiment about the buildings on campus which we have utilized to help determine the significance of each of the buildings. The survey also satisfied the need for public opinion about our project. Our recommendations have stemmed from detailed research of historic preservation plans from other universities to compare what fits best for our individual campus needs. Each of the buildings on campus is classified into one of three tiers which correlate to the interpreted importance of each building in relation to their place on campus. This plan will provide the framework for how the question of preservation will be handled in the future. As the campus moves forward in adopting an official preservation plan, this student project will provide guidance and a student perspective.

**Student Researcher: Sarah Almahdali**

**Major: Chemistry**

**Research Mentor(s): Dr. Katherine N. Crowder**

**Project Title: Synthesis of Modified Copper Electrodes for the Electrocatalytic Reduction of CO<sub>2</sub>**

To decrease the amount of atmospheric carbon dioxide, the green house gas has been reduced to many different products, most of which have only one carbon atom. For many of these reactions, the first step is to convert CO<sub>2</sub> to CO<sub>2</sub><sup>-•</sup> radicals. The different products form depending on reaction conditions. This research aims to create an electrocatalytic method of reducing CO<sub>2</sub> to a structure with a C-C bond by covalently attaching an electrocatalyst to a copper electrode via long chain alkanes and a phosphonate monolayer. In this way, CO<sub>2</sub><sup>-•</sup> radicals on the catalyst have some flexibility of motion, but are confined to one area, encouraging a reaction between two or more radicals. 11-hydroxyundecyl phosphonic acid was synthesized and used to create a phosphonate monolayer on the copper surface using the Tethering by Aggregation and Growth method. A Steiglich esterification was used to add a terminal pyridine moiety. A reported ruthenium-based electrocatalyst was then bound to the surface via the pyridine.

**Student Researchers: Kaitlin Aquino, Alessandra Askins, Travis Bice, Brian DeMott, Stacy Peros, Mazi Moinian**

**Major/Focus: Italian**

**Research Mentor(s): Prof. Federico Schneider**

**Project Title: Become the Renaissance**

This project is the final project of the course ITAL 396: Masterpieces of the Italian Renaissance. It consists in crafting a dramatic dialogue between the student and an author of the Italian Renaissance of choice. The primary objective of the dialogue is to make this a verisimilar conversation based on the knowledge the student has acquired of the author's life and work. The student's work will be evaluated specifically on its ability to bring back the author of choice as a historical figure, through the dialogue the student establishes with him / her. Dialogues will be performed by the student and by a partner.

**Student Researcher: Brigette Arlaud**

**Major: Anthropology**

**Research Mentor(s): Dr. Gable**

**Project Title: Understanding Life Through Death: Choctaw Mortuary Rituals 1540-1812**

My research is an anthropological interpretation of the Choctaw mortuary rituals and beliefs practiced and held from 1540 to 1812. During this period the Choctaw were a Muskogean-speaking group of Native North Americans who occupied parts of present-day Mississippi and Alabama. They exhibited a particularly unique funerary practice (second-burial), which involved an aboveground preparation and interment. I argue and demonstrate that one can better understand the numerous historical accounts of pre-removal (a period of history that begins with the first European contact in 1540 and ends with the forced relocation of the Choctaw in 1831) Choctaw people by analyzing their funerary practices. This assertion is based on the idea that "life becomes transparent against the background of death, and fundamental social and cultural issues are revealed (Huntington & Metcalf 1998: 25)." In short, one can better understand how the Choctaw ordered and thought of life by analyzing their symbolic treatment and beliefs associated with death.

**Student Researcher: Alexandra Atkeson**

**Major: Sociology**

**Research Mentor(s): Dr. Tracey Citeroni**

**Project Title: Sex, Pills and Education: A Qualitative Study on Contraceptive Use Among College Males**

Contraceptive use is a popular issue among college-aged individuals. As female students involved in sexual health peer education programs, our experiences have led us to believe that women are taking more active roles in the prevention of pregnancy and STDs. While contraceptive use is not a gender specific issue, we have witnessed it more discussed among females leading us to question male attitudes towards it. This paper focuses on sexual education history, contraceptive attitudes and knowledge,

responsibility of sexual partners, and peer views of contraceptives. In-depth interviews were conducted with sexually active heterosexual male college students, aged 18-23, varying in school year and majors. Amongst the interview sample as a whole, many of them engaged in contraceptive use mainly for pregnancy prevention rather than STD prevention. Despite our interviewees' reliance on the pill as a sole form of birth control, they all expressed a general fear of fatherhood further echoed by their parents' threats to use protection. Only one of our interviewees had ever been tested for STDs and most associated the risk of contracting a STD with the number of sexual partners their sexual partner had been with as opposed to an unprotected sexual encounter. This paper's findings advocate for a more comprehensive sex education in the college setting and reinforce factors that cause high STD rates among the collegiate population.

**Student Researcher: Robin Ayers and Isabel Moore**

**Major: Environmental Science-Natural**

**Research Mentor(s): Dr. Melanie Szulczewski**

**Project Title: ACID MINE DRAINAGE EFFECTS ON SEDIMENTS AND SURROUNDING SOILS OF CONTRARY CREEK, VIRGINIA**

Acid mine drainage (AMD) has greatly affected the 8-km long Contrary Creek, a minor tributary of Lake Anna in Louisa County, Virginia. This area is known for its pyrite ( $\text{FeS}_2$ ), which can be found even today along the creek bed. Most pyrite mines closed in the 1920s, but the EPA conducted only limited remediation in the 1970s. A few follow-up studies on the streamwaters, as well as this research, show continuing low pH and high dissolved metal concentrations. This is the first study to look at the impacts of AMD on the surrounding soils, sediments, and the local ecosystem. Macroinvertebrate population, water, soil, and sediment samples were taken from the creek and along a transect out to 40 meters from the creek at multiple sites. Samples were analyzed for pH, organic matter, and the concentrations of metals in various fractions. Macroinvertebrate samples showed effects in species richness and diversity and levels of bioaccumulation. The soils, sediments, and creek waters still demonstrate high levels of pollution, especially with low pH levels and high aluminum, lead, and zinc concentrations. Interestingly, the small tributary site showed the healthiest water and macroinvertebrate population, but the soils there were just as contaminated as elsewhere.

**Student Researcher: Priyanka Rani Bajaj**

**Major: International Affairs**

**Research Mentor(s): Professor Gupta**

**Project Title: Agriculture, the World Trade Organization and the Least Developing Countries Paradox**

The on-going Doha Round of negotiations at the World Trade Organization (WTO) have stalled due to differences in regard to agriculture. Developing countries have argued that they are representing the interests of poorer states. There is, however, a paradox between Least Developing Countries' positions (LDC), defined by the great potential for food production, as well as heavy debt due to food importation. The conflicting interests of LDC's make it difficult to present a cohesive position to the WTO. For example, African LDC's vie for greater trade liberalization, to make their products competitive abroad while, G33 LDC's focus on trade marginalization, to protect small farmer's crops. As can be seen, countries concerns and tactics of tackling agricultural trading issues are different. This paper will examine the lack of a cohesive interest in the LDC's agricultural trade sector and identify where the differences lie.

**Student Researcher: Matthew C. Baker**

**Major: Economics**

**Research Mentor(s): Prof. Robert Rycroft**

**Project Title: The Role of State Abortion Legislation in the United States**

This study uses an ordinary least squares model with period fixed effects on state level data from 1980 to 2004 to estimate the relative impact on the abortion rate of several state policies – partial birth abortion bans, parental consent requirement, and Medicaid funding for medically necessary abortions. The model provides evidence that stricter laws greatly influence the abortion rate holding constant race, income,

education, age, and marital status. The study continues by discussing the significance of these results and the role of policy in the United States.

**Student Researchers: Sarah E. Bergstresser, Michelle V. Bondesen, Barbara B. Chitty, Rachel L. Martin**

**Major/Focus: Modern Foreign Languages**

**Research Mentor(s): James F. Gaines**

**Project Title: Students Compose Germanic Myths**

As part of their second assignment in FSEM 100P Major Germanic Myths, students had to apply their knowledge of the characters and stories of Germanic mythology by composing their own original myth. Students could choose a prose narrative or a variant of skaldic poetry in imitation of either the form of the Prose Edda or the Poetic Edda. They were expected to use kennings and other elements of Scandinavian story telling as part of the assignment. The panel involves the four top papers to come from the assignment and will discuss the creative influences and processes that went into the students' works.

**Student Researcher: Ellen Bikowski, Louis Kartoudi, and Katherine Morris**

**Major: Biology**

**Research Mentor(s): Profs. Andrew Dolby and Deborah O'Dell**

**Project Title: Enzyme immunoassay detection of heat shock proteins in the Tufted Titmouse: a new tool for evaluating chronic stress in birds**

Unexpected challenges activate a protective physiological stress response in birds. This response involves both stress hormones, such as corticosterone (CORT), and heat shock proteins (HSPs). CORT can mobilize energy reserves on an emergency basis, whereas HSPs protect other proteins from a wide variety of metabolic challenges. Long-term activation of the stress response diverts biological reserves away from growth and reproduction. Thus, to manage threatened bird populations, the ability to assay birds' stress status is crucial. CORT has been applied more heavily than HSPs in bird stress research, but HSPs may be better indicators of chronic stress. However, HSPs have been used in relatively few studies with significant limitations. Our objectives are to: 1) introduce a new, more reliable protocol for assaying HSPs in birds, enzyme immunoassay (EIA), and 2) compare the effects of handling distress on the rate of HSP and CORT release. We collected blood samples from Tufted Titmice during the winter of 2011, evaluated their physical condition, and recorded the elapsed time between each subject's capture and blood collection. We are analyzing these blood samples for HSP60 and CORT using EIA. This study will provide a new stress indicator which will be applicable to avian conservation biology.

**Student Researcher: Sarah D. Bostaph**

**Major: Anthropology**

**Research Mentor(s): Prof. Eric Gable**

**Project Title: Health Care and Latinos: Shifting Attitudes and their Significance Today**

The topic of Latino immigration is currently a hotbed of controversy, with polarized attitudes causing conflict between not only the political parties, but also the communities concerned. Relations between the Latino community and the larger US community are strained and often mistrustful. The health care community, though it has made many changes, still has various problems in its interactions with the Latino community. By studying relations between Latinos and their health care providers, interactions which are impacted by every aspect of Latino and US culture, I hope to identify the main attitudes, biases, concerns, and issues in the health care community of Fredericksburg and surrounding areas, as well as steps that can be taken to educate both communities in order to better their interactions.

**Student Researcher: Tess Buccigrosso**

**Major: Studio Art**

**Research Mentor(s): Dr. Rosemary Jesionowski**

**Project Title: Universal Art: Explorations in the Human Experience**

For my presentation I will first cover works from earlier in my UMW career that have led to my interest in the human experience. I will then address specific works from this year and the senior show and the

edits I have made. Lastly, I will discuss my final works that address if there are universals in life, and how something becomes a universal.

**Student Researcher: Erin K. Burke**

**Major: Sociology**

**Research Mentor(s): Dr. Leslie Martin**

**Project Title: The Gender Gap Effects in Special Education**

Within the educational system, it is common to see more boys enrolled in special education programs than girls. This overrepresentation of males has reached the startling ratio of two boys identified and enrolled in special education programs for every one girl (Wehmeyer & Schwartz, 2001). This is true across culture, race, and class (Arms, Bickett & Graf, 2008). Overrepresentation of boys in special education programs implies that there are “lost girls” in schools who are not receiving much needed services. If they are identified, students with special needs continue to struggle in school and in post-educational experiences. This finding is exacerbated for girls, both those who are identified as in need of special education services and those who are overlooked. The following research presents a picture of this gender disparity in the identification of children with special needs in the public school system, as well as the alarming effects this disparity poses for young girls during and after their educational experiences.

**Student Researcher: Benjamin L. Burruss**

**Major: Chemistry**

**Research Mentor(s): Dr. Charles M. Sharpless**

**Project Title: Physical and Photochemical Characteristics of Fractionated NOM**

Natural organic matter (NOM) originates from the degradation of plankton and vascular plant matter residues in natural waters and sediments. Humic substances (HS) represent a slowly-degrading fraction of the NOM, and HS are often isolated and studied to determine their photoreactivity. Upon absorbing sunlight, HS react with molecular oxygen to produce an unstable and reactive form of O<sub>2</sub>, singlet oxygen, which is capable of destroying organic pollutants in water. Previous studies have shown relationships between the molecular size, light absorption properties, and photoreactivity of HS, but the exact reasons for this are unclear. Soil and river NOM were isolated from the bank and the river of Rappahannock, respectively. For each NOM type, we isolated an unfractionated (NOM) sample, as well as two fractionated samples, fulvic acids (FA) and humic acids (HA). The apparent molecular weights, E<sub>2</sub>/E<sub>3</sub> ratios (the absorbance at 254 nm divided by that at 365 nm), and relative rates of 1O<sub>2</sub> production were determined for unfractionated and fractionated NOM samples. It generally observed by this study that the E<sub>2</sub>/E<sub>3</sub> ratios and the relative rates of 1O<sub>2</sub> production were inversely correlated to apparent molecular weight with the exception of the unfractionated soil NOM sample.

**Student Researcher: Julianne Todd Burton**

**Major: Environmental Science**

**Research Mentor(s): Dr. Neil Tibert**

**Project Title: BIOSTRATIGRAPHIC AND PALEOGEOGRAPHIC IMPLICATIONS OF THE CRETACEOUS NONMARINE OSTRACODES FROM SOUTHWESTERN UTAH, USA**

Cretaceous shale samples collected from vertebrate localities in Utah contain a rich association of nonmarine ostracodes. Exceptional specimens were observed and photographed using a Variable Pressure Hitachi 3400 Scanning Electron Microscope. Ostracodes were identified to genera and species level and paleontological plates were created based on geologic age and geographic locality. The Lower Cretaceous localities yielded a single species of *Candona*. The Middle-to-Upper Cretaceous localities contain a diverse assemblage of ostracodes with biostratigraphic ranges that correspond favorably with vertebrate distributions. Localities assigned to the Cenomanian and Turonian epochs contain *Cypria*, *Paracyprretta subglobulosa*, and *Candona*. *Mongolacypris*, *Altanicypris*, and *Spoonicypris* characterize the samples assigned to the Coniacian and Santonian Epochs. Campanian Epoch localities contain a Santonian association with the exception of *Bisulcocypridea skeeteri* and evolved *Altanicypris*

descendants. These deposits of Southwest Utah contain rich ostracode fauna that bears close affinities with the latest Cretaceous deposits in Asia and India (Himalayan region). Curiously enough, the ostracode associations of Southwest Utah along the western slopes of the present day Rocky Mountains bear little resemblance to the Lower and Upper Cretaceous nonmarine deposits in Western Europe. We postulate that a geographical barrier contributed to the geographic isolation of the region during the Late Cretaceous.

**Student Researcher: Joseph C. Calpin**

**Major: History**

**Research Mentor(s): Prof. Susan Fernsebner**

**Project Title: Chinese Character Reform and the Hundred Flowers Movement**

In the 1950s, language reformers within the People's Republic of China began to reconsider the issues and connections of the complex, written characters and the extremely high illiteracy rate among the masses. However, the work during the 1950s was an extension of previous debates during the Republican era; the process of language reform transcended political regimes, and during the Hundred Flowers Movement, many intellectuals were able to freely air their opinions on the pros and cons of the reform. As an issue slightly more detached from the Communist Party, even those with "Rightist" views could express their opinions. Through a Beijing newspaper and the Character Reform Committee's scholarly journal, I trace the development and main lines of questioning for character reform through the Hundred Flowers Movement.

**Student Researcher: Emmanuel Carreño-García**

**Major: Spanish**

**Research Mentor(s): Dr. Jeremy Larochelle**

**Project Title: Human and non-human connections in Amazonian Cosmologies and Recent Writing from the Amazon**

Since beginning my studies in Amazonian poetry and literature, I have been interested in learning more about the unique perception of the connection between the human and the non-human world as seen in literary language and commentary. In this discussion, it is natural to use the myths and folklore from Amazonia, classic stories from the surrounding city Iquitos, and poetry from contemporary authors who capture elements from Amazonian cosmology in their relation to the human and non-human world. In addition, philosophers and ecologists like David Abram, Fernando Santos-Granero, and Wendell Berry inform my perspective on this discussion that has received little critical attention, perhaps due to what philosopher Josef Pieper calls a "decline in man's ability to see." My work is informed by my recent field experience in the Peruvian Amazon where I interviewed the townspeople of the remote village San Rafael, located on the banks of the Amazon River. I had the opportunity to collect oral narratives relating to people's unique relationship to the non-human world. In my presentation, I will show video clips of these narratives in addition to analyzing recent literature from the Amazon including poetry by Carlos Reyes Ramirez and folktales by Juan Carlos Galeano.

**Student Researcher: Katlin Cataldi and Kelly Welch**

**Major: Environmental Science-Natural**

**Research Mentor(s): Dr. Melanie Szulczewski**

**Project Title: Trace Metal Analysis in Fredericksburg City Cemetery Soils**

This research focuses on trace metal concentrations in cemetery soils at four sample sites in the Fredericksburg City Cemetery, located at the corner of William Street and Washington Avenue in Fredericksburg, Virginia. This cemetery was established in 1867 and holds over 3000 confederate soldiers and other residents buried there over the past 150 years. Arsenic and lead, as well as other trace metals, are of particular interest due to their prior use in embalming fluids and wood preservation for coffins. The determination of the concentrations and possible sources of trace metals present in this area is necessary in order to maintain the health and safety of the surrounding environment and inhabitants. At high concentrations, these metals could contaminate groundwater, allowing for easy transport and leading to further dispersal and contamination. Samples were analyzed for pH and the concentrations of metals

in various fractions through the use of inductively coupled plasma- atomic emission spectroscopy (ICP-AES). Metal concentrations were compared within each site over depth and among the sites as well. Arsenic displayed elevated but not high levels. Preliminary analysis showed that chromium and other trace metals could also be metals of concern.

**Student Researcher: Aaron N. Chandler**

**Major: Business Administration**

**Research Mentor(s): Prof. Wei Chen**

**Project Title: A Case Study of Crazy Stupid or Crazy like a Fox: An Analysis of Escalating Commitment Going Right and Lessons Learned From Residential Mortgage-Backed Securities and Banks During the 2007 Recession**

Through the lens of Prospect Theory used to explain escalating commitment, this study examines U.S. commercial banks' escalating commitment to their individual residential mortgage-backed securities portfolios following the collapse of the U.S. housing market. Ordinary least squares models test three hypotheses and whose results are significant and suggest that an escalating commitment took place and that escalating commitment led to positive outcomes related to commercial banks' residential mortgage-backed securities portfolios. The discussion section addresses the findings' implications of the existence of aggregate escalating commitment and the development of the theoretical framework. The conclusion makes suggestions for further research.

**Student Researcher: Aaron N. Chandler**

**Major: Economics**

**Research Mentor(s): Prof. Margaret Ray**

**Project Title: Why Banks Fail: An Analysis of the Total Capital Ratio and the Bank Failure Rate**

Partially replicating a study done by the St. Louis Reserve in 2010 and adding elements from other studies, this research examines the relationships between macroeconomic factors, business risk, and capital regulation in predicting bank failures. Additional attention is given to total capital ratio. The results show that total capital ratio and net charge-offs are significant in predicting the annual percentage of total bank failures in the U.S. between 1949 and 2009.

**Student Researcher: Kathryn Emily Christian**

**Major: Mathematics**

**Research Mentor(s): Dr. Leo Lee**

**Project Title: Mathematical and Numerical Solutions for a Heat Conduction Model**

We use differential equations to model the conduction of heat energy in one-dimensional and two-dimensional regions. For the steady-state heat conduction problems with Dirichlet boundary conditions, we find the exact solution for the one-dimensional problem in an interval, and we find the exact solution for the two-dimensional problem inside a rectangle using the method of separation of variables. There are two different forms of the solution to the problem in two dimensions, one using four subproblems and one using two subproblems. Computationally, we find a method to approximate the solution to the one-dimensional problem using polynomial basis functions. We run numerical experiments to test the accuracy of the numerical solution for the one-dimensional problem and to compare the computational work necessary to calculate the solution using four subproblems to the work necessary to calculate the solution using two subproblems.

**Student Researcher: Anne Cosby**

**Major: Psychology**

**Research Mentor(s): Dr. Virginia Mackintosh**

**Project Title: The Autism Question: An Exploration into Expectation and the Culture of Recovery**

Children with autism spectrum disorders (ASD) have marked deficits in three main categories: communication, social interaction, and repetitive behavior (DSM-IV TR). Applied Behavioral Analysis

(ABA) is the treatment option with the most empirical support, but there are numerous alternative methods that claim to ameliorate autism symptoms or even bring about a cure. Many families employ a variety of experimental treatments in hopes of recovery. In the literature, recovery entails a child having a normal IQ, being a part of a regular classroom, and not being identifiably different from others his/her own age. This study aims to gain an understanding of people's expectations of recovery and their overall knowledge of the disorder. A survey was sent to physicians, ABA therapists, therapists in training, and parents of children with ASD to evaluate differences across varying relationships to individuals diagnosed with ASD in order to explore the culture of recovery.

**Student Researcher: Sarah T. Dawes**

**Major: English**

**Research Mentor(s): Mr. Alan Dean**

**Project Title: Digital Storytelling - Why I Chose UMW**

"Why I Chose UMW" is a digital story - it uses new media tools to convey an idea and tell a narrative. Developed by Sarah Dawes, Sarah DeLaney, and Bobby Tillett for Mr. Dean's Digital Storytelling class, "Why I Chose UMW" explores the reasons why students and faculty alike have chosen to spend such a significant portion of their lives at Mary Washington. The brief film (required to be under two minutes for the original assignment) follows the decision process high school seniors face upon choosing which college to attend in the fall. "Why I Chose UMW" uses actual students and professors from the university in the piece, looking at specific academic, athletic, and social reasoning for "choosing UMW." A special thanks to Nathan Dawes, a contributing editor to this piece.

**Student Researcher: Charlie Devine**

**Major: Environmental Science**

**Research Mentor(s): Prof. Brian Rizzo**

**Project Title: GSi and Remote Sensing applications for south western forestry**

**Student Researcher: Kevin J. Doubleday**

**Major: Mathematics**

**Research Mentor(s): Dr. Julius Esunge**

**Project Title: Application of Markov Chains to Stock Trends**

The Dow Jones Industrial Average is analyzed with a discrete time stochastic model, namely a Markov Chain. Two models are highlighted, where the DJIA is considered as being in a state of 1) gain or loss and 2) small, moderate, or large gain or loss. A portfolio of five stocks is then considered and two models of the portfolio much the same as those for the DJIA. These models are used to obtain transitional probabilities and steady state probabilities, which are in turn tested. Our results show that the steady state distributions for all four models closely resemble those determined by examining data not included in the model. The first model of the DJIA correctly predicts a higher number of market gains than losses and the second model correctly predicts an approximate normal distribution for the steady state probabilities. We also found that the second model of the portfolio lacks a steady state probability vector.

**Student Researcher: Geoffrey Driskell**

**Major: Mathematics**

**Research Mentor(s): Dr. Julius Esunge**

**Project Title: A Comparison of Two Derivations of the Black-Scholes Option Pricing Model**

One of the most widely used models in financial mathematics is the Black-Scholes Option Pricing Model. It has been the benchmark against which all other option pricing models have been judged since its introduction nearly forty years ago. The model can be derived in a number of different ways using mathematical techniques of varying sophistication. To gain a better understanding of this model we will explain and compare two of the most popular and widely used derivations of the model that use two completely different mathematical approaches, the Dynamic Hedging Strategy and Risk-Neutral Valuation. Throughout this process, concepts such as the Wiener Process, Ito's Lemma, Geometric



Brownian Motion and, put-call parity that make up the foundation of Financial Mathematics will be introduced and applied to the practice of theoretical option pricing.

**Student Researcher: Elena V. Fernandez**

**Major: Biochemistry**

**Research Mentor(s): Dr. Kelli Slunt**

**Project Title: Development of a Reliable Sample Preparation Method for Estrogen ELISA**

**Assay**

In the last decade, concern about endocrine-disrupting compounds, such as estrogens, in food products has been raised. In addition, the consumption of organically processed and labeled foods has increased in an effort to promote healthy living. Previous studies have identified estrogens in dairy products but few studies have compared the presence of these hormones in organically processed versus non-organic milks. An E2 (17- $\beta$  Estradiol) competitive ELISA assay methodology is being developed to measure estrogen content in various commercially available milks, including organic and non organic. The ELISA assay can determine concentrations between 0.05 $\mu$ g/L and 3.0 $\mu$ g/L while most milk estrogen concentrations are much lower, between 5 and 1300 ng/L. Sample preparation including concentration of the sample is necessary for proper ELISA analysis. Currently, the proteins in the milk matrix are removed by acetic acid precipitation. The estrogens are extracted from the remaining matrix using Solid Phase Extraction and concentrated 1000-2000 fold by evaporation of solvent. Research to date of method development will be presented.

**Student Researcher: Stanley J. Gredinger**

**Major: Anthropology**

**Research Mentor(s): Prof. Eric Gable**

**Project Title: Following the 'Colt' of Gun Collecting**

"I own about 1500 guns right now I think", a gun dealer said casually when asked about his collection, "not counting the canes and other items I collect." In the past decade a debate over collecting has recently sprung up and has spurred an interdisciplinary discussion on how and why people collect the things they do. Though they have gone largely unnoticed in this debate antique gun collectors and dealers lie at the very center of this debate. Antique gun collecting is a unique field to study because, like the debate surrounding collecting, it is relevant to the fields of art history, history, museum studies, economics, and psychology. It is my hope that using anthropological methods and ethnographic data that I can look closely at antique gun collecting and, through it, get a better understand of collecting in general.

**Student Researcher: Lauren R. Guzinski, Carley McCready, Christian Vega and Lucia Morey**

**Major/Focus: Spanish**

**Research Mentor(s): Dr. Betsy Lewis**

**Project Title: Women and Charity in Spain 1786-1939**

**Student Researcher: Thalia N. Halpert Rodis**

**Major: Anthropology**

**Research Mentor(s): Prof. Eric Gable**

**Project Title: Border Control: Immigration and Homogeneity in Greece**

The majority of my work focuses on strained Greek-Albanian relations and the lenient views that Greeks have toward refugees and asylum seekers. The importance of keeping the Greek nation close-knit and nearly pure has always been relevant to Greeks. But the immigration of Albanians, Macedonians and others from the Balkans has become a real threat because the food, customs, and looks of people from the Balkans are incredibly similar to Greeks. Many would say that these similarities would naturally form because of the closeness of geography, but Greeks would say instead that these nations copy the Greek way of life and they want to steal Greece's history and their glory; just as Macedonia did by claiming Alexander the Great to be a Macedonian. Because Greeks are so concerned with homogeneity within their country, they are more comfortable with refugees coming in from Kurdistan and African countries.

It is easier for Greeks to accept those whose customs are not similar to Greek customs and those who look different from Greeks because they know they cannot “steal” the Greek identity that they have tried so hard to shape throughout history. The refugees who mainly come to Greece have darker complexions or more Asiatic features. They cannot pass as Greeks, nor do they have the desire to. They want to leave Greece as quickly as they can to move on to the next phase of their lives. These are the issues that I will discuss in my paper and presentation at the Research & Creativity Symposium.

**Student Researcher: Lauren P. Hartwell**

**Major: Psychology**

**Research Mentor(s): Dr. Erchull**

**Project Title: Young Women Going All the Way: What Predicts Hook Ups and Casual Sex in College?**

The sexualization of women in Western culture is pervasive. It is difficult to turn on the television or read a magazine without seeing a woman in a sexualized pose. Some theorists argue that sexualization is a form of oppression used to control women, but others offer sexualization as a method for women’s empowerment. Indeed, women’s participation in the beauty industry suggests that some women are seeking sexualization and may even be enjoying it. The Enjoyment of Sexualization Scale (ESS) was developed to assess the extent to which women reported enjoying the experience of being sexualized by men. Theorists have argued that women who embrace sexualization may be more in touch with their own sexuality. These women may, therefore, hold more permissive sexual attitudes and be more willing to engage in casual sex and hooking-up behaviors (sexual encounters that may not involve sexual intercourse, but occur without the expectation of a relationship). We sought to understand if enjoying sexualization was, in fact, related to more permissive sexual attitudes and behaviors. We predicted that women who enjoyed sexualization would hold more permissive sexual attitudes, would report more casual sex partners and hooking-up, and would have greater sexual assertiveness and sexual esteem.

**Student Researcher: Amanda J. Johnson, Jeanine Tiara St. Lawrence, and Dolly Suarez**

**Major: Sociology**

**Research Mentor(s): Dr. Debra Schleef**

**Project Title: Weapons, Fights, and Dating Violence: How Does Community Support Affect School Aged Violence?**

It may be hard to pinpoint exactly what causes young people to participate in violence; however, several factors have been highlighted as contributors even they may not entirely explain it. Commonly people say that it is because an adolescent is just a “bad egg”, that it is a product of poor parenting or that they hang out with the wrong crowd. While all of these may be contributing factors, scholars find certain variables to be of particular importance. Scholarly research suggests that social control theory, family bonds, race and community structures can all have varied impacts on whether or not youth engage in violence. The data analyzed in this study is based on quantitative data and is interpreted using statistical tests. For the purposes of our research, school-aged violence is considered any physical altercation between eleven to eighteen year old peers and/or romantic partners. Adolescent violence includes, but is not limited to: fistfights, weapon carrying, assault, dating-victimization and bullying. Using data on risk behaviors gathered from students in Caroline County, Virginia, we look specifically at certain questions to determine if race, community, and family support impact the incidence of violence among youth.

**Student Researcher: Emma V. Jones**

**Major: Geology**

**Research Mentor(s): Dr. Jackie Gallagher**

**Project Title: Shoreline Change in Stafford County, Virginia from 1937 to 2010**

Coastlines link marine and terrestrial systems that, ideally through time, remain in dynamic equilibrium, resulting in negligible changes in coastal geomorphology. However, when sediment input fails to match removal, whether from increased marine energy or anthropogenic interactions, coastal erosion occurs. The banks of Stafford County along the Potomac River are on the losing end of this deal. Historical shoreline comparison within a GIS reveals Widewater and Marlborough Point are receding at a rate of

two acres per year. A total loss of 146 acres occurred between 1937 and 2010 with tidal marshes composing the majority of land lost. The Digital Shoreline Analysis System (DSAS), a product of the United States Geological Society (USGS), confirms observations with negative linear regression rate trends throughout the study area. Accretion is noted in areas where hard erosion control measures are in place, but hurricane season reminds us our efforts are merely temporary fixes. Establishing a long-term solution is imperative as climate change threatens to intensify storms in addition to a rising sea level.

**Student Researcher: Nicole D. Kappatos**

**Major: History**

**Research Mentor(s): Prof. Jess Rigelhaupt**

**Project Title: The Oral History of Kefalos; A Greek Heritage Organization in Norfolk, Virginia**

In an attempt to preserve their cherished island culture in the United States, twenty-five young Greek immigrants from the island of Kefalonia established the organization Kefalos in 1973. Based in Norfolk, Virginia, the organization has succeeded in its mission for thirty-eight years, unifying Kefalonians across the Virginia tidewater region and promoting the education and cross-generational preservation of their distinct linguistic and cultural practices. Kefalos performs philanthropic work for both the surrounding Greek American community and the island of Kefalonia, and ultimately nurtures a unique Kefalonian-American identity among its members in its area. Oral histories were utilized as the primary methodology for constructing the history of Kefalos and highlighting its importance. Nine interviews were conducted with vital figures in the history of Kefalos. An interpretation of each interview reveals the importance of individual voice and experience when constructing a community history, as well as reveals a distinct cultural identity grounded in a generation of people. Furthermore, since Kefalos is connected to the larger history of Greek immigration to the United States, a history of this broader immigration experience is constructed. It outlines the two major waves of Greek immigrants to America, U.S. legislative decisions and their effect on Greek immigration, and the differences of the new and old Greek American society.

**Student Researcher: Megan Helen Kent, Amanda Nicole Tennyson, and Benjamin Newman**

**Major: Business Administration**

**Research Mentor(s): Dr. Carole Creque**

**Project Title: "My Box"**

"My Box" is an interactive book for children ages 4-7 that focuses on motor-skill development and tactile learning skills. A storyline and illustration of a character completing an activity appears on one side of the page. The opposite side has a corresponding, hands-on activity focusing on motor skill development (e.g. tying a shoelace, zipping a zipper, buttoning a shirt, writing their name, building a tower, etc.). A recording device is installed inside the book, providing the option to personalize the narration of the story. "My Box" is unique because it is modeled after a metal lunchbox, measuring 10 by 6 inches. A child can carry "My Box" by the handle and open it to begin reading and completing the various activities. The activities are innovative because they correspond with the storyline and focus on motor skill development while also engaging the child's creativity. "My Box" also includes a voice narration feature that allows parents or relatives to personalize the narration of the story by recording their voice. My Box is designed to build a child's self-confidence through developing basic fundamental life skills at a reasonable price. The overall value in "My Box" is that it addresses the little-known problem of children lacking fine motor skills between the ages of 4-7. Value is created because "My Box" offers outstanding benefits for parents and teachers as well as the end users of the product: the children. \*Copyright Pending\*

**Student Researcher: Katey Kerns**

**Major: Studio Art**

**Research Mentor(s): Dr. Rosemary Jesionowski**

**Project Title: Explorations in Bookmaking**

Bookmaking is an ancient art with a fascinating and enduring historical significance in art as well as other disciplines. This project has been based upon research of this history as well as

inspiration and influence from professors and recognized artists working in the book arts. The materials used and technical elements play a large role in the creation of a book. These aspects often accompany a strong conceptual basis for work and the format of the book is always a strong complement to its contents.

**Student Researcher: Jenna Kincaid**

**Major: History**

**Research Mentor(s): Dr. Steven Harris**

**Project Title: A Beekeeper's Dystopia: Race and Class in 20th Century Bee Culture**

This research project examines the ways in which post WWI European and American societies extracted ideas of labor and social structures from the beehive and adopted practices of beekeeping to symbolize utopian ideas of labor and class. These ideas were constructed through various human and honey bee exchanges and beekeeping technological advancements. In the post-WWI socio-political environment of isolationism and nativism in Europe and the United States, the beekeeper's utopian ideas were not realized, but rather the beekeeping community perpetuated the racial and class prejudices present in Euro-American society as a whole.

**Student Researcher: Sarah Katherine Kountz**

**Major: English – Creative Writing**

**Research Mentor(s): Dr. Zachary Whalen**

**Project Title: The Three Empires Resurrected**

Alternative reality games, or transmedia games, are based on the concept of creating an immersive world that a player influences based on his or her actions in real time. This type of gaming is wholly interactive and is the future of gaming. Using concepts learned in Dr. Zachary Whalen's English 376MM: False and the Virtual class, Lourdes South and Sarah Kountz created and are currently implementing an original transmedia game. The purpose of their study is to see firsthand the social implications of creating and running a transmedia game involving players from all around the world. Their project also uses the framework developed by Dave Szulborski in his book "This Is Not a Game: A Guide to Alternate Reality Gaming." Lourdes and Sarah will document their own creative process for their transmedia game, as well as their results from this experience, in an analytical and cohesive narrative.

**Student Researcher: Kristen R. Lewis**

**Major: Biology**

**Research Mentor(s): Dr. Dianne Baker**

**Project Title: The Effects of Atrazine on Gene Expression of Appetite-Regulating Neurohormones in Zebrafish, *Danio rerio***

Atrazine is an herbicide that is widely used in the United States and is one of the most common contaminants in groundwater. In Atlantic salmon exposed to 100 µg atrazine/ L for ten days, appetite was inhibited. Under normal conditions, appetite is regulated through neurohormones like the appetite-stimulating NPY and ghrelin. To further examine the mechanism through which atrazine affects appetite, we are studying the effects of atrazine exposure in the zebrafish, *Danio rerio*. We hypothesize that atrazine may work as an endocrine disruptor and inhibit appetite by disrupting the development or function of the neurons that secrete NPY or ghrelin. To test this hypothesis, juvenile fish were exposed to 0, 10 and 100 µg atrazine/ L. On three different days RNA was isolated from whole fish heads of fish that had recently been fed and from fish that had been fasted overnight. From the isolated RNA, complementary DNA was generated. Preliminary results from real-time PCR testing indicate that ghrelin levels were significantly higher for control fish that were fasted than for controls that were fed. In treated fish, ghrelin expression did not increase with fasting. Work is underway to measure expression of NPY.

**Student Researcher: Kristin L. Magill**

**Major: Sociology**

**Research Mentor(s): Dr. Debra Schleef**

**Project Title: An Analysis of Juvenile Sexual Violence and Subsequent Drug Abuse**

The purpose of this research is to explain the link between nonconsensual sexual intercourse and drug use amongst 8th, 10th, and 12th grades in the greater Fredericksburg area utilizing data gathered by the Rappahannock Area Office on Youth through a self administered survey issued to students in multiple public middle and high schools in the area. In our research, we attempt to illustrate a link between forced sexual intercourse and substance use among juvenile victims. We hypothesize that forced sexual intercourse has a direct and positive relationship with drug abuse; that is, an individual who has suffered sexual trauma is markedly more likely to engage in various types of drug abuse, (specifically alcohol, marijuana, cocaine, ecstasy, inhalants, and over-the-counter drugs). Our analysis seems to confirm our original hypothesis, as we found a statistically significant relationship between adolescents who had been forced to have sexual intercourse and drug abuse, depending on the type. Over the counter drugs were the most widely abused, followed by cocaine and ecstasy. Inhalants and marijuana were the weakest correlations, and quite surprisingly, alcohol did not prove to have a statistically significant relationship with rape whatsoever.

**Student Researcher: Rosana Marzullo-Dove**

**Major: Psychology**

**Research Mentor(s): Prof. Denis Nissim-Sabat**

**Project Title: Emotional Intelligence and the Effect of False Feedback on Decision-Making**

This study seeks to support the hypotheses that emotional intelligence (EI) plays a critical role in how participants respond to false physiological feedback. On the first day participants were administered the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT) to measure their EI and then asked to rank-order their feelings to the Ad Council's Health and Safety issues (ACHS). On the second day, based on results of the MSCEIT, participants were divided into high EI and low EI and randomly assigned to either a dissonant, congruent or control group. Participants were shown false physiological data about their feelings on the ACHS issues. Finally, all participants were asked to re-rank the ACHS issues. We predicted that participants in the high EI group in the dissonant feedback condition were less likely to change their rank orderings of the ACHS issues, as compared to the low EI group in the dissonant condition. Other students in this group: Susan Ramsland Victoria Toadvine

**Student Researcher: Rosana Marzullo-Dove**

**Major: Psychology**

**Research Mentor(s): Dr. David Rettinger**

**Project Title: Effect of Native and Non-native Accent on Perceptions of Attractiveness and Intelligence**

Humans use voices to judge other attributes and stereotype people based on their accents. The purpose of this study was to determine if, when listening to voices, there is a significant difference in first impressions between natives and foreigners based only on their accents. Thirty-seven American undergraduate students rated four native female and four nonnative female voices on a line scale for perceived attractiveness and intelligence. We hypothesized that native voices would be rated as most intelligent, while foreign voices would be rated as more attractive, due to the common portrayal of exotic women in the media today, and research showing that people will generally rate the native speakers (independently of the group they belong) as more intelligent than nonnative speakers. Our data showed that native voices were rated as significantly more intelligent and more attractive than the foreign voices. The foreign voices significantly differed from each other on ratings of intelligence, with Chinese rated as the most intelligent.

**Student Researcher: Bethany Mastrorilli**

**Major: Psychology**

**Research Mentor(s): Dr. Debra Steckler**

**Project Title: Parental Influences on Emerging Adulthood**

It has been suggested that emerging adulthood, a time in which people are between the life stages of adolescents and adulthood, is a result of societal changes (Arnett & Taber, 1994; Arnett, 2004). Emerging adulthood is characterized by five dimensions: age of identity exploration, age of instability, age of possibilities, self-focused age, and age of feeling in-between (Arnett, 2004). This study examined the perceived generational differences in the context of these five dimensions as originally proposed by Jeffery Jensen Arnett. Our findings indicate that there are generational differences in parenting styles that may have contributed to the development of the stage of emerging adulthood.

**Student Researcher: Emma Max**

**Major: Art History**

**Research Mentor(s): Prof. Dreiss**

**Project Title: Form Follows Mission: Richard Meier's Getty Center and The Role of The Contemporary Museum**

Museums play an essential role in society as a place for leisure activity and as cultural accelerators. In addition to the importance of what museums contain, the architecture of museums also enhances the visitor experience. Modernism is arguably the most effective style in enabling museum institutions to achieve their purposes. The Getty Center in Los Angeles, California is an example of modern museum architecture that creates an engaging environment for visitors. The architecture of the Getty center helps fulfill the mission of the Getty Center by encouraging and nurturing the critical viewing of art. Architect Richard Meier designed the Getty Center in his personal style, creating a complex of buildings that display a sense of permanence, harmony and culture. Through the different elements of the campus, he created an environment that attracts people from all over the world to the site, and also functions to enhance their experience of art. This paper explains the architecture of the Getty Center from the standpoint of style and the manner in which the Center functions to help achieve the mission of the museum.

**Student Researcher: Isabel H. McLoughlin**

**Major: Geography**

**Research Mentor(s): Profs. Brian Rizzo and Peter Chirico**

**Project Title: Geospatial and Statistical Modeling of Artisanal Miners in West Africa**

This study examines the Kenieba artisanal and small-scale mining (ASM) region of western Mali. In this region, ASM of gold and/or diamonds occurs largely as part of the informal economy. ASM refers to the mining activities of small groups or individuals using very basic tools and processes to extract the ore and minerals. Due to the unstable nature of the work, miners are often transient and must travel long distances to the mine site and to other towns to sell their products. This study uses questionnaire/interview information gathered during field work conducted by USGS personnel in 2007 in Mali. The questionnaires contain information about the mining sites as well as demographic data on the mine workers. From these interviews, information was compiled on access routes to the mine, and proximity to local towns or villages. A tool called Network Analyst in ArcGIS was used to establish the range and domain of the mine workers to mine sites, thereby defining individual areas of influence around each mine site, indicating areas from which mine sites attract workers. Using an equation to model pedestrian travel time, areas around each mine have been delineated to mark how far a miner could travel, on foot.

**Student Researcher: Sarah A. Mendelsohn**

**Major: Historic Preservation**

**Research Mentor(s): Dr Leslie Martin**

**Project Title: Mothers on the Street: What Support Do Pregnant Women and Their Newborn Babies Receive and What Impact Does It Have on Them?**

Aches, pains, mood swings, cravings; all are normal aspects of pregnancy that women often experience. However, imagine how much worse they would be for the woman if she had no proper food, no place to rest, or no home. Homeless pregnant women must face harsh living conditions that drain their health and increase the chances of something going wrong with their baby. The women frequently do not have access to medical help to ensure that their baby is born healthy. There are some programs in place to provide support for homeless pregnant women, yet it is still not enough to help the women. Pregnant women and their babies do not receive enough support to remain healthy and more action should be taken to enable the women to give birth to healthy babies.

**Student Researcher: Victoria Miller**

**Major: Studio Art**

**Research Mentor(s): Prof. Joseph Di Bella**

**Project Title: An Opinion of Beauty**

My work deals with the subject of beauty in its broadest sense; more concisely with the idea of what we as human beings find truly beautiful. Recently, I have been exploring this theme of exaggerated beauty with a combination of media. These works focus on overstated features of the human form that when separate are considered attractive, but when placed together can become slightly alarming or disturbing. Characteristics of the human figure, represented by interpretation of both the living and deceased, are explored through the mediums of paint and ceramics. These works reinforce themes of past funerary customs and rituals with a contemporary, expressionist interpretation to the idea of death and remembrance. This is further supported by references alluding to skin, stitches, and tattoos. History operates as an underlying force that drives my work aside from its thematic content. Funerary portraits and memorials have served as the basis for the majority of my inspiration. Artists Lucian Freud, El Greco, Michael Lucero, and Kathe Kollowitz serve as art historical references that blend with traditional and non-traditional techniques to form figural hybrids.

**Student Researcher: Mejgan G. Mukhtarzada**

**Major: Biology**

**Research Mentor(s): Prof. Theresa M. Grana**

**Project Title: Anatomical Comparison of Caenorhabditis Species**

It is estimated that there are approximately one million nematode species, mostly uncharacterized. The purpose of this project is to isolate and characterize several new nematode species in the hope that a phylogenic relative of the popular model organism *Caenorhabditis elegans* will be identified for future use in comparative genomics. Soil dwelling nematode species were isolated based on morphological similarities to *C. elegans*. We examined several features of the newly isolated worms, including adult morphology and reproductive mode. Features known to be beneficial in model organisms were systematically examined. For example, of the six isolated species, five are amenable to long-term freezer storage. Future plans include species identification via 18S rDNA sequencing and phylogenic tree building.

**Student Researcher: Girbran A. Parvez**

**Major: Computer Information Systems**

**Research Mentor(s): Prof. Stanton**

**Project Title: Dulles Airport: An Embodiment of American History**

The land now occupied by Washington Dulles Airport once told a different story: agricultural settlement along the Fairfax/Loudoun border has embodied multiple eras in American history. Originally a part of King Charles II's Northern Neck Proprietary, this area was considered home by a number of First Families of Virginia during the 18th century. With its location along the cultural boundary between the

North and the South came an eclectic perspective on the Civil War and social tensions between northerners and the southerners in the years leading up to it. Along with this was a firsthand view on reform and migration during the Progressive Era as well as tough times faced by farmers during the Great Depression. However, in many ways, these changes would pale in comparison to the monumental transformation of quiet, rural Northern Virginia into the bustling metropolis it is today. The construction of Dulles Airport during the Eisenhower and Kennedy administrations brought a piece of the military-industrial complex to Northern Virginia and catalyzed the growth of the suburban technological corridor now considered the "Silicon Valley of the east" by many. From the American Revolution to the Cold War, the area within and around Dulles Airport has quite the story to tell.

**Student Researcher: Melissa Patterson**

**Major: Sociology**

**Research Mentor(s): Dr. Kim**

**Project Title: Two Perspectives on Refugee Resettlement Policies in Virginia**

**Student Researcher: Thien T. Phan**

**Major: Biology**

**Research Mentor(s): Prof. Lynn Lewis**

**Project Title: Mycobacteriophage Genomic of Venkman**

Bacteriophage are abundant in the environment and have co-evolved with the bacteria they target. In order to better understand how bacteriophages work, we collected a soil sample and isolated several mycobacteriophages, using *Mycobacterium smegmatis* as our host. We chose one bacteriophage to collect DNA for genomic sequencing. Restriction enzyme digests were performed to compare the phage DNA to other known bacteriophages. The genome was sequenced and analyzed and the gene sequence of our isolated phage are being compared to known mycobacteriophages. Electron microscopy was performed. This information will give us more insight into how mycobacteriophages work.

**Student Researcher: Ian Christopher Pope**

**Major: Environmental Science**

**Research Mentor(s): Dr. Kisila**

**Project Title: Soil Erosion and Sediment Fluxes Analysis: A Watershed Study of the Ni Reservoir, Spotsylvania County, Virginia**

Anthropogenic forces that alter the physical landscape are known to cause significant soil erosion, which has negative impact on surface water bodies such as rivers, lakes/reservoirs and coastal zone, and thus sediment control has become one of the central aspects of catchment management planning. The RUSLE empirical model, erosion pins and isotopic sediment core analyses were used to evaluate watershed erosion, stream bank erosion and reservoir sediment accumulation rates for Ni Reservoir, in central Virginia. Land-use land cover seems to be dominant control in watershed soil erosion, with barren land and human disturbed areas contributing the most sediment, whereas forest and herbaceous areas were the least eroded. Results shows a 7% increase in human development between 2001 (14%) to 2009 (21%) translating into to an increase in soil loss of 1.45 ton/acre/yr in the same time period. <sup>210</sup>Pb based sediment accumulation rates at three locations in Ni Reservoir were 0.63, 0.26, and 0.22 g/cm<sup>2</sup>/ yr, with values decreasing towards the dam, indicating that sediment accumulation and distribution in the reservoir is influenced by reservoir configuration and significant contributions from bedload. All three locations show modern accumulation rate increases. Erosion pin results shows variability in stream bank erosion with values ranging from 5.3 to 11.3 cm/yr. These preliminary results shows that urban growth and the decline in vegetative cover has increased sediment fluxes from the watershed and poses a significant threat to the sustainability of the Ni Reservoir.



**Student Researcher: Lauren F. Redding**

**Major: Sociology**

**Research Mentor(s): Dr. Tracy Citeroni**

**Project Title: Women and Gender in Sociology**

Sociologists have long studied concepts like race, class, and gender and helped bring these concepts to the attention of larger society. However, the study of gender in mainstream sociology has received the least amount of attention when looking at what the discipline considers to be important (Ferree and Hall 1996; Ferree et al. 2006; Thistle 2000). Furthermore, women tend to be underrepresented in the field of sociology, specifically when looking at the history of sociology and who is included in that history (Deegan 1990; Deegan 1991; Lengermann and Niebrugge 2007). The representation of women and gender in sociology and the transformation of the discipline as a whole into a more inclusive one depends much on their place within academic sociology. As such, this study first involves establishing the early women founders of sociology as active members of that community who contributed as much, if not more than their male contemporaries. Second, this study turns to gender's place in academic sociology through a qualitative study on sociology students' own experiences learning about gender and feminism and their importance. More research on specific sociology programs is needed in order to better determine the representation of women and gender studies in sociology today.

**Student Researcher: Lauren F. Redding**

**Major: Sociology**

**Research Mentor(s): Dr. Kristin Marsh**

**Project Title: Women and Gender in Sociology**

Sociologists have long studied concepts like race, class, and gender and helped bring these concepts to the attention of larger society. However, the study of gender in mainstream sociology has received the least amount of attention when looking at what the discipline considers to be important (Ferree and Hall 1996; Ferree et al. 2006; Thistle 2000). Furthermore, women tend to be underrepresented in the field of sociology, specifically when looking at the history of sociology and who is included in that history (Deegan 1990; Deegan 1991; Lengermann and Niebrugge 2007). The representation of women and gender in sociology and the transformation of the discipline as a whole into a more inclusive one depends much on their place within academic sociology. As such, this study first involves establishing the early women founders of sociology as active members of that community who contributed as much, if not more than their male contemporaries. Second, this study turns to gender's place in academic sociology through a qualitative study on sociology students' own experiences learning about gender and feminism and their importance. More research on specific sociology programs is needed in order to better determine the representation of women and gender studies in sociology today.

**Student Researcher: Nilab Sadat**

**Major: International Affairs**

**Research Mentor(s): Ms. Connie Smith**

**Project Title: Plight of Women in Afghanistan**

The plight of Afghan women throughout the Afghan history varied under different rulers. Some regimes were pro women's rights while others were against it. The history illustrates that Afghan women suffered from conservative groups in almost all regimes. The Taliban (Islamic extremists) government is considered the darkest period of history for Afghan women. During the Taliban period, any glimmer of hope for the emancipation and empowerment of Afghan women was snuffed out. They were denied basic human rights including access to education and freedom of movement. After the fall of the Taliban, the door of hope was opened to Afghan women once again. Still, they face a great amount of challenges to overcome so they can progress. The main obstacles for Afghan women are lack of security, lack of access to education, lack of practiced laws to protect women from violence and support women's social and political participation. The key to ensure women's right and reduce these challenges is to provide Afghan women with education. To develop and improve public and social places like the Women's Garden is another successful way to support Afghan women. The garden is accepted a safe and socially well-received place for women in Kabul. The WG is not only used for social gathering and entertainment

but also as a tool of empowerment. The WG offers psychological support, primary legal awareness, literacy classes, vocational training, sport facilities and business activities funded by USAID and UNDP.

**Student Researcher: Lauren Scott**

**Major: Studio Art**

**Research Mentor(s): Dr. Rosemary Jesionowski**

**Project Title: Humanism: An Approach in Study**

My presentation will be on: 1) How I became interested in the work that was produced during my independent study (College Student Series). 2) How the work evolved. 3) What I did. 4) The technical and conceptual ideas behind the work. 5) What I learned during the study and finally 6) What I am doing now, the works' evolution and springboard into my latest series.

**Student Researcher: Anum Khan Shaikh**

**Major: Biology**

**Research Mentor(s): Dr. Deborah O'Dell**

**Project Title: Effects of Combined Vitamin E and C treatment on Plaque formation in Alzheimer's disease**

The purpose of this experiment is to measure the effects of vitamin treatment for Alzheimer's disease. Specifically, Vitamin C and E will be tested for their effectiveness in reducing inflammation and amyloid plaque formation in transgenic mice brains as measured by concentrations of tumor necrosis factor-content  $\alpha$  (TNF- $\alpha$ ) and  $\beta$ -amyloid protein, respectively. It is hypothesized that the experimental group with combined vitamin C and E treatment will have the least plaques and lowest concentrations of  $\beta$ -amyloid and TNF- $\alpha$ . Concentrations of both mentioned variables will be quantitatively measured by the ELISA protocol, while the plaques will be qualitatively examined via immuno-histochemistry. The experimental mice were divided into 3 groups and received vitamin C, vitamin E or both vitamins C and E. The control mice were also transgenic but did not receive any vitamin treatment. Both experimental and control mice will be sacrificed at 48 weeks of age. All data will be analyzed for statistical significance using Analysis of Variance (ANOVA). This test will be used to make a comparison between the 3 experimental groups and 1 control group and then amongst the 3 experimental groups themselves. P values of 0.05 or less will be considered significant, and would indicate that the treatment had a statistically significant effect.

**Student Researcher: Jessica L. Sine**

**Major: Biology**

**Research Mentor(s): Dr. Dianne Baker**

**Project Title: The effect of atrazine on the thyroid axis in zebrafish**

Atrazine is one of the most widely used herbicides in the United States. Previous studies have shown that exposure to atrazine disrupts the thyroid axis in vertebrates, resulting in lower concentrations of thyroid hormones T3 and T4. The purpose of this study is to investigate the long-term effects of embryonic exposure to atrazine on the thyroid axis in zebrafish (*Danio rerio*). Zebrafish embryos were exposed to atrazine (0  $\mu\text{g/L}$ , 10  $\mu\text{g/L}$ , 100  $\mu\text{g/L}$ , and 1000  $\mu\text{g/L}$ ) for two weeks post-fertilization. At 10-weeks and 24-weeks after termination of atrazine exposure, total RNA was isolated separately from heads and bodies. Probe-based quantitative polymerase chain reaction (qPCR) assays have been developed and are now being used to measure levels of thyroid stimulating hormone  $\beta$  (TSH), the enzymes deiodinase I and II, and the thyroid hormone receptors (TR $\alpha$  and TR $\beta$ ) mRNA. Results indicate that exposure to 100  $\mu\text{g/L}$  atrazine during early development causes increased deiodinase II mRNA levels. Increased deiodinase II levels may be a result of low T3 levels associated with atrazine exposure found in previous studies.

**Student Researcher: Meagan E. Smith**

**Major: Classical Civilization**

**Research Mentor(s): L. Houghtalin**

**Project Title: Exploring Silchester: A Journey of Space**

As my senior research project in the Classics department, I studied the British town of Silchester. Known as Calleva Atrebatum to the Roman world, Silchester was originally home to the Belgic Atrebate, an indigenous British population. When the Romans invaded Britain, Silchester developed into a large city based on its location to major road systems. Because of its excellent geographical assets, Silchester became a Roman metropolis with newly gridded streets, an amphitheater, and basilica. I have just this fall visited the site through a Mary Washington Undergraduate Research Grant. Space is a cultural phenomenon, and thus should be treated as an ever-changing artifact reflective of both cultural and temporal relationships. Analyzing space in addition to other cultural resources will give a fuller picture of a culture. My work on Silchester provides a guide on not only Roman Britain, but also a general overview of deconstructing cultural space.

**Student Researcher: Sadie Terrell Smith**

**Major: History**

**Research Mentor(s): Dr. Jess Rigelhaupt**

**Project Title: John Pearce on James Farmer: An Oral History**

A project meant to highlight information learned about Farmer's tenure at UMW, recall Jess Rigelhaupt's Fall 2009 Oral History and James Farmer research project, and evaluate John Pearce as a narrator of the memory of James Farmer.

**Student Researcher: Kelsie B. Snyder**

**Major: Mathematics**

**Research Mentor(s): Dr. Keith Mellinger**

**Project Title: c-Dominating Sets for Families of Graphs**

The topic of domination in graphs has a rich history, beginning with chess enthusiasts in the 1850s determining how many queens are necessary to dominate an entire chessboard and continuing to current problems involving computer communication networks, social network theory, and other similar problems. We define a dominating set of a graph  $G$  to be a set of vertices of  $G$  such that every vertex of  $G$  is either in the set or adjacent to a vertex in the set. The domination number for a graph  $G$  is the size of a minimum dominating set. Determining the domination number of graphs can prove highly useful in solving many types of problems, and recent studies of dominating sets reflect this. We focus on describing various families of graphs in terms of bounds on the domination number. Although the computation of dominating sets for arbitrary graphs is an NP-complete problem, it is possible to compute certain bounds on the domination number for certain families of graphs. We examine families of graphs, specifically the family of grids, and determine the bounds on domination number for these families.

**Student Researcher: Andrew E. Snyder-Beattie**

**Major: Math/Economics**

**Research Mentor(s): Dr. Julius Esunge**

**Project Title: Are Gas Prices Random? A Stochastic Analysis of Energy Markets**

Geometric Brownian Motion (GBM) has been used to model the behavior of the world's energy markets, but some mathematicians posit that markets for oil are not well-modeled by stochastic processes with the Markov Property. We confirm that GBM may be a problematic assumption for modeling the price of oil and that a standard Ornstein-Uhlenbeck process does a better job, implying that changes in oil prices are somewhat determined by previous price changes. After controlling for OPEC quota periods, we investigate whether or not this behavior is a result of OPEC policy. Ultimately this study did not find sufficient evidence to conclude OPEC's quotas are responsible for mean reversion.

**Student Researcher: Lourdes Elena South**

**Major: Spanish/English**

**Research Mentor(s): Dr. Jeremy Larochelle**

**Project Title: Sirens, Amazons and Pink Dolphins: Gender Roles in Amazonia**

Amazonian Literature reflects the complex gender roles that are prominent in the mestizo communities of the Amazon river Basin. Through the study of *La Vorágine* by José Eustasio Rivera, one of the classic Latin American jungle novels, and *El Ojo Verde*, a collection of indigenous Amazonian cosmologies, one can see the patriarchal system that this region inherited from its European discoverers. In addition, the opportunity to conduct field research in the Peruvian Amazon, thanks to the UMW research grant, I was able to see the complex patriarchal roles in this society. While in the Peruvian Amazon, I had the opportunity to visit with the women of San Rafael, a rural village along the Amazon River Basin. In doing so I was able to see firsthand how integral the women are to the spiritual and daily survival of the community. My presentation will also include works by Ana Valera Tafur, one of the few contemporary female Amazonian poets. In her works I was able to see the vital connection between the female gender and the natural world. Women are tied to this natural world and due to patriarchal perspective of this society, they both occupy a subjugated role.

**Student Researcher: Lourdes Elena South**

**Major: Spanish/English**

**Research Mentor(s): Dr. Zachary Whalen**

**Project Title: The Three Empires Resurrected**

Alternative reality games, or transmedia games, are based on the concept of creating an immersive world that a player influences based on his or her actions in real time. This type of gaming is wholly interactive and is the future of gaming. Using concepts learned in Dr. Zachary Whalen's English 376MM: False and the Virtual class, Lourdes South and Sarah Kountz created and are currently implementing an original transmedia game. The purpose of their study is to see firsthand the social implications of creating and running a transmedia game involving players from all around the world. Their project also uses the framework developed by Dave Szulborski in his book "This Is Not a Game: A Guide to Alternate Reality Gaming." Lourdes and Sarah will document their own creative process for their transmedia game, as well as their results from this experience in an analytical and cohesive narrative.

**Student Researcher: Jeanine Tiara St. Lawrence and Tatiana Haywood**

**Major: Sociology**

**Research Mentor(s): Dr. Tracy Citeroni**

**Project Title: Attitudes Towards Marriage Readiness among College-Aged Females in Monogamous, Committed Relationships**

It is clear that dating relationships become significantly more meaningful and commitment-based for a number of young women during the "transitional" college years. For many females, a commitment-based relationship is one that is molded and finalized during college—the end goal being that of marriage. This "culture of marriage" among college-aged women has led us to question the idea of readiness. What compels young women to want to marry during or immediately following their college years? Why do some women feel that they are far from ready for such a commitment? All in all, we wish to explore all dimensions of marriage readiness, such as external factors, values, emotional investment, financial security and familial support, in order to address the ways in which females perceive marriage readiness within their own romantic relationships.

**Student Researcher: Tekla L. Taylor**

**Major: History**

**Research Mentor(s): Dr. Angela Pitts**

**Project Title: Perilous Ambiguity: The Cultural Meaning of Hermaphroditism in Antiquity**

When studying gender in the ancient world, there are two very important areas that have often been overlooked, and those are the cultural meaning and mythical place of those who were in-between. Essentially, what did it mean to occupy this strange position of fluid or indeterminate gender? This

discussion seeks to combine evidence found in myth, philosophical writings, and history as well the views espoused in modern scholarship in order to make sense of the cultural imagery which reveals the important place held by intersex and gender-variant individuals in antiquity.

**Student Researcher: Mary Catherine Thompson**

**Major: Chemistry**

**Research Mentor(s): Dr. L. Giancarlo**

**Project Title: Analysis of Copper from Indian Bone Ossuary**

This study aims to establish the date of a Native American Ossuary on Maryland's Eastern Shore. Secondary resting places for remains of multiple individuals, ossuaries often contain grave associations such as ceramics, beads, and metal pieces. The samples in this study are metal grave associations obtained from the Smithsonian Institution's Department of Anthropology through collaboration with archaeologist Dr. Carter C. Hudgins, director of preservation at the Drayton Hall historic site in South Carolina. The composition of the samples is being determined via inductively coupled plasma atomic emission spectroscopy: pure copper samples are assumed to be native to North America, whereas the presence of trace metals presumes copper mined in Europe. The composition of the copper grave associations will be used to help date the site because composition can be linked to certain production periods. Preliminary spectroscopic analysis reveals that three of the seven samples are most likely native copper; the remaining four are probably of European origin.

**Student Researcher: Annie L. Truslow**

**Major: Sociology**

**Research Mentor(s): Dr. Tracy Citeroni**

**Project Title: THE VIRGINAL BODY: A CROSS-CULTURAL PERSPECTIVE OF HYMENAL INTACTNESS AND SOCIALLY CONSTRUCTED NOTIONS OF VIRGINITY**

Many cultures share a common notion that the primary marker of female virginity is identified through the intact hymen. Belief in a normative standard for hymenal intactness and the perpetuated myth of virginity continue to dominate socio-cultural rhetoric pertaining to female sexuality. This occurs without regard to the fact that science has proven that there is no singularly specific, normative appearance of the hymen among women. Given the knowledge that there is no normative form of the hymen, notions of virginity are then socially constructed, resulting in various degrees of value, honor, and pressure being placed on the female virginal body. Social scientists and cultural theorists have played an active role in discovering how associating female virginity with the intact hymen serves to enforce stricter control over female sexuality, as well as to reaffirm a globally prevalent sexual double standard that disproportionately targets women. Although the ways in which individual societies operationalize their expectations of the female virginal body differ cross-culturally, the myth that the intact hymen is representative of virginity impacts the individual female body as well as the collective female experience of embodiment in remarkably similar ways across Latin America, Turkey, Jordan, South Africa, and the United States.

**Student Researcher: Sarah E. Tryon**

**Major: Biology**

**Research Mentor(s): Dr. Dianne Baker**

**Project Title: The effect of dietary fat on the expression of appetite hormones in zebrafish, *Danio rerio*.**

We hypothesized that dietary fat levels during juvenile development affect the central expression of the appetite-stimulating neurohormone ghrelin. To test this hypothesis, zebrafish were fed high fat (HF) or low fat (LF) diets from 5 weeks to 12 weeks post-fertilization. Total RNA was extracted from whole heads in fed and fasted conditions, and ghrelin mRNA levels were measured by quantitative PCR (qPCR) of synthesized cDNA, and normalized to GAPDH levels. We found that fish fed a LF diet had higher ghrelin mRNA levels than fish fed a HF diet, in fed conditions. To test whether fat levels during development have long-lasting effects on ghrelin expression, fish reared on high and low fat diets over the same period were all fed a HF diet for an additional 7 weeks, and ghrelin mRNA levels were

measured in fed fish. Ghrelin expression significantly differed between fish reared on LF and HF diets switched to HF diets as adults ( $p=0.05$ ). We conclude that dietary fat levels affect central ghrelin expression, and these effects are permanent. This project was funded by a UMW Undergraduate Research Award to Sarah Tryon.

**Student Researcher: Annie E. Unger**

**Major: International Affairs**

**Research Mentor(s): Dr. Gupta**

**Project Title: Benefits and Consequences of Creating a Monetary Union: A Comparison of the Debt Crises in Greece and Ireland**

This research project looks at the benefits and consequences to creating a monetary union. It analyzes the recent debt crises in Greece and Ireland and looks at what implications these situations could have for the eurozone as a whole. The eurozone is a group of countries that share a common currency, the Euro, and are governed by one body, the European Central Bank. In order to join the eurozone, countries must meet certain guidelines and agree to maintain certain monetary standards. However, standards that apply in larger economies, like those in Germany and France, may not be what is best for smaller economies, like those in Greece and Ireland. Different factors led to the debt crises in Greece and Ireland but both nations incurred so much debt that they were forced to take a bailout package from the EU and IMF. The European Central Bank must do a better job enforcing policy so that member states do not reach the exorbitant debt levels that Greece and Ireland did. They must also look at the standards they have in place and decide what reforms should be made in order to prevent these types of problems from arising in the future.

**Student Researcher: Kelsey L. Voss**

**Major: Biology**

**Research Mentor(s): Dr. Deborah O'Dell**

**Project Title: Identifying Target Genes in the ERR $\gamma$  Pathway Resulting from BPA Exposure in Breast Cancer**

Bisphenol A (BPA) is a xenoestrogen which has been shown to mimic estrogen both in vivo and in vitro. There are two main types of estrogen receptors, estrogen receptor  $\alpha$  (ER $\alpha$ ) and estrogen receptor  $\beta$  (ER $\beta$ ). An additional pathway by which BPA could act is via an estrogen related receptor (ERR), or by activating androgen receptors. BPA binds strongly to the estrogen related receptor  $\gamma$  (ERR $\gamma$ ); even more strongly than the estrogen receptors  $\alpha$  and  $\beta$ . However, the actual molecular pathway of the ERR $\gamma$  remains unclear. We suggest that a potential mechanism by which BPA can cause breast cancer in humans is by activating estrogen receptor pathways through the ERR $\gamma$ , resulting in the unregulated transcription of certain gene products. Fourteen experimental treatments will be made in which breast mammary epithelial cells will have either 1, 2 or all 3 receptors blocked. Cells will be divided into 2 groups, one will be exposed to BPA in culture medium the other to culture medium without BPA. RT-PCR will be used with a microarray to determine the activity levels of 84 different genes; some of these genes are pS2, c-fos, c-myc, c-jun, and cyclin D1. By comparing the gene activity in the control treatments to that found in the receptor block treatments, the microarray will identify any oncogenes that are being activated by BPA as well as any tumor suppressor genes that are being inactivated. This will allow us to infer a possible signaling cascade pathway resulting from BPA interaction with the various receptors.

**Student Researcher: Lindsay Jane Walker**

**Major: Geology**

**Research Mentor(s): Dr. Neil Tibert**

**Project Title: A Centennial Record of Paleosalinity Change in the Tidal Reaches of the Chesapeake Bay**

Microfossil paleoecological trends and oxygen isotope values observed in cores collected from the Rappahannock and Potomac Estuaries record evidence of changing salinity gradients in the tidal reaches of the Chesapeake Bay pre- and post-industrial revolution. Gravity and push cores from the Potomac

(134 cm) and Rappahannock (141 cm) estuaries were collected from the central and proximal estuarine zones, respectively. The lowermost microfossil associations in both cores comprise relative abundance alternations with respect to the ostracodes *Cyprideis salebrosa* and *Cytheromorpha* spp. The uppermost microfossil association gives way to an oligohaline assemblage of thecamoebians (*Diffugia* and *Centropyxis*), foraminifera (*Ammobaculites*), and freshwater ostracodes (*Darwinula stevensoni*). From the Potomac estuary,  $\delta^{18}\text{O}$  stable isotope values obtained from *Cyprideis salebrosa* range from -7.6 to -4.2 ‰ VPDB, and  $\delta^{18}\text{O}$  values from *Cytheromorpha fuscata* range from -8.9 to -3.2‰ VPDB. Three intervals of paleosalinity change are interpreted on the basis of changing ostracode assemblages and  $\delta^{18}\text{O}$  values. This hypothesis is corroborated by results of *C. salebrosa* sieve pore morphological analysis and  $\delta^{13}\text{C}$  values. Microfossil and oxygen isotope trends indicate a general recent trend towards freshening and deterioration of the salinity structure in both the Rappahannock and Potomac estuaries, and approximately corresponds to the mid-to-late 19th century. We attribute these trends to the combined influences of anthropogenic activity in the estuaries' watersheds, as well as natural short term climate fluctuations, possibly including the last vestiges of the Little Ice Age and prolonged droughts during the late 19th and early-to-middle 20 centuries.

**Student Researcher: Chelsea E. Wegner**

**Major: Environmental Science**

**Research Mentor(s): Dr. Ben Odhiambo Kisila**

**Project Title: Sedimentation Rates and Trace Metal Input History in Chincoteague Lagoon-Marsh System Derived from Pb-210 and Cs-137 Chronology**

Chincoteague Bay is a small coastal lagoon located on the Eastern Shores of Maryland and Virginia. The salt marshes are ecologically important to this system, which trap sediments to allow for landward accretion of the barrier island, protect the mainland from wave energy, filter run-off and provide habitats. Recent rapid population growth in Chincoteague is altering this watershed and therefore this study analyzes the impacts of modern sedimentation changes and the environmental evolution of this lagoon-marsh system. The results show Pb-210 and Cs-137 based sediment accumulation rates varied in the upper 8-10 cm from 0.22 g/cm<sup>2</sup>/yr to 0.26 g/cm<sup>2</sup>/yr and in the lower 10-24 cm from .02 g/cm<sup>2</sup>/yr to .06 g/cm<sup>2</sup>/yr, which appears to be a notable increase in sediment accumulation since the mid 1930's. It is possible that increasing numbers of storm events, increasing population rates in Chincoteague and the opening of the Ocean City Inlet in 1933, could have contributed to this change. Trace metal profiles of As, Cd, Cu, Pb and Zn while relatively low, have observable modern enrichments that are probably associated with increased sediment fluxes and anthropogenic related pollutants. Continued research and better management practices are needed to prevent any further degradation to this ecosystem.

**Student Researcher: Jonathan S. Williams**

**Major: Chemistry**

**Research Mentor(s): Prof. Charles M. Sharpless**

**Project Title: Exploring Direct Photolysis Mechanisms of Polycyclic Aromatic Hydrocarbons in Non-Polar Solvents**

Polycyclic aromatic hydrocarbons (PAHs) are toxic components of oil spills whose fate is often controlled through photochemical reactions. PAH photolysis mechanisms in hydrophobic media are not fully characterized, hampering efforts to predict their removal rates from oil in the event of a spill. One hypothesis is that singlet oxygen ( $^1\text{O}_2$ ) generated by excited state PAHs is an important intermediate that contributes to PAH photolysis. In order to test this hypothesis, we are studying whether PAHs undergo a self-sensitized photolysis mechanism involving  $^1\text{O}_2$ . We employed a  $^1\text{O}_2$  scavenger,  $\alpha$ -terpinene, to determine whether  $^1\text{O}_2$  is produced during irradiation of four PAHs: benzo[a]pyrene, benzo[e]pyrene, benz[a]anthracene, and chrysene. Loss of  $\alpha$ -terpinene in irradiated PAH mixtures revealed that  $^1\text{O}_2$  is sensitized in hexane. Additionally,  $^1\text{O}_2$  quantum yields were measured in hexane using a Stern-Völmer analysis, yielding previously unknown values for benzo[a]pyrene and benzo[e]pyrene at 0.84 and 0.70 mol Es<sup>-1</sup>, respectively. To determine if proposed self-sensitized mechanism was occurring, we investigated whether the direct photolysis quantum yield ( $\Phi_D$ ) was linearly dependent on PAH concentration as

predicted by our kinetic model. Experiments showed a non-linear decrease in  $\phi D$  with increasing concentration, suggesting that another mechanism is contributing to PAH photolysis in non-polar media.

**Student Researcher: Peter M. Wingrove**

**Major: Economics**

**Research Mentor(s): Dr. Rycroft**

**Project Title: Doing Well by Doing Good?: The Net Present Value of the Investment to Become a Doctor**

Continuing education after undergraduate studies is a costly proposition. This is especially true for medical school where the prospective student can expect to incur thousands of dollars of debt while foregoing many years of wages. This project uses a net present value (NPV) framework to analyze how valuable becoming a doctor is. Specifically, this paper seeks to compare the income streams from a variety of medical careers against the opportunity cost of not working immediately after an undergraduate degree is received. The income streams are first adjusted for expected inflation, expected growth, and taxes. The difference between these streams in each year is taken and then discounted. Summing these terms yields the NPV of entering that profession. This analysis concludes that NPV tends to be positive and of a few hundred-thousand dollar magnitude for most specifications of the model. Unsurprisingly, more competitive specialties usually have a higher NPV. NPV can become negative when the time period is short, the discount rate is unusually high, the tax code is very progressive, real salary growth is negative, or there is some combination of the preceding variables.

**Student Researcher: Nathaniel Winston**

**Major: Geology**

**Research Mentor(s): Dr. Neil Tibert**

**Project Title: FORAMINIFERA POPULATIONS AND TRACE METAL CONCENTRATION TRENDS IN THE POTOMAC ESTUARY**

Foraminifera populations, trace metal concentrations and Cesium isotope dating suggest changes in environmental conditions in the tidal region of the Potomac estuary near Quantico Marine Corps Base over the last 50 to 60 years. Microfossil population changes may have been influenced by an influx of anthropogenic activity in the Quantico area, such as, the increased runoff of Lead rich Light Non-Aqueous Phase Liquids (LNAPL), and higher sedimentation rates from large amounts of deforestation and construction in the area. To test this hypothesis, a sediment core was taken from the Potomac River, just south of the Quantico Military Base. Microfossil populations were calculated in 1 cm intervals throughout the upmost 65 cm of the core. The Microfossil populations were then plotted and compared to trace metal concentration (Pb, Cu, Cr, Ni) taken at discreet depths using flame atomic absorbance spectrometry, and previously calculated sedimentation rates for the Potomac River basin. Pb concentrations that transition from background values to higher values at ~35cm correspond to a substantial decrease in Microfossil populations at the same depths. Trends in microfossil populations and trace metal concentrations indicate a correlation between anthropogenic surface activity and water quality during the 1950's and 60's in the Potomac River south of the Quantico Military Base.

**Student Researcher: Patrick Wood**

**Major: Chemistry**

**Research Mentor(s): Dr. Katherine N. Crowder**

**Project Title: Modification of Gold Electrode Surfaces with a Ruthenium Based Alkanethiol for the Reduction of CO<sub>2</sub>**

Carbon dioxide is a natural byproduct of human respiration that can be chemically reduced to a non-toxic byproduct. Surface modification with alkanethiols allows a CO<sub>2</sub> reducing electrocatalyst to be directly attached to a gold surface. The attachment of dichlorotricarbonylruthenium(II) to a bipyridine ligand can act as an appropriate CO<sub>2</sub> reducing substance. Synthesis of [Ru(4-methyl-4'-10-mercaptodecyl-2,2'-bipyridyl)(CO)<sub>2</sub>(Cl)<sub>2</sub>] was confirmed by Infrared and NMR spectroscopy. The appearance of bands at 2052.8 and 1990.2 cm<sup>-1</sup> along with 2928.9 and 2585.9 cm<sup>-1</sup> indicate carbonyl groups attached to a metal



on a long chain alkane. NMR spectroscopy confirms the attachment of a ruthenium complex to the alkanethiol with the presence of 3 different aromatic protons along with a series of aliphatic protons. Surface modification requires immersion of the gold electrode in a solution of dichloromethane for 48 hours and was confirmed by specular reflectance IR spectroscopy. The appearance of bands around 2922  $\text{cm}^{-1}$  help to confirm the attachment of an alkanethiol along with the strong carbonyl-metal bands around 2000  $\text{cm}^{-1}$ .

**Student Researcher: Alexandra I. Zelin**

**Major: Psychology**

**Research Mentor(s): Dr. Mindy Erchull**

**Project Title: Is Everybody Doing It? Comfort and Perceived Comfort in the College Freshman Female Population**

Descriptive norms are created based on people's perceptions of how often an act occurs. Injunctive norms are judgments made from information gained through descriptive norms. These norms have been studied in relation to alcohol use among college students. Research shows that college students assume that other students have consumed more alcohol at parties than they actually have, thereby increasing the likelihood that students will drink more due to peer pressure. In terms of sexual practices, there has been little research on whether developing descriptive and injunctive norms about sexuality are commonplace for the average female college freshman. The current research seeks to determine whether female heterosexual college freshman perceive themselves to be more promiscuous or more conservative both in thoughts and sexual acts when compared to other female heterosexual college freshmen. We anticipate that the average female heterosexual college freshman will be perceived as having participated in a wider array of sexual practices than is actually the case. We believe further investigation of this concept is important because accurate knowledge of both sexual behaviors, and misperceptions of those behaviors, may reduce pressure on female heterosexual college freshman to engage in sexual acts simply because fellow classmates are participating.

## Other Campus Research Celebrations:

### **Forum on Undergraduate Research in Women's Studies**

March 23, 2011, Red Room of the Woodard Campus Center  
Outstanding Research Award presented to: Alexandra Zelin, "Is Everybody Doing It?  
Comfort and Perceived Comfort in the College Freshman Female Population,"

### **Psi Chi Research Symposium**

April 22, 2011, 5:30pm  
Chandler Hall, Room 102

### **History and American Studies symposium**

Friday, April 22, 2011, 8:00 am-3:00 pm  
Woodard Campus Center

### **Student Showcase**

Saturday, April 2, 2011, 11:15 am – 2:00 pm  
Jepson Alumni Executive Center



The Council on Undergraduate Research hosts a Registry of Undergraduate Researchers. The purpose of this registry is to facilitate matchmaking between undergraduates who have research experience and a desire to pursue an advanced degree, with graduate schools seeking high quality students who are well prepared for research. The Registry is open to students and graduate schools in the fields of Anthropology/Archaeology, Arts/Humanities, Biology/Biochemistry, Business, Chemistry/Biochemistry, Economics, Education, Engineering, English and Linguistics, Environmental Studies, Geosciences, Health Professions, History, Journalism and Communications, Mathematics/Computer Science, Physics/ Astronomy, Political Science, Psychology, Social Work and Sociology.

Any undergraduate may go to <https://www.cur.org/ugreg/reg1.asp> to fill out a simple curriculum vitae form. There is no charge to the student or the student's institution and records will be made available to bona fide Graduate Schools that contract with CUR for this service. Organizations or companies seeking the students' information for other marketing purposes will not be granted access. Graduate School representatives may contact students to invite applications or visits to the campus and laboratory, or to share information about their research programs and financial support opportunities. Be sure to include a statement of your research interests, as this will be important for making the match. For more information or to login if you've already created a profile, please visit: <http://www.cur.org/ugreg/>.

# CALL FOR PAPERS

Submit your undergraduate papers for selection to

## **METAMORPHOSIS**

### **A JOURNAL OF UNDERGRADUATE RESEARCH AND CREATIVE ACTIVITY**

**Due: May 1, 2011**

**Email to: Ana Chichester, [achiches@umw.edu](mailto:achiches@umw.edu)**

Style Sheet

---

All papers should include the following in MS Word format:

1. Cover page with the following information

Title  
Author's Name  
Academic Major  
Institution

2. A 200-250 word abstract that will be used to direct readers to the full text.
3. Single-spaced with 1" margins, 12 point font, 10 single-spaced pages max.
4. All references submitted as end notes (no footnotes).

\*<http://www.coplac.org/metamorphosis/metamorphosis.php>

**Undergraduate Student Research & Creativity Day 2011**  
Dr. Ana Chichester, Professor and Associate Dean, College of Arts and Sciences  
Ms. Beth Searcy, Assistant Dean, Academic Services

