



Winthrop University

UNDERGRADUATE  
SCHOLARSHIP

College of Arts and Sciences

2009  
BOOK OF  
ABSTRACTS



# Introduction

“I WAS BOLD IN THE PURSUIT OF KNOWLEDGE, NEVER FEARING TO FOLLOW TRUTH AND REASON TO WHATEVER RESULTS THEY LED, AND BEARDING EVERY AUTHORITY WHICH STOOD IN THEIR WAY.”

**-THOMAS JEFFERSON**

The College of Arts and Sciences proudly presents the seventh *Book of Abstracts*, highlighting the undergraduate scholarship conducted by students in collaboration with faculty mentors. This collection of abstracts represents many hours of scholarly activity in which students further developed their research, critical thinking, and writing skills and engaged in learning well beyond the classroom.

We congratulate the students and their faculty mentors for the quality of their work and their willingness to share it with the academic community through publications in refereed journals and presentations at regional, national, and international meetings. We also thank Evan Adams for editing the abstracts and Chris Richter, a visual communication design major, for designing the cover and producing the book.

Dr. Dwight D. Dimaculangan  
*Director of Undergraduate Research*  
*College of Arts and Sciences*

Dr. Debra C. Boyd  
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April 2009





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# Winthrop University Undergraduate Research Initiative

## COLLEGE OF ARTS AND SCIENCES

The Winthrop University Undergraduate Research Initiative (WUURI) supports a student-centered learning environment that fosters student research, scholarship, and creative activities. The Initiative encourages students and faculty mentors to collaborate in the design and implementation of projects and the dissemination of results.

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# Publication Abstracts

## MEASURING THEODICY: INDIVIDUAL DIFFERENCES IN THE PERCEPTION OF DIVINE INTERVENTION

*Published in Pastoral Psychology, 58 (1), 2009 (Daugherty, T.K., West, A.M., Williams, M.C., & Brockman, J.M.)*

**Aimee West, 2008**  
**Melissa Williams, 2007**

*Department of Psychology*  
*Faculty Mentor:*  
*Tim Daugherty, Ph.D.*

The attribution of control to God may have particularly interesting psychological properties. Theodicy refers to the perception of God controlling history - even the minutiae of daily events. The current study examines the psychometric properties of a new instrument, the Theodicy Scale. Results support the reliability of the brief scale when administered to college students, and some evidence is provided suggesting construct validation. Theodicy appears to represent a unitary construct, and scores vary independent of social desirability bias. The absence of a relationship between Theodicy scores and simulated medical advice raises questions to be addressed in future research.

## HISPANIC/LATINO/MULTIPLE-HISPANIC SUICIDAL BEHAVIORS: DEPRESSION AND BODY-IMAGE

*Submitted for publication in Hispanic Journal of Behavioral Sciences, March 2009*

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009*

**John Greer, 2010**

The Hispanic/Latino/Multiple-Hispanic adolescent population is growing in the US. Yet little is known about suicidal behaviors among this population. Adolescents



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*Department of Social Work.*

are a vulnerable population and more information is needed in relation to factors that contribute to these suicidal behaviors. This article aims to provide information in regard to the relationship between suicidal behaviors, depression, and body image among Hispanic/Latino/Multiple-Hispanic adolescents. Using a sub-sample of 3,383 high school students, we found statistical associations between suicidal behaviors, feelings of sadness (depressed mood), perceptions of being overweight, and taking pills to lose weight. We present our findings to inform the helping professionals who interact with Hispanic/Latino/Multiple-Hispanic adolescents in the school system and other helping venues.

## MONITORING THE EARLIEST AMYLOID-BETA OLIGOMERS VIA QUANTIZED PHOTOBLEACHING OF DYE-LABELED PEPTIDES

*Published in Analytical Biochemistry, Volume 382, 2008 (Dukes, K., Rodenberg, C., and Lammi, R.)*  
*Supported by an NIH Grant from the National Center for Research Resources for SC-INBRE and a Winthrop University Research Council Grant*

**Cassandra Rodenberg, 2009**  
**Kyle Dukes, 2008**

*Department of Chemistry,*  
*Physics, and Geology*  
*Faculty Mentor:*  
*Robin Lammi, Ph.D.*

Misfolding and aggregation of amyloid-beta peptide (Abeta) are widely recognized as causative events in Alzheimer's disease (AD). Contrary to earlier hypotheses, recent studies have identified soluble Abeta oligomers as the pathogenic agents and documented neurodegenerative effects from species as small as dimers and trimers. As such, detection and characterization of the earliest Abeta oligomers is paramount to understanding, preventing and treating AD. We have exploited quantized photobleaching from individual dye-labeled Abeta peptides to characterize monomers and small oligomers tethered to the surface of functionalized cover slips. In this way, we have directly determined reproducible distributions of peptide species in various sample environments. Fresh samples (30 pM peptide) at pH 7.4 consist primarily of monomers and dimers. Both acidic conditions (pH 5.8) and zinc coordination promote greater association, which is further increased in samples prepared from more concentrated stocks. Acid- or zinc-promoted association is largely prevented and/or reversed by addition of the beta-sheet breaker peptide iA $\beta$ 5 or the chelator clioquinol, respectively. These results are qualitatively consistent with bulk-solution studies of Abeta40, and demonstrate a powerful approach for definitively characterizing Abeta oligomers. The methodology utilized here holds promise for assessing aggregation promoters and inhibitors and investigating peptide-association in its earliest stages.

# WRENCHING THINGS AWRY: FROM “EXPLICATION DE TEXTE” TO CYBERTEXT IN THE COLLEGE LITERATURE CLASSROOM

*Published in the Journal of Ubiquitous Learning, 2009 (Koster, J., Blumenschine, S., Folden, W., Hill, E., Mahan, R., Sigmon, S., Smith, C., Stone, K., and Wasson, M.)*

*Presented at the Ubiquitous Learning Conference, Chicago, Ill., November 2008*

**Sara Jane Blumenschine, 2010**

**Eric W. Hill, 2010**

**Randall H. Mahan, Jr., 2010**

**Samantha A. Sigmon, 2009**

**Christopher Smith, 2009**

**Kevin Stone, 2010**

**Megan Wasson, 2009**


*Department of English*

*Faculty Mentor:*

*Josephine Koster, Ph.D.*

As literature instructors face classrooms full of digital natives (Prensky 2001), we must interrogate the methods used to teach traditional literary analysis and evaluate whether they may be enhanced or even supplanted by using digital technologies to supplement traditional print-based assignments. Our collaborative paper details an experiment in an upper division literature class to analyze and evaluate the strengths and weaknesses of the traditional literature class assignment to “explicate the meaning of a poem” by having students create parallel versions—one a traditional, print-based essay and the other a multimedia presentation using Microsoft PhotoStory 3. In this paper, the instructor (Koster) delineates the purpose and requirement of the assignment; a majority of the students completing the assignment (Blumenschine, Folden, Hill, Mahan, Sigmon, Smith, Stone, Wasson) contribute their analyses of composing in these different modalities; and Koster draws preliminary conclusions based

on the class’s overall results in completing the assignment. We argue that while the traditional print-based text allows closer attention to literary language and form, multi-media texts allow students to examine the nuances of tone, diction, and imagery in richer and more imaginative ways by choosing visual and auditory reinforcement of their interpretative scripts. In addition, we argue that the addition of the students’ own voices (as narrators) allows them to develop and portray an authorial ethos in ways the traditional “student writing to teacher” print essay does not. Thus, while both forms of the assignment have great value for students of literature, the multimodal text allows more opportunities to demonstrate synthetic skills and to facilitate deep learning (Marton & Saljo 1976). We recommend that students in literary analysis classes be given the opportunity to explore the possibilities both kinds of assignments offer for learning. Materials from the assignment, including samples of student print and digital work, is available for review at <http://faculty.winthrop.edu/kosterj/scholarly/ubiquitous.htm>.



# Honors Thesis Abstracts

## THE LORD'S DAY RESISTANCE ARMY OF UGANDA

**Haily Jo Davis, 2008**

*Department of Political Science*

*Honors Thesis Committee:*

*Christopher Van Aller, Ph.D.*

*Virginia Williams, Ph.D.*

*April Gordon, Ph.D.*

This paper explores the Lord's Day Resistance Army of Uganda, a group that continues to intimidate and kidnap the citizens of that country. It reviews the complicated political history of the area, such as its problems with unstable governments presiding over ethnic divisions in the societies involved. The paper examines both the domestic and international attempts to both negotiate and prosecute this non-state actor.

## THE AFFECTS OF ARTISTIC TRAINING ON A PERSON'S WORLD VIEW

*Presented at the Southern Regional Honors Conference, St. Petersburg, Fla., March 2009*

**Chris Osborne, 2009**

*Department of Psychology*

*Honors Thesis Committee:*

*Merry Sleigh, Ph.D.*

*Laura Ullrich, Ph.D.*

*Kelly James, Ph.D.*

The current study assessed how a young adult's artistic experience related to his worldview. Participants completed the Myers-Briggs Personality Inventory, as well as questions to assess their background. Participants then viewed three images, each for 60 seconds. One image was a young man skateboarding, one was an aerial view of a landscape, and one was a cemetery gate. While viewing the image, participants were asked to describe what they saw. Descriptions were coded for complexity, creativity, and level of detail. Results revealed that women were more likely to notice detail than men; there were no other gender differences. Years of visual art experience resulted in greater attention to the

color scheme of the images. Participants who rated high on 'Sensing' were more likely to respond to the images with complexity and attention to color. Other personality variables, participants' race and self-reported GPA did not predict participants' responses to the images. Participants who considered themselves to be creative did not produce more creative responses than others. Similarly, participants' self-perceptions of writing skill did not relate to their writing abilities; however, the grades participants reported earning on papers predicted their writing abilities. Participants who enjoyed the process of writing produced some of the most complex written responses. In sum, how participants view the world seems to relate to a myriad of factors.

## DO POLITICAL CAMPAIGNS TRULY MATTER? US PRESIDENTIAL ELECTIONS UNDER REVIEW

*Presented at the Southern Regional Honors Conference, St. Petersburg, Fla.,  
March 2009 and Winthrop University Honors Thesis Colloquium, 2009*

**Candace Marie Porter, 2009**

*Department of Political Science  
Honors Thesis Committee:  
Scott H. Huffmon, Ph.D.  
Lynne K. Dunn, Ph.D.  
Karen M. Kedrowski, Ph.D.*

Most see the United States (US) presidential election as the focal point of American politics. Because of this, the political campaigns surrounding the presidential elections involve overwhelming amounts of media attention, money, time, and energy, leading many people to naturally assume that political campaigns decide the election's outcome. Even with this common belief, many election analysts argue that election results can be predicted using external pre-campaign conditions: incumbent poll ratings, national economic conditions, national political conditions, international events, and party loyalty. If the argument made by political analysts is true, presidential campaigns may merely exist to highlight the current conditions which move voters toward a largely preordained outcome. Though US presidential campaigns are important, numerous questions surround their existence; the most fundamental being: Do US presidential campaigns significantly impact election outcomes? This manuscript reviews the corpus of research regarding US presidential elections from 1992 through 2008 specifically focusing on campaign events and national conditions that contributed to electoral outcomes and delves more deeply into campaign decision-making with interviews from those who have worked on both Republican and Democratic campaigns. To complement the review of existing research and campaign insider insight, this research includes a political opinion survey (both consisting of, and limited by, a large convenience sample of those over the age of 18), to determine the perceived impact of political campaigns on the average American's voting decision.

# U.S. FOREIGN AID: TURNING THE FOCUS FROM U.S. FOREIGN INTEREST TO SUSTAINABLE DEVELOPMENT

*Presented at the Southern Regional Honors Conference, St. Petersburg, Fla., March 2009*

**Lauren Bohn, 2009**

*Department of Sociology  
and Anthropology*

*Honors Thesis Committee:*

*April Gordon, Ph.D.*

*Christopher Van Aller, Ph.D.*

*Virginia Williams, Ph.D.*

Every year the United States administers foreign aid to developing countries in the form of grants, loans, food, expert advice, and in some cases, military assistance. To what extent, however, does U.S. foreign aid assist the recipient country, and to what extent does it pursue its own foreign interests? For foreign aid to be most affective, its design and implementation is just as important as the amount we give. Unfortunately, because this funding is attached to U.S. interests, the amount of funding we give often does not provide recipient countries with the quality of aid they need. This study will investigate the design of U.S. foreign aid policies and the effects of its implementation on both the donor and the recipient countries. How can aid offer the recipient country tools for improving government, health, education and security while also permitting that country more autonomy in meeting its needs? To what extent could the sustained independence of developing countries strengthen and secure health, peace, and stability throughout global relations?

# THE EFFECTS OF INTERNATIONAL FINANCIAL INSTITUTIONS ON AFRICA'S POLITICAL ECONOMY

**Linda Atiase, 2009**

*Department of Political Science*

*Honors Thesis Committee:*

*Christopher Van Aller, Ph.D.*

*April Gordon, Ph.D.*

*Jennifer Disney, Ph.D.*

Post-colonial Africa has adopted a series of economic and political principles based on the policies of international financial institutions such as the International Monetary Fund and World Bank. These products of the Bretton Woods Conference are Africa's major lenders, and thus play a role in the shaping and development of its political economy. Given that Africa's increasing debt burden has a negative effect on its sustainable development and ability to compete in the global market, it is essential to investigate the effectiveness of Africa's current relationship with these financial institutions. The African nations of Ghana, Ethiopia and South Africa serve as case studies. Due to the foundations and characteristics of these institutions, it is suggested that the relationship hinders rather than helps Africa's rate of

progress. This evaluation is useful for assessing changes that can be made to financial assistance and development patterns across the continent.

## POTENTIAL INVOLVEMENT OF HMGA PROTEINS IN THE MOLECULAR PATHWAYS LEADING TO COLON CANCER

*Presented at the Southern Regional Honors Conference, St. Petersburg, Fla., March 2009  
(Pitchford, A., Bush, B., and Sumter, T.)*

**Abigail Pitchford, 2009**

*Department of Chemistry,  
Physics, and Geology*

*Honors Thesis Committee:*

*Takita Sumter, Ph.D.*

*Laura Glasscock, Ph.D.*

*Robin Lammi, Ph.D.*

The High Mobility Group A proteins are a family of four ancillary transcription factors whose specific role in cancer is beginning to emerge. Within the family, three are products of various splicing combinations of the *hmg1*: HMGA1a, HMGA1b, HMGA1c; the fourth, HMGA2, is translated from a separate gene, *hmg2*. These proteins have been found to be important in normal cellular processes like transcriptional regulation and cellular growth during embryogenesis while also having functional roles in viral integration, neoplastic transformation, and metastasis. However, the overlap in functions of the HMGA protein family is not clearly understood. As a downstream target of the well-studied oncogene, *cmyc*, HMGA1 is a target of interest in developing novel cancer therapies. Our lab is interested in understanding the involvement of HMGA proteins in molecular pathways leading to colorectal cancer. A common hallmark of colon cancer is truncation of the *Apc* tumor suppressor gene. Because HMGA proteins are increased in a variety of cancers and because *c-Myc* is activated as a result of *Apc* mutations, we hypothesized that members of the HMGA protein family may play a critical role in the development of colon cancer. Our initial observations show a direct correlation between the expression of HMGA1 and *Apc* function. To further investigate this finding, this paper aims to 1) determine if the upregulation of HMGA1 is *c-Myc* dependent and to 2) determine if this involvement in colon cancer extends to other HMGA family members. Our studies will be completed using mouse cancer tissues as well as colon cancer cell lines. It is likely that the results of these studies will contribute to our understanding of the mechanism by which the HMGA family causes cancer thus providing a base for the development of more effective and specific drug therapies.

# IS LEGALIZED ABORTION A VIOLATION OF AN INDIVIDUAL'S CIVIL LIBERTIES?: AN EXPLORATION OF ROE V. WADE IN TODAY'S SOCIETY

*Presented at the Southern Regional Honors Conference, St. Petersburg, Fla., March 2009*

**Rachel Heidenberg, 2010**

*Department of Political Science*

*Honors Thesis Committee:*

*Michael Lipscomb, Ph.D.*

*Kathy Lyon, Ph.D.*

*Timothy Boylan, Ph.D.*

*Kelly James, Ph.D.*

This paper will explore the history of abortion in the United States beginning with the pivotal Supreme Court decision *Roe v. Wade* until present day. This exploration will include a description and analysis of the current laws concerning abortion. These laws, articulated by the decision of *Roe v. Wade*, will be examined, in comparison to decisions of previous cases, for specific constitutional violations of an individual's guarantees to privacy and property rights as outlined by Amendments Nine and Fourteen of the United States Constitution. Furthermore, if these laws are determined to be unconstitutional, this paper will examine the justifiability of these violations because of the arguably positive impact of abortion on society. Additionally, the laws concerning abortion will be examined to determine their appropriateness in today's society, regardless if they are determined to be Constitutional violations.



## Meeting Abstracts

### EDUCATING PSYCHOLOGY STUDENTS FOR PERSONAL AND SOCIAL RESPONSIBILITY

*Presented at the Annual Meeting of the South Carolina Psychological Association,  
Myrtle Beach, S.C., April 2009*

*Supported by an Association of American Colleges and Universities Core Commitments Grant*

**Bailey Lemmon, 2010**

*Department of Psychology*

*Faculty Mentors:*

*Tim Daugherty, Ph.D.*

*Lisa Johnson, Ph.D.*

The Association of American Colleges and Universities (AAC&U) has identified personal and social responsibility as critical though neglected outcomes of undergraduate education. This presentation will explore how to infuse the undergraduate psychology curriculum with experiences that better prepare students for the unscripted challenges of post baccalaureate citizenship.

### GENDER AND THE PUBLIC SPEAKERSHIP: NEWS MEDIA COVERAGE OF SPEAKER NANCY PELOSI

*Paper presented at the Southern Political Science Association meeting, New Orleans, La., January 2009  
and the South Carolina Political Science Association Meeting, Greenville, S.C., February 2009*

*(Gower, R. and Kedrowski, K.)*

*Supported by the Carrie Chapman Catt Award for Research on Women and Politics from the Catt Center at the University of Iowa*

**Rachel Gower, 2009**

Starting with Speaker Tip O'Neill, speakers of the House of Representatives have



*Department of Political Science*

*Faculty Mentor:  
Karen M. Kedrowski, Ph.D.*

received substantial news coverage, a phenomenon called “the public Speakership.” This project will compare the media coverage of Speaker Nancy Pelosi to her predecessors to determine how Pelosi’s “public speakership” compares to them. Moreover, news coverage of women members of Congress often focuses on their sex, and/or their interest in traditional women’s issues. Therefore, this study also includes a content analysis of Pelosi’s news coverage in four television networks and three national newspapers to determine whether it is characterized by references to Pelosi’s sex or includes gendered themes. We found that Pelosi’s media coverage is greater than most of her predecessors, with the exception of Newt Gingrich. The coverage includes references to traditional women’s issues and other gendered themes, in part because Pelosi makes these references. However, they do not dominate coverage, and they wane over time. This study is significant in the election of the first woman Speaker and is a unique opportunity to study gender dynamics in the media coverage of congressional leaders.

## A MARXIST PERSPECTIVE ON THE PICTURE OF DORIAN GRAY

*Presented at the Winthrop University Department of English Undergraduate/Graduate Research Conference, February 2009*

**Sally Shader, 2009**

*Department of English  
Faculty Mentor:  
Leslie Bickford, Ph.D.*

This paper seeks to readdress the treatment of class hierarchy in Oscar Wilde’s controversial lone novel *The Picture of Dorian Gray*. Although the majority of the action in the novel takes place in settings familiar to high class society, glimpses into the lives of common, lower class individuals come up quite often. In fact, while *The Picture of Dorian Gray* may seem to be Wilde’s whole-hearted reinforcement of capitalist class hierarchy in Victorian England, a closer look reveals that the novel highlights the horrid hypocrisy and corruption found in the upper echelons of society by utilizing caricatured versions of the lower classes as seen through the eyes of the bourgeoisie. A Marxist reading of the novel thus questions whether or not Wilde actively sought to criticize the civilized society of dandies of which he was a member. The treatment of the working classes similarly asks for interpretation, as basically no critics have seen fit to tackle this novel from a decidedly Marxist perspective. The critical essays thus far composed on *Dorian Gray* have analyzed the novel from many approaches, but a devotion to the rather obvious class stratification has yet to be explored. The few critics who have chosen to tackle economics, class struggle, or even simply the lower classes

tend to brush off the topic by reinforcing Wilde's incompetence in addressing these issues. The fact that critics have been writing Wilde off as an insensitive member of the aristocracy with not so much as an opinion, other than revulsion, of the poorer classes, is shocking. Wilde writes about what he knows, and that is the charming, frivolous, yet often horribly corrupt lifestyle of the wealthy dandy. Yet, by reading his descriptions of the lower classes in *Dorian Gray* with his anti-capitalist sentiments in mind, it becomes hard to believe that Wilde is not seeking to unearth the hypocrisy of his own class.

## DEVELOPMENT OF AN HPLC-F METHOD FOR THE DETECTION OF MELATONIN IN BIOLOGICAL SAMPLES

*Presented at the Annual Meeting of the South Carolina Academy of Sciences, Columbia, S.C., April 2009*

**Daniel Stanton, 2009**

*Department of Chemistry,*

*Physics, and Geology*

*Department of Biology*

*Faculty Mentors:*

*Cliff Calloway, Ph.D.*

*Julian Smith, Ph.D.*

Melatonin has been described as an almost ubiquitous hormone in living systems, including animals and plants. Small amounts of melatonin have been shown to be present in grape skins and wines. It has been associated with regulating circadian and diurnal rhythms and exhibits anti-oxidant properties, similar to vitamin C. Anti-oxidants like melatonin have been associated with such phenomena as the so-called "French paradox" (a high-fat cuisine yet low incidence of cardiovascular disease). In triclad flatworms (Platyhelminthes, Rhabditophora), melatonin suppresses asexual reproduction. It has been suggested that melatonin's most primitive function is to act as a scavenger of free-radicals. Melatonin exhibits fluorescence spectroscopic properties, which is often used as a detection method due to the selective nature of this property. In this study we develop and validate an analytical HPLC method using fluorescence detection for melatonin in *Stenostomum virginianum* (Platyhelminthes, Catenulida). We calculated the average amount of melatonin per worm and analyzed the worms for diurnal variance in levels present at the time of death. We then use this data to create a biological production clock indicative of *S. virginianum* that can be compared to other species production clocks.

# THE ROLE OF MELATONIN IN THE CELLULAR PROCESSES IN THE SUPPRESSION OF ASEXUAL REPRODUCTION IN STENOSTOMUM VIRGINIANUM (PLATYHELMINTHES, CATENULIDA)

*Presented at the Society for Integrative and Comparative Biology, Boston, Mass., January 2009*

*(Stanton, D. and Smith, J.)*

*Supported by funds from the Winthrop University Research Council*

**Daniel Stanton, 2009**

*Department of Biology*

*Faculty Mentors:*

*Julian Smith, Ph.D.*

Melatonin is a naturally occurring hormone responsible for diurnal activity in organisms ranging from single-celled algae to humans. We found that a 0.1mM concentration of exogenously applied melatonin suppressed asexual fissioning in *Stenostomum virginianum* ( $p < 0.05$ ). These results are consistent with data from triclad flatworms. At present, it is unclear how melatonin suppresses asexual reproduction. The suppression may be caused by a down-regulation of mitosis, an up-regulation of apoptosis, or by a combination of the two. We have examined the effect of melatonin on the mitotic rate of *S. virginianum*. Preliminary data show that exogenously applied melatonin does not appear to inhibit mitosis. We will present data on the effects of melatonin on apoptosis. Further research will allow for a better understanding of how melatonin affects the cellular cycle and influences biological activities in an organism.

# EFFECTS OF WETLAND ESTABLISHMENT ON SPECIES RICHNESS OF AQUATIC INSECTS

*Presented at Winthrop University's Biology Department Seminar Series, April 2009*

**Ginger N. Devinney, 2009**

*Department of Biology*

*Faculty Mentor:*

*Paula L. Mitchell, Ph.D.*

The Winthrop Wetland was established in response to a mandate by South Carolina Department of Health and Environmental Control. The Rock Hill School District had plans to build a third high school, South Pointe High School, in Rock Hill, SC. The land where this school was to be built was located on a native Piedmont wetland. South Carolina DHEC required the

school district to fund and establish a wetland at another location. The Rock Hill School District in collaboration with Winthrop University established the Winthrop Wetland in the summer of 2004. Plants that were native to the Piedmont wetland were planted at the new wetland location. The establishment of the wetland was predicted to increase diversity at the Winthrop Lake area. Three Orders (Odonata, Coleoptera, and Hemiptera) including eight families of aquatic insects were used in the comparison of species richness before and after the wetland establishment. Specimens of aquatic insects from summer of 2000, summer and fall of 2003, summer and fall of 2005, summer of 2007 and summer 2008 were obtained from student collections from Biology 304. Additional specimens were collected from August to November 2008. Specimens were identified to species using published keys. Results indicate that the diversity of Odonata has increased over time with the establishment of the wetland. The diversity of Coleoptera and Hemiptera has stayed the same. This could be due to a small sample size of Coleoptera and Hemiptera. The purpose of this study was to establish an initial base line data set for comparison with changes as the Winthrop Wetland matures.

## OPTIMIZATION OF A “ONE-POT” CONVERSION OF ARYLAMINES TO SYMMETRICAL BIARYLS

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009*

**S. Emily Conyers, 2009**

*Department of Chemistry,*

*Physics, and Geology*

*Faculty Mentor:*

*James Hanna, Ph.D.*

The biaryl structural unit is found in many types of pharmaceuticals, including those that are effective against tumors, hypertension, and atherosclerosis. In fact, the biphenyl unit is considered a “privileged substructure” for protein binding and is found in 4.3% of all known drugs. The biaryl unit is also found in a number of natural products, conducting polymers, and optically active ligands for asymmetric synthesis. Symmetrical biaryls are traditionally made by the Ullmann reaction, but the high temperatures and stoichiometric copper which are typically required limit its usefulness as a general synthetic method. Recent research conducted in our laboratory has shown that the palladium-catalyzed homocoupling of arenediazonium tetrafluoroborates is a mild alternative to the Ullmann reaction. However, since diazonium salts containing water-solubilizing groups are usually difficult to isolate and heterocyclic diazonium salts tend to be difficult to work with due to their low decomposition temperatures, the need to isolate the arenediazonium salt potentially limited the generality of the method. Because of this potential limitation, the synthesis of symmetrical

biaryls directly from an arylamine starting material has been investigated. Using the reaction of p-bromoaniline as a model system for optimization studies, it has been determined that 4,4'-dibromobiphenyl can be produced in yields up to ~65% from p-bromoaniline upon treatment with an alkyl nitrite, strong acid and a catalytic amount of palladium acetate in methanol solvent. Further optimization studies are currently underway in our laboratory.

## PALLADIUM CATALYZED HOMOCOUPLING OF ARENEDIAZONIUM SALTS

*Presented at the Southeastern Regional Meeting of the American Chemical Society, Nashville, Tenn., November 2008 (McClellan, J. L. and Hanna, J. M., Jr)*

**Joshua L. McClellan, 2009**

*Department of Chemistry,  
Physics, and Geology  
Faculty Mentor:  
James Hanna, Ph.D.*

The synthesis of symmetrical biaryls is important in organic chemistry since the biaryl unit is found in many pharmaceuticals, conducting polymers and natural products. In our laboratory, we have developed a viable palladium-catalyzed route to symmetrical biaryls from arenediazonium salts. However, yields are not always high due to the formation of by-products, primarily the reduced diazonium salt and the anisole resulting from reaction of the diazonium salt with methanol solvent. Therefore, in the hope that biaryl selectivity could be improved, we began a kinetic investigation of this reaction to determine (1) the kinetic order with respect to diazonium salt and palladium acetate, and (2) quantify the effect of substitution on the diazonium salt by plotting the rate of appearance of the products vs. the Hammett substituent effect constant. We developed a simple protocol for determining the reaction kinetics of a model homocoupling reaction in which aliquots of the reaction were taken at regular intervals and quenched into alkaline H-acid solution, forming a red-purple dye. The dye was analyzed by visible spectroscopy to determine the concentration of diazonium salt, then extracted with dichloromethane and analyzed by GC (using dodecane as the internal standard) to determine the concentration of the products. This allowed the time dependence of both the disappearance of the arenediazonium salt as well the appearance of the products to be measured. Our preliminary results indicate that the reaction requires a significant induction period. In addition, these results suggest that the rate of appearance of biaryl product is 1st order in Pd(OAc)<sub>2</sub> and zero order in diazonium salt, while the rate of appearance of reduced product is zero order in both diazonium salt and Pd(OAc)<sub>2</sub>.

## AN ANALYSIS OF SECOND CORINTHIANS CHAPTER FIVE

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009*

**Kim Rathod, 2011**

*Department of Philosophy and  
Religious Studies  
Faculty Mentor:  
Peter Judge, Ph.D.*

The Second Letter to the Corinthians contains apologetic and polemical material addressed to the Christians at Corinth by the Apostle Paul. He focuses on the doctrines of God's relationship with Christ and salvation, as well as the doctrine of justification through faith and the importance of the Church being a community of love. Chapter Five of the letter is commonly accepted as a part of a separate "letter of defense" (2:14-6:13) in which Paul aims to explain and clarify his apostleship and regain the Corinthians' support and commitment to the gospel and his ministry. Chapter Five can be divided into three main parts: the perspective from which Christians should view death through assurance of the resurrection (vv.1-5), a focus on the present life of the believer and the coming judgment of Christ (vv. 6-10), and the ministry of reconciliation (vv. 11-21). During the course of this last section, Paul also comments on the mindset of a believer who, because he has been reconciled to God, subsequently takes on a transformed identity in Christ. Through analysis of the literary and historical contexts of Second Corinthians and the specific use of metaphor, diction and comparison in Chapter Five, the paper discusses Paul's examination of the major theme of reconciliation to God through Jesus. This offers important implications, then and since, for Christians' approach to life, death and beyond.

## DIETARY AND SELF-ESTEEM INFLUENCES ON HISPANIC SUICIDAL BEHAVIOR

*Presented at the South Carolina National Association of Social Workers 23rd Annual Spring Symposium, Myrtle Beach, S.C., March 2009*

**John Greer, 2010**

This study targets the prevalence of Hispanic/Latino/Multiple-Hispanic suicidal behaviors linked to self-esteem and diet. Factors include feelings of being overweight, low self-esteem, history of eating disorders and potentially developing an eating disorder, self-injury, depression, and suicidal behav-

*Department of Psychology*  
*Faculty Mentor:*  
*Ameda Manetta, Ph.D.*  
*Department of Social Work*

iors. Methods utilized a subs-ample of the CDC Youth Risk Behavior Survey. The objective of this workshop is to help participants understand the links between 1- influence of feelings of being over-weight and self-esteem; 2- eating disorders and self-injury; and 3- depression and suicidal behaviors. We believe these findings will inform the helping professionals who interact with Hispanic/Latino/Multiple-Hispanic adolescents in the school system and other helping settings.

## HI! WHAT COLOR IS YOUR RELATIONSHIP?

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009*

### **Lawana Peoples, 2009**

*Department of Sociology*  
*and Anthropology*  
*Faculty Mentor:*  
*Douglas Eckberg, Ph.D.*

The objective of this research was to discover what race/ethnicity college students choose to date and/or marry and what influences those choices. I wanted to discover if there is any relationship between race, geographic location, neighborhood ethnic make-up and parental support when it comes to the choice of interracial dating and marriage. The methods used to discover attitudes and influences toward interracial dating and marriage were completed online surveys. The results taken from the online surveys showed that one of the independent variables, one's own race, had any statistical significance on whether a person is dating someone of another race, has dated someone of another race, would marry someone of another race, or has the parental support if he or she chooses to date/marry someone of another race. I had enough information to draw conclusions. Some of the conclusions I developed were that Caucasians have dated the least amount outside of their race, and Caucasians are not very likely to date or marry anyone outside of their race.

## POLITICAL POLICIES CORRELATING WITH INDIVIDUAL VOTING

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009*

**Brandy Werner, 2008**

*Department of Sociology  
and Anthropology  
Faculty Mentor:  
Douglas Eckberg, Ph.D.*

This research was set up to test the proposal that individuals vote for candidates who support their policies. It was important to determine how partisans form their perceptions of candidates' positions on issues and what effect they have on voting. It was hypothesized that if the individual had the same views as the candidate on policy preferences the person would tend to lean towards or vote for that candidate. Data were gathered via an online survey of students in a state university. Students were asked their positions on a series of policy issues on which Barack Obama and John McCain differed, and they were also asked about their candidate preference. It was found that positions on policy issues have a considerable impact on preferences for candidates and for election voting.

## VIEWS OF EUTHANASIA FROM A SOUTHEASTERN UNIVERSITY

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009*

**Debbie Rivers, 2009**

*Department of Sociology  
and Anthropology  
Faculty Mentor:  
Douglas Eckberg, Ph.D.*

For many years, euthanasia has been a subject of public debate and a concern both morally and legally. This study investigated (1) general attitudes toward different levels of euthanasia and physician-assisted suicide, and (2) relationships between gender and attitudes toward euthanasia and physician-assisted suicide. Respondents were 195 students from a southeastern university. Participants completed an on line survey that covered different levels of euthanasia, self-evaluation, and their attitudes in general in areas of insurance and hypothetical scenarios. Analysis indicated no relationship between gender and attitudes on euthanasia and physician-assisted suicide. Although, 36.36% males and 40% females believed a physician should not be able to assist in suicide in any manner, and over 50% believed that an individual who is terminally ill should have the right to end his or her life.



## RACIAL INEQUALITY AND POLITICS: RESULTS FROM THE 2008 SOCIOLOGICAL SURVEY BY A STATE UNIVERSITY IN THE SOUTH

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009*

**Anthony Nguyen, 2009**

*Department of Sociology  
and Anthropology*

*Faculty Mentor:  
Douglas Eckberg, Ph.D.*

This research tests the assumptions that racism influenced the outcome of the 2008 presidential election. Previous research has produced mixed results. Data from the survey implemented at a state university was employed to explore the issue that there was racial inequality in the 2008 election. The survey includes a question about what the students' choices were for president, their ethnicity, and their attitudes towards an African-American democratic nominee. Other effects were looked into such as age, sex, family income, class rank, and previous place population size. Using tables and chi-square shows that different races do align with the race of their chosen candidate. However, multiple regression shows racism and other factors do not influence their choices and that only their party affiliation does.

## TAINTING THE NEW LITERATURE: ETHNIC DEPICTIONS IN AMERICAN FILM

*Present at the Southern Regional Honors Conference, St. Petersburg, Fla., March 2009*

**Dylan Phillips, 2010**

*Department of History*

*Faculty Mentor:  
Jason Silverman, Ph.D.*

Racism has soiled the American reputation throughout the history of the United States and continues to do so to this day through the new literature: film. Observations of American film, which has been in existence for barely over a single century, reveal continued perpetuation of negative stereotypes of many immigrant cultures, including African-Americans, Asian-Americans, Jewish-Americans, German-Americans, Irish-Americans, Italian-Americans, and Hispanic-Americans, along with many others. These images are not found only in radical films from the independent market, and to prove that, the focus is placed on popular films, many of them major Academy Award winners or films recognized by the American Film Institute. Each of these cultures' depictions in American film, from its dawn up to today, are analyzed, exposed, and challenged. Within these expositions are many surprising

revelations such as the facts that Jewish-Americans cultivated their own stereotypical images in the films that they controlled, that negative stereotypes were masked with deceptively positive propaganda such as the depiction of the “good German,” and that many of the example films were critical, financial, and historical successes, such as the infamous 1915 classic, *The Birth of a Nation*, a film in the medium’s infancy that portrayed the Ku Klux Klan as the heroes that preserved the South. Finally, films released as recently as 2008 and that continue to portray untrue stereotypes on the screen are cited as evidence that American film needs to progress into a more culturally accepting era.

## LET’S GET TOGETHER: COLLABORATIVE TUTORIALS IN THE WRITING CENTER

*Presented at the Southeastern Writing Association Conference, Greensboro, N.C., February 2009*

**Dylan Phillips, 2010**

*Department of English*

*Faculty Mentor:  
Jane B. Smith, Ph.D.*

The traditional model of peer-tutoring (one tutor with one student) does not take full advantage of collaborative learning opportunities that foster long-term and fundamental improvement in writing. Peer-tutored writing labs could improve effectiveness by combining similar sessions into group learning experiences, facilitated by trained peer tutors, that present invaluable input from the multiple perspectives of students. With synthesis of relevant scholarship on collaborative learning and peer tutoring, a detailed proposal is made, highlighting benefits along with potential problems, for three possible models in which collaborative tutorials could be incorporated in the Writing Center: “Offering Collaborative Sessions” in which tutors would facilitate a group learning experience focused on a single troublesome topic such as development or transition, “Grouping Collaborative Sessions” in which similar tutorial appointments made in advance could be grouped into a larger collaborative tutorial to take advantage of multiple perspectives, and “Collaborative Sessions by Availability” in which tutors who are working in the center but have no appointments could participate in other tutorials to add additional perspectives.

## AN ESSENTIAL DISTORTION: THE FORM AND STYLE OF THE SOUND AND THE FURY

*Presented at the Winthrop University Department of English Undergraduate/Graduate Research Conference, February 2009*

**Dylan Phillips, 2010**

*Department of English  
Faculty Mentor:  
Leslie Bickford, Ph.D.*

While William Faulkner's work has lent itself well to critical interpretations, Faulkner's unconventional use of form in his writing remains the reason that he is particularly interesting to study as a writer. Some have even criticized his work for that same unconventional use of style and form. Donald M. Kartiganer, for example, declared that Faulkner's "The Sound and the Fury is the quintessence of fragmentation failing to unify itself." This failure of unification that Kartiganer describes is not a failure at all. In fact, the way in which Faulkner achieves successful unity in his novel is one of the work's most appealing aspects. Faulkner's deliberate and varied execution of unorthodox and orthodox format and style is an essential piece to his novel, as important as the words on the page, ultimately achieving two things: the unique and believable genesis of separate and unique characters, alienated from one another, through use of creative form, and also the skillful juxtaposition of those "fragments" to create a unified work of fiction, not a fragmented one. This is proven by analyzing Faulkner's varied stylistic devices for his different narrators (the Compson brothers: Benjy, Quentin, and Jason), comparing and contrasting those devices (such as Benjy's lack of chronology to convey the character's lack of mental development, or Quentin's lack of conventional grammar and punctuation to convey his gradual demise into insanity), and finally presenting a case that these differently written fragments all seek to achieve the same goal: to create a full image of Caddy, a character that was Faulkner's inspiration for the entire novel from the beginning.

# EFFECTS OF SERVER APPEARANCE AND AGE ON TIPPING BEHAVIOR

*Presented at the Southeastern Psychological Association, New Orleans, La., February 2009  
(Woodberry, C., Woodard, N., and Sleigh, M.)*

**Courtney Woodberry, 2009**  
**Natalee Woodard, 2009**

*Department of Psychology  
Faculty Mentor:  
Merry Sleigh, Ph.D.*

This study examined how customers tip based on perceptions of the server. Participants saw one of four photographs. One photograph depicted an older woman with a disheveled appearance, one depicted the same older woman with a tidy appearance, one depicted a disheveled young woman, and one depicted the same young woman with a tidy appearance. Participants were told to imagine that this person was their waiter and were presented with a mock bill, as well as questions pertaining to their perceptions of the server. The average tip reported on a \$34.72 bill was \$4.79 (SD = \$1.98). The older, attractive woman received a lower mean tip than the two younger woman groups,  $F(3, 72) = 3.16$ ,  $p < .05$ . Men were more likely to agree that attractive servers deserve bigger tips,  $t(76) = 3.73$ ,  $p < .01$ . Women were more likely to agree they would enjoy working with the servers,  $t(75) = -2.01$ ,  $p < .05$ . There were no differences in tipping behavior between genders. Caucasians tipped more than African-Americans,  $t(68) = 2.90$ ,  $p < .01$ , and reported eating at restaurants more often,  $t(71) = 2.30$ ,  $p < .05$ . African-Americans were more knowledgeable about the tipping norm,  $t(70) = -2.88$ ,  $p < .01$ . The higher the tip, the more participants agreed they found the server similar to themselves,  $r = .37$ ,  $p < .01$ . The older the participants, the higher the reported tip,  $r = .25$ ,  $p < .05$ . Our findings partially supported our hypotheses regarding age, in that the older, attractive server received the lowest tips. This may indicate ageism, or that young adults relate better with younger servers. In support of the latter, women seemed to relate to the female servers more. Men were more willing to tip a waitress based on attractiveness rather than hard work. More African American participants knew the tipping norm, but Caucasians tipped more and closer to the norm. Caucasians may have more restaurant experience or identify with the server more. This finding raises the possibility that adults may tip more generously to people perceived as similar to themselves, with racial similarity being more influential than gender similarity.

# LOSS OF FOX01 IN ENDOTHELIAL CELLS CAUSES DECREASED CARDIAC MYOCYTE PROLIFERATION

*Presented at the South Carolina Academy of Science Meeting, Columbia, S.C., April 2009 and the Weinstein Cardiovascular Development Conference, San Francisco, Calif., May 2009*

*Supported by an NIH Grant from the National Center for Research Resources for SC-INBRE*

**Katie Marie Wessinger, 2009**  
**Sabahat Khanum, 2010**  
**Lindsay Sherria Johnson, 2011**

*Department of Biology*

*Faculty Mentor:*

*Heather Evans-Anderson, Ph.D.*

During heart development, the proliferation of cardiac myocytes plays a critical role in both normal and aberrant heart development. Endothelial cells influence cardiac myocyte proliferation via cell signaling between the myocardium and the surrounding endocardium. Our aim was to investigate if the disruption in the function of endothelial cells negatively affects the proliferation of cardiac myocytes. In order to disrupt the function of endothelial cells, the Fox01 gene was targeted. Fox01 is a member of a subclass of the Forkhead genes, which encode for transcription factors involved in proliferation, apoptosis, and cell cycle regulation. In endothelial cells, Fox01 controls excessive endothelial cell growth by establishing a balance between proliferation and apoptosis. Our hypothesis is that Fox01 regulates the ability of endothelial cells to influence cardiac myocyte proliferation. Transgenic mice were generated using the Tie2Cre promoter to specifically delete Fox01 in endothelial cells. The gross morphology of the transgenic (lacking Fox01 in endothelial cells), and non-transgenic mouse embryos were examined at embryonic day 10.5. The absence of Fox01 in endothelial cells resulted in embryonic lethality, and the embryos demonstrated growth retardation, pericardial edema, and a poorly formed vasculature. In order to confirm that the absence of Fox01 was responsible for the difference in morphology, we employed immunohistochemistry (IHC) to show that Fox01 was being expressed in the endothelial cells of the non-transgenic mouse embryos and not in the transgenic embryos. Genomic PCR was used to confirm the loss of Fox01. Proliferation of cardiac myocytes was assayed using the Phosphohistone H3 (PHH3) antibody. Decreased expression of PHH3 in cardiac myocytes indicates decreased proliferation in transgenic embryos. Thus, the loss of Fox01 in endothelial cells results in decreased proliferation of cardiac myocytes and causes embryonic lethality due to heart defects. Future studies include in vitro assays to further define the role of Fox01 in endothelial cells during heart development.

# PD/C-CATALYZED CROSS-COUPLING OF ARENEDIAZONIUM SALTS WITH POTASSIUM ORGANOTRIFLUOROBORATES

*Presented at the Southeastern Regional Meeting of the American Chemical Society, Nashville, Tenn.,  
November 2008 (Angel, B. and Hanna, J.) and received an Honorable Mention for Undergraduate Oral Presentation  
Supported by a Winthrop University Research Council Grant*

**Brad Angel, 2009**

*Department of Chemistry,  
Physics, and Geology  
Faculty Mentor:  
James Hanna, Ph.D.*

Polyarene structures, such as terphenyls, quaterphenyls, and sexiphenyls, have shown great promise in some important emerging areas of science. Organic light-emitting diodes utilize polyarenes for their large and stable conjugated systems; also, preliminary research has shown that drugs built around a polyarene backbone may show HIV protease inhibition activity, furthering development of AIDS treatment. The Suzuki-Miyaura reaction is an increasingly popular pathway for carbon-carbon bond formation and the synthesis of biaryl compounds. The Suzuki-Miyaura coupling of arenediazonium salts and aryltrifluoroborates has been shown to be a rather effective means for the synthesis of biaryls, having the advantages of a short reaction time at moderate temperatures and under aerobic conditions. Previously, research in our laboratory showed that Pd/C is an ideal catalyst for these reactions, as it is relatively inexpensive, readily available, and can be easily recovered from the reaction by simple filtration. Also, under optimized conditions, Pd/C gave near quantitative yields of the model biaryl product. To investigate the catalytic activity of palladium on carbon after successive reactions, a recyclability study was carried out under optimized conditions. Two series of five subsequent reactions using identical molar amounts and conditions were carried out using two separate lots of palladium on carbon. Both series showed that palladium on carbon possesses rather high catalytic activity for three uses, and then product yield begins to fall somewhat as side reactions become more competitive and byproducts increase, presumably due to palladium leaching from the catalyst surface. P-Bromobenzenediazonium tetrafluoroborate was also found to couple very effectively with several different organotrifluoroborate salts under these conditions affording good to excellent yields of corresponding biaryls. These data show that palladium on carbon is a cheap and effective catalyst for the Suzuki-Miyaura cross-coupling of arenediazonium salts and aryltrifluoroborates, and may be a means to a facile one-pot synthesis of polyarene systems.

# UTILIZATION OF ENVIRONMENT BY 8 DIFFERENT PRIMATE SPECIES IN THE PERUVIAN RAINFOREST

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009*

*(Parrish, A. and Chism, J.)*

*Supported by the Lockett Davis Endowment and the Arts and Sciences Travel Grant*

## **Audrey Parrish, 2009**

*Department of Biology*

*Faculty Mentor:*

*Janice Chism, Ph.D.*

In the Amazon rainforest, there is a dry season spanning May-September followed by a wet season in which rivers flood into the rainforest. Resources in these seasonally flooded lowland forests along black water rivers (called igapo forests) differ throughout the year. Habitats within them are drastically redefined, and the New World monkeys inhabiting them must adjust their foraging and traveling patterns to survive in this changing environment.

This study investigated how the primate species resident in the Northeastern Peruvian Amazon utilize their natural resources and habitats during the dry season. Due to the abundance of resources in aguajals (swamps) during this season, it was predicted that the primates would use these habitats most frequently. The field site was in the Area de Conservacion Regional Comunal Tamshiyacu-Tahuayo located on the Tahuayo River, a tributary of the Amazon. Data was collected daily for three weeks in June 2008 by walking a 2 km x 2 km trail grid, assessing habitat type and noting the location of fruiting and flowering plants consumed by the monkeys. Seven habitat types and eight species of New World monkeys were identified, and their locations on the grid were mapped using a GIS mapping program. Associations among three variables, including primate species, resource location, and habitat type, were tested. Flowers and flower buds occurred significantly more often in the wetter areas; however, during this period at the start of the dry season, there was no significant difference in habitat use by the primates. This data serves as a baseline for future research at the reserve for cross-seasonal comparisons.

# ARE PEPTIDE-BASED AGGREGATION INHIBITORS EFFECTIVE AGAINST THE EARLIEST OLIGOMERS OF AMYLOID-BETA PEPTIDE?

*Presented at the Southeastern Regional Meeting of the American Chemical Society, Nashville, Tenn., November 2008 (Powell, L., Dukes, K., and Lammi, R.)*

*Supported by an NIH Grant from the National Center for Research Resources for SC-INBRE*

**Lyndsey Powell, 2010**

**Kyle Dukes, 2008**

*Department of Chemistry,*

*Physics, and Geology*

*Faculty Mentor:*

*Robin Lammi, Ph.D.*

Alzheimer's disease (AD) is linked to the association of amyloid-beta peptide (Abeta), a protein of 39-43 amino acids that is normally soluble in the plasma and cerebrospinal fluid. Abeta is the primary component of the insoluble senile plaques characteristic of AD, and large, fibrillar aggregates were long thought to be the pathogenic agents; however, recent evidence suggests that small, soluble oligomers are more closely linked to disease progression. In fact, negative effects have been observed from oligomers as small as dimers and trimers. A number of compounds have been found to inhibit the large-scale aggregation of Abeta in bulk solution, typically by disrupting the beta-sheet structure characteristic of these assemblies, but little is known regarding inhibition of the earliest association steps. We have used single-molecule fluorescence spectroscopy to characterize the efficacy of four known peptide-based inhibitors toward preventing or reversing association in the earliest Abeta oligomers ( $n = 2-5$ ). Fluorescein and biotin-labeled Abeta (1-40) is tethered to functionalized cover slips (pM concentrations) through biotin-streptavidin binding. Spatially resolved monomers and oligomers are examined, one at a time; the number of associated peptides in each species is determined based on quantized photobleaching of the individual dye molecules. Distributions of Abeta monomers and oligomers are determined through examination of dozens of individual peptide species, and permit comparison of the different inhibitor compounds. Results will be presented for inhibition under neutral versus acidic conditions (pH 7.4 versus 5.8). Collectively, these studies provide new insight into the potential for reversing or preventing Abeta association in its earliest stages.



## EXPLORING ATTITUDES ABOUT DOCTOR-ASSISTED SUICIDE

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009*

**Rachel Nash, 2009**

*Department of Sociology  
and Anthropology  
Faculty Mentor:  
Douglas Eckberg, Ph.D.*

My objective was to evaluate differences in attitudes towards doctor-assisted suicide of individuals of varying religious beliefs. The data was gathered from a survey of 195 students attending a small university in the Southeast. Respondents were drawn via a systematic sample of all names in the university student directory, and the survey was conducted using Survey Monkey. The response rate was about 20 percent. The findings suggest that the less religious a person considers him or herself, the more they support doctor-assisted suicide. In addition to religiosity, evangelical conservatives are more likely to be opposed to assisted suicide than less liberal Christians. This study investigated general attitudes toward diverse manners of euthanasia and focused on relationships between religion, denomination, church attendance, and attitudes toward euthanasia and physician-assisted suicide.

## YOUNG ADULTS' ATTITUDES TOWARDS ANIMAL ABUSE AND NEGLECT

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009 (Hunt-Augustine, B. and Ritzer, D.)*

**Selina Hunt-Augustine, 2009**

*Department of Psychology  
Faculty Mentor:  
Darren Ritzer, Ph.D.*

Most adults believe that animal abuse is a social problem that should warrant severe criminal penalties (Taylor & Signal, 2006; Vollum, Buffington-Vollum, & Longmire, 2004). Women, senior citizens, and those familiar with laws regulating animal abuse are most concerned and likely to report abuse (Taylor & Signal, 2006; Vollum et al, 2004). Despite these strong sentiments, research in this area is limited. The current study examined characteristics of young adults that might predict attitudes toward animal abuse. Eighty-six college students, with a mean age of 19.5 (SD = 1.96), completed the 'Punitive Attitudes Toward Acts of Violence Against Animals Scale' (Vollum et al, 2004), as well as questions that assessed their past experi-

ences with animals and demographic variables. Results revealed that the older the young adult, the more positive their attitude toward animals,  $r(85) = .26$ ,  $p < .05$ . The more adults considered their pets to be family members, the more positive their attitudes toward animals,  $r(79) = .60$ ,  $p < .05$ , and the more harshly they felt animal abuse should be punished,  $r(79) = .34$ ,  $p < .05$ . In contrast, gender, SES of the household in which they were reared, and personal experiences with victimization did not predict participants' attitudes toward animal abuse or punishment. Thus, age and emotional involvement with a pet were more predictive of attitudes toward animal abuse than were the other variables studied. These findings may be useful for evaluating public policy and understanding young adult perspectives.

## THE PROTEIN C PATHWAY IN PROSTATE CANCER METASTASIS

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009  
(Sheehan, S., Brunson, L., and Glasscock, L.)*

*Supported by an NIH Grant from the National Center for Research Resources for SC-INBRE and a McKay Urology Endowment*

**Sara Sheehan, 2009**  
**Lacey Brunson, 2009**

*Department of Biology*  
*Faculty Mentor:*  
*Laura Glasscock, Ph.D.*

We investigated the role of the anticoagulant protein C pathway in regulating prostate cancer (CaP) metastasis in vitro. Specifically, we investigated if thrombomodulin (TM), thrombin, protein C, or activated protein C (APC) affect invasion by regulating interactions between plasminogen activator inhibitor-1 (PAI-1) and urokinase type plasminogen activator (uPA). We determined the effect of these proteases and protease inhibitors on PC-3 and DU-145 cell invasion using a modified Boyden chamber. Addition of thrombin, protein C, and APC alone did not affect PC-3 or DU-145 invasion. The ability of DU-145 cells to invade in a Boyden chamber increased in the presence of uPA, decreased in the presence of PAI-1, and increased in the presence of APC, uPA, and PAI-1. We conclude that in the presence of TM, thrombin, protein C, PAI-1 and uPA, TM regulates DU-145 cell invasion by generating APC, which can bind to PAI-1, freeing uPA to facilitate tumor cell invasion.

## RELATIONSHIP BETWEEN COLLEGE STUDENTS' PARENTS/PEERS

*Presented at the Southeastern Psychological Association, New Orleans, La., February 2009, and the Southern Regional Honors Conference, St. Petersburg, Fla., March 2009*

**Chelli Lowe, 2009**

*Department of Psychology  
Faculty Mentor:  
Merry Sleigh, Ph.D.*

Previous research on parental relationships showed that perceived parental support exerted only a minor influence on college students' academic achievements (Cutrona, Cole, Colangelo, Assouline, & Russel, 1994). However, Kilmann, Urbaniak, and Parnell (2006) suggested that young adults with insecure attachment patterns with parents have an increased likelihood for relationship problems. The current study assessed college students' relationships with mother, father, and friends and investigated relationships between these variables and typical college behaviors. Seventy-six college students completed the Inventory of Parent/Peer Assessment (Armsden, Greenberg, Corcoran, & Fischer, 2000). Participants also responded to a series of health and wellness statements. Quality of relationship with parents and friends did not relate to: race, sexual orientation, honor society membership, Greek membership, GPA, overall number of friends, likelihood of graduating on time, or income level of family household. In general, findings suggest that the quality of students' relationships with their mothers have more impact on college lifestyle choices than students' relationships with their fathers. However, the links were not linear. Extreme levels of mother-trust or mother-alienation predicted increased trust of friends and reduced alcohol-related behaviors. Similarly complicated, students' quality of relationship with friends predicted both healthy and unhealthy behaviors.

## GREEKS AND NON-GREEKS: SELF-PERCEPTIONS AND BELIEFS ABOUT HOW OTHERS PERCEIVE THEM

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009 (Gillespie, A., Shubrick, A., and Sleigh, M.)*

**Amber Shubrick, 2010**  
**Abby Gillespie, 2010**

Greek and non-Greek students have different experiences on the college campus. For example, in comparison to non-Greeks, Greeks drink more alcohol

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*Faculty Mentor:*  
*Merry Sleight, Ph.D.*

(Sher, Park, & Krull, 2008; Wood, Borsari, & Laird, 2007) and Greeks' social statuses are more dependent on extraversion (Anderson, John, Keltner & Kring, 2001). Previous research suggests that Greeks and non-Greeks hold stereotypical, and often negative, views of each other (Biernat, Vescio, & Green, 1996).

The purpose of the current study was to further examine this issue. Fifty-two undergraduate students, half Greek and half non-Greek, responded to thirteen descriptive statements three times. Participants responded once in reference to their own social group, once in reference to the opposing social group, and once in reference to how they believed the opposing social group perceived their own social group. In contrast to non-Greeks' actual views, Greeks thought that non-Greeks perceive Greeks as self-centered, unintelligent, and promiscuous. Non-Greeks viewed Greeks as more involved and more charitable than Greeks realized. We compared Greek students' actual opinions of non-Greeks to what non-Greeks thought that Greeks believed about non-Greeks; non-Greeks believed that Greeks view non-Greeks as unintelligent, which was not the case. We compared Greek and non-Greek students' perceptions of their own groups. In comparison to non-Greek students, Greek students reported themselves as being more involved on campus, more materialistic, more well-known, more charitable, more loyal, and more well-rounded. Overall, Greeks and non-Greeks perceive one another in a more positive light than each group realizes; however, both groups revealed stereotyped perceptions of Greeks.

## LEARNING ABOUT DIVERSITY: THE IMPACT OF MOOD AND EXPOSURE TO DIFFERENCES

*Presented at the National Institute on the Teaching of Psychology, St. Pete Beach, Fla., January 2009*  
*(Nelson, D. and Palm, K.)*

**Kathryn Palm, 2009**

*Department of Psychology*  
*Faculty Mentor:*  
*Donna Nelson, Ph.D.*

Instructional tools that promote learning about diversity are valuable to teachers of psychology. Pedagogical approaches that promote deliberate, critical thinking may be especially relevant. We designed a class exercise to promote critical thinking about issues tied to prejudice, discrimination, and privilege. We found that placing students in a positive (versus neutral) mood increased identification of their own unearned privileges. Students in a positive mood also generated more examples of social groups that afford unearned benefits.

Recognizing one's privileges has been characterized as a difficult task that requires deliberate and flexible thought (McIntosh, 2001). Our findings are consistent with the notion that positive

mood promotes open-minded, flexible thinking (Fredrickson, 2001; Nelson, 2009). Our class exercise required students to work with an interview partner. We found that those students who were randomly assigned to an interview partner with different (versus similar) background and social group membership identified a greater number of own privileges and identified more associated social groups that provide such benefits. These findings support work by Moradi (2004), suggesting that becoming acquainted with persons who are dissimilar to one's self increases critical thought about diversity. Our results suggest that class exercises that target critical thinking about diversity can promote greater appreciation of subtle social psychological realities that have implications for interpersonal relations between persons of differing social or ethnic groups.

## IDENTIFYING NEW REGULATORS OF AUTOPHAGY

*Presented at the Leadership Alliance Symposium, Hartford, Ct., July 2008*

*(Bush, B., Lee, J., and Thomas, S.)*

*Supported in part by the National Science Foundation's Research Experience for Undergraduates Site Grant*

### **Bethany Marie Bush, 2009**

*Department of Biology*

*Faculty Sponsor:*

*James Johnston, Ph.D.*

*Mentors:*

*Sheila Thomas, Ph.D.*

*(Harvard Medical School)*

*Janice Lee, Ph.D.*

*(Harvard Medical School)*

Autophagy is a cellular process that removes damaged or unneeded organelles and proteins. This process can be both a cell survival and cell death mechanism in mammalian cells, and misregulation of autophagy has been implicated in a variety of cancers and neurodegenerative diseases such as Alzheimer's. Therefore, understanding how this cellular pathway is regulated may provide insight into new treatments for various pathogenic conditions. Previous research shows that when several known upstream tumor suppressors were knocked down, autophagy was unexpectedly increased. To address this issue, we investigated the response of MCF10A mammary cells when autophagy was blocked by knocking down the key autophagy initiator protein Beclin 1. Knock down of Beclin 1 expression was achieved using several small hairpin RNA (shRNAs) and confirmed with western blot analysis. Once autophagy was blocked in the cells by Beclin 1 knock down, small interfering RNAs (siRNAs) were used to interfere with the expression of the tumor suppressors PTEN and LKB1. Using fluorescence microscopy and a green fluorescence protein method for quantifying autophagy, we found that when autophagy was blocked and the tumor suppressors were knocked down, the cells responded by dying rather than finding another mechanism of survival. This seems to indicate that autophagy plays a survival role in the cells. In addition to these studies, we attempted to optimize for the lab

a newly developed method to detect autophagy using luciferase detection. We adapted an assay that linked LC3, a key regulatory protein in autophagy, to actin and luciferase. When autophagy occurs, LC3 undergoes a cleavage process that releases luciferase into the extracellular media. The luciferase can then be easily detected using a luminometer and correlated with the amount of autophagy induced. Our initial findings indicate that this luciferase method successfully detected the amount of autophagy that occurred between induction points in MCF10A cells but was not yet useful for high throughput screening.

## REGULATION OF HIGH MOBILITY GROUP A1 EXPRESSION BY THE ADENOMATOUS POLYPOSIS COLI (APC) TUMOR SUPPRESSOR GENE

*Presented at the American Society for Biochemistry and Molecular Biology National Meeting, New Orleans, La., April 2009 (Bush, B., Hurlbert, J., and Sumter, T.)*

*Supported by an NIH Grant from the National Center for Research Resources for SC-INBRE and grants from the National Science Foundation*

### **Bethany Marie Bush, 2009**

*Department of Chemistry,  
Physics, and Geology*

*Faculty Mentors:  
Takita Sumter, Ph.D.  
Jason Hurlbert, Ph.D.*

High Mobility Group A1 (HMGA1) is dysregulated in neoplasias and is a prominent biomarker for colon cancer. However, the molecular networks involved in HMGA1-mediated transformation are only partially understood. Mutations in the adenomatous polyposis coli (Apc) gene are associated with the earliest stages of colon carcinogenesis. These mutations activate the Wnt signaling pathway, resulting in stabilization of beta-catenin which then binds to T-cell factor-4 (Tcf-4) causing subsequent increases in target gene expression. We explored the role of the Wnt pathway in HMGA1 regulation. In Apc(Min/+) mice expressing truncated Apc, we observed 9-fold greater HMGA1 mRNA levels relative to mice bearing wild-type Apc. HMGA1 protein levels were also significantly elevated in Apc (Min/+) intestinal tumors. To assess the effects of wild type Apc recovery, we used HT-29 cells (human colorectal carcinoma cell line with truncated Apc) in which wild type Apc has been introduced under the control of a zinc inducible promoter. Induction of full length Apc caused down-regulation of HMGA1 at the translational level suggesting a novel role for HMGA1 in Wnt signaling. Current studies are aimed at understanding the mechanism by which HMGA1 expression is regulated using MALDI-TOF mass spectrometry. Our data implicates Wnt signal transduction as a regulator of HMGA1 in colon cancer

## THREE GENERATIONS IN JOYCE: DEDALUS' INTERPRETATION OF HAMLET

*Presented at the American Conference for Irish Studies Southern Regional Meeting,  
Chattanooga, Tenn., March 2009*

**Jason Rogers, 2010**

*Department of English*

*Faculty Mentor:*

*Marguerite Quintelli-Neary, Ph.D.*

James Joyce illustrates genealogical legacies through a series of allusions to Hamlet in his epic work, *Ulysses*, and we are mindful that Irish history and literature have often held to the power of three generations, a tradition that was not unknown to Joyce. I argue that Shakespeare is not only Prince Hamlet but King Hamlet and Prince Hamlet's "soul" as well, despite Hamlet's specific reference to the soul as female, and, therefore, it can be argued that Shakespeare is his own father, son, and metaphorical "grandfather," and that this argument offered by

Dedalus in *Ulysses* must be made in order for Joyce to showcase the convention of referencing three generations in Irish literature. My paper addresses the following: an investigation of Shakespeare's history and how it correlates with that of King Hamlet, Virgil's comments in Dante's *Inferno* and Dedalus's application of these ideas, Aristotle's interpretation of the soul and Dedalus's (Thomist) manipulation of it, the algebraic equation Dedalus creates to "prove" the supposed genealogy, as well as the most notable examples of three generations in Irish literature/history and how Joyce incorporates Dedalus' argument. We read in *Ulysses*: "We have grown out of Wilde and paradoxes. It's quite simple. He proves by algebra that (King) Hamlet's grandson is Shakespeare's grandfather and that he himself (Shakespeare) is the ghost of his own father." While the reader who works through *Hamlet* is filled with a myriad of emotions, s/he rarely considers the autobiographical implications that Shakespeare may have offered through characters that recall his own family history. We can logically question which character is a reflection of the bard himself. While the commonly accepted theory is that Shakespeare projects himself onto Prince Hamlet, there are some striking indicators, presented by Stephen Dedalus in James Joyce's *Ulysses*, that could (and do) lead one to believe that Shakespeare associates himself with the ghost of King Hamlet. Additionally, there are concepts surrounding the playwright as a creator and the soul as one's experience, making it possible for connections to be made as though there were three generations in the play into *Ulysses*.

## WHAT CAN YOU SAY TO A (BELLIGERENT) BRICK WALL?: RESPONDING TO DIFFICULT TUTORIALS

*Presented at the Southeastern Writing Association Conference, Greensboro, N.C., February 2009*

**Lacey Long, 2009**

*Department of English*

*Faculty Mentor:*

*Jane B. Smith, Ph.D.*

Tutors are sometimes called upon to act as a teacher (sometimes a mind-reader of the student or the student's instructor). I will focus on sessions with students coming from difficult-to-understand instructors, students outside the writing field, and those who consider writing centers a crutch, an extra credit source, or a place to have someone simply "fix" their papers. I'll consider the tutor's options in helping the students write for themselves despite their confusion, frustration, apathy, and sometimes, manipulation. How can we respond to the questions, "Why should I CARE?" "What does this MEAN?" and "What (exactly) should I write?"

## THE RELATIONSHIP BETWEEN COLLEGE GPA AND EXTRACURRICULAR ACTIVITIES

*Presented at the Southeastern Psychological Association Conference, New Orleans, La., February 2009  
(Yeater, K., Woods, C., and Rodgers, F.)*

**Kristyn Yeater, 2010**

*Department of Psychology*

*Faculty Mentor:*

*Matthew Hayes, Ph.D.*

Previous research has looked at one specific extracurricular activity, such as fraternities, athletics, and jobs and its effect on college academic performance. Only one study, Stright (1947), looked at multiple extracurricular activities and their effect on academic performance, but this study was completed over 60 years ago. The purpose of this study was to determine if the same results from Stright's study still held true by looking at the relationship between college students' involvement in extracurricular activities and two measures of academic performance, grade point average (GPA) and hours spent studying. A total of 104 undergraduate students participated. They completed surveys inquiring about their GPAs, study habits and the number of hours they spent in nine extracurriculars (working, academic and social fraternities/sororities, volunteering, church, clubs, organizations, and athletics). There was no significant correlation between total extracurricular hours and either measure of academic



performance. However, there was a significant positive correlation between hours spent working and GPA, hours studying and church, and hours studying and volunteering. These results suggest that people who are highly motivated to serve others are also high motivated in their academic performance.

## TO EXPOUND THE DREAM: A PSYCHOANALYTICAL INTERPRETATION OF DREAMING IN A MIDSUMMER NIGHT'S DREAM

*Presented at the Winthrop University Department of English Undergraduate/Graduate Research Conference, February 2009*

**Ashley Galloway, 2012**

*Department of English  
Faculty Mentor:  
Matthew Fike, Ph.D.*

This paper uses a psychoanalytic approach to explain that Shakespeare's fallacious message about dreaming set forth in Mercutio's "Queen Mab" speech from *Romeo and Juliet* is corrected in *A Midsummer Night's Dream*, which puts forth the idea that dreams, as Freud and Jung would later theorize, are a constructive means to a restorative end. Through her serpent dream, Hermia is able to confront her subconscious reservations towards intimacy with Lysander, and it allows her to confront the incestuous nature of Hermia's betrothal to Demetrius, who is like her father in so many ways (Norman Holland, *Psychoanalysis and Shakespeare*); this ability of the dream to allow an individual to confront those fears that cannot be dealt with in waking life is completely ignored in Mercutio's speech. Bottom's dream experience involves an encounter with the divine feminine that enables the reader to see that Bottom's dream is about the fulfillment of his wish to be cared for by Titania. His dream "proclaims the infant's exclusive right to the mother" (Weston A. Gui, "Bottom's Dream"). The dream also allows Bottom to undergo a creative transformation that allows him to focus on his portrayal of Pyramus and the creation of "Bottom's Dream" (Marjorie Garber, *Dream in Shakespeare: From Metaphor to Metamorphosis*). Mercutio does not allow dreams to fulfill the desires of anyone but the flippant Queen Mab. Through Puck's epilogue, Shakespeare states that through dreams "all is mended," recognizing a power in dreaming to make up for the limitations of the waking conscious, whereas in the Queen Mab speech, it seems that Shakespeare is saying that dreaming in itself is just another human inconvenience. Thus Shakespeare seemingly rescinds the dismissive interpretation of dreams in *Romeo and Juliet* in favor of the more positive outlook put forth in *A Midsummer Night's Dream*.

# MAXIMIZING YOUR STUDY TIME: A COMPARISON OF TEXT MARKING STRATEGIES

*Presented at the Southeastern Psychological Association Conference, New Orleans, La., February 2009*

**Elizabeth White, 2010**

**Erin English, 2009**

**Kristyn Yeater, 2010**

*Department of Psychology*

*Faculty Mentor:*

*Matthew Hayes, Ph.D.*

Text marking is a method sometimes used by students when studying course material. Text marking can include any addition to printed material such as highlighting text deemed as important by the student or making notes in margins to elaborate or explain what is already written. Previous studies show that highlighting relevant information increases comprehension of the text (Fowler & Barker, 1974; Hartley, Bartlett, & Branthwaite, 1980; Rickards & August; 1975). Much research has been done on the effectiveness of highlighting, but none has been done on the scratching out of irrelevant material.

We believe that scratching out irrelevant material serves essentially the same purpose as highlighting material, but instead of drawing attention to what is important like highlighting, scratching out eliminates the distraction of information that is unimportant. Each participant received three passages and was instructed to highlight important information in one passage, scratch out unimportant information in one passage, and just read one passage. The participants returned one week later to review their passages from the week before and take a multiple choice test on each of the passages. It was hypothesized that both the highlighting and scratching out conditions would have an effect on reading comprehension, as determined by test results, and that both conditions would improve test scores. The main results were not supportive of our hypothesis. An analysis of the data showed that, overall, the number of correct answers in relation to text marking condition was not significant at the .05 level,  $F(2, 72) = .437, p = .648$ .

## AN INDIVIDUAL'S WORLDVIEW: DOES MATCHING PEERS IN THE MAJOR INCREASE SATISFACTION?

*Presented at the Southeastern Psychological Association Conference, New Orleans, La., February 2009*

**Terri Whited, 2009**  
**Teanna Schofield, 2010**

*Department of Psychology*  
*Faculty Mentor:*  
*Merry Sleight, Ph.D.*

This study assessed psychology majors' worldviews and how those worldviews related to satisfaction with major. Fifty-five psychology majors completed the 'Life Satisfaction and Motivation Scale' (Krapu, Meinke, Kramer, Friedman, & Voda, 2006), modified to relate to satisfaction with major. Participants also completed a 'Worldview Questionnaire,' based loosely on Jenkins (2004). Participants were asked to respond to the 'Worldview Questionnaire' with their own opinions, then to complete the scale a second time by responding the way a "typical psychology major" would respond. The mean 'satisfaction with major' score was 69.88 (sd = 8.46), indicating an average level of satisfaction with low variability. We calculated a 'difference' score. A higher score indicated that an individual's actual responses to the 'Worldview Questionnaire' were different than that individual's "typical psychology major" responses. The possible range was 0 to 132, with a mean of 32.63 (SD = 13.54). Satisfaction with major was not related to the difference score. Similarly, age did not predict difference or satisfaction scores. How much students believed that psychology faculty agreed with their personal viewpoints also did not predict satisfaction or difference scores. Men were more satisfied with the psychology major than were women,  $t(48) = 2.84$  ( $p < .01$ ). We found no differences between African-American and Caucasian participants on satisfaction and difference scores. We calculated an average response for each statement and compared the means for the 'typical psychology major' to the actual opinions of psychology majors. Participants responded similarly on issues such as racial equality, gender equality, gender as a primarily social construction, importance of voting, and society's responsibility to protect individual rights. Participants responded more positively to homosexuality as a lifestyle choice when answering as the typical psychology major than when answering for themselves. In contrast, participants gave higher ratings for themselves on spirituality, the need for one moral code, and belief in God than for the typical psychology major. In general, psychology majors perceived themselves to be similar to their peers, which was accurate. Matching peers' worldview did not relate to satisfaction, perhaps because of the homogenous perspective of psychology majors.

## MALVOLIO: THE PURITAN HYPOCRITE

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009*

**Margaret Gaddis, 2010**

*Department of English*

*Faculty Mentor:*

*Matthew Fike, Ph.D.*

The purpose of my paper is to prove that Shakespeare uses Malvolio, a character in *Twelfth Night* whose Puritan beliefs are easily tossed aside for personal gain, as a means to poke fun at Puritans and suggest that they are a society of hypocrites. Even though L. G. Salingar briefly suggests in "The Design of *Twelfth Night*" that Malvolio lacks the ability to act impulsively, Malvolio's quick removal of his Puritan appearance in favor of the behaviors dictated by Maria's letter suggests that he was never strong in his beliefs. Thus, Malvolio is a hypocrite since he previously admonished Feste's behavior under the guise of one who is dedicated to the practices of Puritans. From a Jungian psychological standpoint, his secret desires and hypocrisy are his shadow, which he struggles to suppress. His refusal to acknowledge his own hypocrisy leads to his decision to seek revenge, which is his way of diverting his attention away from a possible confrontation with his shadow. Also, the hostility that Malvolio displays as a result of his mistreatment reflects the behaviors of the Puritans of Shakespeare's time. Malvolio is acting the role of a Puritan much as the actors of Shakespeare's time took on the roles of various fictional characters. Ultimately, then, Malvolio suggests that Shakespeare believed that Puritans shunned the theater because it revealed and exploited their secret desire to live outside the restrictions of their religion.

## SHAKESPEARE'S PARODIC USE OF THE FISHER KING MYTH IN THE HENRIAD

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009*

**Allison Stucker, 2009**

*Department of English*

*Faculty Mentor:*

*Matthew Fike, Ph.D.*

This paper argues that Shakespeare uses elements of the Fisher King myth in *The Henriad* - particularly Falstaff's behavior at Shrewsbury, his role as scapegoat, and his ultimate banishment - but that Shakespeare parodies the myth by dismantling its sense of renewal. Many sources regarding the Fisher King myth would have been available to Shakespeare because of its presence

in Norse, Celtic, and Arthurian legend. Although several versions of this legend exist, two primary motifs remain consistent throughout the accounts. The Fisher King, or Maimed King, is wounded in the upper leg or testicles; therefore, the King is impotent and the land is infertile and sickly. First, Shakespeare establishes a banishment/cleansing motif in 1 Henry IV that begins with Prince Hal and Falstaff. Second, the Shrewsbury battle in the final act of 1 Henry IV recalls the Fisher King myth through Falstaff's actions; he stabs Hotspur in the thigh - the same location as the Fisher King's wound. Third, the kingdom remains devastated in 2 Henry IV due to the incomplete renewal witnessed in the previous play. Henry IV is sickly; thus, land and people are also sickly. Meanwhile, Falstaff acts as the physical embodiment of the land. But Shakespeare's use of the Fisher King motif is parodic rather than straightforward because there is no genuine renewal of the kingdom. Falstaff's actual banishment at the end of 2 Henry IV does nothing to renew the land. England remains ill. In this respect, Shakespeare alters the myth in accordance with the ongoing violence found in Holinshed's Chronicles.

## RATEMYPROFESSORS.COM: FACULTY VERSUS UNDERGRADUATES' PERCEPTIONS AND BEHAVIORS

*Presented at the Southeastern Psychological Association Conference, New Orleans, La., February 2009  
(Ohiser, E., Wooldridge, T, Metts, S., and Sleigh, M. J.)*

*Received the SEPA Regional Research Award and was awarded Psi Chi National Honor Society in Psychology certificates*

**Emily M. Ohiser, 2010**  
**Toni L. Wooldridge, 2010**  
**Sarah J. Metts, 2010**

*Department of Psychology  
Faculty Mentor:  
Merry Sleigh, Ph.D.*

RateMyProfessors.com (RMP) is a web-based forum where people can anonymously post comments about professors. Previous research suggests that both students and faculty frequently visit this site, although faculty questions its accuracy (Felton, Koper, Mitchell, & Stinson, 2008). The current study compared undergraduate students and faculty members' perceptions of RMP. Thirty-five students and 30 faculty members completed a survey, created by the researchers, to assess participants' behaviors on and attitudes toward RMP. Participants also responded to 12 descriptions of a male teacher designed to look as though they were copied directly from RMP; eight descriptions centered on a focal point, such as arrogance or attractiveness of instructor. Four of the descriptions were based on a classification developed by Felton, Mitchell and Stinson (2004): a) high quality and

easy, b) high quality and difficult, c) low quality and easy, and d) low quality and difficult. Ninety-seven percent of students and 96% of faculty were familiar with RMP; however, only 56% of students and 67% of faculty reported having visited RMP. There were no differences between the two groups in how frequently they visited RMP, with both groups viewing the site an average of once a semester. Forty percent of students and 29% of faculty believed that poor students were most likely to post comments on RMP, whereas 0% of students and 5% of faculty believed top students were most likely to post. Forty-two percent of students and 24% of faculty believed that students who hate a professor were most likely to post comments on RMP, whereas 3% of students and 5% of faculty believed that students who like a professor were most likely to post. Both groups gave a mean response of 'neutral' regarding the accuracy of RMP. Similarly, both groups were 'neutral' in regard to whether professors change their behavior based on RMP comments and whether professors check RMP to get information about other professors. In contrast to these similarities, the two groups differed in their perceptions of the described teachers. Compared to faculty, students were more likely to view the "enthusiastic, plays favorites" professor as respected,  $t(63) = 2.01$ ,  $p = .49$ , and were more likely to believe that a "horrible, hard grades" professor was respected by colleagues,  $t(63) = 2.10$ ,  $p = .04$ . Compared to faculty, students perceived the professor who "got off on tangents/changed test dates and deadlines" as more popular,  $t(61) = 3.0$ ,  $p = .004$ , and more respected by colleagues,  $t(61) = 2.17$ ,  $p = .034$ . Students rated the "parent, understanding" professor as more skilled,  $t(60) = 4.09$ ,  $p = .00$ , and more respected by colleagues,  $t(60) = 3.90$ ,  $p = .00$ , than did faculty. Students rated the "arrogant" professor as more skilled,  $t(61) = 2.05$ ,  $p = .04$ , than did faculty. Students also perceived the following two faculty as more popular than did faculty: the "learned all our names/cares about students,"  $t(60) = 2.93$ ,  $p = .005$ , and the "puts you on the spot, but you learn a lot,"  $t(60) = 2.05$ ,  $p = .044$ . The number of years faculty members had taught did not predict their behaviors or attitudes related to RMP. There was only one gender difference in the faculty sample; compared to men, women were more likely to believe that a "parent, understanding" professor was popular with students,  $t(20) = 2.37$ ,  $p = .028$ . These findings suggest that students and faculty share common perceptions of and interactions with RMP. However, in response to individual comments, faculty and students have unique perspectives. In general, faculty rated the teacher profiles more harshly than did students, and faculty seemed unaware of certain factors that made professors popular with students. An awareness of these different perspectives might be helpful for faculty as they reflect on their own classroom performance.

# THE INFLUENCE OF RATEMYPROFESSORS.COM ON PROFESSOR AND COURSE SELECTION

*Presented at the Southeastern Psychological Association Conference, New Orleans, La., February 2009  
(Metts, S., Wooldridge, T, Ohiser, E., and Sleigh, M. J.)*

**Sarah Metts, 2010**  
**Toni Wooldridge, 2010**  
**Emily Ohiser, 2010**

*Department of Psychology  
Faculty Mentor:  
Merry Sleigh, Ph.D.*

RateMyProfessors.com (RMP) is frequently visited by both students and faculty (Felton, Koper, Mitchell, & Stinson, 2008). Silva et al (2008) found that for psychology instructors, positive comments were more common than negative comments, and that grading leniency and low workload were associated with higher ratings. The current study assessed to what extent students utilize RMP, versus other resources, when selecting classes and professors. Sixty-nine college students responded to 12 teacher descriptions designed to look as though they were copied directly from RMP; the descriptions centered on a focal point, such as easiness of grading or attractiveness of instructor. Half of the surveys referred to the described teacher as a man, and half referred to a woman. Ninety percent of participants were familiar with RMP. Men posted more frequently than women; however, participants believed women posted more often. Students believed that students who hated a professor were more likely to post comments than students who liked a professor. Students believed that a 'caring' teacher who is female would be more respected by colleagues than a 'caring' male teacher. Students believed that a female teacher who was 'demanding' was more skilled than a male teacher who was 'demanding'; however, students believed that the demanding male teacher was more popular with students than the demanding female teacher. Compared to women, men were more likely to trust the opinion of a professor regarding another professor and to view professors as being skilled. Compared to Caucasians, African-Americans were more likely to visit RMP and trust RMP to provide accurate information. Compared to lower classmen, upper classmen visited RMP more often and trusted RMP when picking professors. When choosing an elective class, upper classmen ranked "the person teaching the class" as a more important factor than did lower classmen. Compared to lowerclassmen, upperclassmen rated the following teachers as more popular: the 'easy A' teacher, the 'flexible' teacher, the 'understanding' teacher, and the 'caring' teacher. Upperclassmen were less willing to take the 'arrogant' teacher. These findings suggest that RMP influences students' choices, and that those influences may depend on the gender, race, and level of the student.

## “THE LIQUOR IS NOT EARTHLY”: THE TEMPEST AND THE DOWNFALL OF NATIVE AMERICANS

*Presented at the Big South Undergraduate Research Symposium, Asheville, N.C., March 2009*

**Sally Shader, 2009**

*Department of English*

*Faculty Mentor:*

*Matthew Fike, Ph.D.*

The purpose of this paper is to illuminate Caliban’s encounter with alcohol in *The Tempest* in light of his similarity to Native Americans. His introduction to liquor by Stephano and Trinculo is highly reminiscent of the first times in which Europeans gave alcohol to Native Americans in the New World. The interpretation of Caliban as a Native American thus reflects issues that these oppressed peoples, past and present, have experienced with alcohol and leads one to wonder why Shakespeare lets Caliban escape his drunken tomfoolery unscathed. Critics who mention Caliban’s intoxication, such as Stanton Garner, Charles Frey, Virginia Mason Vaughan, and Alden T. Vaughan, generally do not explore the occurrence in relation to Caliban’s role as a Native American. To fill this void, I examine several similarities between drunken Caliban and intoxicated Indians: instant insobriety, delusions of power, the link between alcohol and the supernatural, and violent tendencies. European colonizers bring about this behavior in Caliban and Native Americans, yet Caliban cannot be considered a true American, being a European fabrication himself. Therefore, he escapes the fate of real-life Native Americans because he does not share their disconnection from European society. Shakespeare’s true intentions behind Caliban’s flirtation with alcohol will forever be unknown, but it is justifiable to conclude that while infusing the play with contemporary criticism, the author could not fully realize or tackle the plight of a real-life “Other,” the Native American, nor could he do anything about their downfall.

## TO BE OR NOT TO BE - ONE’S OWN GRANDFATHER

*Presented at the Winthrop University Department of English Undergraduate/Graduate Research Conference, February 2009*

**Jason Rogers, 2010**

When reading *Hamlet*, the reader is filled with a myriad of emotions: hope, sorrow, despair, hysteria-the entire gambit. Yet when taking into account as-



*Department of English*  
*Faculty Mentor:*  
*Matthew Fike, Ph.D.*

pects of Shakespeare's history, we are consumed with a plethora of unanswerable questions, primarily, for me, which character is a reflection of the bard himself? While the commonly accepted theory is that Shakespeare projects himself onto Prince Hamlet, there are some striking indicators, presented by Stephen Dedalus in James Joyce's *Ulysses*, that could (and do) lead one to believe that Shakespeare associates himself with the ghost of King Hamlet. Additionally, there are concepts surrounding the playwright as a creator and the soul as one's experience, making it possible for connections to be made as though there were three generations in the play. I argue that Shakespeare is not only Prince Hamlet but King Hamlet and Prince Hamlet's "soul" as well, despite Hamlet's specific reference to the soul as female, and therefore it can be argued that Shakespeare is his own father, son, and metaphorical "grandfather." My paper addresses the following: an investigation of Shakespeare's history and how it correlates with that of King Hamlet, Virgil's comments in Dante's *Inferno* and Dedalus' application of such, Aristotle's interpretation of the soul and Dedalus' manipulation of it, and the algebraic equation Dedalus creates to "prove" the supposed genealogy. The combination of these points should lead to an understanding of the comments made in *Ulysses*: "We have grown out of Wilde and paradoxes. It's quite simple. He proves by algebra that [King] Hamlet's grandson is Shakespeare's grandfather and that he himself [Shakespeare] is the ghost of his own father." With this understanding, it will become apparent that there are more layers in Hamlet than is commonly accepted.

## COLLEGE STUDENTS' PERCEPTIONS OF PSYCHOLOGY AS A SCIENCE

*Presented at the Southeastern Psychological Association Conference, New Orleans, La., February 2009*

**Jennifer Ludwig, 2009**

*Department of Psychology*  
*Faculty Mentor:*  
*Merry Sleight, Ph.D.*

Friedrich (1996) developed the Psychology as a Science (PAS) Scale to measure people's attitudes towards psychology as a natural science. The higher the PAS score, the more psychology is perceived as an empirical science (Friedrich, 1996). The current study used the PAS scale to compare students majoring in natural sciences to psychology majors. Participants were 20 men and 65 women from chemistry, biology, and psychology classes. Participants completed the PAS Scale (Friedrich, 1996) and questions created by the researcher to further assess perceptions of psychology as a science. Natural science students were more likely to agree that the sub-areas of psychology seem unrelated to each other,  $t(66) = -3.56$ ,  $p < .01$ , and

that psychological problems cannot be solved with controlled research,  $t(66) = -2.97, p < .01$ . Psychology majors were more likely to agree that research funding is as necessary for psychology as it is for the natural sciences,  $t(66) = 3.77, p < .01$ , society benefits greatly from research done in psychology,  $t(66) = 2.87, p < .01$ , and researchers in psychology are scientists,  $t(65) = 2.04, p < .05$ . The more psychology credit hours participants had completed, the less they agreed that the sub-areas of psychology are unrelated,  $r = -.40, p < .05$ , the more they believed that research can help solve psychological problems,  $r = -.24, p < .05$ , the more they agreed that government funding of psychological research is as important as funding natural science research,  $r = .36, p < .01$ , the more they agreed that research psychologists are scientists,  $r = .29, p < .01$ . We asked psychology majors to classify themselves as counselors, scientists, both, or neither. No psychology major viewed themselves primarily as a scientist. The 'both' group reported more experience with research in biology,  $t(18) = -2.38, p < .05$ . In general, psychology majors are more likely to view psychology as a true science than those majoring in a natural science. Although psychology majors are more likely to view psychology as a science, their experience had little impact on their willingness to identify themselves as scientists.

## VENUS VERSUS DIANA: CHASTITY AND PROCREATION IN A MIDSUMMER NIGHT'S DREAM

*Presented at the Winthrop University Department of English Undergraduate/Graduate Research  
Conference, February 2009*

**Laura Merritt, 2010**

*Department of English*

*Faculty Mentor:*

*Matthew Fike, Ph.D.*

Previous discourse on this work discusses gender roles illustrated in the play, its relationship with history, and its probable creation to honor a marriage. My paper explores uncharted territory by focusing on the emphasis on procreation over chastity in *A Midsummer Night's Dream* by analyzing allusions to the goddesses Venus and Diana. In the play there is one direct allusion to the goddess Diana, while there are six that mention either Venus or Cupid.

The prevalence of allusions to Venus in comparison with the scant mention of Diana suggests that *A Midsummer Night's Dream* emphasizes the importance of reproduction over chastity. The first example of emphasis on procreation is not an allusion to Diana but a mention of the moon. The direct allusion to Diana occurs when the audience is introduced to Hermia and her struggles. Elizabethans saw Diana as unnaturally serious about chastity; to Shakespeare and his peers, Venus symbolized procreation as an important part of the life cycle. These cultural ideas are why Venus is the appropriate deity for the young women in the play to emulate and why the allusions to her are more numerous. In retrospect, *A Midsummer Night's*

Dream does not overemphasize a maiden's chastity but encourages her to marry and increase her legacy by producing heirs. An aspect of Elizabethan culture that made such changes possible was its Queen. But a woman's life at that time was a contradiction, even for the most powerful female. Elizabeth controlled her kingdom brilliantly but was constantly reminded of her childlessness by her advisors and even by Shakespeare. Despite her power, she was a woman, and she was expected to enact the role male society saw appropriate. But life did not enact art, and the Queen lived like Diana until she died. Venus may have been the model for Hermia and Helena, but the Virgin Queen followed the moon, and by transcending expectations she has made a difference in the women's lives for centuries, serving as an example of what women can do whether they are chaste or not.

## ROSALIND AS GANYMEDE: THE FUNCTION OF MASCULINE DISGUISE IN AS YOU LIKE IT

*Presented at the Medieval-Renaissance Conference XXII,  
University of Virginia's College at Wise, September, 2008*

**Taylor Rollins, 2009**

*Department of English*

*Faculty Mentor:*

*Matthew Fike, Ph.D.*

The purpose of this paper is to focus on one of the specific aspects of Elizabethan theater, the use of the boy actor, and to argue that the youth's presence on the stage greatly enhances Shakespeare's references to homosexuality in *As You Like It*. The use of boy actors to play female roles was a common practice in Shakespeare's England because there was a long-standing tradition of women being banned from the theatrical stage. Yet the use of boy actors came under criticism from the conservative religious community, particularly the Puritans, who believed that the use of boy actors in woman's clothing would cause both heterosexual occurrence of adultery and also homosexual desire. In addition to the protest from religious groups, there were laws on the books in Shakespeare's day that specifically outlawed the act of sodomy, though, there were no laws specifically addressing homosexuality per se. Shakespeare's presentation of a homosexual relationship in *As You Like It* is somewhat muted and often lies just beneath the surface of the text. Thus, his allusions and subtle crafting of text may have been missed by his present-day audience during the performance of the work. Yet the use of boy actors adds emphasis to these homosexual elements in the text. Though the text itself provides evidence for Orlando's homosexual desire for Rosalind, it is the boy actor who creates the most convincing presentation of homosexuality within the play. He provides the play with its essential homosexual elements.

# DESIGN OF SKI-I DERIVATIVES THROUGH IN SILICO DOCKING FOR IMPROVED ORAL BIOAVAILABILITY

*Presented at the Southeastern Regional Meeting of the American Chemical Society, Nashville, Tenn., November 2008 and received an Honorable Mention*

**Erin White, 2009**

*Department of Chemistry,*

*Physics, and Geology*

*Faculty Mentor:*

*T. Christian Grattan, Ph.D.*

Sphingolipids are a family of compounds that, in addition to being structural constituents of cell membranes, play key roles as signaling molecules. In particular, two of these sphingolipid metabolites, ceramide and sphingosine 1-phosphate (S1P), have recently received considerable attention as integral mediators of cell death and survival. The regulator of the ceramide/S1P equilibrium is sphingosine kinase-1 which phosphorylates the sphingosine to form S1P. Sphingosine kinase-1 has been identified as an oncogene and is, therefore, of considerable interest in the treatment of cancer. A number of novel inhibitors of sphingosine kinase-1 have recently been identified and evaluated by Smith et al. These inhibitors show promising chemotherapeutic results in vitro, but are a starting point in the eventual optimization of in vivo activity. Without a crystal structure of the protein, a homology model of the sphingosine kinase-1 enzyme has been achieved to aid in evaluating derivatives of the target structure and directs the synthetic efforts. These docking studies allow us to evaluate the molecule for pharmacophoric regions that must be maintained for sustained therapeutic potency while identifying auxophoric regions for synthetic modification. Free energy of binding values and predicted  $K_i$  values produced by the docking program were used to estimate the potential of each derivative as a suitable inhibitor of sphingosine kinase-1. Visualizing the homology model has also led to greater insight about the characteristics of the enzyme's binding site, giving greater direction towards which components are essential for binding. Calculations on various compounds within our homology model have produced a number of promising leads towards improving the inhibitory activity of sphingosine kinase-1. The leads have directed our synthetic efforts so that the in silico docking results may be realized through collaborative bioassay testing. This testing will then allow for additional modifications to the lead compounds until inhibition activity can be optimized.

## NEOBLASTS IN CATENULIDA

*Presented at the Society for Integrative and Comparative Biology, Boston, Mass., January 2009*

*(Merlie, S., Ryan, K., and Smith, J.)*

*Supported by a Winthrop University Research Council Grant*

**Sara Merlie, 2011**

**Kevin Ryan, 2011**

*Department of Biology*

*Faculty Mentor:*

*Julian Smith, Ph.D.*

Our current understanding of the stem-cell (neoblast) system in Platyhelminthes comes primarily from a wealth of experiments on regeneration in members of the Tricladida, supplemented by studies of members of other groups. To date, there are relatively few studies of the neoblasts in the potentially-primitive Catenulida. Accordingly, we have carried out M-phase (anti-phosphoH3) and putative S-phase (anti-PCNA) labeling experiments in *Stenostomum virginianum* and *Catenula lemnae*, supplementing these light-microscopic histochemical studies with electron microscopy. We have also studied neoblast dynamics in starved and fed *S. virginianum*. Neoblasts were observed in the gastrodermis and parenchyma of both species by both light-microscopic immunohistochemistry and by electron microscopy. In addition, *S. virginianum* was found to possess neoblasts in the epidermis, consistent with previous light- and electron-microscopic observations of dividing cells in the epidermis of various catenulid species. Following prolonged starvation, neoblast mitoses in *S. virginianum* recovered in a biphasic fashion, with mitoses peaking at 3 hours and 24 hours post-feeding, in a pattern reminiscent of that in triclad flatworms. Collectively, these data support the hypothesis that the neoblast stem-cell system may be a synapomorphy for the Platyhelminthes.

## CONFLICT IN THE CLASSROOM: THE ROLE OF FACULTY ALLIES

*Presented at the Southern Sociological Society Meeting, New Orleans, La., April 2009*

*(Story, J., Weil, J., and James, K.)*

**Jennifer Story, 2008**

The college classroom represents the heart of the undergraduate learning experience. Ideally, it is a place where professors share their expertise, and students

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Faculty Mentors:  
Jeannie Weil, Ph.D.  
Kelly James, Ph.D.*

actively engage course content through discussion. However, educational dialogue is not always a pleasant experience for some groups. We analyze surveys completed by 304 students at a public liberal arts university in the Southeast. Quantitative data analysis reveals that comfort levels in college classrooms vary for different student populations. Three out of five gay/lesbian/bisexual students and fifteen percent of Christian and African-American students say they have felt uncomfortable in classroom discussion. These findings suggest the need for faculty to serve as allies for those students when covering course material. Focus group data further details student and faculty perceptions of classroom discussions and the role of faculty moderators. Results confirm that professors should actively engage diverse student groups and hone skills to effectively manage contentious debate.

## TOTAL SYNTHESIS OF A NOVEL SKI-I INHIBITOR

*Presented at the annual INBRE Meeting, 2008 and Southeastern Regional Meeting of the American Chemical Society, Nashville, Tenn., November 2008*

**Matthew Wilson, 2009**

*Department of Chemistry,  
Physics, and Geology  
Faculty Mentor:  
T. Christian Grattan, Ph.D.*

Sphingolipids are a family of compounds that, in addition to being structural constituents of cell membranes, play key roles as signaling molecules. In particular, two of these sphingolipid metabolites, ceramide and sphingosine 1-phosphate (S1P), have recently received considerable attention as integral mediators of cell death and survival. The regulator of the ceramide/S1P equilibrium is sphingosine kinase-I (SKI) which phosphorylates sphingosine to form S1P. SKI has been identified as an oncogene and is, therefore, of considerable interest in the treatment of cancer. To this end, a number of novel inhibitors of SKI have recently been identified and evaluated by Smith et al. A concise four-step synthesis of SKI-I has been completed, and in vivo studies show the target compound to have a  $IC_{50} = 1$  M. Straightforward functional group modification allows for numerous derivatives to be synthesized quickly and concisely in effort to increase the therapeutic effect and oral bioavailability of SKI-I. Following a base catalyzed mixed Claisen condensation, three successive microwave reactions run under neat conditions produce a family of diverse complexes in relatively high yield. These compounds are being analyzed to determine the change in inhibition of sphingosine kinase-1. Variations in one, or more, of four molecular zones can be achieved synthetically.

These modifications will identify the pharmacophoric portion of the template structure so that an optimized inhibitor may be realized to improve upon chemotherapeutic cancer treatments.

## UNDERGRADUATES' IN-GROUP IDENTITY AND REACTIONS TO A WEB-BASED GOSSIP SITE

*Present at the Southeastern Psychological Association Conference, New Orleans, La., February 2009*

- Ashton Ryan, 2009**  
**Abigail Harrison, 2008**  
**Kayla Cleveland, 2010**  
**Breland Wright, 2010**
- Department of Psychology*  
*Faculty Mentor:*  
*Merry Sleigh, Ph.D.*
- Juicycampus.com is a controversial, web-based gossip site which allows people to post anonymous comments about individuals, groups, and campuses. The site is relatively new, and research has not yet addressed students' attitudes toward or interaction with it. This study assessed this information, as well as examining how these attitudes and behaviors related to students' in-group identity with their university. Sixty-one college students completed a survey that included a measurement of in-group identity focused on their university (Leach, Zomerren, Zebel, Vliet, Pennekamp, Doosje, and Ouwerkerk, 2008). We also assessed how students use and their attitudes toward juicycampus.com. Half of the participants received a survey that ended with negative comments, referenced as being from juicycampus.com, targeted toward their university. Half of the participants read negative comments that were targeted toward another university. Forty-five percent of our participants reported having visited juicycampus.com, with the remainder reporting they had never visited it. Student characteristics offer some insight as to how an individual will use and respond to web-based gossip. Specifically, students had negative reactions to information associated with their university, and an in-group identity decreased their willingness to respond to web-based gossip. Women and Greek members had greater interaction with the website than men and non-Greeks. In contrast, personal characteristics such as self-esteem, year in school, and religious identity bore no relationship to attitudes and behaviors. This information may be useful to students who are concerned about salacious website postings and to schools that are considering restricting access to such sights in the context of first amendment rights.

# INVESTIGATING STRUCTURAL HETEROGENEITY IN SINGLE DIMERS OF AMYLOID-BETA PEPTIDE

*Presented at the Annual Meeting of the South Carolina Academy of Sciences, Columbia, S.C., April 2009  
(Russell, C., Powell, L., and Lammi, R.)*

*Supported by an NIH Grant from the National Center for Research Resources for SC-INBRE and a  
Winthrop University Research Council Grant*

**Chelsea Russell, 2010**

**Lyndsey Powell, 2010**

*Department of Chemistry,*

*Physics, and Geology*

*Faculty Mentor:*

*Robin Lammi, Ph.D.*

Amyloid-beta (A $\beta$ ) is a peptide of 39-43 amino acids that aggregates to form the senile plaques associated with Alzheimer's disease. Recent evidence suggests that soluble oligomers as small as dimers may be linked to disease progression. As such, understanding how these peptides first begin to associate is a vital step toward preventing and treating Alzheimer's. We are using single molecule spectroscopy (SMS) to investigate the structures of individual fluorescently labeled A $\beta$ (1-40) dimers. Dimers are prepared by combining monomers singly labeled with the donor and acceptor dyes FAM and Hilyte-Fluor TR (HFTR). Biotin moieties on the donor-labeled peptides permit tethering to functionalized cover slips. Laser excitation prepares excited donor (FAM) dyes; peptide association into dimers (and larger species, excluded during analysis) is evidenced by acceptor (HFTR) fluorescence, which can occur due to Forster Resonance Energy Transfer (FRET) between the dyes. Dimers are located by imaging 20x20-micron regions of sample, separating dye fluorescence onto donor and acceptor channels; the appearance of a co-localized spot on both detectors is indicative of at least a dimer. By measuring donor and acceptor fluorescence as a function of time, we are able to determine time-dependent FRET efficiencies for individual dimers, gaining insight into inter-dye distance and dimer structure. To date, we have determined that dimers prepared in solution, prior to surface-tethering, exhibit a particular range of FRET efficiencies. Comparison to published simulations of planar A $\beta$ (1-40) dimers suggests that we observe only a subset of the likely dimer structures, perhaps representing preferred structures in solution. We are currently studying dimers prepared on the glass surface, to determine whether a broader distribution of (preferred and transient/trapped) structures may be observed. Together, these results may lend important new insight into the structures of small A $\beta$  oligomers to be targeted in the treatment of Alzheimer's disease.



## THE AMERICAN REVOLUTION THROUGH A DIFFERENT LENS: THE AMERICAN LOYALISTS IN PERSPECTIVE

*Presented at the Carolinas Phi Alpha Theta Regional Conference, Boone, N.C., March 2009*

**Elizabeth Oswald, 2010**

*Department of History*

*Faculty Mentor:*

*Rory Cornish, Ph.D.*

This paper was the result of independent research. To many contemporary Patriots, the American Loyalist was a dangerous traitor to the American cause of independence. A Tory, one commentator noted, was a thing whose head is in England, his body in America, and whose neck ought to be stretched. This opinion dominated nineteenth century American historical writing, but twentieth century historians, however, refocused attention on the Loyalists, suggesting that much can be learned from their motivations in opposing independence.

Surprisingly, approximately 50,000 Loyalists fought in British provincial line regiments or the Tory militia, and this conference paper explored who the Loyalists were, why they opposed independence, and what happened to them after 1782.

## THERE WAS INDEED BLOOD! THE LUDLOW MASSACRE OF 1914 REVISITED

*Presented at the Carolinas Phi Alpha Theta Regional Conference, Boone, N.C., March 2009*

**Alysja Garansi**

*Department of History*

*Faculty Mentors:*

*Rory Cornish, Ph.D.*

The United States had the one of the worst histories of industrial labor relations at the end of the nineteenth and early twentieth centuries. Begun as a paper in History 300, this paper was rewritten as a conference paper to explore the events of April 20, 1914, when the Colorado National Guard opened fire on striking miners. Seen by recent historians as perhaps the deadliest event in the labor history in the United States, the paper investigated the events surrounding the death of men, women, and children that day. Were the miners, the owners

of the Colorado Fuel and Iron Company to blame? What was the role of President Wilson in this affair? This paper reviewed these questions, as well as the legacy of the Ludlow Massacre.

## MILK KINSHIP: A STRATEGY

*Presented at the 7th Annual South Carolina Student Conference, Columbia, S.C., April 2009*

**Megan Ratcliff, 2010**

*Department of Sociology  
and Anthropology*

*Faculty Mentor:  
Richard Chacon, Ph.D.*

Sharing breastmilk with unrelated people forms kinship ties. These ties known as Milk Kinship are a form of fictive or spiritual kin, but in practice, the social, moral, and legal implications are more consistent with natal or affinal kin. An extensive review with particular attention given to Islamic and Christian influences found commonalities in the application of Milk Kinship. Furthermore, this paper revealed Milk Kinship as a cross cultural strategy, purposefully employed to manipulate outcomes, promote alliances, and improve social standing. This research shows that individuals create and maintain Milk Kinship ties for personal and societal gain.

## IN VITRO DAMAGE MODELS OF MYOCARDIAL INFARCTIONS: ECM REMODELING

*Presented in part at the NIH-NCRR Biennial Symposium as a Highlighted Cardiovascular Presentation, Washington, DC, August 2008*

*Presented to the Department of Biology, Winthrop University, March 2009*

**Christopher Bennett, 2009**

*Department of Biology*

*Faculty Mentors:  
Dwight Dimaculangan, Ph.D.  
Kimberly Wilson, CPhT, MS*

Myocardial infarctions (MI), heart attacks, result from Coronary Heart Disease and account for more than half of all cardiovascular related deaths within the United States. During an MI, ischemia induces cell death that results in a lack of structural integrity at the injury site and extracellular matrix remodeling (ECMr). A primary component of ECMr is the up-regulation of collagen synthesis to form a scar (fibrosis), which causes decreased myocardial function. The cellular responses to this damage are not well understood and few in vitro tissue culture models exist that can mimic this damage. In these studies we are using a 3D cardiac tissue culture system that has been used to study heart development at the USC-School of Medicine, as an in vitro model of MIs via two

different approaches: cyroinjury and hypoxia. Current work has been focused on cryodamage. The method is a physical cellular damage approach involving short-term dry-ice plug contact. To look for the presence of ECMr, staining procedures have been optimized for confocal fluorescent microscopy, used to identify relative levels and changes in the biosynthesis of Collagen Types I and III, and highlight the presence of nuclear material. Two methods were used to prepare specimens for microscopy: cryosectioning and whole mount. Although the cryosectioning method showed large areas of cells becoming detached from the cellular matrix, the whole mount procedure allowed for preparation that provided an intact product with minimal cell loss. Although the tubes used in this preliminary study were not appropriate to assess the cryodamage because fibroblasts were the predominate cell type, they did allow for the development and verification of the staining protocol for confocal microscopy. We found type I collagen staining mostly localized to the outer surfaces of the tubes, while type III collagen was found beneath the outer surfaces and projecting into the matrix of the tubes. In addition we found heavy cable-like structures that stained for both type I and III collagens. Future studies will continue with the whole mount approach to illustrate these differential dispositions for collagen biosynthesis.

## STUDENT STUDY SCHEMAS

*Presented at the Southeastern Psychological Association, New Orleans, La., February 2009  
(Allen, W. and Hayes, M. W.)*

**Wesley Allen, 2009**

*Department of Psychology*

*Faculty Mentor:*

*Matthew Hayes, Ph.D.*

The purpose of this longitudinal study was to observe whether participants' adapted their study habits to meet the demands of their courses. This pilot study consisted of 14 participants enrolled in a General Psychology course during the summer. Students completed a study habits questionnaire and completed a log of the study behaviors at the beginning and end of the course. The results showed that participants' study behaviors changed during the course; however, these changes were not always positive. Results indicated that participants engaged in good study habits but used more surface study strategies towards the end of the semester. Participants were also able to adapt their study strategies to meet the course demands.

## THE EFFECT OF EXPECTATIONS AND DURATION ON SATISFACTION WITHIN ROMANTIC RELATIONSHIPS

*Presented at the Southeastern Psychological Association, New Orleans, La., February 2009  
(English, E., William, D., Adams, B., Klepper, H, and Hayes, M. W)*

**Erin English, 2009**

*Department of Psychology  
Faculty Mentor:  
Matthew Hayes, Ph.D.*

This study delved deeper into romantic relationships with a focus on expectations and duration. Previous work has either investigated expectations or measurements of satisfaction. This research combines expectations and duration to better understand satisfaction in romantic relationships. The results allowed us to conclude that duration has a significant effect on relationship satisfaction, but expectations were not significant in predicting relationship satisfaction.


## INFLUENCE OF A PERSON'S SEX ON THEIR VIEWS OF WOMEN IN LEADERSHIP ROLES

*Presented at the Carolina Undergraduate Social Science Symposium, Aiken, S.C., April 2009*

**Trisha Taylor, 2010**

*Department of Sociology  
and Anthropology  
Faculty Mentor:  
Douglas Eckberg, Ph.D.*

The objective of this study was to find if there is a relationship between the sex of an individual and their beliefs on perspectives on women in power. Previous studies that have been conducted on women in leadership positions have shown that women leaders are judged more harshly and are stereotyped more so than men in leadership positions. In this study, a survey that contained three questions that focused on women in leadership roles were given to students at a university, who were picked by using a systematic random sample. The results showed that sex is related to views on women in leadership positions.



# Other Student/Faculty Collaborations

## PHYSICAL SIMILARITY AND INITIAL ATTRACTION IN ROMANTIC RELATIONSHIPS

**Meghann McKinney, 2009**  
**Ashley Sanders, 2009**

*Department of Psychology*  
*Faculty Mentor:*  
*Merry Sleigh, Ph.D.*

The present study investigated physical similarity in romantic relationships among college students. Previous research has indicated that there was not enough research done on the idea of physical similarity among partners (Bunk, Dijkstra, Fetchenhauer, & Kenrick, 2002, Eastwick & Finkel, 2006, Perlini & Boychuck, 2006, & Saxton, Caryl, and Roberts, 2006). Participants were 52 young adults, with a mean age of 20.5. Participants completed the 41 question study concerning either a current or previous relationship which measured the degree of physical similarity in the specific relationship. A physical similarity score was created out of the collected data. Possible scores could range from 0 to 3, with 0 representing absolutely dissimilar, and 3 being extremely physically similar. The study found that only 13.7% of participants scored a 0 on the physical similarity scale, while 19.6% of participants scored a 3. The rest of the participants scored in the middle, rating themselves slightly dissimilar or slightly similar. Other relationship aspects were also investigated. These aspects included: attractiveness, personality, humor, interests, IQ, marital status, parental status, income, religion, age, and occupation. The study concluded that personality was rated most important among participants, with attractiveness being second most important. The current study loosely supported the idea that physical similarity plays a role in initial attraction, though further studies should be conducted.

## SOCIAL INTERACTION SCENARIOS: STEREOTYPE THREAT IN NON-HETEROSEXUALS

**Ashley Collins, 2009**

*Department of Psychology*  
*Faculty Mentors:*  
*Cheryl Fortner-Wood, Ph.D.*  
*Donna Nelson, Ph.D.*

This study investigates the manifestation of stereotype threat in non-heterosexual group members. Stereotype threat occurs when one becomes concerned about confirming a stereotype about one's group, and many times this affects performance. In the past, stereotype threat has been investigated in regard to gender groups and racial groups in academic settings. This study, however, is geared towards supplying more information about an already under-studied group, non-heterosexuals, and further investigating an additional stereotype threat effect - social performance. This is important because social performance could affect friendship making, misinterpretation of this groups' behavior to dominate culture group members, and general life satisfaction and social comfort. Participants will include non-heterosexual group members who are of the age 18 and older. Subjects will be recruited through leaders of GLBT (gay, lesbian, bi-sexual, transgender) centers who have consented to aid in recruitment. Participants will be given statements about their social experiences and asked to rate the extent to which these statements apply to them, scenarios in which they will be given open-ended questions about stereotypes and interactions they may have with others along with demographic questions. Responses will be anonymous and collected in April using a web-based survey.

## DEVELOPMENT OF SPE HPLC/ESI/MS/MS METHOD FOR TRACE DETECTION OF TARGET ANALYTES IN AQUEOUS MEDIA

*Supported by the Department of Chemistry and by a National Science Foundation MRI Grant*

**Sarah Spell, 2009**

*Department of Chemistry,*  
*Physics, and Geology*  
*Faculty Mentor:*  
*Patrick Owens, Ph.D.*

With annual pharmaceutical consumption in the United States ranging between one and two hundred tons, the occurrence of pharmaceuticals in the environment has become an emerging concern. Many pharmaceuticals and their metabolites are released into the environment primarily through wastewater. When these compounds enter the environment they can form additional degradation byproducts which can be more toxic than the original compound,

having adverse effects on living organisms. It has been reported that pharmaceutical concentrations in wastewater have been detected at ng/L, part-per-trillion (ppt), levels, and those in river waters have been detected at lower sub-ppt levels. The overall goal of this research is to develop an analytical system at Winthrop University that can detect these low ng/L concentrations. After an extensive literature review was conducted, thirteen pharmaceutical compounds were identified for analysis. Because such low levels are being monitored, solid phase extraction (SPE) is necessary for preconcentration of the analyte. The components are then separated using high performance liquid chromatography (HPLC), followed by electrospray ionization (ESI) tandem mass spectrometry (MS/MS) for detection of the analytes. Analysis is conducted in multiple reaction monitoring (MRM) mode. A specific parent ion is selected and passed through a collision cell causing fragment ions to form. From these fragment ions, a specific product ion is selected. This allows for a more selective mode of analysis. Mass spectrometry optimization of both compound and source parameters for four of the target analytes has successfully been completed using positive and negative electrospray ionization. Because the compounds are independent of one another, the parameters must be optimized individually for each compound. Such compound parameters include entrance and collision cell exit potentials, which focus ions in and out of the interfaces. Source parameters, however, are specific to the source only and depend on the chromatography conditions used during analysis. Optimized source parameters include curtain gas flow rates and turbo gas temperatures, which are important in evaporating solvent and carrying ions into the orifice. After optimization was completed, the optimized methods were used to evaluate instrument performance and detection limits. Further work will focus on HPLC method development and SPE evaluation.

## ARE MANY CHILDREN STILL BEING LEFT BEHIND?

**LaTonya Ciera Walker, 2008**

*Department of Political Science*

*Faculty Mentor:  
Karen Kedrowski, Ph.D.*

My paper focused on the No Child Left Behind Act of 2001 implemented during the Bush Administration and the effects it had on the Jasper County School District. The hypothesis that I tested was whether or not the No Child Left Behind Act is failing to provide an adequate educational attainment to its children, thus leaving many children behind. This hypothesis was tested by focusing on race, economic barriers, and other factors that have impacted the implementation of this act. I also used methodological approaches within my paper that we discussed thoroughly during the latter part of the semester. I focused on representing the past and present of education in South Carolina by comparing the South Carolina

Accountability Act and the No Child Left Behind Act. I also focused on future aspects of No Child Left Behind by looking at potential presidential candidates such as Hillary Clinton and Barack Obama to understand how they are going to govern the education of the United States. I used bar charts and comparison charts to demonstrate the level of educational attainment of students in Jasper County School District by race and grade from 2001 to 2007. In the end, I proved the hypothetical theory that the No Child Left Behind Act is failing to provide an adequate education to its children, and that many children are, in fact, being left behind.

## ADVANCED ANALYSIS OF NEWS COVERAGE OF SPEAKER NANCY PELOSI

**Janelle E. Dunlap, 2009**

*Department of Political Science*

*Faculty Mentor:*

*Karen Kedrowski, Ph.D.*

The research conducted for this course includes a content analysis of news articles of Nancy Pelosi, Speaker of the US House of Representatives. This content analysis focused on her leadership ability, whether gendered frames originated with Pelosi or others; and the overall tone of the article. The student's preliminary findings focus on the use of such terms as "playing with the boys," Pelosi as a mother and grandmother, and other superficial references.

## TECHNIQUES AND APPLICATIONS OF FLUORESCENCE LABELING IN STENOSTOMUM VIRGINIANUM

**Justin Waterfield, 2009**

*Department of Biology*

*Faculty Mentor:*

*Julian Smith, Ph.D.*

Stem-cell (neoblast) research in the sub-group Catenulida of the phylum Platyhelminthes is currently a field that is not well defined. There are questions that need to be answered, such as why there are neoblasts present in the epidermis of the Catenulid *Stenostomum virginianum* when there are not any in Rhabditophora, and why the DNA content of these cells is important. In order to answer these questions, M-phase (anti-phosH3) and S-phase (anti-PCNA) labeling were used. Primary anti-bodies Anti-PCNA and Anti-PhosH3 were used with their corresponding antigens of Cy2 donkey anti-mouse and Cy3 donkey anti-rabbit to create the antibody cocktail used in fluorescence staining. DAPI was used as well in 1-200 and 1-500 concentrations to illustrate DNA content in the epidermal cells.



Acetone and Osmium fixations were used, as well as varying the concentrations of secondary antibodies in 1-200 and 1-500, respectively. It was determined that the 1-200 secondary antibody concentrations, as well as the Acetone over the Osmium fixation produced better results. The data collected represents the potential for extended research, as well as refinement of microscopy techniques to optimize the results yielded.

## DEVELOPING A NEW SYNTHETIC PATHWAY FOR IMPROVED SPHINGOSINE KINASE INHIBITORS

**Nicole Quigley, 2009**

*Department of Chemistry,*

*Physics, and Geology*

*Faculty Mentor:*

*T. Christian Grattan, Ph.D.*

The regulator of the ceramide/S1P equilibrium, sphingosine kinase-1, has been identified as an oncogene and attracted considerable interest for cancer treatment. A number of novel, non-lipid based inhibitors of sphingosine kinase-1 were recently identified and evaluated by Smith et al. One of these inhibitors, SKI-1, showed promising chemotherapeutic results in vitro but poor in vivo activity, and has therefore become a target for synthetic design. A concise four-step synthesis has been investigated, and the product was compared to the original molecule through collaborative bioassay testing with very similar activity. Although complete, we are developing a new synthetic pathway to produce more derivatives of our target compound, SKI-1. This route has allowed us to explore some novel chemical reactions in order to improve upon our previous scheme. A comparison of the known compounds to the new derivatives will allow for pharmacophoric identification on the target structure along with information on enhancing the inhibition of S1P production. These results will be applied toward the design and synthesis of an inhibitor compound that maintains and improves upon current cancer therapy.

# CLONING AND EXPRESSION OF HUMAN SPHINGOSINE KINASE 1

**Sabine Mahony, 2009**

*Department of Chemistry,  
Physics, and Geology  
Faculty Mentor:  
Jason Hurlbert, Ph.D.*

Human sphingosine kinases (hSKs) are a novel group of enzymes that regulate the balance of sphingolipids such as ceramide, sphingosine, and sphingosine-1-phosphate (S1P). Sphingolipids are key regulators of biological responses such as apoptosis and angiogenesis. The product of the sphingosine kinase 1 catalyzed reaction, S1P, has been shown to promote antiapoptotic behavior in vitro, and elevated levels of hSK1 have been found in cells from tumors of the breast, colon, lung and prostate. These observations have made hSK1 an attractive target for the development of new therapeutic agents for the treatment of cancer.

Our laboratory uses x-ray crystallography to determine the three-dimensional structure of proteins which, in turn, can be used for the design of protein-specific inhibitors. As an initial step in the determination of the structure of hSK1, we have identified and cloned the catalytic core of the enzyme for expression in a bacterial system. Soluble expression of target proteins is one of the bottlenecks in the structural analysis of proteins, and to overcome this, we employed several bioinformatic analyses in order to identify the sequence of hSK1 that would give optimal yields of soluble protein. We initiated our studies by using the Basic Local Alignment Search Tool (BLAST) at the National Center for Biotechnology Information (NCBI) to scan the protein data bank (PDB) for homologous proteins with known crystallizable amino acid sequences. Sequence alignments of hSK1 with homologous proteins were inspected for regions of localized amino acid identity, which allowed for identification of catalytically important domains within hSK1, as well as regions to be considered as termini for recombinant hSK1. To better identify possible terminal regions of the hSK1 catalytic core, the hSK1 sequence was analyzed via the Predictor of Natural Disordered Regions (PONDR) algorithm. Based upon the results of our bioinformatic analyses, it is our hypothesis that a bacterial expression construct containing the cDNA for the truncated hSK1 amino acid sequence, Arg24 through Glu364, can be used to express soluble hSK1 protein. This sequence was cloned into several bacterial vectors, and studies are currently underway to identify the optimum conditions for protein expression.

## EXPRESSION, PURIFICATION, CRYSTALLIZATION AND PRELIMINARY X-RAY CRYSTALLOGRAPHIC ANALYSIS OF BACILLUS SUBTILIS ENDOXYLANASE C

**David K. Godwin, 2009**

*Department of Chemistry,  
Physics, and Geology  
Faculty Mentor:  
Jason Hurlbert, Ph.D.*

Unlike fossil fuels, ethanol is a renewable energy source produced through the fermentation of sugars by bacteria. Heteroxylan, a carbohydrate polymer found in the hemicellulose fraction of plants, is an underutilized source of fermentable pentose sugars from hardwoods and crop residues. The primary component of heteroxylan,  $\beta$ -1,4-D-xylan is periodically substituted with a variety of chemical moieties, including: arabinofuranose, coumaric acid, ferulic acid and 4-O-methyl-D-glucuronic acid (MeGA). Conversion of this polymer to fermentable sugars may be significantly limited by these substitutions. Recently, the family 5 xylanase (xylanases C, XynC) encoded by the *ynfF* gene in *Bacillus subtilis* strain 168 was found to hydrolyze such substituted heteroxylans, forming a mixture of oligomeric xylose products bearing MeGA substitutions on the xylose residue penultimate to the reducing terminus. The exact means by which the enzyme tolerates MeGA substitutions on the substrate during binding is unknown, and characterization of the binding and catalytic modes of the enzyme may allow for the design of efficient hybrid enzymes for industrial applications. Insight into these processes can be gained by x-ray crystallographic analysis of the XynC/MeGAXn complex. To acquire crystals for such analyses, XynC from *B. subtilis* was cloned and expressed in *Escherichia coli* Rosetta2. Recombinant enzyme was extracted and purified in a two step process utilizing metal chelating affinity chromatography followed by gel filtration chromatography. Aliquots of purified XynC (5 mg/ml) were subjected to sparse matrix screening using commercially available crystallization kits. Small, rodlike protein crystals (~0.1mm, see figure) grew within 3 weeks in 0.2M sodium tartrate dibasic dehydrate, 20% PEG3350, pH 7.3. Three such crystals were harvested and cryoprotected, then subjected to diffraction analysis on beamline BL9-1 at the Stanford Synchrotron Radiation Laboratory (SSRL). The crystals diffracted to 3.0Å and were indexed to the monoclinic P21 spacegroup with unit cell parameters:  $a=61.55$ ,  $b=82.20$ ,  $c=96.93$ ,  $\alpha=90$ ,  $\beta=105.36$ ,  $\gamma=90$ . The data were sufficient to allow a medium resolution structure to be solved, which will be used as a search model for future structure determinations. The crystallization conditions are currently being refined to allow for the production of larger crystals that diffract to a higher resolution.

## TERRORISM IN THE MEDIA: A COMPARISON OF U.S. AND CANADIAN RESPONSES TO TERROR

**Cali Sandel, 2009**

*Department of  
Mass Communication*

*Faculty Mentors:*

*Guy Reel, Ph.D.*

*Christopher Van Aller, Ph.D.*

This essay investigates the way in which terrorism attacks were addressed by the media in Canada and the United States. An investigation was conducted to summarize the reactions by the media to terrorist acts before and after the September 11, 2001, attacks. By referencing major print media, such as the U.S. and Canadian publications of Time, as well as the Canadian publication McLean's and the American Newsweek, this essay attempted to determine how the media may cause an increase in the amount of fear and revenge that citizens felt in both countries. This fear and need for revenge was in many cases taken out on the Muslim communities both to the north and south of the border. Citizen reactions after major acts of violence in Canada and the U.S. are largely similar, but the differences are worth noting and interpreting. One puzzling difference is the increased tendency for Canadians to want revenge. This is difficult to explain since the September 11th attacks occurred on U.S. soil. It was concluded that the populations of both nations were affected by the September 11th attacks and felt vulnerable and fearful of further acts of violence. This fear and insecurity may be due to the media and the pro-Western agenda that is broadcasted in both Canada and the United States. By publishing stories that generally depicted terrorists as being "evil" or "monsters," the media neglected their responsibility to give their audience a clear cut story of how and why events had escalated to such a terrible point. Though violence is never the answer, there was a great deal more to the story than was broadcasted.

## MUTATION RATES IN EPITOPE AND NON-EPITOPE REGIONS OF THE HEMAGGLUTININ GENE OF INFLUENZA A.

*Supported by an NIH Grant from the National Center for Research Resources for SC-INBRE*

**Robert Zinna, 2009**

Influenza A virus, particularly the H5N1 subtype, has recently become a source of much concern to health officials. This highly pathogenic subtype, while primarily affecting avian hosts, has recently demonstrated the ability

*Department of Biology*  
*Faculty Mentor:*  
*Kristi Westover, Ph.D.*

to infect humans as well. Several Chinese provinces have reported human infection with H5N1 influenza A. It is possible that one of the factors contributing to the influenza virus's ability to make this host change lies within the hemagglutinin (HA) gene. This cylindrical glycoprotein plays an important role in viral cell attachment and is also a key protein recognized by the host's cellular immune response. We studied the mutation rates in the hemagglutinin gene of Chinese avian influenza viruses by first collecting 123 HA nucleotide sequences from GenBank ([www.ncbi.nlm.nih.gov/](http://www.ncbi.nlm.nih.gov/)) and BioHealthBase ([www.biohealthbase.org](http://www.biohealthbase.org)). These sequences contained representatives from the highly pathogenic H5N1 strain and also the less pathogenic H9N2 strain. The data set included sequences from Chinese provinces where human H5N1 infection has been reported. The nucleotide sequences were translated and aligned. Mutation rates were estimated for both predicted and known epitope sites using MEGA 4.0. The number of synonymous substitutions per synonymous site (pS) and non-synonymous substitutions per non-synonymous site (pN) were calculated for hemagglutinin epitopes of different serotypes and collection provinces. We predicted that pN would be greater for antigenic regions of H5N1 subtypes from provinces where human infection had been reported because changes in the glycoprotein gene were likely necessary for the virus to infect a novel host. Our results supported an increase in mutation rates from provinces where there had been reported human cases of avian influenza virus. There were greater pN and pS mutations in the antigenic regions compared to non-antigenic regions in HA. However, these results were not statistically significant. In order to increase the power of the analysis, we included more recent sequences (2008-2009) and will use a novel phylogenetic approach to identify pairs in independent sequences for the mutation rate calculations. This will allow a more conventional analysis of variance analysis (ANOVA) to test whether the differences in pS and pN are driven by host or location effects.

## DEVELOPMENT OF THE NERVOUS SYSTEM IN THE PARATOMIC FISSION PLANE OF AEOLOSOMA HEADLEYI

**Robert Zinna, 2009**  
*Department of Biology*  
*Faculty Mentor:*  
*Julian Smith, Ph.D.*

*Aeolosma headleyi* is a small worm belonging to the family Aeolosomatidae, located in the phylum Annelida. The exact placement of the family Aeolosomatidae within the Annelida is the subject of much debate and hinges on the morphology of the brain and nervous system, as well as the presence of ciliated pits acting as chemosensory nuchal organs. *A. headleyi* undergoes paratomic asexual fission as the primary mode of reproduction in laboratory cultures.

There have been no studies of the morphology or any concrete description of the formation of the new brain in daughter zooids. Using immunohistochemical techniques coupled with confocal scanning laser microscopy, the morphology of the original brain, central nervous system, and formation of the new brain during paratomy was described for this animal. Contrary to an earlier theory, the new brain is formed as an extension of the mother organism's central nervous system instead of being formed separately and connected. In addition, the central nervous system of this animal supports distancing this family from the Naididae, as well as removing it from Oligochaeta and keeping it within Polychaeta.

## INFLUENZA A VIRUS EVOLUTION: MUTATIONS RATES OF CHINESE NEURAMINIDASE SEQUENCES

*Supported by an NIH Grant from the National Center for Research Resources for SC-INBRE*

**Stephanie Reid, 2008**

*Department of Biology*

*Faculty Mentor:*

*Kristi Westover, Ph.D.*

Avian strains of influenza A virus have attracted enormous public attention following the appearance of human cases of avian H5N1 subtypes and associated fatalities in the early 1990s. The greatest number of deaths was seen in Hong Kong, China. We collected all available Chinese avian influenza A sequences (369), including H5N1 strains, and focused on estimating mutation rates on neuraminidase (NA) gene segment. The NA gene codes for a protein known to aid virus infection by allowing release from host cells variants of the NA gene confer enhanced virulence. The collected sequences represent 30 provinces in China, with the largest number from provinces Yunnan, Hong Kong, Guangdong and Guangxi. We hypothesized that mutation rates would vary among Chinese provinces, and that avian H5N1 mutation rates would be largest for those provinces where there had been a documented case in humans. The nucleotides sequences were translated and aligned. Mutation rates were estimated for both predicted, and known epitope sites were analyzed using MEGA 4.0. Specifically, the number of synonymous substitutions per synonymous site (pS) and non-synonymous substitutions per non-synonymous site (pN) were calculated for NA epitopes of different serotypes, collection provinces, and avian hosts. Our results supported an increase in mutation rates from provinces where there had been reported human cases of avian influenza virus. There were greater pN and pS mutations in the antigenic regions compared to non-antigenic regions in NA but were not statistically significant. We are currently developing a phylogenetic

approach using H5N1 sequences collected from *Gallus gallus* (chicken) hosts to identify pairs of independent sequences for the mutation rate calculations. This approach involves generating phylogenies using sequences from five provinces selected at random and continuing this until all combinations of provinces have been used in all phylogenies. The sequence pairs identified in all phylogenies will be used as independent replicates for the mutation calculations. We expect more robust results because by doing this we will be able to apply a more conventional analysis of variance analysis (ANOVA) to test whether the preliminary differences in pS and pN are driven by host or location effects.

## PD/C-CATALYZED CROSS-COUPLING OF ARENEDIAZONIUM SALTS AND POTASSIUM ARYLTRIFLUOROBORATES: SCOPE AND LIMITATIONS

**Lee S. Varnedoe, 2010**

*Department of Chemistry,  
Physics, and Geology  
Faculty Mentor:  
James Hanna, Ph.D.*

Palladium-catalyzed cross-coupling of arenediazonium salts with potassium aryltrifluoroborates is an attractive method of biaryl synthesis, since potassium aryltrifluoroborates have some advantages over boronic acids, and arenediazonium salts are easily made from readily available aryl amines. However, many of the published protocols require a relatively large amount of palladium catalyst for effective coupling. The resulting catalyst cost can potentially be offset by finding a relatively inexpensive heterogeneous catalyst system that can be easily recovered and has sufficient activity to be recycled into the next reaction. We have previously found that Pd/C is an effective, recyclable catalyst for the cross-coupling of p-bromobenzenediazonium tetrafluoroborate with several potassium aryltrifluoroborates. In the present study we have expanded the scope of the protocol with respect to both reactants and have found that a wide variety of both arenediazonium salts and potassium aryltrifluoroborates can be cross-coupled giving moderate to excellent yields of biaryl products.

## SYNTHESIS OF ZONE 3 SPHINGOSINE KINASE INHIBITOR DERIVATIVES AND IMPROVED LIGAND DEVELOPMENT

**Demetrius Miles, 2011**

*Department of Chemistry,  
Physics, and Geology*

*Faculty Mentor:  
T. Christian Grattan, Ph.D.*

Sphingolipids are a family of compounds that, in addition to being structural constituents of cell membranes, play key roles as signaling molecules. In particular, two of these sphingolipid metabolites, ceramide and sphingosine 1-phosphate (S1P), have recently received considerable attention as integral mediators of cell death and survival. The regulator of the ceramide/S1P equilibrium is sphingosine kinase-1 which phosphorylates the sphingosine to form S1P. Sphingosine kinase-1 has been identified as an oncogene and is, therefore, of considerable interest in the treatment of cancer. To this end, a number of novel inhibitors of sphingosine kinase-1 have recently been identified and evaluated by Smith et al. These inhibitors show promising chemotherapeutic results in vitro, but are simply a starting point in the eventual optimization of in vivo activity. Initial studies have recently been completed, in collaboration with Smith's lab, on a synthetic route to produce one of these inhibitor compounds as a template molecule along with numerous analogs. Specifically the synthesis will focus on developing zone three modifications of the template molecule which will then be compared to the template molecule through collaborative bioassay testing. These numerous derivatives will ultimately lead to an increase in the therapeutic effect of sphingosine kinase-1 inhibition. Investigation of a new methodology for synthesizing poly(pyrazolyl)methane ligands will also be examined. This methodology would dramatically improve the utilization of these ligand systems and lead to potentially new discoveries due to our findings.

## SYNTHESIS OF NOVEL ZONE 2 SPHINGOSINE KINASE INHIBITORS TOWARDS IMPROVED EFFICIENCY

**Valencia Flemming, 2009**

*Department of Chemistry,  
Physics, and Geology*

*Faculty Mentor:  
T. Christian Grattan, Ph.D.*

Sphingolipids are a family of compounds that, in addition to being structural constituents of cell membranes, play key roles as signaling molecules. In particular, two of these sphingolipid metabolites, ceramide and sphingosine 1-phosphate (S1P), have recently received considerable attention as integral mediators of cell death and survival. The regulator of the ceramide/S1P equilibrium is sphingosine kinase-1, which phosphorylates the sphingosine to



form S1P. Sphingosine kinase-1 has been identified as an oncogene and is, therefore, of considerable interest in the treatment of cancer. To this end, a number of novel inhibitors of sphingosine kinase-1 have recently been identified and evaluated by Smith et al. These inhibitors show promising chemotherapeutic results in vitro but are simply a starting point in the eventual optimization of in vivo activity. Initial studies have recently been completed, in collaboration with Smith's lab, on a synthetic route to produce one of these inhibitor compounds as a template molecule along with numerous analogs. Specifically, the synthesis will focus on developing zone two modifications of the template molecule, which will then be compared to the template molecule through collaborative bioassay testing. These numerous derivatives will ultimately lead to an increase in the therapeutic effect of sphingosine kinase-1 inhibition.

## CLONING OF ADIPOR2 FOR EXPRESSION IN C43 ESCHERICHIA COLI CELLS

**Shaylin Duncan, 2009**

*Department of Chemistry,  
Physics, and Geology  
Faculty Mentor:  
Chasta Parker, Ph.D.*

Metabolic syndrome and type 2 diabetes have become major health issues in the United States. While type 2 diabetes is known to be linked to obesity, the correlation at the molecular level is not entirely understood. One hormone that has drawn attention as the missing link between type 2 diabetes and obesity is adiponectin. Plasma levels of the hormone are higher in healthy individuals than in those who have metabolic syndrome and type 2 diabetes. It has been determined that adiponectin has anti-inflammatory effects, stimulates fatty acid oxidation, and promotes insulin sensitivity. These cellular effects occur when adiponectin binds to cell surface membrane receptors, adiponectin receptors 1 (AR1) and 2 (AR2). AR1 and AR2 are part of the PAQR family of proteins and are characterized by seven trans-membrane regions with an intracellular N-terminal end and an extracellular C-terminal end. The goal of this project was to study the structure of adiponectin receptor 2 and to determine which of the protein's amino acids play important roles in the binding interaction with adiponectin as well as the protein's stability in the plasma membrane. In order to do so, our aim was to clone the human AR2 sequence into a bacterial pET vector and to induce the expression of AR2. In an effort to maximize protein expression, a C43 strain of E. coli was used which, due to its invaginated membrane and higher surface area, was expected to produce a sufficient amount of AR2. Cloning of the AR2 sequence into a pET21a vector was verified by gel electrophoresis after a double digest with restriction enzymes EcoRV and XhoI. This vector was then transformed into the C43 E. coli. Cells were induced using 1 mM of IPTG and expression of AR2

was analyzed by Western blot analyses using both AR2-specific and 6x poly-his tag antibodies. After comparing the results to those obtained from a control culture of C43 containing a wild-type pET21a vector, it was determined that AR2 was not being expressed. Sequencing analyses of the pET21a vector revealed that the sequence had undergone a mutation, causing the AR2 gene to read out-of-frame.

## EXPRESSION OF ADIPONECTIN MEMBRANE RECEPTOR 1 IN *E. coli* CELLS

*Supported by an NIH Grant from the National Center for Research Resources for SC-INBRE and a Winthrop University Research Council Grant*

**Rachel Wilson, 2010**  
*Department of Chemistry,  
Physics, and Geology  
Faculty Mentor:  
Chasta Parker, Ph.D.*

Health issues such as obesity, diabetes, and heart disease all contribute to a newly defined medical problem known as metabolic syndrome. Adiponectin (ACRP30), a 30-kDa hormone, has been linked to metabolic syndrome and circulates in high levels in healthy individuals. One receptor that binds to adiponectin is Adiponectin Receptor 1 (AR1), expressed in the highest levels in skeletal muscle, liver, and pancreatic cells. AR1 has a seven-transmembrane domain structure where the N terminus is intracellular and the C terminus is extracellular. AR1 binds to full length and globular ACRP30 to carry out glucose uptake, fatty acid and glucose oxidation. The goal of this project was to study the structure of AR1 to determine which amino acids are needed for binding to ACRP30. AR1 was successfully cloned into a pET21a vector for expression in bacterial cells. This vector containing AR1 cDNA was then transformed into C41 and C43 bacterial cells and expression analyzed using SDS-PAGE and immunoblot analysis using specific AR1 antibodies. A better understanding of the binding properties of AR1 to ACRP30 can help advance knowledge, at the molecular level, about metabolic syndrome and potentially introduce new targets for pharmaceuticals that may alleviate symptoms of metabolic syndrome.

# CLONING, EXPRESSION AND PURIFICATION OF HUMAN ADIPONECTIN RECEPTOR 1 FOR BINDING DOMAIN STUDIES

*Supported by an NIH Grant from the National Center for Research Resources for SC-INBRE and a Winthrop University Research Council Grant*

**Zainab Ghadiyali, 2009**

*Department of Chemistry,  
Physics, and Geology  
Faculty Mentor:  
Chasta Parker, Ph.D.*

Metabolic syndrome, a cluster of physiological irregularities that include diabetes, obesity, heart failure risk, etc. affects one in every five Americans. Adiponectin (Acrp30), a 30-kDa complement related adipokine is closely related to metabolic syndrome with high circulating levels providing protective effects. AdipoR1, a recently discovered, novel membrane receptor binds to full length and globular adiponectin to mediate AMP kinase activity, regulate fatty acid oxidation and glucose uptake. The goal of this project is to produce a recombinant form of AdipoR1 in HEK 293T cells for structural analysis and biochemical assays. AdipoR1 has seven trans-membrane domains and yet is structurally and functionally distinct from the most common seven trans-membrane domain family of receptors, the G-coupled protein receptors (GPCRs). We have successfully ligated AdipoR1 cDNA into a pCMV5a vector. This vector will be transfected into HEK 293T cells and expression levels measured using Western blotting technique. Future work will involve producing mutants of AdipoR1 to look into the domains responsible for binding to Acrp30. Insight into the binding mechanism of AdipoR1 with adiponectin will help in understanding the physiology of metabolic syndrome, which may lead to the development of novel treatment methods.

# A HISTORICAL EXAMINATION OF THE GREAT AWAKENING

**Zachary Thurston, 2009**

This paper examines the issues, key figures, as well as the historiography relating to the Great Awakening of the 1740s. The paper first examines the general nature of the movement and then examines various causes. Key figures such as George Whitefield, Jonathon Edwards, William Tennent,

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*Faculty Mentor:*  
*Virginia Williams, Ph.D.*

Charles Chauncey, and others are discussed in relation to their roles in the Great Awakening. The significance of the Great Awakening in terms of growing egalitarianism, as well as schism in various churches, is discussed, as well as the effect on a changing demographic in the various churches affected by the Great Awakening. Various criticisms of the Great Awakening are then examined, from contemporary sources to later historical sources. Such criticisms included the nature of the itinerant preachers, participation of laymen in preaching, and the breakdown of a strict functionalism within the church. Some criticisms may be viewed as resulting merely from petty jealousies or prejudice, but some are notably accurate and remain issues today when studying the Great Awakening. The paper then discusses the decline of the Great Awakening and moves on to developing historiographical trends and the current scholarly consensus.

## CATHODE MATERIALS FOR LITHIUM ION BATTERIES

**Lisa Kingsmore, 2009**  
*Department of Chemistry,*  
*Physics, and Geology*  
*Faculty Mentor:*  
*Lennart Kullberg, Ph.D.*

The rapid development of lithium ion batteries provides a response to the growing needs of the electronics and information industries. The  $\text{LiMn}_2\text{O}_4$  spinel has garnered increasing interest as a lithium ion battery cathode material due to its high voltage, low toxicity, and low cost. However, the  $\text{LiMn}_2\text{O}_4$  spinel displays severe capacity fading after several charge-discharge cycles. Cation dopants, such as  $\text{Ni}^{2+}$  and  $\text{Co}^{2+}$ , used to substitute manganese ions have shown to improve capacity fading upon cycling. In our laboratory, researchers have used high temperature solid state techniques to synthesize cobalt- and aluminum-doped  $\text{LiMn}_2\text{O}_4$  materials that show promising electrochemical properties. Since recent research shows that improved spinel materials may be obtained using a sol-gel synthesis method, a modified Pechini sol-gel technique was used in this study to synthesize  $\text{LiMn}_2\text{O}_4$  spinel materials using  $\text{Co}^{2+}$  and  $\text{Al}^{3+}$  as dopants. Cathode materials of composition  $\text{Li}_{1+x}\text{Co}_x\text{Al}_x\text{Mn}_{2-3x}\text{O}_4$  ( $x = 0.02, 0.03, 0.04$  and  $0.06$ ) were prepared, characterized using XRD and electrochemically tested.



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