## **Spring Undergraduate Research Forum**

## Welcome to SURF 2012

The 19<sup>th</sup> Annual Celebration of Achievements in Undergraduate Research at Elon University

The **S**pring **U**ndergraduate **R**esearch **F**orum is a time each year when we suspend our other campus activities to celebrate the academically-centered creative endeavors and research efforts of Elon's students. This year, over 175 proposals for presentation were submitted for consideration, and over 125 faculty members representing all disciplines on campus provided over 615 reviews of the submitted abstracts. Students were invited to present at SURF at the recommendation of that body of reviewers.

SURF is an integral part of brings to light the wonderful diverse academic and creative pursuits in which our students engage each year.

We invite you to join and support the student presenters and performers as they share the joy of exploration and discovery that are the hallmarks of an intellectual community.

#### UNDERGRADUATE RESEARCH PROGRAM ADVISORY COMMITTEE

Dr.	Eric Hall	Prof. Joel Hollingsworth
Dr.	Megan Isaac	Prof. Lauren Kearns
Dr.	Byung Lee	Dr. Kyle Altmann
Dr.	Mark Kurt	Dr. Mark Enfield
Dr.	Meredith Allison	Dr. Ryan Kirk
Dr.	Yuko Miyamoto	

Dr. Paul Miller, Director, Undergraduate Research Program

Undergraduate Research & Creative Endeavors includes activities undertaken by undergraduate students with significant faculty mentoring that: (1) lead to new scholarly insights and/or the creation of new works; (2) add to the discipline; and (3) involve critical analysis of the process and/or outcome of the activities. Quality undergraduate research and creative activity result in a product that has potential for peer-reviewed dissemination in the form of presentations, publications, exhibitions, or performances.

## TABLE OF CONTENTS

### **PROGRAM LISTING by SESSION and TIME**

POSTER SESSION I POSTER SESSION II POSTER SESSION II	(8:30am - 10:30am; Authors Present 9:00am - 10:30am)
SESSION I	(10:40am - 12:20pm)
SESSION II	(12:40pm - 2:20pm) </td
SESSION III	(2:40pm - 4:20pm)

#### **ABSTRACTS BY DEPARTMENT**

Accounting	20	Health & Human Performance	72
Art History	20	History/Geography	74
Biology	22	Human Service Studies	79
Chemistry	33	International Studies	83
Communications/Journalism	41	Mathematics/Statistics	86
Computing Sciences	47	Music	88
Economics	49	Neuroscience	89
English	54	Physics	91
Environmental Studies	62	Political Science/Public Administration	93
Exercise Science	64	Psychology	96
Foreign Language	71	Religious Studies	107
General Studies	72	Sociology/Anthropology	108
		Sport/Event Management	112

## **Poster Session I**

8:30am - 10:30am; Authors Present 9:00am - 10:30am

## <u>McKinnon Hall</u>

Allison M. Rodgers & Rachel C. Banner (Dr. Barry B. Beedle) The Relationship among Body Composition, Leg Strength and Wingate Performance

**Monika B. Hayleck** (Dr. David B. Vandermast) Impact of Beech Bark Disease on Epiphyte Diversity and Cover in High Elevation Beech Gaps in the Great Smoky Mountains National Park

**Freda L. Thompson** (Dr. Caroline J. Ketcham & Dr. Eric E. Hall) Hippotherapy in Children with Developmental Delays: Physiological and Psychological Benefits

**Amy E. Salek & Jordan T. Lee** (Dr. Walter R. Bixby) Examination of Overspeed Training on Power, Speed and Agility

Jasmine G. Jackson, Morgan L. Bailey & Stephen R. Rusterholz (Dr. Amy J. Stringer) Physical Education in US News 2011: A Critical Content Analysis

**Jo A. Crum** (Dr. Victoria Del Gazio Moore) Examining Changes to BCL-2 Family Proteins Using an In Vitro Model of Sepsis in Kidney Cells

Kelly A. Giffear (Dr. Victoria Del Gazio Moore) Estrogenic Activity of Wastewater Effluent in the Piedmont Triad Area using a Four-Hour Yeast Bioassay

Kelsey M. Van Dalfsen (Dr. Victoria Del Gazio Moore) Cardiomyocyte Changes induced by Hyperglycemia

**Rachel E Wilson** (Dr. Victoria Del Gazio Moore) Investigation of BCL-2 Protein-Protein Interactions in Prostate Cancer Cells

Kelly M. McNamara (Dr. Linda Niedziela) The Effect of Estrogen Exposure on the Reproductive Ability and Success of Adult Danio Rerio

Kelly A. Giffear & Brett J. Schuchardt (Dr. Michael J. Terriblini) Protein Structure Modeling of ABCD1 Mutants: The Link to X-ALD

Marie M. Oh, Megan A. Martin & Erika M. Flashburg (Dr. Eugene B. Grimley) Flavonoid Composition of Sourwood (Oxydendrum Arboretum) Honey

**Daniel B. Agocs** (Dr. Eugene B. Grimley) A Study of the Kinetics and Mechanism of  $C_{60} + [(C_6H_5)_3P]_2Pt(C_2H_4)$ 

**Kileigh D. Browning** (Dr. David B. Vandermast) An Interaction between the European Wild Boar and Beach Bark Disease in Great Smoky Mountains National Park

## Poster Session II 12:00pm – 2:00pm

12:00pm - 2:00pm; Authors Present 12:30pm - 2:00pm

## <u>McKinnon Hall</u>

**Tyler S. Zoda** (Dr. Jennifer Platania) Can Football Buy Smarter Students?: The Effect of Athletic Spending on Football Championship Subdivision Academic Institutions

**Mara L. Bollenbacher** (Dr. James L. Barbour) Tending the Flock: Market Share Implications of Vatican II

Lauren D. Kolodrubetz (Dr. Naeemah Clark) Identity Festival: A Study of the Promotional Efforts of the First Touring Electronic Music Festival

**Carissa A. Hilliard** (Dr. Connie Book) Telemedicine and Oncology: A Study in the Effectiveness of Cancer Support Through Social Media

Molly K. O'Brien (Dr. Deborah Long)

"We Should Probably Go Sit with Them": The Role of College Access Programs in the Social Lives of Students

**Elisabetta C. McSheehy-Cooper** (Dr. Evan Gatti) Sustainable Sustainability: An Analysis of Ancient and Contemporary Perspectives

**Willem J. Prins** (Dr. Benjamin Evans) Magnetic Microspheres for Recovery of Organic Waste in Waterways

Todd M. Calnan (Dr. Daniel Evans)

Using NASA's Chandra X-Ray Observatory to Study Black Hole Variability in the Centaurus A Galaxy

**Grace C. Elkus** (Dr. Barbara Miller) Analysis of the CNN and FOX News Networks' Framing of the Keystone XL Pipeline

**Erin E. Valentine & Beatriz A. Jurema** (Dr. Amanda Sturgill & Dr. Naeemah Clark) Coverage of the Occupy Movement in U.S. Newspapers

Samantha A. Calvert (Dr. Anthony Hatcher) Media Coverage of Four Pioneering Black Athletes in Four Major American Sports

**Daniel M. Baquet** (Dr. Sharon L. Spray) Effects on Presidential Addresses Concerning the Middle East Peace Process

**Keyona D. Osborne** (Dr. Laura Taylor) Not Your Average Estimator: Evidence the Mean Should Retire

## Poster Session II....*continued*

**Theodore S. Z. Berkowitz** (Dr. Kirsten Doehler) Confidence Intervals for Proportions Using the Binomial Distribution: Traditional Methods and Improved Alternative

**Gregory S. Ehrenberg** (Dr. Anthony Weaver) Baseball Player Performance in High Leverage Situations

## Poster Session III 3:30pm – 5:30pm

3:30pm - 5:30pm; Authors Present 4:00pm - 5:30pm

## <u>McKinnon Hall</u>

**Kathryn J. Milizio** (Dr. Amy Overman) List Discrimination and Associative Recognition: Effects of Encoding Strategy in Young and Older Adults

**Lauren N. Deaver** (Dr. Maureen Vandermaas-Peeler) Influence of Home and School Context on the Oral Narratives of Pre-Kindergarten Children

Ashley Ann Guy (Dr. Alan C. Scott) Haptic Perception and Spatial Processing of Tactile Illusions

**Leslie A. Hart** (Dr. Amy Overman) The Effect of Multiple Pair Repetitions on Associative Memory

**Katherine D. McCaughey** (Dr. Gabie Smith) The Effects of Social Anxiety, Sensation Seeking, and Alcohol Expectations on Pregaming

**Clea A. Colangelo & Sarah C. Connors** (Dr. Gabie Smith) Women's Motivations for Pre-Gaming Behaviors: A Focus Group Study

Kallan M. Holt, Hannah E. Smith, Megan E. Riddle, & Emily M. Fogg (Dr. Corinne Auman) Long-Term Retention of Learning in a Simulation Game Educational Psychology Class

Marissa R. Semon (Dr. Meredith Allison) Students' Understanding of Punishment for Crimes in North Carolina

Hannah E. Smith, Megan E. Riddle, Kallan M. Holt, Sara K. Edwards, & Emily M. Fogg (Dr. Corinne Auman) Assessing Student Thinking Within the Classroom: Development of a Coding Scheme Using Blooms Taxonomy of Learning

**Morgan J. Gregg** (Dr. Yuko J. Miyamoto) Examining the Role of mTOR in T Cell Proliferation Under Immunosuppression by Rapamycin

**Sarah A. Hoopes** (Dr. David Vandermast) Ecological and Temporal Variation in the Concentration of Podophyllotoxin in Podophyllum Peltatum

**Margo R. Lowe** (Dr. Linda Niedziela) Reproductive Rate Reduction and Possible Adaptation to Stress Seen in Daphnia Magna after Exposure to Oil Dispersant

## Poster Session III....*continued*

Brittany L. White (Dr. Yuko J. Miyamoto)

The Establishment of Successful Talin Knockdown and Appropriate Conditions for Inducing Focal Adhesion Kinase (FAK) Phosphorylation in Mammalian Cells (HEK293AD)

**Benjamin P. Schwartz** (Dr. Antonio D. Izzo) Potential for Interspecies Plant Connections via Ectomycorrhizal Fungi in the Elon Forest

**Kirsten L. McCormick** (Dr. Tonya Laakko Train) The Immunosuppressive Effects of Cayaponia Tayuya on T Cells

**Kelsey Norkett** (Dr. Robert Vick) The Real Wet T-Shirt Contest: The Effect of Cotton and Dry Wicking Materials on Temperature, Exertion, and Feeling During Exercise

**Brett A. Gladish** (Dr. Joyce A. Davis) The Effect of Fatigue on Plantar Pressure in Soccer Players

**Rachel G. Anderson & Jasmine G. Jackson** (Dr. Caroline J. Ketcham) Fine Motor Development in 5-10 Year-Old Children: The Role of Posture

**Amanda B. Mischo** (Dr. Walter R. Bixby) Examination of the Impact of a Cooling Product on Cycling Performance in the Heat

**George A. Wentz, Paul E. Riuli, Andrea G. Gross, & Kelly L. Brand** (Dr. Caroline J. Ketcham & Dr. Paul C. Miller) EMG and Anaerobic Power Responses to Acute Whole Body Vibration

## Session I (10:40 am - 12:20 pm)

### LaRose Digital Theatre (Moderator: Dr. Alan Scott)

10:40 amJenna R. Chenault & Margot E. Haglund<br/>(Dr. Alexa Darby & Dr. Buffie Longmire-Avital)Student Motivation in Academic Service-Learning Over the Semester

## 11:00 amAlyson J. Hignight, Brittany C. Bowers, Jennifer K. Cox, Hayley L.<br/>D'Antuono & John M. Hollander (Dr. Kim Epting)

Glowing Review or Tough Love? The Effects of Audience and Feedback on Self-Editing in Writing

**11:20 am Katherine N. Atkins** (Dr. Alan C. Scott) Synesthesia and the Experience of Creativity

**11:40 am** Rachael E. Jones (Dr. Paul M. Fromson) Online Dating and the Consequences of Choice: The Paradox of So Many Potential Partners

**12:00 pm** Kelly A. Little (Dr. Maurice J. Levesque)

The Relationship Among Body Dissatisfaction, Relationship Beliefs, and Social Interactions With Peers: A Study of Male and Female College Students

## Koury Business Center 200 (Moderator: Dr. Walter R. Bixby)

### **10:40 am Melanie C. Chun** (Dr. Paul C. Miller)

The Impact of Glycine Propionyl-L-Carnitine Supplementation on Power Production in Recreationally Active Women

### **11:00 am** Mae C. Langford (Dr. Joyce Davis)

Is There Something Skectchy About Skechers Shape-Up Shoes?

### **11:20 am** Caroline A. York (Dr. Walter R. Bixby)

Examination of the Impact of an Active Video Game on Academic Achievement

### 11:40 am Brett A. Brawerman & Kendall L. Adkins

(Professor Elizabeth K. Bailey)

The Effect of a Health-Focused Mentoring Program on Self-Esteem, Physical Activity and Perceived Competence in Young Boys

## Session I (10:40 am - 12:20 pm) ...*continued...*

### Koury Business Center 208 (Moderator: Dr. Antonio Izzo)

**10:40 am** Jeffrey D. Wojewoda (Dr. Antonio Izzo) Analysis of *Brassica* Amended Soils Using Molecular Techniques

**11:00 am Patrick T. Ma** (Dr. David Vandermast & Dr. Ryan Kirk) Land-Use History and the Composition and Structure of Elon University Forest, A Successional Hardwood Forest in the North Carolina Piedmont

**11:20 am Lora L. Sigmon** (Dr. David Vandermast) Composition of the Soil Seedbank in a Highly Altered Riparian Forest in the Central Piedmont of North Carolina

**11:40 am David J. Muñoz** (Dr. Michael Kingston) Does Human Scent Affect the Capture Rates of Camera Traps in Wildlife Studies?

### **12:00 pm Brittany L. White** (Dr. Brant Touchette)

Physiological Responses in the Coastal Marsh Plants, Spartina Patens, Following Sudden Increases in Soil Salinities

### Koury Business Center 211 (Moderator: Dr. Mary Jo Festle)

### **10:40 am Katherine E. MacDonald** (Dr. Clyde Ellis)

"My Own People Have a Name for Me": Two-Spirit Identity in the Contemporary American Indian Community

### **11:00 am** Jessica L. McDonald (Dr. Mary Jo Festle)

Three Decades of Change: The History of Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ) Life at Duke University and UNC-Chapel Hill

### **11:20 am Kelly M. Herrick** (Dr. Janet Myers)

"A Gold Piece for a Scarlet Shame like Mine/But Mine was Not the Same": The Breaking Down of Victorian Sexual Binaries in Charlotte Mew's Poems on Gender and Sexuality

### **11:40 am Devon McGowan** (Dr. Kristen Sullivan)

"Would we Consider all Guys Rapists?": Perspectives of Undergraduate Females of Coerced-Consensual Sexual Experiences

### **12:00 pm** Katherine E. Anderson (Dr. Michael Carignan)

Women of the Primrose League: A Revolution of Gender Roles in the Conservative Party, 1880-1900

## Session I (10:40 am - 12:20 pm) ...*continued...*

### Koury Business Center 242 (Moderator: Dr. Paula Rosinski)

10:40 amMary Kate Hinshaw (Dr. Paula Rosinski)Text-Messaging: The "Digital Writing Underlife" of Elon University Students

**11:00 am Katherine J. Whittaker** (Prof. Michael B. Strickland) Lyrical South America: Travel Writing Adventures as Cultural Analysis

**11:20 am** Katie E. Kenney (Prof. Michael B. Strickland) The Power of Travel Writing: Water Scarcity in India

**11:40 am** Anna E. Becker (Dr. Stephen Braye) Employing Rhetoric in International Public Service Nonprofits: Communication Strategies for Effective and Sustainable Service

**12:00 pm Emily D. Ash** (Dr. Jessie Moore)

Inequality and Language Acquisition: A Sociocultural-Linguistic Study of Education in Los Pueblos Jovenes of Arequipa, Peru

## Koury Business Center 244 (Moderator: Dr. Safia Swimelar)

**10:40 am** Rachel R. Stanley (Dr. Safia Swimelar) The Effect of French Intervention in Domestic African Conflicts

**11:00 am Elizabeth A. Johnson** (Dr. Sean Giovanello) Biological and Chemical Weapons: L:ikelihood of Acquisition and Use by Non-State Actors

**11:20 am** Sarah B. Harrs (Dr. Prudence Layne) From the Bottom Up or the Top Down? A Comparative Analysis of Government and Grassroots Organizations in Uganda

**11:40 am Kathleen E. Price** (Dr. Betty Morgan) Circular Migration in Turkey and the Maghreb Region: Observations from the German Socio-Economic Panel Survey and Mirem Data Collections

**12:00 pm** Virginia A. Huth (Dr. Tom Arcaro) Mutual Empowerment: Experiences Through Photovoice

## Session I (10:40 am - 12:20 pm) ...*continued...*

### Koury Business Center 310 (Moderator: Dr. Sophie Adamson)

**10:40 am Katherine G. McKenzie** (Dr. Sophie Adamson) Silence and Miscommunication in the Works of Marguerite Duras

**11:00 am** Victoria S. Doose (Dr. Evan Gatti)

Re-Thinking Iconography in Ancient Art: A Case Study on the Munich Antikensammlungen Vase 1615

**11:20 am Caitlin A. Glosser** (Dr. Kirstin Ringelberg) Image and Sound: Whistler, Debussy and the Intermedial Artform

**11:40 am** Mary B. Safrit (Dr. Todd Coleman) Learn by Doing: The Compositional Process of an Untrained Composer

**12:00 pm** Joshua R. Goldstein (Dr. Omri Shimron) Informed Performance Through Analysis: C.P.E. Bach's Cello Concerto in a Major Wq. 172

### Koury Business Center 346 (Moderator: Dr. Harlen Makemson)

**10:40 am Daniel A. Koehler** (Dr. Brooke Barnett) *The Tobacco King*: Question and Answer Session

### 11:00 am Lauren D. Kolodrubetz (Dr. Harlen Makemson)

Selling the Interstate Highway System: American Security and the Frame of Safety in TIME Magazine Advertisements, 1953-1954

### 11:20 am Margaret G. Cissel (Dr. Byung Lee)

Media Framing: A Comparative Content Analysis on Mainstream and Alternative News Coverage of Occupy Wall Street

## Session II (12:40 pm - 2:20 pm)

### LaRose Digital Theater (Moderator: Dr. Buffie Longmire-Avital)

### **12:40 pm** Meagan H. Harrison (Dr. Kristen A. Sullivan)

Fair and Lovely? Skin Tone Satisfaction, Self-Esteem, and Skin Lightening Practices Among Adolescent Females in the Philippines

### **1:00 pm** Kathryn H. Seringer (Dr. Cynthia D. Fair)

"As Much as I Hate the Disease, I Probably Wouldn't be Where I am Today Without it": Experiences of Acceptance and Rejection in HIV Illness Narratives

## **1:20 pm** Kristen N. Van Fleet (Dr. Bud Warner)

Level III & IV Residential Group Homes: Cost-Effective Care for High Risk Adolescents

**1:40 pmGabrielle Newman** (Dr. Alexa Darby)Maintaining Faculty Motivation to Utilize Academic Service-Learning Pedagogy

### **2:00 pm Benjamin R. Unger** (Dr. Buffie Longmire-Avital) From Recreational to Stress Reliever: The Relationship Between Marijuana and Perceived Stress

## Koury Business Center 208 (Moderator: Dr. Tonya Laakko Train)

**12:40 pm**Alyssa D. Drosdak (Dr. Tonya Laakko Train)The Effect of Titanium Dioxide Nanoparticles on T Cell Viability and Activation

### **1:00 pm** Bryan A. Strelow (Dr. Gregory Haenel)

Exploring Species Boundaries: A Genetic Study of Interactions Between North American Cricket Frogs, Acris Crepitans and A. Gryllus

**1:20 pm Kaitlyn L Maier** (Dr. Linda Niedziela) Exposure to Carbaryl Insecticide Alters General Motor Activity in Larval Zebrafish

#### **1:40 pm** Brittany D. Corbin (Dr. Tonya Laakko Train) Titanium Dioxide Nanoparticle Toxicity in PC12 Cells

### 2:00 pm Brett J. Schuchardt (Dr. Linda Niedziela)

Sub-Lethal Impacts of Oil Dispersants on *Danio Rerio* NA+/K+ATPASE α- Subunit Expression Regulation and Enzymatic Function

## Session II (12:40 pm - 2:20 pm) ...*continued...*

### Koury Business Center 211 (Moderator: Dr. Dion Farganis)

**12:40 pm** John W. Hendrickson (Dr. Dion Farganis) Characterizing America's Political Geography

**1:00 pm** Sarah Elyse Naiman (Dr. Jason A. Kirk) India's Naxaliste Threat: Evolution of a Maoist Rebellion and State Counterinsurgency Responses

**1:20 pm** James R. Dolphin, III (Dr. Safia N. Swimelar) American Exceptionalism and the International Criminal Court

**1:40 pm** Philip R. Grimes (Dr. Honglin Xiao) Land Use and Land Cover Changes in Elon University

### Koury Business Center 242 (Moderator: Dr. Megan Isaac)

**12:40 pm** Alexandra M. Leikin (Dr. Megan Isaac) Turning Pages on Time: The Evolution of Children's Book and a Transition into the Digital World

**1:00 pm** Katherine G. Spruill (Dr. Megan Isaac)

Bullies, Books, and Broomsticks: Portrayals of Education in British and American Boarding School Stories

**1:20 pm** Emily M. Mooney (Dr. Jean Schwind) The Power of Myth in Stories of Columbine

**1:40 pm** Jillian S. Weiss (Prof. Cassie Kircher) Applying Magical Realism to Literary Nonfiction

## Koury Business Center 244 (Moderator: Dr. Kathryn Matera)

**12:40 pm** Mary C. Bedard (Dr. Karl D. Sienerth) Binding Analysis Study of Estrogenic Compounds and Humic Substances Using NMR Spectra

**1:00 pm** Anthony T. Pratt (Dr. Kathryn Matera) Determining the Effect of Amyloid Beta on Acetylcholinesterase Using a Model System of Insulin

**1:20 pm** Alex M. Helman (Dr. Kathryn Matera) Inhibitory Effects of Congo Red Dye on Amyloid-Beta Plaque Formation

**1:40 pm** Kathryn E. Knaus (Dr. Kathryn Matera) Determination and Alteration of the Loci of Aggregation in Amyloid Beta and Insulin

**2:00 pm** Alison E. Deatsch (Dr. Benjamin Evans) Magnetic Nanoparticles for Hyperthermia Treatment of Malignant Tumors

## Session II (12:40 pm - 2:20 pm) ... continued...

Koury Business Center 346 (Moderator: Dr. Anthony J. Amoruso)

12:40 pm Kellye N. Coleman, Nicole M. Chadwick & Samantha L. Baranowski (Professor Janna Anderson)

Human Right? Access and the Future of the Global Internet

**1:00 pm** Hannah B. Nelson (Dr. Amanda Gallagher) Stereotypes and Portrayals of Germans Through U.S. Social Media Platforms

**1:20 pm Michael H. Lindsey** (Dr. Anthony J. Amoruso) What Next for Facebook? The Implications of Technology Companies Hoarding Cash

## **Session III** (2:40 pm – 4:20 pm)

### LaRose Digital Theatre (Moderator: Dr. Mark Kurt)

**2:40 pm** Katherine N. Atkins (Dr. Thomas K. Tiemann & Dr. Alan C. Scott) Sidewalks, Streetscapes, and Walkability

**3:00 pm** Joseph Q. Patterson (Dr. Thomas K. Tiemann) How Much Congestion is too Much Congestion?

**3:20 pm** Grace A. Foster (Dr. Katy Rouse) The Long Term and Short Term Effect of Single-Sex Education on Extracurricular Participation

**3:40 pm** Alexander D. Spitz (Dr. Mark Kurt) To Reboot or Not to Reboot? Analyzing the Performance of Movie Franchises

**4:00 pm** Thomas S. Whyel & Thomas J. Gutierrez (Dr. Vitaliy Strohush) Demographics Influence on Global Current Account Imbalances in Advanced Economies

### Koury Business Center 208 (Moderator: Dr. Amy A. Overman)

2:40 pmMark H. Sundman & Drew Gardner (Dr. Eric Hall)Catechol-O-Methyltransferase Genotype Influences Cognitive Performance and ConcussionHistory in College Football Players

**3:00 pm Ruth E. Robbins** (Dr. Amy A. Overman) A Model Community Brain Health Program for Minority and/or Low Socioeconomic Status Older Adults

**3:20 pm** Adrienne M. Rouiller (Dr. Karen Yokley)

"A Coupled Ode Lattice Model for the Simulation of Epileptic Seizures"

### Koury Business Center 211 (Moderator: Dr. Michael Carignan)

**2:40 pm Danielle L. Damren** (Dr. Michael Carignan) "Love Sought is Good, but Given Unsought, is Better": The State of Love and Marriage in Tudor and Early Stuart England

**3:00 pm** Kelly M. Herrick (Dr. Michael Carignan)

A Tale of Dreadful Derangement: A Case Study of the Media Coverage of the Rugeley Poisoning Case

**3:20 pm** Paul R. Rodriguez (Dr. David Crowe) Prussian Military Planning and the General Staff

**3:40 pm** Kenton W. Porter (Dr. David Crowe) Wernher von Braun: Should He Have Been Tried as a Nazi Criminal?

**4:00 pm** Elisabeth S. Maselli (Dr. David Crowe) Rasputin: The Creation of a Popular Myth

## Session III (2:40 pm – 4:20 pm) ...*continued...*

### Koury Business Center 242 (Moderator: Dr. Dr. Rosemary Haskell)

### **2:40 pm** Mason E. Sklut (Dr. Michelle Trim)

"What Motivates Students to Make Changes to Papers?" Applying Communication Theories to the Feedback Process in First-Year College Writing Classes

### **3:00 pm** Caitlin J. Tarantiles (Dr. Michelle Trim)

Do Personality Traits and Identity Factors Contribute to How Students Use Feedback?

**3:20 pm** Samantha R. Rohrborn (Dr. Rosemary Haskell) Language and Hybrid Identity in *White Teeth* and *Wide Sargasso Sea*: A Postcolonial

Interpretation

**3:40 pm Jensen T. Suther** (Dr. Kevin Boyle)

"The Time is Out of Joint": A Dialectical Hauntology of Justice in Specters of Marx

## Koury Business Center 244 (Moderator: Dr. Karl D. Sienerth)

**2:40 pm** Alexander W. Bruch & Michael Norris (Dr. Joel Karty) Contributions by Resonance and Inductive Effects Towards the Strength of the Hydrogen Bond between the Formate Anion and Formic Acid

**3:00 pm Robert E. Rawlings & Adam McKerlie** (Dr. Joel Karty) The SN2 Benzylic Effect: Contribution by Resonance

**3:20 pm** Cecilia L. Smith (Dr. Karl D. Sienerth) Development of a New Method for Detecting Explosives in Aqueous Solution

**3:40 pm** Russell B. Davidson (Dr. Karl D. Sienerth) Synthesis, Characterization and Electrochemistry of Possible Carbon Dioxide Reduction

Catalysts

## Session III (2:40 pm – 4:20 pm) ...*continued...*

### Koury Business Center 310 (Moderator: Dr. Benjamin Evans)

**2:40 pm** Julie C. Ronecker (Dr. Benjamin Evans) Folic Acid Conjugated Magnetic Microspheres for Ligand-Targeted Drug Delivery

**3:00 pm** Michael F. Berg & Willem Prins (Dr. Benjamin Evans) Use of Artificial Cilia for Microfluidic Mixing

**3:20 pm** Amanda J. Bienz (Dr. Shannon Duvall) Creating Adaptable Communication Software for Disabled Users

**3:40 pm David S. Williams Jr.** (Dr. Dugald R. Hutchings) The Effiency and Versatility of Visual Passwords

**4:00 pm Thomas W. Price** (Prof. Joel Hollingsworth) Engineering on the Go: Designing a 'Serious Game' to make Games on the Android Platform

## Koury Business Center 346 (Moderator: Dr. Rissa Trachman)

2:40 pm Katherine E. MacDonald (Dr. Rissa Trachman)

Ancient Maya Ritual Performance as Reflected in the Monumental Architecture of Dos Hombres, Belize

**3:00 pm Jacob A. Canterbury** (Dr. Rissa Trachman) Porotic Hyperostosis, Disease or Diet?: Correlating Health and Maize Consumption in Ancient Maya Burials

**3:20 pm Rebecca R. Berube** (Dr. Michael Matthews) As History Affects Hunger: Costa Rica's Development and Modern Food Security

**3:40 pm Jessica M. Gibian** (Dr. Bud Warner) The Immigration Debate, Public Climate, and Youth Latina Self-Esteem: Is there a Connection?

**4:00 pm** Lauren C. Needell (Dr. Tom Mould)

The Expressive and Social Functions of Food in the Construction of Identity Among African American Students at a Predominantly White University

## Session III (2:40 pm – 4:20 pm) ...*continued...*

### Koury Business Center 353 (Moderator: Dr. Sharon Spray)

**2:40 pm Daniel F. Layman, III** (Dr. Sharon Spray)

Twitter and the Arab Spring

### **3:00 pm** Katharine E. Donovan (Dr. Brian Digre)

Muslim Women's Motivations Behind the Colorful Hijab: A Case Study of Sakhnin College, Israel

### **3:20 pm Daniel M. Baquet** (Dr. Michael Pregill)

The Religious Minority Experience Under Medieval Islam and Christianity: Impact of Religious Beginnings and Empire

### 3:40 pm Stephen W. Rosebaugh-Nordan (Dr. Pamela Winfield)

Buddhism and Video Games

### 4:00 pm Eryn A. Gorang (Dr. Pamela Winfield)

Buddha Meets Shiva, Apollo, and Pu-Tai: Multiculturalism and Cultural Borrowing of the Buddha Image Along the Silk Road

## ACCOUNTING

## WHAT NEXT FOR FACEBOOK? THE IMPLICATIONS OF TECHNOLOGY COMPANIES HOARDING CASH

### Michael H. Lindsey (Dr. Anthony J. Amoruso) Department of Accounting

As the US economy began to recover from the effects of the 2008 financial crisis and the subsequent Great Recession, a number of highly profitable companies began to hoard cash and other non-productive investments in unprecedented amounts. This has been particularly true of technology giants, such as Apple and Dell. In January 2012, Facebook announced that it plans to raise \$5 billion in cash through an initial public offering (IPO). Facebook is the most eagerly anticipated IPO since the start of America's Great Recession, but this enthusiasm has not drowned out concerns regarding the staggering value of the company – estimated to range from \$75 billion to \$100 billion – and the amount of cash it appears to be hoarding in its corporate coffers. This study will investigate the financial policies of Facebook and the implications of technology companies maintaining large amounts of cash.

We are analyzing the information disclosed in Facebook's prospectus filed with the Securities and Exchange Commission in order to identify the policies driving its need for cash. As a private company, Facebook has not previously been required to reveal details of its finances and strategies, so the prospectus offers new insights into the workings of the company and its plans for the future. We are also examining Facebook's finances within the context of the technology industry, focusing on the sources and uses of cash by leading firms and recent IPOs, including LinkedIn and Zynga. The findings of this research are relevant to investors as they consider the motivations behind corporate finance policies. They are also of potential interest to other private technology firms that are weighing the benefits and costs of going public, such as Twitter.

## **ART HISTORY**

### **RE-THINKING ICONOGRAPHY IN ANCIENT ART: A CASE STUDY ON THE** MUNICH ANTIKENSAMMLUNGEN VASE 1615

Victoria S. Doose (Dr. Evan Gatti) Department of Art and Art History

Iconography is considered a traditional art historical methodology that finds meaning in art by comparing it to written texts. In studies of ancient Greek art, those written texts are extant recordings of mythology from Greek and Roman writers alike — texts that are rare and often fragmentary, providing an incomplete record of ancient mythology and its variants. To have a realistic understanding of Greek art, it is important to establish that the relationship between ancient literary and visual traditions is more complicated than one of artists directly translating words into visual art.

Painted Greek vases depicting the centaurs Chiron and Pholos are exemplary of the complications between the literary and visual evidence of mythological figures. A case study of a vase in Munich's Antikensammlungen (inventory 1615) further illustrates the

limitations of studying Greek vase paintings with a strict text-image method. I first examined the vase using the traditional iconographic method and compared it to ancient literary sources. I found that the mythological scene, which depicts Hermes carrying an infant Herakles to Chiron, is either unknown to modern scholars or considered a "mistake." The vase painting iconographically follows images of the transfer of Achilles (not Herakles) to Chiron, and there are no extant textual records of a story in which infant Herakles is taken to Chiron.

I then contextualized the vase — a grave good in an Etruscan tomb — through considerations of the appeal of the vase painting's subject matter within Etruscan culture, as well as the subject matter's symbolic connections to death. In doing so, I argue the story behind the scene is less important than the compositional and symbolic cues that associate the vase painting to death and its Etruscan funerary context. I also argue that the concept of liminality, or the state of being "in between," is essential to understand how a transfer scene involving Hermes, Herakles, and Chiron was appropriate to a vase painting interred in an Etruscan tomb. The case study shows that even without definite literary precedent, vase painting scenes created meaning by appealing to ancient contexts and concepts familiar to the ancient viewers themselves.

## IMAGE AND SOUND: WHISTLER, DEBUSSY AND THE INTERMEDIAL ARTFORM

### Caitlin A. Glosser (Dr. Kirstin Ringelberg) Department of Art and Art History

Late nineteenth century Paris, marked by the constant reshaping of its political and social milieu, acted as a centralized forum for the artistic conversations taking place in Western art during this time. Among the many shifts in the artistic mindset that flourished out of these conversations, shifts which we might today say led to the modernization of Western art, one shift in particular rejected academic notions of artistic structure and function in search of a means of cultivating pure art forms: painting that evokes only color and shape, music that evokes only sound and rhythm. The artists participating in this conversation endeavored to create works that would not only refute traditional means of artistic analysis but also exist separate of any other medium. Paradoxically, in their attempt to purify their respective mediums, these artists chose to allude to those other mediums, inherently negating the impurity of their own.

In his book, *Art as Music, Music as Poetry, Poetry as Art, From Whistler to Stravinsky and Beyond,* Peter Dayan labels this conversation the 'interart aesthetic' to emphasize a triangular convergence of the visual arts, music, and literature, all the while maintaining their successful divergence through the practices of figures such as Whistler, Satie, and Ponge. Using Dayan's book as a pivotal text in my own research, I have analyzed the works of two artists in order to better understand how intermedial relationships played a significant role in the shifting artistic structures of this time period. Through a study of the paintings and music of James McNeil Whistler and Claude Debussy respectively, their artistic methodologies, and their interactions with other artists and viewers/listeners I argue that while these artists explored intermedial relationships with the intention of

developing distinctly divergent artistic categories, their endeavor led instead to the propagation of a sort of artistic symbiosis.

## SUSTAINABLE SUSTAINABILITY: AN ANALYSIS OF ANCIENT AND CONTEMPORARY PERSPECTIVES

### Elisabetta C. McSheehy-Cooper (Dr. Evan Gatti) Department of Art History

From green building to green washing, sustainable development is a global hot topic. But, sustainable initiatives are not confined solely to contemporary contexts; rather they span centuries and civilizations. What is sustainability and how do different civilizations define it? Can ancient perspectives be used in contemporary contexts? These are questions sought through analysis of case studies comparing the Ancient Maya to 21stcentury green design and urban planning. From an ancient perspective, sustainable development is ideological, based on a reverence for the earth and an associated religious and cosmological structure. Conversations about contemporary sustainability focus more on materials, such as the use of renewable and non-renewable resources. The Ancient Maya saw the Earth as a living, sacred entity, not merely a source of materials. This connection forged a deep relationship with the landscape and determined the location and spatial orientation of structures, concepts that contemporary sustainability does not often consider. Today we view sustainability with a "reduce, reuse, recycle" attitude. My project asks could a contemporary approach to sustainability benefit from a dialogue between contemporary and ancient perspectives. Specifically would we arrive at a more "sustainable" sustainability if the ideological values of a community and its landscape were as important as materials and green certifications? Would this conversation assist in regaining a sense of place, no longer looking at the environment as materials for consumption? Inspired by George Kubler's book *The Shape of Time: Remarks on the* History of Things, which argues that cultural patterns can be revealed through form and are not categorized chronologically but rather through concepts that transcend time and space, this project asks how built spaces reflect cultural ideologies and how those cultural ideologies might be used to develop a more sustainable sustainability. Ultimately the progression of contemporary sustainable development relies not on our physical handling of resources but rather our moral and ideological associations with sustainable practices.

## **BIOLOGY**

### TITANIUM DIOXIDE NANOPARTICLE TOXICITY IN PC12 CELLS

### Brittany D. Corbin (Dr. Tonya Laakko Train) Department of Biology

Nanotechnology is a relatively recent field involving the synthesis of materials on the nano-scale. Nanoparticles have novel properties, allowing them to be utilized in a variety of markets, including industrial and consumer products. Despite the benefits of this material, there is some evidence that nano-sized  $TiO_2$  particles are toxic to many different

mammalian cell types. Effects of  $TiO_2$  nanoparticles on cells include the production of reactive oxygen species, the induction of apoptosis, and other modes of damage. The brain is particularly susceptible to oxidative stress making the effects of TiO<sub>2</sub> nanoparticles on neuronal tissue an important risk to consider. In this study, the viability of PC12 neuronal cells in the presence of  $TiO_2$  nanoparticles was measured. PC12 cells were cultured with or without various concentration of TiO<sub>2</sub>. The number of viable cells at each TiO<sub>2</sub> concentration was then counted at 0,  $\sim$ 12, and  $\sim$ 24hours. Trypan blue dye was utilized to differentiate live and dead cells. Results indicated a significant difference in live cell concentration from the control group at 23 hours for 50 µg/mL and 100  $\mu$ g/mL TiO<sub>2</sub>. No difference was seen at 10 hours. This indicates a time- and dosedependent toxicity of TiO<sub>2</sub> nanoparticles in PC12 neuronal cells. The decreased cell concentrations are likely due to increased apoptosis. Preliminary results using Western Blotting techniques indicate that an increase in cleavage of caspase 7, a protein that is cleaved when cells undergo apoptosis. Western Blotting was used to detect levels of different proteins in cells exposed to different concentrations of TiO<sub>2</sub> nanoparticles. Specifically, it was found that levels of cleaved caspase 7 increased with increasing concentrations of TiO<sub>2</sub> nanoparticles. Additionally, the significance of size in cytotoxicity will be considered by comparing the effect of nanoparticles and micro-sized TiO<sub>2</sub>. As nanoparticles are used in more products, the potential risk will increase. Thus, more measures should be taken to determine safe levels of TiO<sub>2</sub> nanoparticles in light of their effect on the body.

## THE EFFECT OF TITANIUM DIOXIDE NANOPARTICLES ON T CELL VIABILITY AND ACTIVATION

#### Alyssa D. Drosdak (Dr. Tonya Laakko Train) Department of Biology

Titanium dioxide nanoparticles (TNP) can be found as an additive to sunscreens, paints, pharmaceuticals, foods and cosmetics. TNP's risk to human health through inhaled or ingested routes has yet to be determined. Impact on cells of the immune system is a current focus of this emerging research field. T-cells are integral in recruiting and directing other immune cells to eliminate a foreign target. Studies suggest that TNP induces human T cell death (Park et al. 2008). An investigation of T-cell viability after TNP exposure was conducted in this study. Cells were cultured with TNP and then counted by visual analysis using standard microscopy. Time and dose dependent cell death was evident as early as 24 hours after treatment. Viability of TNP treated cells was measured at 78% as compared to 88% in the control sample at 24 hours of exposure. After 48 hours, viability of the TNP treated group dropped to 68% compared to the viability of the control group at 85%. T cell activation, stimulation by a novel foreign target, was also studied. Signaling proteins Zap-70 and LAT were investigated for their early and robust activity in the T cell activation pathway. Time and dose dependent increase in T cell activation after TNP treatment were confirmed by the expression of both proteins using western blot analysis. T cell viability and activation findings were compared to the response observed after titanium dioxide microparticle exposure. Microparticles are larger than TNP, and served to assert that TNP's observed impact on T cells was based on smaller particle size. At a maximum dose of 50µg/mL, TNP was observed to induce a greater death response in T cells as compared to microparticle treatment. However, both treatments produced statistically significant reductions in cell viability. Experiments comparing activation effects are ongoing. Results of this study

suggest that TNP exposure may be detrimental to the human immune system, and further research is warranted to elucidate the safety of this compound in consumer product use.

## PROTEIN STRUCTURE MODELING OF ABCD1 MUTANTS: THE LINK TO X-ALD

## Kelly A. Giffear and Brett J. Schuchardt (Dr. Michael J. Terriblini), Department of Biology

Mutations in the ABCD1 gene are responsible for the human disease X-linked Adrenoleukodystrophy (X-ALD), which causes an accumulation of very long chain fatty acids (VLCFAs) as well as a degradation of myelin sheath in the central and peripheral nervous system. The ABCD1 gene codes for ALDP, an ABC transporter protein embedded in peroxisome membranes. The mechanism by which mutated amino acids affect ALDP structure and function is still unknown. Given that over 1000 mutations in the ABCD1 gene are known to cause X-ALD, we focused on the mutations near the ATP-binding site since this region is well defined and can be related to the vital mechanism of ATP hydrolysis. We have generated a three-dimensional model of ALDP based on template structures of other ABC transporters. Based on published structures of ABC transporters bound to ATP analogs, we manually docked ATP in the binding site of our modeled structure. We then modeled all known X-ALD causing amino acid substitution mutations in the ATP binding site and analyzed their effects on the predicted structure, especially the ability to bind and hydrolyze ATP properly. This first structural model of ALDP and disease causing mutants will provide new insights into the ALDP functional mechanism.

## EXAMINING THE ROLE OF mTOR IN T CELL PROLIFERATION UNDER IMMUNOSUPPRESSION BY RAPAMYCIN

### Morgan J. Gregg (Dr. Yuko J. Miyamoto) Department of Biology

mTOR (mammalian target of rapamycin) is a protein that has been implicated in the process of cell survival and proliferation in multiple human cell lines including endothelial and epithelial cells (Panwalkar et al., 2003). However, the role of mTOR signaling in T cells is not fully understood. In the human body, proper T cell behavior is crucial for normal immune function. The overall goal of this project is to determine the role of the protein, mTOR and its effect on T cell signaling when T cells were treated with rapamycin (an immunosuppressant). Methodology used includes cell counting and Western blot analysis to detect protein levels. Jurkat E6.1 cell line was used to study T cell activation and to mimic T cell proliferation, PMA and PHA were added at different concentrations (50 ng/ml PMA and 5µg/ml PHA). The increase in cell numbers was determined at 12, 24, and 48 hrs after treatment; rapamycin has been shown to inhibit levels of T cell growth and proliferation, with inhibition increasing with dosage increase (Seghal, 1998). When treated with 12, 24, and 48 hours of exposure to rapamycin, the Jurkat cells showed a decrease in proliferation when compared with the control (93.75%), with treatment of cells showing no significant additional effect beyond 20 nM of

rapamycin. Additional analysis of proteins known to be important in cell proliferation also showed a decrease in concentration as determined by Western blot analysis. Tentatively, results suggest that even in combination with activating agents, rapamycin prevents T cells from proliferating. Future studies will determine the specific effects on proteins associated with mTOR signaling and the effect of rapamycin on T cell migration.

#### IMPACT OF BEECH BARK DISEASE ON EPIPHYTE DIVERSITY AND COVER IN HIGH ELEVATION BEECH GAPS IN THE GREAT SMOKY MOUNTAINS NATIONAL PARK

Monika B. Hayleck (Dr. David B. Vandermast) Department of Biology

Beech bark disease is an introduced insect-fungal pathogen complex that has been killing beech trees in Great Smoky Mountains National Park (GRSM) since 1993. Successional processes following the death of beech in GRSM are not fully understood but it is apparent that new tree species, such as red spruce (Picea rubens), are able to establish themselves in the diseased areas. Little is known about how epiphyte (lichens and mosses) species are impacted by beech tree mortality. This study investigated how beech mortality has impacted bark (found on the main trunk of the tree) epiphyte cover and richness in high elevation (>4,500') beech gaps in GRSM. Bark epiphytes were surveyed in diseased (high beech mortality) and non-diseased (low to no beech mortality) plots throughout the eastern region of GRSM. Various tree species, including American beech (Fagus grandifolia) and red spruce, were sampled using transects. Information on tree diameter at breast height, lichen color and structural form (crustose, foliose, or fruticose), and percent of trunk covered by epiphytes was collected. The results indicate that there is no correlation between tree diameter at breast height and epiphyte cover and richness. Overall, red spruce had a significantly lower average percent epiphyte cover (9.7%), lichen cover (8.2%) and richness (2.5 species) than all other tree species, including beech. In contrast, beech had significantly higher epiphyte richness than all other species. Average epiphyte cover for beech was 46.9% (P<0.0001), average lichen cover was 26.9% (P<0.0001), and average number of species was 3.1 (P=0.04). It was observed that red spruce bark seems to peel frequently, which probably keeps epiphytes from becoming established on them. These results indicate that as red spruce becomes established in diseased beech gaps where beech is no longer the dominant species, epiphyte richness and cover could decrease.

## ECOLOGICAL AND TEMPORAL VARIATION IN THE CONCENTRATION OF PODOPHYLLOTOXIN IN *PODOPHYLLUM PELTATUM*

Sarah A. Hoopes (Dr. David Vandermast) Department of Biology

Podophyllotoxin is a medicinal metabolite of plants in the genus *Podophyllum* which is used in the treatment of some cancers. Podophyllotoxin is best known from studies conducted on the Asian species, *P. emodi*. Natural populations of this species are declining because podophyllotoxin must be extracted from roots, which kills the plant. This study was conducted to determine if usable quantities of podophyllotoxin could be extracted from aboveground tissues of the native North American species, *P. peltatum*, and whether the concentration of podophyllotoxin varies seasonally, geographically, and within different parts of aboveground plant tissues. Plants were collected from six

different locations: five along the Haw River in North Carolina and one in southeastern Pennsylvania. Podophyllotoxin was extracted using an aqueous extraction and separated using HPLC with previously established methods. Concentrations were compared using paired t-tests and ANOVA. Podophyllotoxin concentration varied seasonally with the highest concentration gathered at the beginning of the growing season. Podophyllotoxin concentration also varied geographically with the highest concentrations being further south though the correlation was weak. Podophyllotoxin was extracted at the highest concentration in the leaf, where it was found in concentrations similar to those in the roots of *P.emodi*. These results support the potential use of *P. peltatum* as a cash crop grown under specific conditions for production of podophyllotoxin use in cancer treatments.

### **REPRODUCTIVE RATE REDUCTION AND POSSIBLE ADAPTATION TO STRESS SEEN IN DAPHNIA MAGNA AFTER EXPOSURE TO OIL DISPERSANT**

#### Margo R. Lowe (Dr. Linda Niedziela), Biology Department

The recent accident in the Gulf of Mexico not only increased public concerns about the environmental impact of oil spills; but also worries of the potential effect of oil dispersants used in massive quantities to clean up the oil spill. Dispersants are considered to be safe when compared to the potential harm of the oil; however, studies have found that the dispersants can have toxic effects on aquatic organisms exposed during oil spill clean-up. The goal of this research was to study the effects of oil dispersants on reproduction and stress in *Daphnia magna*. One day old *D. magna* were introduced to the oil dispersant, Dispersit SPC 1000, at five different concentrations for twenty one days in individual beakers. Over the twenty-one days, the number of offspring produced by each D. magna was recorded and also the number of casualties. In another experiment, D. *magna* were exposed to the same five concentrations of oil dispersants and their heart rate was measured over twenty-one days as an indicator of stress. To measure the heart rate, the D. magna were put under a Digital OSX microscope and were videotaped for 15 seconds. The heart rate was counted during slow motion playback. Oil dispersant exposure induced statistically significant decreases (p < 0.05) in total reproductive output per parent. The highest number of average D. magna produced per day was 2.2 in the control and the lowest was 0.6 in the 0.1 ppm. However, there were no statistically significant changes in reproductive rate over time or cumulative mortality. Oil dispersant produced a decrease in heart rates with increasing concentrations. The heart rate decreased significantly (p < 0.05) during the first nine days of the experiment and on day 17, however heart rates were not statistically different after day 9 up to day 21 of the exposure (except for day 17). The results suggest that there could be a physiological adaptation to the oil dispersant over time since mortality did not increase and heart rates remained stable.

### LAND-USE HISTORY AND THE COMPOSITION AND STRUCTURE OF ELON UNIVERSITY FOREST, A SUCCESSIONAL HARDWOOD FOREST IN THE NORTH CAROLINA PIEDMONT

#### Patrick T. Ma (Dr. David Vandermast & Dr. Ryan Kirk) Department of Biology

It is commonly believed that old-growth forests are rare and are limited to inaccessible sites and locations where farming was not economically viable. However, "forests of continuity" are unique, under-appreciated ecological resources in which patches of residual old-growth trees occur above a relatively young, sapling-dominated understory. Common throughout the eastern United States, forests of continuity are the remnants of 18<sup>th</sup> and 19<sup>th</sup> century land-use practices where farmers left forests of mast-bearing trees like oaks and hickories unharvested for purposes such as grazing farm animals. Forests of continuity are typically small in area but have structural characteristics similar to that of old-growth forests-large, old trees, tip-mound topography and standing dead trees. In regions, like the North Carolina Piedmont, that are otherwise devoid of old-growth forests, forests of continuity represent an approximation of old-growth. During the summer of 2011, we used the Carolina Vegetation Survey protocol and prism cruising to quantify total basal area, species richness, relative abundance, and diversity in Elon University Forest (EUF) a 22.5 hectare (ha) forest preserve on abandoned farmland in the North Carolina Piedmont. Additionally, ESRI's ArcGIS 9.3 software was used to track land cover changes to confirm Elon University's Forest's potential as a continuous forest. Our results show that EUF, as expected, is a fragmented forest due to selective historical land use. Average basal area was 36.1  $m^2$ /ha which is comparatively high for North Carolina Piedmont forests but which is representative of the transitional nature of EUF where much of the land consists of relatively young forests of pine and mixed hardwoods where agricultural fields existed decades ago. However, we also discovered that approximately 6 ha, representing 28% of EUF land area, is likely a forest of continuity. Here we found large and old (tree cores indicate ages in excess of 200 years) stands of oaks and other species. Our measurements of species richness and diversity (both relatively high), and stem density (relatively low) are also consistent with those of oldgrowth forests. These findings are important to understanding the resources represented by old farmlands.

## EXPOSURE TO CARBARYL INSECTICIDE ALTERS GENERAL MOTOR ACTIVITY IN LARVAL ZEBRAFISH

#### Kaitlyn L Maier (Dr. Linda Niedziela) Department of Biology

Carbaryl insecticide, sold under the brand Sevin®, is one of the most commonly used insecticides in the United States and it persists in the groundwater of forty-two states. Previous research in zebrafish has linked carbaryl to decreased embryo size, delayed hatching time, vision abnormalities, decreased respiration rate, damage to gill and liver cells, and kidney lesions. To date, the neurotoxic effects of carbaryl exposure have not been widely described in the scientific literature. In addition, structurally similar insecticides have been shown to cause negative effects on the developing nervous system. Due to the severity of those findings, this study investigated the toxicity of carbaryl exposure on developing zebrafish behavior. Zebrafish embryos were exposed to 0, 0.1, 1.0, and 5.0ug/mL carbaryl insecticide. At 9 and 11 days post fertilization (dpf), larvae were placed in a small petri dish with a grid below it. They were videotaped while

swimming and the number of lines the larvae crossed in a two-minute period was determined. It was found that the day of testing did not significantly affect activity (p=0.869) and there was no interaction between day of testing and treatment (p=0.752). However, at all concentrations, exposure to carbaryl significantly reduced general activity levels (p<0.001) and a dose response was observed. In an additional study examining recovery after exposure, half of the embryos from each exposure concentration were transferred to embryo media at 6 dpf. Placing the larvae in embryo media after early exposure to carbaryl did not significantly change their activity as compared to those that remained in carbaryl solution (p>0.05). While this project used carbaryl concentrations higher than those found in the environment, it adds to the body of literature that aids in understanding the potential toxic effects of carbaryl on a developing organism and shows that there may be a cause for caution of carbaryl's effects on human health.

### THE IMMUNOSUPPRESIVE EFFECTS OF CAYAPONIA TAYUYA ON T CELLS

Kirsten L. McCormick (Dr. Tonya Laakko Train) Department of Biology

Inflammation results from the activation of T and B cell lymphocytes. These cells are responsible for the release of pro inflammatory proteins called cytokines. In autoimmune diseases like Rheumatoid Arthritis (RA); inflammation causes swelling, stiffness and pain, which could lead to joint damage. Current treatments for RA include steroids. Steroids are effective at suppressing immune system function, however, negative side effects such as swelling and osteoporosis are common. Because of the negative effects of current anti- inflammatory drugs, it is important to investigate alternative options. Cayaponia tayuya (tayuya) is a type of plant found in South America and has been shown to act as an anti- inflammatory (Aquila et. al. 2008). It is thought that one potential antiinflammatory component of tayuya are chemicals known as cucurbitacins. In the studies conducted here, the effects of tayuya on Jurkat T cells, a T lymphocyte cell line, were determined using a viability time course. Jurkat cells were exposed to 0.5%, 2.5% or 5% of a tea made from 40 mg/mL dried tayuya root. The number of viable cells at 6 and 24 hours was then determined. The results of this experiment indicate that the effects of tayuya on Jurkat cell concentration are time and concentration dependent, with the 5% tayuya at 24 hours having the greatest effect. A second 24-hour time course experiment was also performed comparing the effects of tayuya, cucurbitacin and dexamethasone, a current anti- inflammatory drug, on Jurkat cell concentration. This experiment found that cucurbitacin was slightly more effective than tayuya at reducing Jurkat cell concentration and viability. However, both tayuya and cucurbitacin reduced cell concentrations significantly more than dexamethasone. These results therefore indicate that tayuya is possibly more effective at suppressing T cell lymphocytes than a current antiinflammatory drug on the market. These results also indicate that cucurbitacin is the main anti-inflammatory component of tayuya. Ongoing research will investigate the mechanism by which tayuya reduces cell concentration and viability.

## THE EFFECT OF ESTROGEN EXPOSURE ON THE REPRODUCTIVE ABILITY AND SUCCESS OF ADULT *DANIO RERIO*

### Kelly M. McNamara (Dr. Linda Niedziela) Department of Biology

Estrogens are the primary female sex hormones present in humans and other animals. They are naturally found in living organisms, but synthetic versions are also found in oral contraceptives, other pharmaceutical products, animal waste, soy and dairy products, and even plastics. As such, estrogens have been detected in river and drinking water, and even after wastewater treatment, estrogens have a continued presence in the water. High levels of estrogen exposure can be environmentally detrimental, as well as potentially harmful to humans. Estrogen has been linked to breast cancer, autoimmune diseases, anxiety, and infertility. Studies on various aquatic life has shown estrogen exposure can lead to feminization of male fish, and may skew the male to female ratio for humans, as well as for fish. To determine how estrogen can affect the development of zebrafish, embryos were exposed to concentrations of 0, 0.1, 0.5, and 1.0 ng/mL of 17 alphaethinylestradiol, a synthetic estrogen from oral contraceptives. Viability and hatching rates were compared among the various concentrations, and larval growth was measured at days nine and fifteen. No significant differences were discovered among these endpoints for the various concentrations. Since embryo treatment showed no alteration in development, the next step was to explore how the estrogen compound affected the reproductive success of adult zebrafish. Breeding groups were established and treated with 0, 20, and 40 ng/L of 17 alpha-ethinylestradiol. The number of eggs fertilized and the viability of the eggs to hatching will be compared to determine the success of the male's sperm and the female's eggs, respectively. With the feminization of male fish exposed to higher levels of estrogen, it is expected that the reproductive success of the zebrafish will decrease.

# THE REAL WET T-SHIRT CONTEST: THE EFFECT OF COTTON AND DRY WICKING MATERIALS ON TEMPERATURE, EXERTION, AND FEELING DURING EXERCISE.

### Kelsey Norkett (Dr. Robert Vick) Department of Biology

The effect of clothing choice on exercise performance is a major concern for athletic programs to the avid exerciser. Materials that were once available only to pro athletes have now become available to the general public due to the introduction of dry weave materials onto the athletic apparel market. This study analyzed the thermoregulatory effects of cotton and dry wicking clothing during strenuous exercise. The working hypothesis is that dry wicking shirts will keep core and skin temperature cooler and possibly allow a better athletic performance. 11 healthy and euhydrated participants (8 females, avg age= $20.5 \pm 0.7$  yr, 3 males, avg age= $29 \pm 14.1$ yr) ran on a treadmill for 45 min in a controlled environment (Temp= $70 \pm 1^{\circ}$ F, RH= $60.5 \pm 3.5\%$ ) at 75% VO<sub>2</sub> max. The participants ran 1 trial each in a randomly assigned long sleeve cotton (COT) or polyester/nylon (PN) shirt. Data was taken every 10 min for 40 min, with a 5 min cool down. No significant difference was observed in hydration level or self-reported thermal sensation. Core temperature was significantly higher in PN (p $\leq 0.07$ ) except at time=0 and 30 min. Forearm and forehead temperature were significantly higher in PN (p $\leq 0.07$ ) at time  $\geq 20$  min. Rating of Perceived Exertion was significantly higher with COT

 $(p \le 0.07)$  and Feelings Scale ratings were significantly lower with COT  $(p \le 0.08)$  at every time point. In conclusion, under identical exertion, participants wearing PN shirts had a more positive exercise experience, dissipated more heat, but had an increased core temperature in relation to the COT. Our data supports our working hypothesis. Funding provided by Elon University Undergraduate Research Program and College Fellows Program.

# SUB-LETHAL IMPACTS OF OIL DISPERSANTS ON DANIO RERIO NA $^{+}/K^{+}$ ATPASE $\alpha$ -SUBUNIT EXPRESSION REGULATION AND ENZYMATIC FUNCTION

Brett J. Schuchardt (Dr. Linda M Niedziela) Department of Biology

With the frequency of oil spills and the millions of gallons of dispersants entering the sea to clean them up, the marine environment is increasingly at risk. Previous studies have demonstrated significant toxicity of oil dispersants to a marine organism's  $Na^+/K^+$ ATPases (NKAs). These enzymes help to maintain osmoregulation and create electrochemical gradients that drive the function of ion exchange proteins to maintain electrolyte homeostasis across the cell. Structural and functional miscues of dispersant-ATPase interactions have been proposed but not analyzed in further detail. This study examined NKAs specific for the gills and skin. Zebrafish (Danio rerio) were exposed to Dispersit<sup>TM</sup> at 0, 0.05 and 0.5 ppm, and gill and skin tissues were excised for genetic and enzyme activity analyses. RNA was extracted and mRNA quantified via reversetranscriptase PCR using alpha subunit primers that targeted atp1a1a (1,2,4,5) genes in zebrafish skin and gill ionocytes (Liao et al. 2009). Differential mRNA expression in atp1a1a.1, which is involved in  $Ca^{2+}$  uptake and release, was observed but the response was not dose-dependent. No differences in mRNA expression were observed for atp1a1a.2, 4 and 5. Dispersit<sup>TM</sup> appears to modify NKA  $\alpha$ -subunit by alterations in in atp1a1a.1 gene expression. Ongoing trials of real time PCR will more accurately measure atp1a1a.1 expression in exposed tissues. Furthermore, NKA enzyme activity in gills and skin were measured using a standard protocol for phosphatase activity. NKA ATPase activity was higher in the gills than skin, supporting the role of NKAs in regulation of electrolytes across gill ionocytes. Gill ATPase activity also was modified by treatment. Additional studies are underway to determine if there is a dose response. Finally, NKA alpha subunit amino acid sequence alignment and protein structure prediction may indicate unique structural and functional differences that highlight potential sites for dispersant interaction and potential ATP binding sites. This information could then be used for further risk assessment for other aquatic organisms or to develop less toxic formulations.

### POTENTIAL FOR INTERSPECIES PLANT CONNECTIONS VIA ECTOMYCORRHIZAL FUNGI IN THE ELON FOREST

Benjamin P. Schwartz (Dr. Antonio D. Izzo) Department of Biology

This study investigated the potential for interspecies connections between pine and oak trees through ectomycorrhizal fungi. These fungi are known to play roles in nutrient capture by individual trees, but recent evidence also suggests that they may be capable of transferring nutrients between trees. Molecular techniques, utilizing DNA-based

analyses of ribosomal RNA gene spacer regions, allowed us to identify and compare fungi from ectomycorrhizal roots of both pine and oak trees in a mixed-species forest in Elon, NC. In this investigation, one hundred ectomycorrhizal root samples were analyzed. The results of this research indicated that, although there were thirty-six unique species, two primary species dominated. Each of these dominant species were found on both pine and oak and were distributed evenly across the same plot. This outcome is consistent with the concept that there is a high potential for interconnectivity between the plant host species.

### COMPOSITION OF THE SOIL SEEDBANK IN A HIGHLY ALTERED RIPARIAN FOREST IN THE CENTRAL PIEDMONT OF NORTH CAROLINA

#### Lora L. Sigmon (Dr. Vandermast) Department of Biology

Riparian forest buffers are important landscape features which maintain the health of the water bodies they adjoin. In an earlier study we reported that, despite being heavily altered in the past, Haw River riparian forests appear healthy and are in the accreting stage of structural development with very few invasive tree species. As a follow-up to our forest canopy work, we conducted a seedbank study to understand the degree to which it resembles the canopy composition and to examine propagule pressure. Soil samples from five sites were collected at 25m intervals up to 75m from the river. The soils were placed in a greenhouse in order to germinate the seedbank. Only 4 of 29 species in the seedbank were trees and two of these were invasive (Ailanthus altissima and Paulownia tomentosa). Overall, 110 of 817 germinations (13.5%) were invasive, as were 5 of 29 species (17.2%). Invasive species germinated in 13.9% of soil samples. There was no correlation between the presence of invasives and the distance from the river. Our results indicate that, while invasive species make up meaningful proportions of plant diversity and of saplings in the herbaceous layer, germinable seeds tend to be found in strong concentrations in some areas while being absent from others. Furthermore, the success of invasive woody species in depositing seed in Haw River riparian forests has not resulted in similar proportions of those species in the canopy.

### EXPLORING SPECIES BOUNDARIES: A GENETIC STUDY OF INTERACTIONS BETWEEN NORTH AMERICAN CRICKET FROGS, ACRIS CREPITANS AND A. GRYLLUS

### Bryan A. Strelow (Dr. Gregory Haenel), Department of Biology

The failure of reproductive barriers has been well documented in many different systems and results in the mixing of genetic characters between previously independent populations. In this study, we investigate interactions across the species boundaries of two closely related species of North American cricket frogs, *Acris crepitans* and *A. gryllus*. These species have distinct calls and morphological characters in allopatry, and are therefore expected to show strong reproductive isolation. We surveyed *Acris* populations surrounding a region of range overlap in North Carolina to quantify genetic differences. We used our genetic information, in conjunction with previously cataloged

morphological and acoustic data, to examine the historic gene-flow and present genetic interactions of these two species. We demonstrate the presence of hybrid individuals using mtDNA haplotype discordance of cytochrome B gene sequences with morphology and call type. We report the sequence haplotype (220 bp) for 140 individuals in 24 populations, representing both allopatric and sympatric populations. Twenty-seven percent of samples show evidence of hybridization in locations currently inhabited by both species. Historically syntopic populations, determined by past sampling and records, had a 48% occurrence of hybrid individuals. Population genetics models (Tajima's D, Fu's F, and AMOVA) support a hypothesis of rapid range expansion in *A. crepitans* but not *A. gryllus*. This study documents a system of interspecific gene-flow between closely related species with the rapid range expansion of one species and demonstrates a lasting genetic signature of interaction.

### THE ESTABLISHMENT OF SUCCESSFUL TALIN KNOCKDOWN AND APPROPRIATE CONDITIONS FOR INDUCING FOCAL ADHESION KINASE (FAK) PHOSPHORYLATION IN MAMMALIAN CELLS (HEK293AD)

Brittany L. White (Dr. Yuko J. Miyamoto) Department of Biology

The cytoskeletal proteins, talin and focal adhesion kinase (FAK), have been linked with metastasis and tumor invasion. Both processes are closely associated with the development of cancers (Lu, Blume-Jensen & Hunter, 2001). When increased levels of FAK are present, cancer cells progress to a malignant phenotype and can acquire the ability to survive independently of cell adhesion, thus increasing the ability of tumor cells to migrate, invade, and metastasize. (Gabarra-Niecko, Schaller & Dunty, 2003). The cytoskeletal protein, talin, binds directly to FAK and a group of cell surface proteins (integrins), and therefore allows cells to adhere to the extracellular matrix, even when it is supposed to detach (Zhang, Jiang, Monkley, Critchley & Sheetz, 2008). Since talin is so closely associated with FAK, studying FAK activation and expression in talin-reduced cells is a novel topic to study. This research was conducted to reproduce previously established conditions for talin knockdown and to determine the conditions for FAK phosphorylation for future research involving the relationship between talin knockdown and FAK activity. Introducing small interfering RNA into HEK293AD was done to reduce talin protein. The conditions for inducing FAK phosphorylation were determined by plating adherent human embryonic kidney cells (HEK393AD) on an extracellular matrix protein (fibronectin) at various time intervals. Western blotting techniques were used to assess the activation of FAK protein phosphorylation. Image J software indicated an average of 66.2% talin knockdown (n=8). Results also indicated that 10ug/mL of fibronectin for 3 hours is the most effective fibronectin treatment for inducing FAK activation (n=3). The results from these findings will be used in future studies to evaluate the role of FAK in the absence of talin and hopefully lead to better understanding of tumor metastasis.

## ANALYSIS OF *BRASSICA* AMENDED SOILS USING MOLECULAR TECHNIQUES

### Jeffrey D. Wojewoda (Dr. Antonio Izzo) Department of Biology

The difficulty often experienced when trying to plant apple trees in the soil where there used to be orchards is known as apple replant disease (ARD). Pathogenic microbial populations are believed to contribute to ARD. Some microbes found to be associated with the cause of ARD include different types of fungi, and the oomycete, Pythium. Previous studies have found that *Brassica* seed meals had the ability to suppress the populations of certain pathogens in the soil that contribute to ARD, while also increasing certain bacterial populations which have been found to be beneficial to plants. Previous studies have used culturing techniques to examine how *Brassica* seed meals changed the microbial populations in the soil. These studies have been limited to the estimated 1% of all microbes that can be cultured. This study used molecular techniques to examine how the populations of all of the microbes within specific taxons responded to *Brassica* treated soils. Two experiments were conducted. One examined the changes of microbial populations between Brassica juncea treated soils and non-treated soils. The other examined the changes of microbial populations between B. juncea treated soils and *Brassica napus* treated soils. Microbial populations in the soils were examined directly after treatment and then seven days later. Polymerase chain reactions were used to amplify taxon specific genes of bacteria, fungi, Pythium, actinomycetes, and Streptomyces. Electrophoresis agarose gels were used to examine the relative presence of the genes amplified. A terminal restriction fragment length polymorphism (TRFLP) analysis was used to examine the microbial profile within taxons. It was found that B. juncea suppressed the Pythium population over time. Fungal DNA was only found in one sample. B. napus increased the population of actinomycetes more over time than B. The TRFLP analysis revealed that after seven days, changes in microbial juncea. communities differed depending on taxon examined. After seven days, the total bacterial communities in *B. juncea* treated soils and non-treated soils showed more resemblance Microbe communities of than the actinomycetes and *Streptomyces* communities. different taxons responded to Brassica seed meals in different ways.

## **CHEMISTRY**

### A STUDY OF THE KINETICS AND MECHANISM OF $C_{60} + [(C_6H_5)_3P]_2Pt(C_2H_4)$ .

#### Daniel B. Agocs (Dr. Grimley) Department of Chemistry

Buckminsterfullerene ( $C_{60}$ ) was discovered in 1985 and has since been found to have applications ranging from hydrogen storage to inhibiting the AIDS virus.  $C_{60}$  is of special interest, as it is both the smallest pure form of carbon, and was the first fullerene discovered. Though it is a fully conjugated aromatic system,  $C_{60}$  is not unreactive. Buckminsterfullerene has been seen to react readily with metal complexes, as reported by Fagan *et al* (1992).  $C_{60}$  reacts with a platinum(0) complex,  $[(C_6H_5)_3P]_2Pt(C_2H_4)$ , in benzene to form  $[(C_6H_5)_3P]_2Pt(C_{60})$  in accordance with the procedure reported by Fagan *et al* (1991). Prior to this study, the mechanism of this reaction was unknown. A fast mixing accessory, FMX-2, was used in conjunction with a HP 8452 UV-Visible

spectrophotometer in order to perform kinetic analysis. According to previous research (Grimley, 1993), the half-life of the first substitution of  $C_{60}$  for  $C_2H_4$  in  $[(C_6H_5)_3P]_2Pt(C_2H_4)$ , was found to be 1.36 s at 25°C. This was confirmed at 21°C where  $t_{1/2}=1.99$  s. At low concentrations of the platinum-ethylene complex, it was determined that a subsequent reaction occurs. Either a second  $C_{60}$  can add to the Pt(0) complex of the first reaction undergoes a first-order dissociation of  $(C_6H_5)_3P$ . The half-life of this second reaction was determined to be  $t_{1/2}=49.9$  s at 21°C, which is much slower than the first reaction. Characterization of products was performed using NMR, HPLC, and UV-Visible spectroscopy. Future research will include kinetic analysis of these multiple additions as well as further analysis of the indicated process:  $[(C_6H_5)_3P]_2Pt(C_2H_4) + 2C_{60} \rightarrow Pt(C_{60})_2 2(C_6H_5)_3P + C_2H_4 (g).$ 

## BINDING ANALYSIS STUDY OF ESTROGENIC COMPOUNDS AND HUMIC SUBSTANCES USING NMR SPECTRA

Mary C. Bedard (Dr. Karl D. Sienerth) Department of Chemistry

This study characterizes binding between estrogens, known endocrine disruptors, and humic substances using nuclear magnetic resonance spectroscopy (NMR). Humic substances occur naturally as the result of biodegradation of formerly living tissues. Current estrogen analytical techniques involve solutions that inherently contain humic substances, but such substances bind with estrogens and interfere with estrogen concentration estimates, especially in compounds present in water effluents. To accurately survey estrogen concentrations, the long-term interaction between estrogens and humic substances must be determined. If estrogens only weakly bind to humic substances, these can later dissociate in the environment or after consumption, thus resulting in higher effective concentrations of estrogens than established, which poses a significant health risk. This study characterizes binding by isolating the spectrum of the bound species using Saturation Transfer Double Difference (STDD) NMR. We will present NMR spectra of low-concentration estrogens and humic substances in aqueous solution using a solvent suppression pulse program, as well as initial STDD studies focusing on binding interaction in deuterated water. In the long run, this study aspires to answer questions surrounding the validity of current estrogen analytical techniques at various concentration levels and persistence of these levels post consumption.

#### CONTRIBUTIONS BY RESONANCE AND INDUCTIVE EFFECTS TOWARD THE STRENGTH OF THE HYDROGEN BOND BETWEEN THE FORMATE ANION AND FORMIC ACID

Alexander W. Bruch & Michael Norris (Dr. Joel Karty) Department of Chemistry

Hydrogen bonds are one of the most important forces in chemistry and biology. Hydrogen bonds are especially important in the three-dimensional structure of proteins and attracting different molecules together. The hydrogen bond that forms between the formate anion and formic acid ( $HCO_2^-\cdots HO_2CH$ ) is one of the strongest known. It is markedly stronger than the comparable hydrogen bond between the methoxide anion and methanol ( $CH_3O^-\cdots HOCH_3$ , Example 1) by about 8 kcal/mol, and even more so than

hydrogen bond between the formate anion and methanol (HCO<sub>2</sub><sup>-</sup>...HOCH<sub>3</sub>, Example 2) by 16 kcal/mol. This hydrogen bond is involved in proteins that are prevalent in the stomach and certain strains of HIV. To study this system we employed a computational methodology, called a vinylogue extrapolation (VE) methodology (*J. Am. Chem. Soc.*, **2003**, *125*, 2797), to determine the energy of these complexes. Density functional theory calculations were carried out, using the Gaussian 03 software package. Two processes, resonance and inductive effects, are known to affect the distribution of electrons in these complexes. Considering the hydrogen is caused by attractions between positive and negative charges, these processes can affect hydrogen bond strength. We built the molecules in the computer and used the Gaussian software to isolate these respective contributions. Our results indicate that the difference in strength between and the hydrogen bonds in Example 1 is largely accounted for by inductive effects. By contrast, we find that roughly 50% of the difference in strength between the hydrogen bond in Example 2 is accounted for by resonance effects, and the remaining 50% is accounted for by inductive effects.

### EXAMINING CHANGES TO BCL-2 FAMILY PROTEINS USING AN *IN VITRO* MODEL OF SEPSIS IN KIDNEY CELLS

Jo A. Crum (Dr. Victoria Del Gazio Moore) Department of Chemistry

Sepsis, the systemic inflammation caused by infection of the blood with gram positive or gram negative bacteria or fungi, has increased over the course of the past 20 years, with the number of sepsis-related deaths nearly tripling. Currently, sepsis is the third highest cause of death in the world. Although the mortality rate of patients with sepsis has decreased slightly in recent years, the mortality of patients with septic shock and/or Acute Kidney Injury (AKI) caused by sepsis remains high. Currently, sepsis is the third highest cause of death in the world. AKI, rapid loss of kidney function, is caused by excessive cell death. This damage in the kidneys is triggered by cytokines, which are the chemical signals released by immune cells when they are stressed, and results in persistent and lasting inflammation. The role of one type of cell death, called apoptosis, in sepsis associated AKI (SA-AKI) on a molecular level is currently unknown; therefore there is a lack of treatments aimed at the cause of sepsis. By using a two-step cell culture sepsis model, the role of apoptotic proteins in SA-AKI will be investigated. Baseline protein levels in healthy Human Embryonic Kidney Cells (HEK) have been established, and the process of stressing Human Acute Monocytic Leukemia cells (THP1) to release chemical stress messages, cytokines has begun. These cytokines will then be harvested and applied to healthy HEK cells to model sepsis. After baseline septic protein levels are obtained, various methods will be used to examine relationships and interactions between the members of a specific family of proteins responsible for regulating programmed cell death. Unraveling the interactions leading to apoptosis in this disease model will provide a greater understanding of the molecular processes involved in sepsis. With this insight, more effective treatments can be developed for this common condition.

## SYNTHESIS, CHARACTERIZATION AND ELECTROCHEMISTRY OF POSSIBLE CARBON DIOXIDE REDUCTION CATALYSTS

#### Russell B. Davidson (Dr. Karl Sienerth) Department of Chemistry

CO<sub>2</sub> emissions in USA have increased annually for decades, only recently starting to show a decrease. Still, in 2009, the USA was responsible for 5.5 petagrams of  $CO_2$ emissions (that is over 6 billion tons of CO<sub>2</sub>).<sup>\*</sup> The loss of vast tracts of rain forests due to commercial logging and agricultural development in tropical nations is steadily diminishing Earth's carbon-sink pathway. It becomes ever more important to discover methods through which  $CO_2$  can be converted back into useful substances (e.g., fuels) in order to involve it in a reasonable sustainability cycle. Because reduction of CO<sub>2</sub> requires immense energy investment much research has focused on developing CO<sub>2</sub> reduction catalysts, which would make  $CO_2$  reduction more energetically viable. In our group, we recently found that  $[Rh(bpca)_2][PF_6]$  (bpca = bis(2-pyridylcarbonyl) amide) demonstrated clear indication of the catalytic electro-reduction of CO<sub>2</sub>. In the current research, we synthesized and began electrochemical studies of a group of similar complexes with the common structure of  $[M(bpca)_2]^{(n-2)+}$  (M=Ni(II), Co(II), Pd(IV), and Pt(IV); n=charge of metal center). Three of the four compounds studied had never been reported before, so synthesis procedures of these compounds were developed and their structures were confirmed spectroscopically. We will also present the results of electrochemical experiments in the presence and absence of  $CO_2$  demonstrating that Ni(bpca)<sub>2</sub> is not a catalyst and that  $Co(bpca)_2$  is a possible catalyst in acetonitrile under ambient conditions.

#### ESTROGENIC ACTIVITY OF WASTEWATER EFFLUENT IN THE PIEDMONT TRIAD AREA USING A FOUR-HOUR YEAST BIOASSAY

### Kelly A. Giffear (Dr. Victoria Moore) Department of Chemistry

The presence of estrogens in wastewater effluent has been attributed to the cause of various reproductive issues in aquatic organisms. Since estrogens are not regulated in wastewater treatment plants (WWTPs), many escape the WWTPs into the environment. Additionally, the interaction of humic substances and estrogens in wastewater effluent has recently come under investigation due to the suspected interference of humic substances with analytical techniques to determine estrogen levels. This is problematic because the level of estrogens present in water may be inaccurately characterized. Even more important than the concentration of estrogens is the estrogenic activity or the level of estrogens that is biologically available. The addition of a yeast bioassay, which can determine estrogenic activity is a important extension of this research. Recombinant yeast is modified to detect DNA changes caused by the presence of estrogens. This models the DNA in aquatic organisms in contact with wastewater effluent. Modifications were made to the yeast to enable detection of estrogenic compounds through the change in color observed by a spectrometer at 420 nm. The four commonly found estrogens in wastewater,  $17\alpha$ -ethynylestradiol, estriol,  $17\beta$ -estradiol, and estrone, will be examined with the addition of humic substances to determine the impact the humic substances have on the bioassay. Through this process, it is hypothesized that the interaction of humic substances will dampen the estrogenic activity of the wastewater effluent collected from the sections of the Haw River in the Piedmont Triad area. The proposed project involves the application of a reporter assay for estrogenic activity to both analyze wastewater
effluent in the Piedmont Triad area and to further characterize the impact of humic substances on estrogen analysis.

### INHIBITORY EFFECTS OF CONGO RED DYE ON AMYLOID-BETA PLAQUE FORMATION

Alex M. Helman (Dr. Kathryn Matera) Department of Chemistry

Alzheimer's disease (AD) is a neurodegenerative disorder that has numerous hallmarks, including the presence of insoluble deposits within the brain. These deposits are amyloid-beta (A $\beta$ ) peptide plaques and are the result of aggregates of A $\beta$ . The presence of A $\beta$  aggregates is detected in an assay in the presence of the organic molecule Congo red dye, which only absorbs to the aggregated form of  $A\beta$ . Previous studies have shown that Congo red dye can be used as an inhibitor for the formation of A $\beta$  plaques. The mechanism between Congo red and A $\beta$  plaque formation was investigated in vitro, where physiological variables could easily be controlled and manipulated. A model study using insulin was created, which was then replaced by A $\beta$  once a procedure was established. UV-Vis Spectroscopy and Western blots were used to gather data, and it was established that Congo red is neither preventing the formation nor breaking apart A $\beta$  aggregates. However, it was noted that when Congo red and  $A\beta$  were aggregated together, the aggregates formed different structures than when Congo red was added to preaggregated  $A\beta$ . Currently, experiments are being done to observe the differences in the oxidative effects of these two structures. These studies can then be used as a model to quantify the effectiveness of possible therapeutics in slowing down A $\beta$  oxidation.

# DETERMINATION AND ALTERATION OF THE LOCI OF AGGREGATION IN AMYLOID BETA AND INSULIN

Kathryn E. Knaus (Dr. Kathryn Mansfield Matera) Department of Chemistry

This project examines the structures of the polypeptides amyloid-beta and insulin and how these structures affect the aggregation of said proteins. By chemically modifying the amino acids in these peptide chains, the researcher hopes to pinpoint the amino acids involved and compare sites of aggregation. Quantitative measurements of the degree of aggregation are found using Congo Red dye, and qualitative observations are made using gel electrophoresis. The results found support the claim that altered lysine and arginine affect the extent of aggregation of the peptides. Although the shape of the graph is indicative of a shift in maximum absorbance, the raw numbers show that this shift is slight (approximately 2 nm). This project has implications in continued improvements in drugs for Type II diabetes and Alzheimer's. By blocking the reactive sites or changing their composition, the protein aggregates will not form and some symptoms of these diseases might be treated.

# FLAVONOID COMPOSITION OF SOURWOOD (*OXYDENDRUM* ARBORETUM) HONEY

Marie M. Oh, Megan A. Martin & Erika M. Flashburg (Dr. Eugene B. Grimley) Department of Chemistry

Flavonoids are a class of over 8,000 phenolic organic molecules that have a wide range of biochemical and pharmacological effects due to their highly-reactive antioxidant and radical scavenging properties. They play a role in anti-inflammation, anti-platelet, antithrombotic action, and anti-allergic effects. They also inhibit enzymes that are closely related to tumorgenesis, and induce detoxifying enzyme systems. Sourwood (Oxydendrum arboretum) honey had not been studied in detail with regards to its flavonoid composition, an oversight rectified by this project. This research was a chemotaxonomic study to confirm its botanical origin<sup>1,2</sup> by establishing a "chemical fingerprint" of flavonoidic constituents. The flavonoid composition of Sourwood honey was observed by first separating the flavonoids from constituent sugars and other nonflavonoid components<sup>3</sup> using a bulk separation column filled with Amberlite XAD-2 ion exchange resin. The isolated flavonoids were then separated from each other by a second chromatographic step employing a Prevail (Grace) 150 mm 5 micron C-18 column, on a Varian ProStar high performance liquid chromatograph (HPLC). Using a time variable gradient mobile phase of acetonitrile and aqueous 0.025 M KH<sub>2</sub>PO<sub>4</sub>, perfected by multiple lab trials with standards, the flavonoids were separated and analyzed by passage through a detector measuring absorbance at either a wavelength of 280 nm or at 340nm. Each time the flavonoids passed through the instrument detector they produced a spike which was subsequently recorded thus producing a chromatogram. The chromatograms consisted of 'peaks' corresponding to the different flavonoids present, identifiable as a function of chromatographic retention times. Recognition of constituent flavonoids was accomplished by comparison of retention times and published UV-Visible spectra with those of known standard flavonoids obtained commercially, by co-chromatography, and by proton nuclear magnetic resonance of isolated compounds. Initial chromatographic analyses have shown about twenty different flavonoid peaks for Sourwood honey. More extractions and separations will be conducted in the comprehensive determination of the flavonoid composition of Sourwood honey.

### DETERMING THE EFFECT OF AMYLOID BETA ON ACETYLCHOLINESTERASE USING A MODEL SYSTEM OF INSULIN

### Anthony T. Pratt (Dr. Kathryn Matera), Department of Chemistry

Acetylcholinesterase metabolizes the neurotransmitter acetylcholine, which is involved in memory in the brain. In Alzheimer's patients, levels of acetylcholine are lower than normal, thus one method of treatment is to administer compounds which inhibit acetylcholinesterase activity. To determine possible inhibitory effects amyloid-beta, a peptide chain that abnormally aggregates and forms plaques in Alzheimer's, may have on acetylcholinesterase activity in Alzheimer's patients, a model system using insulin in place of amyloid-beta was developed to examine acetylcholinesterase activity *in vitro*. The effect of insulin on acetylcholinesterase activity was measured in kinetic assays at increasing concentrations of insulin. Results indicate that at 5, 38, 50 and 100 excess molar equivalents of insulin to acetylcholinesterase, the Michalis-Menton value of

acetylcholinesterase, which describes how well the enzyme binds to acetylcholine, remains constant while the maximum velocities increase by 19, 44, 26, and 53%, respectively. This suggests that amyloid-beta contributes to memory loss in Alzheimer's disease by accelerating the rate at which acetylcholine is broken down. Further research is being done to determine the mechanism by which amyloid beta quickens acetylcholinesterase activity.

### THE SN2 BENZYLIC EFFECT: CONTRIBUTION BY RESONANCE

#### Robert E. Rawlings & Adam McKerlie (Dr. Joel M. Karty) Department of Chemistry

In organic chemistry, there are a small set of fundamental reactions that are understood to happen in a single, instantaneous reaction. One of these reactions is the nucleophilic substitution,  $S_n 2$ , reaction. There are many factors, chemically, that stabilize or destabilize these reactions. Stabilization increases the rate at which the reaction can occur, while destabilization slows the reaction. In a phenomenon known as the benzylic effect, the presence of a benzene ring in a molecule offers a very large stabilization which increases the rate at which the  $S_n^2$  reaction can occur (Galabov et al, 2008). This study examines these stabilization effects by constructing virtual models via a computer software program called Gaussian04. The program calculates the energy in a given molecule based on the theory behind atomic orbitals. Certain models can be built in order to deduce the specific effects that the benzene ring has on a molecule so that the overall effect of just the benzene can be extrapolated (Fersner et al, 2009). Thus far, the data that has been collected supports that a benzene ring increases the stability of a molecule undergoing an  $S_n^2$  reaction. The stability has been confirmed to originate in at least two separate factors and can be quantified. This study is important because the method being used can determine exactly how the benzene ring stabilizes the reaction. Understanding elementary steps is paramount to understanding anything about organic chemistry and chemical reactions.

# DEVELOPMENT OF A NEW METHOD FOR DETECTING EXPLOSIVES IN AQUEOUS SOLUTION

Cecilia L. Smith (Dr. Karl D. Sienerth) Department of Chemistry

Many of the current methods used for the analysis of explosives and explosives residue require expensive instrumentation and methodology that are not amenable to on-site analysis. Although most such methods are chromatographic, some that are based on fluorescence quenching have been reported recently for determination of TNT, C4 and other nitrate explosives. Our studies indicate that a method similar to fluorescence, electrochemiluminescence (ECL), shows promise as an inexpensive approach that could be employed on-site and in a short time frame. This presentation will describe recent research into a method that quantifies the ECL signals observed from two different luminescent substances: (a) tris(bipyridine) ruthenium(III), [Ru(bpy)<sub>3</sub>]<sup>2+</sup>, in the presence of the helper compound tripropylamine (TPA); and (b) luminol. In the case of each luminescing substance, inverse mathematical relationships were observed between concentration of added quencher and measured ECL signal. The correlation between ECL signal and model compounds (such as dinitrophenol) and TNT in aqueous luminol solution will be presented.

### CARDIOMYOCYTE CHANGES INDUCED BY HYPERGLYCEMIA

### Kelsey M. Van Dalfsen (Dr. Victoria Del Gaizo Moore) Department of Chemistry

A complication of diabetes that affects heart function, known as diabetic cardiomyopathy (DCM), contributes to the mortality of over 80% of the diabetic population. Despite scientific advances made in the treatment and prevention of cardiovascular disease, the improvement in life expectancy that has been achieved in the non-diabetic population has not been mirrored in the diabetic population. Since current cardiovascular treatments are similar for diabetics and non-diabetics, there is a need to elucidate mechanisms of DCM's progression in order to develop new therapeutic treatments. High blood sugar (hyperglycemia) has been identified as a major contributor to DCM's development. Previous studies have identified the BCL-2 family, a group of similar proteins involved in the regulation of cell death (apoptosis), as being involved in hyperglycemia-induced heart cell damage. Apoptosis is not an inherently bad process; it is an efficient way to remove damaged or unneeded cells. However, when cells die when they should not, as in DCM, it can lead to major complications. Although BCL-2 proteins have been shown to be involved in hyperglycemia-induced apoptosis, the precise mechanisms of BCL-2's involvement remain unclear. In this study, the pathways governing hyperglycemiainduced, BCL-2-regulated cell death are being examined by treating heart cells (cardiomyocytes) with varying levels of glucose and analyzing any resulting changes using standard biochemical techniques. Changes to concentrations of apoptotic proteins, cell viability, and apoptotic cell death have been assessed after 24-hour glucose treatment in mouse atrial cardiomyocytes. Observed changes as a result of hyperglycemia include an up regulation of several pro-apoptotic BCL-2 proteins, accompanied by a decrease in cell viability and increase in apoptotic cardiomyocytes. Further characterization of these changes may provide important insight regarding the specific pathways leading to the development of diabetic cardiomyopathy.

# INVESTIGATION OF BCL-2 PROTEIN-PROTEIN INTERACTIONS IN PROSTATE CANCER CELLS

#### Rachel E Wilson (Dr. Victoria Del Gaizo Moore) Department of Chemistry

Apoptosis is a type of cell death, also known as programmed cell death, that occurs during normal physiological processes, as well as when the cell becomes damaged beyond repair. It allows for the removal of infected or injured cells. The Bcl-2 family of proteins plays a crucial role in apoptosis. Once the cell receives a stimulus for apoptosis, Bcl-2 proteins interact at mitochondria, causing changes within the cell itself eventually leading to cell death. There are two categories of proteins in the Bcl-2 family, proapoptotic (promote cell death) and anti-apoptotic (oppose cell death). In cancer cells, anti-apoptotic Bcl-2 proteins are often upregulated allowing the cells to survive under conditions in which a cell would normally undergo apoptosis. Protein-protein interactions of Bcl-2 family proteins during apoptosis, or cell death, in prostate cancer cells in response to chemotherapy treatments are being evaluated. Prostate cancer is the second most frequent cause of cancer death in men. While previous research has been conducted on prostate cancer, the specific Bcl-2 protein-protein interactions of chemo-insensitive cells are poorly understood. By investigating the importance of Bcl-2 proteins and different protein interactions during apoptosis between a chemo-sensitive and chemo-

insensitive prostate cancer line, the biochemical mechanisms of the disease will be further understood, and therefore, better targeted treatments can be developed. Concentration and time studies to compare protein-protein interaction during chemotherapy treatments are being conducted using two different prostate cancer cell lines, one which is chemotherapy sensitive and the other which is resistant. The two chemotherapeutics being employed, etoposide and docetaxel, are common drugs used to treat prostate cancer. Preliminary results indicate a difference in normal Bcl-2 protein levels and in the effect of the chemotherapy drugs on the two cell lines, indicating changes in Bcl-2 proteins. Ongoing research will determine the specific protein-protein interactions in response to the chemotherapeutics.

## COMMUNICATIONS/JOURNALISM

### MEDIA COVERAGE OF FOUR PIONEERING BLACK ATHLETES IN FOUR MAJOR AMERICAN SPORTS

### Samantha A. Calvert (Dr. Anthony Hatcher) School of Communications

This research seeks to identify how the American news media covered the breaking of the color barrier over the course of the 20<sup>th</sup> century in four major sports, and whether the coverage mirrored the realities black athletes experienced in baseball, hockey, tennis, and auto racing. There is research to suggest that the news media glorified sport as an idealistic space where black and white athletes could participate together on equal footing, but in reality, there was as much prejudice and segregation inside sport as there was outside of it. This is an important part of United States history, especially because in three of the four sports examined, there still exists an inequality in racial participation. One of the men profiled here—baseball's Jackie Robinson—has been the topic of much research, as has tennis player Arthur Ashe. The other two, however, have made the same efforts and strides in breaking the color barrier and have gone essentially forgotten. The four athletes are Jackie Robinson in baseball, Willie O'Ree in hockey, Wendell Scott in NASCAR, and Arthur Ashe in tennis. This research is a case study of these four black athletes from assorted backgrounds who participated in sports with vastly different histories and fan demographics. Each of their stories was compiled using a historical method, looking at primary and secondary sources, including autobiographies, biographies, contemporary newspaper articles, and interviews. News stories were analyzed to see how accurately and sufficiently the press was at capturing the whole story. The findings, however, showed that each athlete experienced unique media coverage based on the social climate of his times, his own personality, the sport, and the extent to which the athlete spoke up about his particular circumstances. All four were the first black man in his sport, but outside of that, the similarities end. Each man was an individual, and the media coverage reflected that.

### MEDIA FRAMING: A COMPARATIVE CONTENT ANALYSIS ON MAINSTREAM AND ALTERNATIVE NEWS COVERAGE OF OCCUPY WALL STREET

#### Margaret G. Cissel (Dr. Byung Lee) School of Communications

The news media, and more specifically print media, serve as valuable sources of information and powerful modes of communication. This power controls much of what people understand of events that occur around the world on a daily basis. Consumer culture has penetrated the business of media through the use of framing, agenda setting, priming and bias, which facilitates its commerce. The essential question behind this study is whether the Telecommunications Act of 1996 and the deregulation of media that gave way to the media conglomerates we have today have an effect on the way news is presented to readers. In order to ask this question, the study examined the relationship between media framing and the way both mainstream and alternative media sources portray similar news events. Communication theories were researched and used in a comparative content analysis that examined articles written in mainstream and alternative media sources within the first three weeks of the Occupy Wall Street demonstrations. The study found that the portrayal of the movement differed greatly depending on media sources. While mainstream media articles framed the movement as lackluster, dismissive and confusing, alternative media emphasized the strength and diversity of its protesters and demonstrations. The results may have far-reaching implications and raise further questions about the mode of communication people depend on to receive their news.

#### HUMAN RIGHT? ACCESS AND THE FUTURE OF THE GLOBAL INTERNET

# Kellye N. Coleman, Nicole M. Chadwick & Samantha L. Baranowski (Professor Janna Anderson) School of Communications

Is access to the Internet a human right? A number of global governance organizations are formalizing or considering formalizing this concept. This study of opinions of information technology stakeholders on issues pertaining to Internet access includes perspectives from people involved in government, industry, civil society, research, and academia from a variety of countries and backgrounds who were in attendance at the 2011 United Nations-facilitated Internet Governance Forum. This was the sixth annual meeting of the IGF, which addresses issues of access, critical Internet resources, diversity, openness, security, capacity building, and development. Research was conducted in Nairobi, Kenya, September 26-30, 2011, at a global IGF event that attracted more than 1,000 stakeholders from 100 nations for a discussion of ideas and ideals as they relate to the future of information and communication technologies. Nearly 100 participants from a range of social, political, geographical, and economic backgrounds responded to a voluntary survey in a convenience sample gathered in the village square and hallways of IGF. The basic purpose of Internet Governance Forum is to maximize the opportunities the Internet offers, addressing risks and challenges. Researchers collected statements dozens of IGF participants who were asked to assess access issues and the future of the Internet. The study yielded a diverse sample of stakeholder attitudes about how the right to Internet access is perceived in varied global regions by a wide

array of people, from the leaders of ICANN and the Internet Society to young student interns working at the event. Results reveal stakeholders hold common views and conflicting opinions as to which challenges are key to the positive diffusion of information and communication technologies and how they should be met.

# ANALYSIS OF THE CNN AND FOX NEWS NETWORKS' FRAMING OFTHE KEYSTONE XL PIPELINE

#### Grace C. Elkus (Dr. Barbara Miller) School of Communications

The proposed Keystone XL Pipeline involves plans to build a 1,700-mile pipeline connecting Canada's oil sands through the Great Plains to Texas and the Gulf of Mexico, making it the longest oil pipeline outside of Russia and China. The proposal has been controversial since it was first introduced because of the variety of factors involved: the implications of the pipeline for the U.S. economy through the creation of construction jobs; the potential environmental consequences of building the pipeline for both the immediately affected land and global climate change from oil extracted from oil sands; the implications for U.S. energy independence; etc. The pipeline has been especially prevalent in recent news due to the November 10, 2011, decision by the State Department to authorize an extension on whether or not to construct the pipeline pending further study on the pipeline's routing and environmental consequences, a decision that angered Republicans and sparked further controversy between the two parties over energy policy and job creation.

This study will compare how news sources, namely those deemed politically liberal and conservative, frame the issue of the Keystone XL Pipeline. News frames are the central organizing idea for news that supplies a context and suggests what the issue is through the selection, emphasis and elaboration of certain topics (Entman, 1993). One of the most frequently used frames in coverage of environmental issues is the adversarial frame, which deals with conflict between opposing groups (Karlberg, 1997). Specifically the study will examine *all* online news stories found on CNN.com (n=33) and FOXNews.com (n=74) between November 11, 2011, the date of the decision by the U.S. State Department to put the project on hold, and February 16, 2012, the date the U.S. House of Representatives passed an energy bill that would wrest control of the pipeline permit away from President Obama. The study will conduct a narrative framing analysis of these articles and explore the implications of these frames for both the future of the Keystone XL Pipeline and the 2012 general election.

# TELEMEDICINE AND ONCOLOGY: A STUDY IN THE EFFECTIVENESS OF CANCER SUPPORT THROUGH SOCIAL MEDIA

#### Carissa A. Hilliard (Dr. Connie Book) School of Communications

Telemedicine is described as the process of transmitting medical information and clinical consultation via computers and satellites. Technology continues to rapidly develop, and each new advancement has the potential to assist doctors in diagnosing and treating patients. This is of considerable interest to rural areas of the United States which face an increasing shortage of accessible physicians. A useful new telemedicine technology is social media, primarily Facebook and Twitter, and its application in oncology. Social

media platforms allow patients, doctors, and hospitals to connect to one another from the comfort of any location. The common themes of the official Facebook groups of the top three cancer centers in the United States were assessed over a 30-day period and a content analysis was conducted to evaluate the following variables: poster type, type of content, gender, age range, location, and activity on the post. The data collected provides a comprehensive overview of how cancer centers interact with their patients through Facebook and how such methods enhance a patient's cancer experience, particularly those that live in rural locations. This research can aid in the understanding of how online communities can be beneficial to those dealing with a terminal illness and extend the reach of telemedicine.

### THE TOBACCO KING: QUESTION AND ANSWER SESSION

### Daniel A. Koehler (Dr. Brooke Barnett) School of Communications

My research project has culminated in a twenty-one-minute documentary that explores questions of past and present, including agricultural productivity and race relations in Zambia. This documentary not only unveils little-known social issues but also challenges dualistic perceptions of the world. As one critic recently put it, *I don't know who to sympathize with*. By the end of your film, I am sympathetic to all sides. Another critic called it a testament to human complexity. A paper component that explores ethical fieldwork models supplements the documentary. This paper helps to guide future fieldworkers as they navigate the ethical challenges that inevitably arise when confronting the grit and dynamism of the world.

Throughout my research, I used a traditional ethnographic toolkit — including interviews and participant observation — to create an issue-driven narrative. I borrowed from the methodologies of both ethnography and documentary, which ultimately informed my understanding of ethics. I have conducted additional research on ethics through reading and interviews with professionals.

The following is a brief synopsis of my documentary, *The Tobacco King*. White farmer George Botha lost his home to Zimbabwean President Robert Mugabe's racially charged and violent land reform program. As life crumbled around him, Botha gathered what he had left and fled to Zambia where he returned to the livelihood he loved: tobacco farming. There, Botha manages Mambo farm and is recognized as Zambia's preeminent tobacco farmer. While Zimbabwe falls into economic ruin, Zambia, aided by the influx of white Zimbabwean farmers, surges toward breadbasket status. Yet Botha lives in the shadow of his past — and for good reason. Tensions simmer on Mambo farm as Botha's 200-strong Zambian workforce complains about management and conditions. The result is a microcosm of countrywide developments: many white Zimbabwean farmers cling to racist tendencies, and frustrations threaten to explode across Zambia, much as they did in Zimbabwe.

# IDENTITY FESTIVAL: A STUDY OF THE PROMOTIONAL EFFORTS OF THE FIRST TOURING ELECTRONIC MUSIC FESTIVAL

### Lauren D. Kolodrubetz (Dr. Naeemah Clark) School of Communications

In today's world of digital media and music sharing, the importance of live music for artists' success has grown to a new level. Artists must rely on individuals buying tickets and attending their shows to generate income since album sales can no longer be a means of guaranteed revenue. Music festivals offer fans a unique experience where they can see a series of different artists coming together for a day or multi-day long series of performances. Industry leaders for different genres of music have attempted to create touring festivals but few of these attempts have been successful. That was until the past summer when artists in electronic music came together with the backing of Ultra Records, the top record label for electronic artists, and formed identity Festival, the first touring electronic music festival. Instead of relying primarily on paid advertising, Identity Festival used social media to generate attention from electronic music fans. The research is significant because it looks into a music tour at the front lines of promotion in the 21<sup>st</sup> century.

The study utilized the qualitative case study method relying upon in-depth interviews and a textual analysis of Identity Festival's social media pages (Twitter, Facebook, and YouTube pages) to understand the promotional techniques the festival used and their effectiveness for the festival. The study then used six in-depth interviews with six festival attendees between the ages of 19-21 to understand how they interacted with the social media.

The study found that Identity Festival's social media promotion was successful in generating and keeping attention of its potential customers. Not only was the social media found to be consistently updated with valuable and unique information, but the individuals interviewed also interacted with it regularly and valued it. The participants interviewed felt that their interactions with the festival via social media were greatly successful and rewarding.

#### SELLING THE INTERSTATE HIGHWAY SYSTEM: AMERICAN SECURITY AND THE FRAME OF SAFETY IN *TIME* MAGAZINE ADVERTISEMENTS, 1953-1954

Lauren D. Kolodrubetz (Dr. Harlen Makemson) School of Communications

For over four decades, the Cold War dominated global politics and media. Specifically, an emphasis on safety and security became a primary Cold War cultural theme. Scholar Elaine Tyler May found that the home offered Americans a place of protection and security since they lived in a constant state of fear from Communism and the threat of attack from the Soviet Union. The government capitalized on this culture with a campaign promoting do-it-yourself fall-out-shelters for individual homes. Similarly, the security culture in the early 1950s sparked efforts to create a national interstate highway system to not only connect all of America but to also provide security in the case of an attack. Consumer companies became largely involved from 1951-1954 through the Project for Adequate Roads, a campaign for a new highway system supported by public

relations gimmickry, large conferences, and advertising. Scholars have examined the political development of the Interstate Highway Act of 1956 but have not studied how it gained support among the American population. Therefore, this study looked at how the interstate defense highway system became popular among Americans through the advertising efforts of three influential companies.

The study utilized the content analysis method on one specific news magazine, *Time*, because of its wide readership across the American population. The study examined every issue of *Time* in 1953 and 1954 because the years not only represent the height of McCarthyism but also an imminent threat to the United States according to *Bulletin of Atomic Scientists*' Doomsday Clock. It is also a period in which advocates for an improved highway system were ramping up their public persuasion efforts.

The study then used a semiotic analysis to examine how the advertisements of the American Trucking Associations, Caterpillar Tractors, and Portland Cement Association promoted the development of an American defense highway system. The separate campaigns not only promoted safety across America, but also used specific images and language to emphasize transportation as part of a new defense system for America. The 41 advertisements emphasized building a "stronger America" and "protecting Americans" through a safe, new highway system in the "atomic age."

### STEREOTYPES AND PORTRAYALS OF GERMANS THROUGH U.S. SOCIAL MEDIA PLATFORMS

### Hannah B. Nelson (Dr. Amanda Gallagher) School of Communications

This research examines the portrayals of Germans on US social media platforms. With the increase in personal computers and virtually unbarred Internet access, it is important to look at how Germans are being portrayed online, where users can create and publish stereotypical portrayals for others and further enhance and maintain stereotypes. The types of portrayals represented in online platforms, in many cases, do not reflect the entire culture. Instead, these representations reflect a minority of a nation and then categorize them as a whole. This research is relevant, as it seeks to better understand how social media and networking can further perpetuate stereotypes of people from "other" cultures as well as marginalize voices of dissent.

This research used an inductive qualitative content analysis (Zhang 2009), utilizing three social media platforms: Facebook, Twitter, and YouTube. Within each platform four separate search inquiries were conducted with the following search key terms: Germans, German People, The Holocaust, and Nazis. The data collected was then placed into different content categories as themes emerged.

Four main categories emerged detailing specific uses of stereotypes in the portrayals of Germans (personality traits, physical appearances and demeanors lifestyle aspects of Germans, and references to Germans as Nazis). By reviewing the data collected within the platforms I researched, it is evident that Americans are logging on and are reading the thoughts posted by users, and possibly they are retaining those messages as fact. With the differences in types of emerging stereotypes among the separate platforms, this study also highlights the need that further research should be done within Web 2.0 platforms to

better understand the uses and gratifications that users take from each social media platform.

### COVERAGE OF THE OCCUPY MOVEMENT IN U.S. NEWSPAPERS

**Erin E. Valentine & Beatriz A. Jurema** (Dr. Amanda Sturgill & Dr. Naeemah Clark), School of Communications

The issues with the U.S. and the global economy in the early part of the 21<sup>st</sup> Century have presented a difficult time for both media and for citizens. As citizen protests spread from Wall Street throughout the U.S., Covering protests against the practices of businesses could present a challenge for newspapers, who need to cover the high-conflict news event, but also need to maintain relationships with businesses in order to continue to be economically viable. Research about the recent economic state of the newspaper industry indicates that papers are in financial turmoil due to a flattening of advertising revenue. Mainstream dailies are not the only newspapers facing economic problems, as other daily newspapers have merged, reduced production or folded entirely. Declining advertising revenue raises the question of whether or not publishers can afford to upset those who are still willing to pay for space. This paper examines the content of the coverage of the Occupy Protests in an area of the media particularly hit by the challenges of the economy – newspapers. We investigated the depictions of protesters, business and the government/police with valances of both position and negative. Lexis-Nexus was used to identify newspaper news articles published between October 31 and November 7, 2011. This is a week including the use of tear gas in Oakland, Calif., which was one of the first police actions against protesters. All articles found were evaluated to emergently develop coding categories and ultimately a coding sheet, which two coders used to look at elements of description of protesters, business and government/police, both positive and negative. Positive depictions of protesters included Peaceful, Well-supported and Well-Intentioned. Negative Depictions of protesters included Whining, Powerless, Inconsiderate, Dangerous and Disorganized. Positive Depictions of business included Unfairly Blamed, Bullied and Cooperative. Negative depictions of business included Controlling, Fearful, Extravagant and Patronizing. Positive depictions of government included Bullied, Unfairly Blamed and Cooperative. Negative depictions of government/police included Controlling, Fearful, Extravagant and Patronizing. Results suggest that the protesters were mentioned both positively and negatively more than the government was and that business was not mentioned positively or negatively much at all.

# **COMPUTING SCIENCE**

# CREATING ADAPTABLE COMMUNICATION SOFTWARE FOR DISABLED USERS

Amanda J. Bienz (Dr. Shannon Duvall) Department of Computer Science

Current electronic boards that help disabled people communicate are large, expensive, and not customizable. Costing between 2500 and 8500 dollars, these boards have large,

generic buttons that cannot be changed. While children with severe disabilities need these boards and children with very mild cases can use computers instead, many disabled children fall in between these two categories. This research tries to aid this community of users by creating software that not only can be used on a mobile device to help the user communicate, but is also customizable and uses Artificial Intelligence techniques to adapt to the user automatically.

In this research project, we created communication software using the Android mobile platform that shows a display of icons. When one button is touched, the word for that icon is said aloud. This mimics the electronic communication board functionality. However, our software allows parents and guardians to customize the buttons for their child by taking pictures of their child's personal things as new buttons as well as record words in their own voices. An unlimited number of buttons can be created, and each can be categorized into specific groups such as playtime or mealtime. The software recognizes whether or not the user is able to accurately touch the buttons, and it resizes the buttons on the fly depending on the agility of the user. This software is currently being run on a Motorola Xoom tablet and is being tested with disabled children in Alamance county.

# ENGINEERING ON THE GO: DESIGNING A 'SERIOUS GAME' TO MAKE GAMES ON THE ANDROID PLATFORM

Thomas W. Price (Prof. Joel Hollingsworth) Department of Computing Sciences

Players of the videogame World of Warcraft (WoW) have collectively logged 5.93 million years of playtime (equivalent to approximately 100,000 60-year-long human lives). While many would argue that WoW and games like it are a waste of time, growing research in the field of Serious Games asks the question: How can we take that almost completely untapped resource of human time and energy and do something good with it? Can we make 'Serious Games' that are designed to be as fun and motivating as WoW but also allow the player to accomplish something meaningful in the process?

This research attempts to answer that question through the creation of a Serious Game which addresses the problem of falling numbers of students enrolling in the fields of Science, Technology, Engineering and Math (STEM). The game, being developed as an App for Android, allows players to create, test and share their own videogames, all on a device that can fit in their pocket. The goal of the App is to expose players to concepts and skills that they will come across in their STEM education, but to do so outside of the classroom and in a positive way. The act of game creation provides an ideal medium for exposing players to ideas, from specific skills like 2D vectors and geometry to general concepts like translating an idea into a product. Equally important, however, is the fact that making games is fun and engaging. Players not only get to test and share their own games, but also to play those of others.

This research is currently in progress but has already produced a working prototype of the App, which has been used to create some sample games. The presentation will include an overview of Serious Games and the App's purpose, as well as a live demonstration.

### THE EFFIENCY AND VERSATILITY OF VISUAL PASSWORDS

### David S. Williams Jr. (Dr. Dugald R. Hutchings) Department of Computing Sciences

Textual-based passwords and numerical PINs are widely used to authenticate users on electronic devices such as computers, mobile phones, and tablets. The question arises on whether or not those methods are the most effective ways for verifying a user's identity or if a visual password system would produce better results. Visual password schemes have started to become developed and proposed as alternatives to the aforementioned textual-based and numerical PIN user authentication methods. None of them have gained a widespread adoption as they would require people to change what they have been using for years as well as encounter a learning burden. However, if research becomes successful in illustrating the advantages of a visual password system, then its widespread adoption would be much more likely. The research for this project will be conducted during the Spring 2012 semester and will include experimentation of different types of password interfaces on a variety of devices. Participants' efficiency of password entry and error rate will be documented to quantify the effectiveness of each selected system. A report will be created from the experimentation to show the speed with which the interfaces can be used as well as their versatility across devices. We aim to conclude our research with recommendations about the efficiency and versatility of different systems. Password entry is an integral component of everyday life in business and personal affairs, and the most efficient and versatile methods should be at the forefront.

# **ECONOMICS**

### SIDEWALKS, STREETSCAPES, AND WALKABILITY

Katherine N. Atkins (Dr. Thomas K. Tiemann & Dr. Alan C. Scott). Departments of Economics and Psychology.

Policy makers have been trying to find ways to increase walking in the general public to improve public health, increase transit use and improve general livability in cities. One of the problems facing researchers evaluating or developing policies to increase walking is the lack of agreement on the details of what makes a place "walkable." The walkability of a place seems to be a complex interaction of the micro-level characteristics of an individual street and the macro-level characteristics of the neighborhood around that street (Ewing, Handy, Brownson, Clemente, & Winston, 2006). Researchers have made some progress on the effects of different macro-level attributes like block size, density, and mix of uses (Owen et al., 2007; Smith et al., 2008), but micro-level attributes have not received as much attention. This research studies how a selection of micro-level attributes affect perceived walkability. Participants were presented with computer generated pictures of a typical low rise business street with sidewalks, but with different

combinations of bike lanes, parallel parking, a planting strip and trees. Participants were asked to rate the walkability of the space for each of the nine different combinations of environmental features and also provided forced choice preferences between pairs of combinations. Statistically significant differences were found among the ratings and the differences were corroborated by the pairwise forced choice data. The findings suggest that alterations to micro-level characteristics (including relatively inexpensive alterations) could alter the perceived walkability of an environment and also suggest that the method employed holds promise for studying the effects of other micro-level attributes. Findings suggest that any additions which create a buffer between vehicle travel lanes and pedestrian facilities, whether in the street (e.g., parallel parking or bike lane) or on the sidewalk (e.g., grass planting strip) will increase perceived walkability, but that the addition of trees may make the most significant impact on how walkable pedestrians find a particular sidewalk.

### TENDING THE FLOCK: MARKET SHARE IMPLICATIONS OF VATICAN II

### Mara L. Bollenbacher (Dr. James L. Barbour) Department of Economics

The essential purpose of my research is to address the relationship between market-share theory and the Second Vatican Council; specifically to answer the question "what was the impact of the changes implemented as a result of Vatican II with respect to market share". This question is situated within two fields, Economics and Religious Studies. This research is more unique, more off the beaten path than the "normal" studies of the effect of (for example) changes in contracting in professional sports or the domestic impact of policy decisions taken by the government, done for most Economics majors' senior thesis. An increase in market-share shows the existence of an environment that is conducive to profit maximization by the church and/or increased political influence. An increase in market-share could also reflect the result of the evangelical church being successful in evangelizing. We cannot know which is the motive behind the increase, but the existence of the conditions indicate that we should heed the possibly. This possibility is one degree to which this research is significant, in addition to adding to a field of Economics that lacks a lot of research.

The main method used was the projection of the church's market share from 1965 forward using a counterfactual structure as though Vatican II never took place, and compared these findings with the factual path. After doing this, I was able to sort out how much of a difference there was that could be attributed to Vatican II. To create this trajectory, I used a model with the dependent variable the ratio of Catholics to Christians in the United States, with the independent variables as the following: contraception use, reported priest scandals, war, education, economic well-being, and immigration. Thus far, while interpreting and analyzing the data we have found that the changes implemented at Vatican II had a significant impact on the trajectory of market share within the Catholic Church.

### THE LONG TERM AND SHORT TERM EFFECT OF SINGLE-SEX EDUCATION ON EXTRACURRICULAR PARTICIPATION

Grace A. Foster (Dr. Katy Rouse) Department of Economics

In the United States, there is growing concern over the quality of the public school system. American children are scoring lower than ever on standardized tests, and high school graduation rates continue to fall. Given these troubling trends, educators and policy makers are continually seeking to implement policy changes that will improve the quality and success of education in the United States. Single-sex schooling, especially in secondary education, is one policy area that has been recently discussed and is likely to be considered by policy makers due to a recent clause in "No Child Left Behind", that allows for single-sex education in public schools. It is theorized that single-sex education is beneficial for students in terms of both their academic and social outcomes. If these theories are correct, then single-sex education could be integral in creating a more diverse and productive community of students and adults. This research examines the benefits of single-sex education, focusing on the effect of single-sex education on a student's decision to participate in extracurricular activities. The hypothesis of this research is that students who attend single-sex schools are more likely to participate in both high school and college extracurricular activities. This effect is predicted to be stronger for females who are subject to a more prevalent adolescent subculture. Data come from the National Educational Longitudinal Study of 1988. Extracurricular involvement is measured through various dependent variables, including time spent per week on activities, participation in sports, and leadership positions held. I estimate the effects of single-sex education on these variables using a multivariate regression. Importantly, I also address the non-random selection of students into single-sex schools using an instrumental variable method. The results suggest that single-sex education has a positive and significant impact on a student's extracurricular choices. As predicted, the marginal effects of single-sex education on these choices are greater for girls. Given the welldocumented benefits of extracurricular activities, these results imply single-sex education may be integral in creating positive academic and social outcomes for students in the short and long run.

## HOW MUCH CONGESTION IS TOO MUCH CONGESTION?

### Joseph Q. Patterson (Dr. Thomas Tiemann) Department of Economics

In the United States today, many people live relatively far from their places of work. However, this sprawl is causing many negative externalities. Gas prices are rising, negative environmental effects and congestion in and around cities are just a few of these externalities. In this paper, I attempt to create a model that shows that as congestion in cities is increasing, people are more willing to find alternate routes or transportation in order to arrive in the city. My variable of interest is not significant. However, it does show that as there are more and more commuters, public transportation use does increase,

which goes to show that public transportation might have a larger effect at decreasing congestion in larger cities over smaller cities. Furthermore, it also shows that people's value of time is significant. This supports the theory that people might be willing to change their mode of transportation if there was a different reliable, faster option available to them. However, as of now, Americans continue to drive their cars in congestion every day. So the question needs to be asked: How much congestion is too much congestion? At what point will we be willing to take an alternate mode of transportation.

# TO REBOOT OR NOT TO REBOOT? ANALYZING THE PERFORMANCE OF MOVIE FRANCHISES

Alexander D. Spitz (Dr. Mark Kurt) Department of Economics

In 2011, the movie industry's top ten worldwide grossing films where all extensions of successful entertainment franchises earning over \$7.8 billion (Box Office Mojo, 2012). These new installments can be broken into the following categories: prequels, sequels, remakes, and a relatively new type, reboots. Reboots are unique in that they allow writers to "reset" the story, giving them much more freedom to create great stories, revive characters, and replace actors with a new cast. In theory, this allows for more appealing movies and thus more profitable films while maintaining key elements which originally appealed to audiences. This paper investigates what, if any, financial advantages of rebooting franchise over other forms of franchise installments and original works. Preliminary results indicate limited financial advantages over sequels and prequels.

### DEMOGRAPHICS INFLUENCE ON GLOBAL CURRENT ACCOUNT IMBALANCES IN ADVANCED ECONOMIES

**Thomas S. Whyel & Thomas J. Gutierrez** (Dr. Vitaliy Strohush) Department of Economics

As the world has become more globalized, global imbalances, specifically global current account balances have become increasingly divergent. The objective of this paper is to determine which factors have caused present global current account imbalances between surplus nations such as East Asian countries and the western countries like the United States. Using the 34 IMF Advanced economies allow my model to have exposure to both the advanced East Asian countries, which run surpluses, and European countries, such as Spain and Greece and North American countries, such as U.S. and Canada, which run deficits. The base variables that we will be using are current account as the dependent variable. Our independent variables are: fiscal balance, capital account openness, relative income, relative dependency ratios for elderly segments of populations, private credit, liquid liabilities, terms of trade volatility, and real effective exchange rate. With a base model to describe the changes, we hypothesize changes in the demographic composition of a country will explain the global current account imbalances. The motivation for this paper is derived from Cooper (2008) who postulates that widespread changes in birth rates, fertility rates and life expectancies may have an effect on current accounts. Including key demographic variables illustrates falling birth rates and fertility rates

leading to current account surpluses for some countries or regions and rising life expectancy is changing saving patterns resulting in current account deficits. Our contribution to the economic literature of determining current account imbalances is the addition of life expectancy, fertility rate, and birth rate variables. In our final econometric model, we utilized a feasible generalized least squares estimation, finding that life expectancy has a positive and significant relationship with current accounts at a 10% significance level, with a coefficient of .21. We, also, find that birth rates have a negative and significant relationship at a .05% significance level, with a coefficient of -.399. Finally, we find that fertility rates have a negative and significant relationship to a country's current account balance with significance at the 5% level.

### CAN FOOTBALL BUY SMARTER STUDENTS?: THE EFFECT OF ATHLETIC SPENDING ON FOOTBALL CHAMPIONSHIP SUBDIVISION ACADEMIC INSTITUTIONS

### Tyler S. Zoda (Dr. Jennifer Platania) Department of Economics

There is a longstanding debate amongst university leaders that money spent on athletics might be better spent on things that directly impact the academic environment of the institution. Yet colleges get exposure from their sport teams, and as intercollegiate sports can be a big part of student life, there is an argument to be made for increased investment in athletics on college campuses. In this study, we analyze whether money spent on Division I-AA athletics, and specifically football, helps to increase the prestige of the university by attracting brighter students. Previous studies have suggested that success on the athletic field may lead to smarter students, thus simultaneously advancing the academic goals of the university. The majority of these studies however have focused on colleges which compete in the Football Bowl Subdivision (FBS), formerly known as Division I-A. This paper focuses on the correlation between athletic spending and academic success in the lower tier Division I-AA Football Championship Subdivision (FCS) schools. Additionally, previous studies have implicitly assumed that the utility or welfare function of the institution is separable in spending on athletics and spending on academics. Given however that much of the literature disputes this claim, this paper suggests that spending on athletics and spending on academics may be non-separable across spending. This would imply any increase in spending on athletics or academics will lead to a change in the marginal effect of the other variable, as well as increasing the overall utility. The empirical results show however that spending on athletics and academics may in fact be additively separable across the welfare function of the institution. These results would support the implicit assumptions in previous papers, thus giving more support to the existing literature. The results also show that while increases in academic spending do in fact lead to an increase in the academic prestige of the institution, spending on athletics may not necessarily have benefits beyond the athletic programs.

# ENGLISH

### INEQUALITY AND LANGUAGE ACQUISTION: A SOCIOCULTURAL-LINGUISTIC STUDY OF EDUCATION IN *LOS PUEBLOS* JOVENES OF AREQUIPA, PERU

### Emily D. Ash (Dr. Jessie Moore) Department of English

Research is done for many reasons; whether out of personal interest, to help fill an academic gap, or to investigate a problem, exploring and expanding on knowledge has positive consequences. The research I conducted in a school located in a *pueblo joven* outside of Arequip, Peru integrated each of the above reasons to determine if Indigenous, Quechua speaking students struggle more than their Non-Indigenous, Spanish speaking peers to acquire English. By working within the frame of socio-cultural linguistic studies I hoped to "shed light on the education of people whose language, literacy and very being have traditionally been marginalized or disenfranchised" (Enciso, 2007, p. 3). The process consisted of a variety of research methods including surveys, interviews, observation, and literacy samples. Collectively, the evidence illuminates the reality of educational quality provided for the students, all of indigenous families, at the school.

The research directly addressed the issues of racial and linguistic discrimination that, despite recent shifts in demographics and an increased level of economic and political stability, still persists in Peruvian society and culture. Each unique, primary source I gathered provided rich insight into the realities of the language acquisition abilities of Indigenous students. Ultimately the evidence illustrates possible causes for the gap in acquisition abilities, and serves to generate potential solutions that would allow indigenous students to achieve their full academic potential.

The end result of my research describes a population of Peruvian children living in a home where one or more parent(s) speak Quechua or Aymara, Peru's two major indigenous languages, who have migrated to the outskirts of Arequipa in hopes of finding a better life. The academic struggles of these students reflect debilitating social alienation and discrimination, all based on their language abilities and their race. In conclusion, current discrimination trends affect access to quality education for students from indigenous backgrounds, therefore, inhibiting their second language acquisition abilities.

#### EMPLOYING RHETORIC IN INTERNATIONAL PUBLIC SERVICE NONPROFITS: COMMUNICATION STRATEGIES FOR EFFECTIVE AND SUSTAINABLE SERVICE

Anna E. Becker (Dr. Stephen Braye) Department of English

Humanitarian efforts have been undergoing a significant shift from aid to service; therefore these efforts present an interesting opportunity to study rhetorical practice at work. As this service sphere continues to grow rapidly, communicating missions, initiatives, and overall identity is more complicated for the international nonprofit

organizations that engage in and organize this service due to the lack of concrete guidelines or boundaries for service organizations and their missions. Organizational documents directly indicate rhetorical strategies and implementation. Therefore, in order to analyze the ways in which the rhetoric used by international public service nonprofits addresses issues such as cultural sensitivity and sustainability, I traced the manifestations and portrayal of these aspects within documents from three organizations (Oxfam America, Habitat for Humanity, and the Peace Corps). In my analysis of these documents, I used a combination of Neo-Aristotelian criticism, Ideological criticism, and Cluster criticism, as well as a coding method built on Kenneth Burke's theory of identification and consubstantiality. This methodology of rhetorical criticism includes matrices that evaluate documents' rhetorical strategies in representing their respective organization's mission. I also categorize each document according to my adaptation of William Easterly's planners and searchers model introduced in his book, The White Man's Burden, which I have expanded through my own definitions and the addition of an "integrated" categorization. This research indicates how the documents created by these organizations effectively use, or do not use, rhetorical strategies to consistently convey their missions and goals. These findings can be used to understand the intentions and the interpretations of language within communicative documents for service situations in order to work towards the use of rhetoric that is not only consistent, but also indicative of sustainability, cultural sensitivity, and empowerment, and therefore is most conducive to effective service.

### "A GOLD PIECE FOR A SCARLET SHAME LIKE MINE/BUT MINE WAS NOT THE SAME": THE BREAKING DOWN OF VICTORIAN SEXUAL BINARIES IN CHARLOTTE MEW'S POEMS ON GENDER AND SEXUALITY

### Kelly M. Herrick (Dr. Janet Myers) Department of English

Charlotte Mew was a highly respected, yet quickly forgotten, English poet and fiction writer who was influenced by both the Victorian and Edwardian eras. This research will explore the question of how Mew's poems responded to Victorian ideologies about gender: specifically, the concept of the fallen woman and the sexual binary for women. Two literary schools of criticism, feminism and historicism, will be used to analyze Mew's poetry. Feminist literary criticism will be used not only to shed light on an overlooked female writer, but also in order to examine the gender roles and sexual expectations for women during Mew's lifetime. By examining the history and culture of the time period alongside Mew's poetry, the literary texts will be illuminated in light of the time period in which they were created. After critiquing Mew's poetry that deals with sexuality and gender, it can be found that Mew creates women who experience sexuality in a new liminal way that distinguishes them from society. She does so by representing women who are lustful but also good and decent women who give into temptation. The liminality of these women, however, is not presented in a negative light, but rather allows Mew to present a more nuanced view of womanhood. Through her detailed portrayal of women and sexuality, Mew breaks down the popular Victorian concepts of fallen women and sexless females. Critics have yet to give Mew proper credit for her poetic attack on the gender ideologies of Victorian Britain and more nuanced representation of womanhood.

# **TEXT-MESSAGING: THE "DIGITAL WRITING UNDERLIFE" OF ELON UNIVERSITY STUDENTS**

Mary Kate Hinshaw (Dr. Paula Rosinski) Department of English, Professional Writing & Rhetoric Concentration

This research study examines the role that text-messaging plays in the personal, professional, and academic lives of Elon University students. Text-messaging is important to study because while it is one of the most frequent kinds of writing that students engage in every day, it is also one of the least-valued and least-studied from a rhetorical and educational standpoint. The existing rhetorical research on text-messaging is limited, but scholars in the fields of writing, rhetoric, and education have argued that it is important to learn more about all of the ways in which students compose and communicate both inside and outside of the classroom. In the Fall of 2011, twenty Elon University students participated in this IRB-approved study, which used several different data collection methodologies: pre-study surveys to collect demographic information from participants, "Text-Message Diaries" to collect actual text-messages and surrounding rhetorical information from participants, and post-study focus groups to ask follow-up questions. Findings from this study indicate, not entirely surprisingly, that students use text-messaging in a variety of ways and for a variety of purposes, most commonly in the personal spheres of their lives, as a way to build and maintain relationships, or, as a way to engage in "phatic" communication. This conclusion supports a view of text-messaging as a complex social and rhetorical act used largely to understand and improve human relations in an increasingly connected and globalized world. The implications of this research could help scholars and teachers adjust their understanding of rhetoric and rhetorical practices in the modern world as well as their teaching practices. In addition, the study opened up many other questions and opportunities for those interested in pursuing research in the realm of text-messaging and other forms of students' digital writing habits.

### THE POWER OF TRAVEL WRITING: WATER SCARCITY IN INDIA

### Katie E. Kenney (Prof. Michael Strickland) Department of English

The purpose of this project was to explore the power of travel writing as a means of communicating and promoting awareness of environmental and social justice issues. How do travel writers effectively persuade their audiences to care? How do they establish their ethos as a foreigner reporting with authority on a location? What are the ethical implications of a travel writer's work? In a world characterized by myriad social, environmental, and economic challenges, travel writing presents an important means of promoting awareness of important issues and persuading audiences to take action. In order to address these research questions, this project seeks to use travel writing as a means of communicating the issue of water scarcity in rural India. The main objectives of the project were to create and submit for publication a full-length travel essay extending from field research conducted abroad in Jamkhed, India. Field research included observation of water development projects, interviews with development projects facilitated by various nonprofit organizations. Through research of the travel writing genre and rhetorical analysis of published travel writing essays focusing on identified

environmental and social issues, this project heavily emphasized writing as a process. Rhetorical research and analysis further informed the writing process by addressing the ethical considerations necessary for effective travel writing, as well as its ethical implications. This project found that travel writing, though often of the guidebook variety, can serve as an important vehicle for informing audiences of social and environmental issues. Strategic employment of rhetorical strategies allows travel writers to not only inform audiences, but also gives them the potential to move audiences to action.

### TURNING PAGES ON TIME: THE EVOLUTION OF CHILDREN'S BOOKS AND A TRANSITION INTO THE DIGITAL WORLD

Alexandra M. Leikin (Dr. Megan Isaac) Department of English

With the exponential growth of technology, the picture book is facing a crossroads. In this paper, I will provide a history of the development of the book as a physical aspect as well as an important historical element essential for cultural identity. I will then switch to the more recent technological advancements affecting the reading process itself – specifically electronic books– and discuss possible implications for deep reading.

I am particularly interested in the importance of children's literature and how advancements in technology may indicate shifts in the activity and development of generations of new readers. A love for reading is learned at a very young age, yet many have argued that we are putting digital technology in front of children as a means of distraction as opposed to encouraging reading.

So, here is the main question – since the development of books, humans have been determined to make learning more efficient and pragmatic. Are we developing the book as a technological object to a point that it is unrecognizable, and how is this affecting the younger generations? After all, without a genuine, early-developed love for reading, society may lose the many valuable skills learned when studying language and literature. Overall conclusions show that, although the digital world is introducing new and exciting ways to read, society may be moving too fast into this direction. We may embrace what the digital world has to offer; however, we must also face the dilemmas concerning the reading process itself and how such technologies may change this process especially concerning those learning to read in today's digital world.

### THE POWER OF MYTH IN STORIES OF COLUMBINE

Emily M. Mooney (Dr. Jean Schwind) Department of English

On April 20, 1999, Littleton, Colorado experienced the deadliest high school shooting ever to occur in the United States. The nation experienced a shock that permanently changed both high school as a social institution and conceptions of the average troubled teen. The story of the Columbine massacre has become an iconic national tale. From the early on-site news reports, to the nonfiction investigations written afterwards, to Columbine-inspired popular fiction and movies, the Columbine "story" (a mixture of fabrication and news reporting) has entered nearly every American household in some form. However, despite the variety of media interpretations of Columbine, the tale has

been repeated with little variation. The Columbine "story" told in film, television, journalism and literature relies heavily on carefully constructed myths in place of established facts. The most common misconceptions include the assumptions that a typical high school shooter has been a victim of bullying, embraces 'Goth' fashions and ideals, enjoys violent video games and music, and hates jocks. This historic event and the literature that represents it illustrate the circuit of culture, namely the way stories construct culture, and culture, in its turn, constructs stories. My research specifically examines how the immediate news reports pertaining to Columbine invent the adolescent shooter and provide insight into how we read crime myths. This historic event and its corresponding literature provide a perfect opportunity to understand and apply the theory of Cultural Materialism. By focusing on the phenomenon of how past events are reconstructed in a variety of modes, I will investigate how primary texts act as sociocultural documents that simultaneously determine and provide insight into culture. I will examine three related questions: How was the tale of the Columbine massacre constructed? Why does this story appeal to our imagination? And why does the fabricated Columbine "story" endure in the face of evidence that refutes it? I will attempt to demonstrate how popular myths are constructed, and explain why the Columbine myths, in particular, are immune to fact.

# LANGUAGE AND HYBRID IDENTITY IN WHITE TEETH AND WIDE SARGASSO SEA: A POSTCOLONIAL INTERPRETATION

### Samantha R. Rohrborn (Dr. Rosemary Haskell) Department of English

The nature and function of language in post-colonial literature can be used as an index of the evolution of colonial hybridity. A comparison between the language use of girls and women from "colonial" cultures in Zadie Smith's *White Teeth* [2000] and Jean Rhys's *Wide Sargasso Sea* [1966] explores the development of the hybrid identity of these minority characters within the language of their colonizers. This research can be used to demonstrate the struggle that colonized peoples face to regain an identity and sense of self within a new imperial culture and language. In these works, the focus is on the relationship between the Caribbean, specifically Jamaica, and England. Both authors, as products of England's colonial history, have a first-hand understanding of the difficulties of expressing oneself in a dominant, and foreign, language.

To examine these works, I will be using a post-colonial perspective. Others have studied the use of language in these novels, though their relationship has yet to be examined. By analyzing the post-colonial theorists, and applying their ideas to *White Teeth* and *Wide Sargasso Sea*, I will support my claim, that language influences cultural hybridity, with textual evidence.

Language can be used to index and identify the evolution of cultural hybridity through the female characters in *White Teeth* and *Wide Sargasso Sea*. The women in these novels, as descendants of natives from British colonies, directly experience the difficulties of expressing themselves within the English language. The evolution of the English language within a minority and colonial culture can be used to understand the effects of colonialism upon the sense of self and identity that these characters struggle to maintain.

#### **"WHAT MOTIVATES STUDENTS TO MAKE CHANGES TO PAPERS?" APPLYING COMMUNICATION THEORIES TO THE FEEDBACK PROCESS IN FIRST-YEAR COLLEGE WRITING CLASSES**

#### Mason E. Sklut (Dr. Michelle Trim) Department of English

In order to understand what the motivational factors are for students to make changes to their papers in first-year college writing classes, it is important to study the communication theories within the feedback process that occurs between students and faculty. Through a series of questions asked to first-year students in focus groups, emails, and forms, I determined what factors influence a student within the writing process including one's writing style, preferred forms of communication, and reactions to parts of the writing process (draft revisions, comments, etc). The student-faculty dynamic that takes place during the feedback process introduces several interpersonal and organizational communication theories. By applying such theories as the Elaboration Likelihood Model (ELM) and cybernetics to the process of feedback interpretation, it becomes clear what factors motivate students to make changes to their papers. Through this study, it was discovered that among the wide variety of motivational factors, the incentive of receiving a high grade was the primary reason for students to make changes to their papers. Even though these results are from the first stage of this two-year study, the communication theories uncovered in this research help to develop strategies in order to understand how students use feedback in college writing classes.

#### BULLIES, BOOKS, AND BROOMSTICKS: PORTRAYALS OF EDUCATION IN BRITISH AND AMERICAN BOARDING SCHOOL STORIES

#### Katherine G. Spruill (Dr. Megan Isaac) Department of English

Boarding school novels have been an integral part of a youthful reading experience since the nineteenth century, and enjoy extreme popularity today due in part to the success of J.K. Rowling's *Harry Potter*. Because these books are popular, aimed at a young segment of the population, and inherently tied to education, examining the teaching methods utilized and the areas of pedagogic concentration gives insight to the expectations of young readers regarding their own educations. This study explains what such portrayals and applications of boarding school education might mean in the context of modern educational theory in addition to literary theory. Specifically, this analysis explores British and American boarding school stories from 1850 to the present day to compare educational styles between nations as well as among individual schools. All of this helps explain why the boarding school setting is so popular and frequently used. By categorizing a selection of 40 British and American boarding school books as belonging to a Pre-WWII category, a Fantasy category, a Realism category, or an Elite category, the boarding school books are compared in terms of their educational approaches concerning teachers, schoolwork, and social activities. Special attention is given to unspoken forms of education, particularly to schools' hidden curriculums and their attempts to indoctrinate students into the society supported by the boarding school lifestyle. Ultimately, the difference between different categories of boarding school stories seems to outweigh the difference between British and American school stories, with each of the categories focusing on distinct issues and areas of concentration. This shows how education in books connects to education in the real world.

# "THE TIME IS OUT OF JOINT": A DIALECTICAL HAUNTOLOGY OF JUSTICE IN SPECTERS OF MARX

#### Jensen T. Suther (Dr. Kevin Boyle) Department of English

Recent treatments of Derrida's project have contended that, while a family resemblance between them may exist, deconstruction and dialectical inquiry are incompatible with one another and operatively dissimilar. Taking Fredric Jameson's recent work on Derrida in his Valences of the Dialectic as an exemplary manifestation of this claim, this analysis, as opposed to Jameson's reading, will seek to demonstrate that deconstruction is grounded in a Hegelian, and therefore immanently dialectical, methodology, but also that deconstruction may be redescribed in Hegelian terms as "indeterminate negation." Through a reading of "The ethical order" in the Phenomenology of Spirit and of Derrida's dyadic formulation of justice in the concept of "hauntology" in Specters of Marx, I will argue that deconstruction, if it is to continue to be a valuable tool for theoretical discourse, must be understood not only in terms of its external dialectical relationship to Hegel, but also in terms of its internal dialectical movements: the concept of justice itself, as presented by both Hegel and Derrida, must be rearticulated as the primary problematic of the intersection between deconstructive and dialectical discourses. Given Derrida's preoccupation in Specters with Walter Benjamin's concept of "weak messianism," a brief consideration of Derrida's relationship to Benjamin's dialectical thought will augment considerably the claim that a dialectical structure is central to Derrida's concept of justice. As an attempt to realize a rearticulation of justice as it figures in the work of Hegel and Derrida, this analysis will seek to establish a deconstructed, dialectical justice as a significant problematic for contemporary engagements with deconstruction, while also grappling with the arguments of those for whom Derrida is not only anti-dialectical, but also largely irrelevant.

#### DO PERSONALITY TRAITS AND IDENTITY FACTORS CONTRIBUTE TO HOW STUDENTS USE FEEDBACK?

### Caitlin J. Tarantiles (Dr. Michelle Trim) Department of English

This study was designed to look at the following research questions. How do students use written feedback that they receive in their papers? Is there a connection between a student's personality traits and how a student uses feedback? This research study examined these questions using previous feedback research and personality research as background information. The study used written responses to feedback, self-reported personality traits, and focus groups to answer the research questions. The study was conducted using data from four freshman writing classes and a freshman honors seminar. The participant's filled out a questionnaire in the beginning of the study, including questions related to thoughts about feedback and writing and also relating to the participant's personalities. Each time the participant's received feedback from their teacher they wrote a response to the feedback. Additional focus groups were also held to gain more insight on student's use of their feedback. All the written responses were coded in order to find patterns between self-reported personality traits and how students use their feedback. The results have been somewhat inconclusive, however, there have been patterns shown between different personality types and reactions to feedback. Research is being conducted to find further patterns between the personality traits and the way they

use feedback. This research is important for students because it will make student's become conscious of how they react to feedback given to them.

### APPLYING MAGICAL REALISM TO LITERARY NONFICTION

#### Jillian S. Weiss (Professor Cassie Kircher) Department of English

The term "magical realism" was first coined in the 1920s by Frans Roh, a German art critic, who applied it to the visual arts. Soon the term was embraced by Latin American writers and was broadened to include ways of approaching literature. Although a discussion of how to define magical realism has been longstanding, I like to think of it as weaving sharp realism and fantastic elements into a story while treating the fantasy as reality. Gabriel Garcia Marquez was the first to popularize this term with his publication of *One Hundred Year of Solitude* into English in 1970, but magical realism had long been used in the early 20<sup>th</sup> century by Franz Kafka, who just didn't have a name for the sort of stories he produced.

My SURF project applies magical realism to literary nonfiction, a genre that allows writers to both narrate facts about their lives and the world and to search for truth. While numerous works of literary nonfiction play with fantasy, such as Virginia Woolf's "The Moment," the term magical realism is seldom used to help describe what is going on in the texts. In fact, magical realism and literary nonfiction are considered antithetical. How, might someone ask, can the real world be fantastical? However, having one foot in both these genres, I was drawn to this unlikely pairing and have written four essays using conventions which I would categorize as being magical realist. My essays demonstrate the various methods that can be employed to help the magical work in realistic literature, such as the use of extended metaphor and first person perception. Including magical realism in the realm of nonfiction will open up alternative ways of expressing our experiences without stamping the title of "fiction" upon them, and what is art if it doesn't always strive to uncover new ways of clearly expressing the world?

# LYRICAL SOUTH AMERICA: TRAVEL WRITING ADVENTURES AS CULTURAL ANALYSIS

**Katherine J. Whittaker** (Professor Michael B. Strickland) Department of English This project began as a result of my first study abroad semester in Argentina. Upon returning to Elon I took a travel writing class and began to explore methods for writing and doing quantitative and qualitative research on the places I visited. In a follow-up summer 499 course I expanded my background in travel writing by reading deeply into the works of writers I found influential such as Paul Theroux, and others who had written in moving ways about South America such as Ernesto Guevara and Bruce Chatwin. This reading has shaped my own writing since. I have moved far beyond description and surface details into examination of perspective, cultural difference and perceptions of "the other." My project has evolved into a planned manuscript of at least eight essays, bookended by an introductory chapter that outlines my research questions about effective travel writing methods and the best way to portray a country through my perspective as a

young female traveler in South America. For my SURF presentation I will outline my approach to examining cultural differences and the way in which people react to different, foreign situations through my travel writing. I will also highlight relevant experiences, and read from two different chapters of my manuscript. One is an examination of a negative cultural experience and its perception from the points of view of both natives and tourists, and the second is a more lyrical piece about a location in Argentina, told from the perspective of a female American tourist.

## **ENVIRONMENTAL STUDIES**

### AN INTERACTION BETWEEN THE EUROPEAN WILD BOAR AND BEACH BARK DISEASE IN GREAT SMOKY MOUNTAINS NATIONAL PARK

Kileigh D. Browning (Dr. David Vandermast) Department of Environmental Studies

The high elevation beech forests (>4500 ft) of Great Smoky Mountains National Park (GRSM) provide an ideal habitat for the introduced European wild boar (Sus scrofa). Boar rooting has been reducing plant species richness and diversity in GRSM since the mid-1950s. In addition, since 1993, Beech Bark Disease (BBD), a non-native insectfungal pathogen complex, has been killing mature beech trees (Fagus grandifolia) in the high elevation beech gaps of the park. Without mature beech trees composing an overstory canopy in the forest, increased sunlight has led to a dense shrub layer that appears to limit boar rooting. This study examined the effect of BBD on boar rooting in beech gaps. Data were collected in the summer of 2011 utilizing 11 plots within beechdominated forests. Estimates of tree and shrub coverage were made for each stratum (canopy, shrub, herb) of vegetation at each plot. Furthermore, species identified by Bratton (1974) as threatened by boar rooting were re-evaluated using data collected in 2008. Our results indicate that BBD-caused mortality of beech trees and the consequent growth of a dense shrub layer significantly reduces the hog rooting in beech gaps (R2 =0.31); average rooting in plots with >50% shrub cover was 32.7% vs. 1.6% in plots with <50% shrub cover (p<0.01). We found that herbs are affected by both hogs and by the dense shrub cover that follows BBD-caused overstory beech mortality. However, our results also indicate that some herbaceous species proposed by Bratton to be endangered by hog rooting such as sedges (*Carex sp.*), violets (*Viola sp.*) and wake robin (*Trillium* erectum) have increased in frequency, possibly as a result of their "protection" in the dense shrub layer. Other species have declined as predicted: asters (Aster sp.), turk's cap lily (Lilium superbum), and bee balm (Monarda dydima) possibly because dense shrub layers are too shady for their survival. Although understanding the effects of introduced diseases and pests has long been an important ecological endeavor, this study adds to the field by reporting on the interactions of two non-native species.

# DOES HUMAN SCENT AFFECT THE CAPTURE RATES OF CAMERA TRAPS IN WILDLIFE STUDIES?

#### David J. Muñoz (Dr. Michael Kingston) Department of Environmental Studies

In order to make smart decisions in regards to biodiversity, knowledge about the various species in question is required. In studies regarding wildlife ecology and conservation, camera trapping has therefore become increasingly widespread, especially for rare and endangered mammals. Camera traps are, on the most basic level, high quality infrared motion-sensor cameras. Being a novel technique, there are gaps in the knowledge, specifically how human scent affects the capture rates of cameras. In an effort to fill these gaps, we deployed four camera traps (Reconyx<sup>™</sup> HC600; Holmen, WI) in each of two treatments ("human-scent masked" and "human-scent unmasked") on the Haw River and Rocky River (Alamance & Chatham County, NC). Random locations for camera trap placement were determined via Geographical Information Systems (GIS) at eight locations on-site, and all cameras were mounted facing active wildlife trails in early spring 2011. After an initial baseline data collection period, treatments were applied when researchers checked cameras every two weeks for basic maintenance (i.e., checking batteries and downloading pictures written to camera memory cards in the field). Human scent-control for the "scent masked" treatment was accomplished during camera maintenance via commercial scent-control clothing, and scent-masking chemicals that was applied prior to entering the study site to conduct maintenance for cameras in this treatment. No effort was made to control human scent when conducting camera maintenance in the "scent unmasked" treatment. A total of 65,000 pictures were taken by cameras over the course of a year. Species identified were Odocoileus virginianus (White-tailed deer), Canis latrans (Coyote), Sylvilagus floridanus (Eastern cottontail), Sciurus carolinensus (Gray squirrel), Procyon lotor (Raccoon), and Didelphis virginiana (Virginia opossum). Capture rates during the treatment period were analyzed, and compared to baseline capture rates during a no treatment period. The results indicate that no substantial difference existed between the two treatments and baseline data collection period. This conclusion is important because it can influence how camera studies are done globally, and it can prevent unnecessary costs.

#### PHYSIOLOGICAL RESPONSES IN THE COASTAL MARSH PLANTS, SPARTINA PATENS, FOLLOWING SUDDEN INCREASES IN SOIL SALINITIES

Brittany L. White (Dr. Brant Touchette) Department of Environmental Studies

Little is known about how upper marsh plants, growing principally in freshwater, will respond physiologically to sudden increases in soil salinity. Nevertheless, this is fundamental to our understanding of how coastal wetland systems may respond to sealevel rise and/or increases in storm intensities attributed to climate change. In such cases, plants adapted to freshwater may suddenly experience a sharp rise in soil salinities following, for example, storm events that exert intense soil erosion which alters existing shoreline profile and changes coastal marsh hydrology. Therefore, in this study we used experimental microcosms to evaluate sudden changes in plant-water relations in the coastal halophyte *Spartina patens* following increases in soil salinity (15-, 30-, and 45-psu). The results indicate a delay (by three to five weeks) in lowering leaf water potential

 $(\Psi_{\text{leaf}})$ , stomatal conductance (g), and tissue water content  $(\theta)$  in plants receiving 30 to 45 psu. These physiological delays in modifying plant-water relations are unusual in coastal wetland halophytes following sudden increases in environmental salinities and may be an adaptation of *S. patens* that allows it to effectively exploit higher habitat elevations receiving intermittent or sparse seawater inundations. While these delay do represent an avoidance-like response with regard to soil salinities, it is evident that if environmental salt-stress is extended over longer-periods (weeks to months) and physiological delays lead to declines in  $\theta$  and perhaps overall plant health, *S. patens* may initiate the more physiologically costly processes involved in salt-tolerance.

# **EXERCISE SCIENCE**

# FINE MOTOR DEVELOPMENT IN 5-10 YEAR-OLD CHILDREN: THE ROLE OF POSTURE

Rachel G. Anderson & Jasmine G. Jackson (Dr. Caroline J. Ketcham) Department of Exercise Science

Fine motor skills include coordinating the eyes and hands to perform manipulative movements, which are crucial for skills used in the classroom setting. Less is understood about the role of posture and core stability in fine motor movements. The purpose of this research is to examine the role of posture in fine motor skill development in 5 to 10 year old children. Data collection for this study has just begun. Ten children per age group (5-6, 7-8, and 9-10yrs) will be recruited from the local community. Participants will sit with both feet on the ground on a stability ball and a rigid stool while completing three fine motor tasks (Purdue Pegboard, theraputty manipulation and bead stringing task, and a handwriting task). Postural control will be measured using EMG (measures magnitude and coordination of muscle activation) connected to antagonist muscles in the legs and core of the dominant side. Three-five trials of each test will be collected and videotaped for further analysis. Measures include magnitude and timing of muscle activation, time to complete pegboard, bead stringing and handwriting tasks, neatness and accuracy of handwriting task, and trunk angle and sway. Based on previous data we expect maturity of postural control (trunk stability, magnitude and coordination of muscle activation) to be related to efficiency (time, accuracy, and neatness) of completing fine motor tasks. Children at all ages that have difficulty with fine motor tasks will show less controlled postural stability. The implications of this work will help determine the importance of postural control in development of fine motor movements. Classroom outcomes often focus on fine motor performance without considering strengthening postural control ability in the learning process.

### THE IMPACT OF GLYCINE PROPIONYL-L-CARNITINE SUPPLEMENTATION ON POWER PRODUCTION IN RECREATIONALLY ACTIVE WOMEN

Melanie C. Chun (Dr. Paul C. Miller) Department of Exercise Science

Many people use dietary supplements to enhance the effects of exercise. This has led to the development of a \$14 billion supplement industry (Sarubin, 2000). One such supplement, glycine propionyl-L-carnitine (GPLC), is marketed to non-athlete exercisers for the purpose of increasing work output while delaying fatigue. Such a supplement may assist individuals in establishing an effective exercise routine that meets health recommendations. GPLC has been shown to increase anaerobic power in resistance-trained men (Jacobs et al, 2009). Recognizing that women may respond differently to exercise and nutritional supplementation, a study focusing on women participants is warranted. PURPOSE: To study the effects of GPLC supplementation on anaerobic power production in recreationally active women. METHODS: A double-blind, repeated measures design was used in this investigation. Participants (n=8) completed four sessions. The first session served to familiarize the participants to the anaerobic power test. Subsequently, 3 testing sessions were performed separated by 1 week. Sessions were counterbalanced by supplement; 3.0 g GPLC, 1.5 g GPLC, or control (200 mg brown rice powder). Ninety minutes following supplement ingestion, participants completed a 5 minute warm-up and then a 5-stage anaerobic power test on a cycle ergometer. The ergometer was loaded with 5% of the individual's body weight. Each stage lasted 10 seconds and was separated by 1 min of active recovery. Active recovery was done by pedaling an unloaded cycle ergometer at 50 RPM. Peak power (PP) and mean power (MP) were measured and recorded. RESULTS: A RM-GLM revealed a significant time effect for both PP (p=.001) and MP (p=.001). There was not a significant condition effect for either PP or MP (p>.05). A non-significant time\*condition interaction was seen for both PP (p=.076) and MP (p=.063). Higher initial power was seen for those consuming 3.0 g GPLC (313.0±16.0 W) than either 1.5 g GPLC (304.6±11.5 W) or control (306.0±15.1 W). CONCLUSIONS: Consuming 3.0 g GPLC prior to exercise may result in an increase in power production among recreationally active women. This may enable individuals to exercise at intensities sufficient to derive health benefit.

#### THE EFFECT OF FATIGUE ON PLANTAR PRESSURE IN SOCCER PLAYERS

#### Brett A. Gladish (Dr. Joyce A. Davis) Department of Exercise Science

Soccer is a popular recreational activity that has unfortunately been linked to certain injuries. In particular, male soccer players have higher incidence rates of 5<sup>th</sup> metatarsal stress fractures. Stress fractures occur when bones are not given enough time to remodel after experiencing a load. Repetitive loading of a structure leads to microscopic fractures, resulting in time off from training and match play. Plantar pressure measurements assess the force on the bottom of the foot. Several variables can alter loading patterns in athletic

tasks. Fatigue has been linked to physiologic and biomechanical changes in athletic performance. Fatigued runners subconsciously change their muscle recruitment strategies and foot loading patterns. Some research has investigated the effects of fatigue on running and walking, but no studies have focused on fatigue and plantar pressure in cleated sports. More soccer injuries occur at the end of the first and second halves and this fatigue may cause biomechanical changes in soccer players. This research will evaluate changes in plantar pressure in soccer players performing a cross cutting maneuver before and after a fatiguing protocol that mimics participation in a regulation soccer match. Plantar pressure will be assessed in 4-6 experienced, male soccer players. Levels of fatigue will be subjectively rated using a Borg Ratings of Perceived Exertion scale and validated through blood lactate measurements. Plantar pressure will be measured using a portable in-shoe measurement system (Pedar Mobile) while subjects side-cut and cross-cut around a series of cones. Subjects will perform a modified Loughborough Intermittent Shuttle Test until fatigued and then plantar pressure data will be recollected. It is hypothesized that plantar pressure in the lateral aspect of the foot will increase with increased fatigue. This data may be used to construct shoe inserts that effectively redistribute loads and to help coaches and trainers design safe training schedules.

### IS THERE SOMETHING SKECTCHY ABOUT SKECHERS SHAPE-UP SHOES?

### Mae C. Langford (Dr. Joyce Davis) Department of Exercise Science

Advertisers for Skechers<sup>®</sup> Shape-ups claim their shoes improve posture, circulation, and cardiovascular health; decrease stress on joints; and increase muscle activation. While these claims have been touted by Skechers<sup>®</sup> as valid (Business Wire, 2010) there is little scientific evidence in support of their advertising campaign. Shape-ups have a "rocker bottom", a current trend in shoe design. The rocker bottom shoe is just one of many types of toning shoes to hit the market recently and Skechers<sup>®</sup> is the most well known manufacturer of toning shoes. While the current economy has decreased sales of traditional athletic shoes by 1.4 percent, toning shoe sales have skyrocketed from \$17 million in 2008 to \$145 million in 2009 (Untapped market, 2010). According to Skechers<sup>®</sup>, wearing their Shape-up shoe will improve posture, strengthen the back, improve circulation, firm buttock muscles, tighten abdominal muscles, tone and firm thigh muscles, reduce joint stress, firm calf muscles, and burn more calories (Skechers<sup>®</sup> Brochure). The purpose of this study was to study the effects of wearing Skechers<sup>®</sup> Shape-up shoes. Twenty-two women ages 18-65 completed a six-week walking program wearing Shape-up shoes. A variety of kinematic and kinetic data was collected using a pre-post design. Results of video analysis revealed that the Shape-up<sup>®</sup> shoe design influences gait patterns however this appears to be limited to movements at the ankle with the Shape-up shoe producing a smaller range of motion when compared to barefoot walking. Dynamic balance showed significant improvements. These results suggest that while walking in Skechers<sup>®</sup> Shape-up shoes may not produce the results publicized by advertisers, they may be a valid therapy for prevention of falls as well as maintaining and/or rehabilitating dynamic balance.

# EXAMINATION OF THE IMPACT OF A COOLING PRODUCT ON CYCLING PERFORMANCE IN THE HEAT

#### Amanda B. Mischo (Dr. Walter R. Bixby) Department of Exercise Science

Exercising in the heat has adverse consequences for physical performance. Little evidence exists examining the impact of a cooling strategy during the event. **PURPOSE:** To examine if a cooling strategy during an event in the heat can reduce the negative effects commonly seen and positively impact performance and perception. METHODS: 10 experienced male cyclists performed a graded exercise test and two time trials (TT) on 3 separate days on a Velotron. Days two and three were identical with the exception of the treatment condition and were performed in an environmentally controlled chamber set to 30 degrees Celsius with 60% humidity. Participants were given 10 minutes to warmup. Following the warm-up, heart rate and affect were recorded. Participants then completed a 30K TT as fast as they could. Heart rate and affect were recorded at 1/4, 1/2, 3/4 of the way through, at the end and 15 minutes after the TT. On one day participants wore a cooling product and the order of presentation was counterbalanced. **RESULTS:** One way Repeated Measures ANOVAs were calculated for Average Watts, MPH, Time, and Heart Rate (HR) across the two TT conditions. No significant results were found: Watts cooling 242.15 (51.16) and non-cooling 239.89 (54.95); MPH cooling 24.18 (2.01) and non-cooling 24.02 (2.21); Time cooling 46:39.6 (3:50.4) and non-cooling 46:57.0 (4:25.2); and HR cooling 165.41 (13.94) and non-cooling 162.39 (15.75). Two way Repeated Measures ANOVAs for the Feeling Scale (FS) and Felt Arousal Scale (FAS) revealed day and time effects for FAS: Day F(1, 9) = 8.79, p < .05, Time F(5, 35) = 5.79, p < .01 such that participants felt more arousal throughout the time trial and overall higher during the cooling day. **DISCUSSION:** While the participants completed the time trial 17.4 seconds faster while wearing the cooling product, this failed to reach statistical significance. Potential reasons for this lack of significance include the relatively small sample size which limits the statistical power to find a difference, the large variability in times of approximately 4 minutes, and the diversity of experience within this group of cyclists. However, this could have real world significance.

# THE RELATIONSHIP AMONG BODY COMPOSITION, LEG STRENGTH AND WINGATE PERFORMANCE

# Allison M Rodgers and Rachel C Banner (Dr. Barry Beedle) Department of Exercise Science

The Wingate test is one of the most commonly used laboratory-based assessments of anaerobic performance. This test involves cycling all-out against a prescribed resistance for 30 seconds and utilizes the anaerobic energy systems (phosphagen and glycogen) (Bean & Adams, 2011). Anaerobic energy systems are used for short tasks or movements such as sprinting, jumping, and walking up steps. Since the Wingate is performed on a cycle ergometer, the major muscle groups used include the gluteals, quads, hamstrings and calf. This raises the question "does leg strength affect Wingate performance?" We hypothesize that leg strength will positively correlate with the test and act as a predictor of Wingate performance. The results of this study will help with the validity of the Wingate test.

Our hypothesis is currently being tested through the following measurements: body composition, leg strength and anaerobic ability. Body composition is calculated by taking height/weight measurements and by skinfolds, which are used to calculate percent body fat. Leg strength is measured by a one repetition maximum leg squat. The squat uses the same muscles as cycling which is why it was chosen. Anaerobic ability is measured by the Wingate test. Data measurements collected include peak anaerobic power, mean anaerobic power, total work, and fatigue index. All participants go through a squat and Wingate familiarization trial, and then actual measurements are taken during separate sessions. Thus far, 12 subjects (6 males, 6 females) have participated with the average age being  $19.7 \pm 1.44$  years. The average percent body fat for male participants is  $13.8 \pm 6.45\%$  and for females  $30.1 \pm 1.91\%$ . More subjects are required to conduct correlational tests. Recruitment of participants and testing will continue until April.

# EXAMINATION OF OVERSPEED TRAINING ON POWER, SPEED AND AGILITY

Amy E. Salek & Jordan T. Lee (Dr. Wally Bixby) Department of Exercise Science

PURPOSE: To determine if 5 weeks of overspeed training can improve vertical jump, 3 cone drill and 40 yard dash times in high school football players. It was hypothesized that after a 5 week training intervention vertical jump would increase, 3 cone drill time would decrease, and 40 yard dash times would decrease. METHODS: Participants were assigned by a coach to either the overspeed (10) or control group (5). The overspeed group completed 5 weeks of overspeed training which consisted of a 60 foot dash, 60 foot cone weave, 20 foot side shuffle and a 20 foot backwards run with a turn with the overspeed bungees twice a week while the control group continued their normal practice routine. There were nine session of training over the 5 weeks. On average, participants in the overspeed group completed 6.1 (1.1) sessions. RESULTS: Two way Repeated Measures ANOVA's (condition x time) were calculated. Results for the vertical jump revealed a significant time main effect, F(1, 13) = 4.61, p = .05 (pre 22.68 (1.36) and post 21.91 (1.32)) such that all participants jumped lower following the treatment. Results for the 3 cone drill revealed no significant difference over time or between the groups (overspeed pre -8.74 (.61) and post -8.54 (.62); control pre -9.36 (.65) and post -8.99(.85)). Results for the 40 yard dash revealed no significant differences over time or between the groups (overspeed pre -5.71 (.49) and post -5.78 (.63); control pre -5.97(.59) and post – 5.96 (.67)). DISCUSSION: The results of the present investigation did not support the notion that overspeed training can improve performance on vertical jump, 3 cone drill, and 40 yard dash in this population of high school athletes. It is possible that more training time with the bungees could lead to improvements in performance variables. Additionally, the athletes had started fall practice by the time the post test took place and thus they could have been fatigued when performing the post test. Future investigations are needed to determine the impact of this form of training.

### HIPPOTHERAPY IN CHILDREN WITH DEVELOPMENTAL DELAYS: PHYSIOLOGICAL AND PSYCHOLOGICAL BENEFITS

**Freda L. Thompson** (Dr. Caroline Ketcham & Dr. Eric Hall) Department of Exercise Science

Hippotherapy, or horse therapy, is an innovative form of physical therapy that involves the use of a horse as a therapeutic tool in order to effectively challenge a rider's core muscles. The rhythm of the horse's gait continuously engages the client's balance and posture, while the supervising physical therapist seeks to improve the client's overall coordination and fine motor skills through various activities. This combination of movement and therapist-directed activity can have significant impacts on the client's postural control and physical function. Eight children between the ages of 2-12 years that had been previously diagnosed with a variety of different developmental delays or disorders participated in 8-12 weeks of hippotherapy. Subjects were tested before, during, and at the completion of their therapy. The physiological measures included a timed level and un-level walking test, a coordination-based flexibility reach test, and were scored using the G.R.E.A.T. Postural Scale to measure quality of posture. Psychological changes were also evaluated based on the physical therapists' notes and on parent questionnaires given pre and post study. Results indicated that 62.5% (5/8) of the subjects improved in their Postural Scale score, 87.5% (7/8) decreased their time to complete the level and un-level distances, and 50% (4/8) of the subjects showed better coordination-based flexibility results from pre to post. Physical therapists' notes and preliminary parent report analyses suggest improvements in subjects' self-esteem and overall quality of life. These results indicate that hippotherapy sessions are a very effective way in which to improve physical function, specifically postural control, strength, and coordination in children who have been diagnosed with any type of developmental delay or disorder. Additionally children showed improvements in confidence, self-esteem, and quality of life, which may be directly related to the interaction with the horse and therapists or indirectly related to the improvements in motor function. This research has implications for the benefits of hippotherapy for the pediatric population for both function and quality of life.

# EMG AND ANAEROBIC POWER RESPONSES TO ACUTE WHOLE BODY VIBRATION

George A. Wentz, Paul E. Riuli, Andrea G. Gross, & Kelly L. Brand (Dr. Caroline Ketcham and Dr. Paul Miller) Department of Exercise Science

Whole body vibration (WBV) has shown to positively impact muscle function. Studies have shown significant improvements in muscular strength and power following acute bouts of WBV in trained participants (Cochrane et al., 2009; Cochrane et al., 2008; Stewart et al., 2009). Less is understood regarding the effectiveness of acute WBV in untrained individuals (de Ruiter et al., 2003). The purpose of this research is to explore

the physiological mechanisms underlying changes in contractile function following an acute bout of WBV. It was hypothesized that WBV may alter muscle activation resulting in changes to anaerobic power production. Nine non-resistance trained male and female college-aged participants completed this study. The vibration protocol required three days of testing for each participant. Day one was a familiarization trial. On days two and three, participants were randomly assigned and counter-balanced to either no vibration or WBV condition. Participants then completed a 6-stage cycle ergometer anaerobic power test. EMG was recorded during each stage and average power and peak power were measured. Preliminary results showed no condition effect for average power but there was a higher trend toward peak power production in the WBV condition (P=.09) and a time effect was seen for these two variables (p<.05). No significant differences were found for EMG activity. This preliminary evidence supporting the hypothesis that WBV does impact muscle function is perhaps contributing to muscular efficiency.

# EXAMINATION OF THE IMPACT OF AN ACTIVE VIDEO GAME ON ACADEMIC ACHIEVEMENT

Caroline A. York (Dr. Wally R. Bixby) Department of Exercise Science

Physical activity has an increasing number of associations to improved cognitive functioning and enhanced brain activity in children (Hillman, Erickson, & Kramer, 2008). ExerGaming, in which the person becomes the controller and is required to move to be successful in a game, is becoming more popular. PURPOSE: To compare cognitive function assessed with a standardized test following an active video game and an inactive video game. **METHODS:** Fourteen participants (12 male) with a mean age of 10.9 (0.93) completed 2 days of testing. Each day was the same with the exception of the video game played. One day participants' played an active game using the Xbox Kinect system and the other day they played an inactive game on the Xbox. The order of days was counterbalanced. Participants played the video game assigned for that day for between 20 - 25 minutes depending on when a level ended. Following completion of the video game participants completed the Wide Range Achievement Test 4 (WRAT4), which is a measure used to assess Word Reading (WR), Sentence Comprehension (SC), Spelling (S), Math Computation (MC), and Reading Composite (RC). RESULTS: Repeated Measures ANOVA revealed non-significant differences on all measures between the active and non-active games; WR, F(1, 12) = 2.71, p = .15; SC, F(1, 11) = .029, p = .87; S, F(1, 12) = .48, p = .50; MC, F(1, 12) = .04, p = .85; RC, F(1, 12) = 1.47, p = .25. **DISCUSSION:** At current, the results do not support the idea that active video games can improve performance on standardized testing compared to inactive video games. While this is contrary to the hypothesis for this study and previous literature, the sample size is small with large variation in the scores achieved. Further data collection is planned with the hopes of increasing the power of the study. Active video games hold promise to increase the physical activity of children regardless of whether or not improvements in standardized testing occur. At worst, participants will see health benefits from participation in active games when compared to inactive games.

# FOREIGN LANGUAGES

# SILENCE AND MISCOMMUNICATION IN THE WORKS OF MARGUERITE DURAS

### Katherine G. McKenzie (Dr. Sophie Adamson) Department of Foreign Languages

Marguerite Duras is a writer whose work proves to be a paradox for French literary theorists. Her work bears the influence of Alain Robbe-Grillet, author of Le nouveau roman, yet certain features in her work recall the revolutionary school of literary existentialism. One of the most characteristic features of existentialist literature is the use of silence and miscommunication in character interactions. Throughout the novels *Un Barrage Contre le Pacifique, L'Amante Anglaise, Le Ravissement de Lol V. Stein, L'Eden Cinéma, L'Amant, Les Yeux Bleus Cheveux Noirs*, and *Ecrire*, Duras develops the twin themes of silence and miscommunication and deploys them in the service of existential ideas about loneliness and the near-futility of human connection.

Ultimately I seek to classify Duras while continuing to acknowledge her uniqueness in the French literary canon. Several critics have noted the unique stylistic qualities that make her so difficult to categorize. My thesis addresses these topics in depth. I used critical scholarship to guide my interpretation of Duras, along with my own close readings of each text, and careful notation, to write my Honors thesis. My research is needed because even French scholarship lacks an enduring understanding of Duras' place within the twentieth-century canon, and Anglophone scholarship remains wholly unfamiliar with Duras. Her work can offer Anglophones a fuller understanding of French literature since the existentialists.

My research has indicated that there is a diversity of opinion on Duras' work among French academics. Critics take divergent interpretations of the silence at the heart of the work I mentioned. Janine Ricouart, for example, sees violence as the ultimate cause of or result of, as her research takes into account the cyclic nature of violence—prolonged silence. For Ricouart, silence is a particularly feminine response to oppression, one which attempts to fulfill the same goals as violence. Critic Rachel Boué argues that the silence of Durassien characters is not gender-specific, only a reaction to long-term emotional suppression. In my research I have tended to take Boué's perspective, with a nod to Ricouart and the potentially explosive tension at the heart of Duras' stylistic choices.

## **GENERAL STUDIES**

### FROM THE BOTTOM UP OR THE TOP DOWN? A COMPARATIVE ANALYSIS OF GOVERNMENT AND GRASSROOTS ORGANIZATIONS IN UGANDA

Sarah B. Harrs (Dr. Prudence Layne) Department of General Studies

I am conducting a comparative analysis of grassroots organizations and government programs in Uganda to gauge the effectiveness of each in aiding women and children. I am comparing levels of funding, the utilization of resources, and how aid recipients and non-recipients perceive the different organizations. This research answers the following question: Are government programs or local grassroots movements more effective in helping the impoverished women and children of Uganda? I hope the results of this research will direct time and donations to the most effective programs in not only Uganda but many third world countries. Based on the organizational theory, I hypothesize that local Ugandan leaders of grassroots movements are more effective in helping the Ugandan women and children because of the mechanisms they use to dispense funds and to connect with the people they serve. I also hypothesize that the structure of nongovernmental organizations fosters more interest and concern among workers for their clients and breeds less corruption than government agencies due to the workers' proximity to the people receiving aid. I am conducting my research using methodological triangulation analysis, which involves: interviewing leaders of orphanages, schools, rural health programs, and government officials; studying the budgets and annual reports of the Ugandan government and select grassroots organizations; administering questionnaires to women who receive assistance from government and grassroots organizations; testing non-recipients' perceptions of the government and grassroots agencies through surveys; and researching the history and leadership of social movements in Uganda. The research regions include the rural Western area and the central suburban and city areas of Uganda. I have secured IRB approval for the ethnographic study (Subject Protocol # 12-020) and conducted the research in Uganda. I am now compiling a literature review and analyzing research findings.

## HEALTH AND HUMAN PERFORMANCE

#### THE EFFECT OF A HEALTH-FOCUSED MENTORING PROGRAM ON SELF-ESTEEM, PHYSICAL ACTIVITY AND PERCEIVED COMPETENCE IN YOUNG BOYS

**Brett A. Brawerman & Kendall L. Adkins** (Professor Elizabeth K. Bailey) Department of Health and Human Performance

According to a White House proclamation, everyone has a role to play in the fight to end childhood obesity. With increasing levels of sedentary behavior contributing to weight gain in children, programs aimed at improving activity levels are more important than ever. Coaching Health and Mentoring Positive Students (C.H.A.M.P.S.) is a program for
boys in 4th and 5th grade which uses group education sessions, physical activity/ sports skills training, and mentoring relationships with college males to address negative attitudes and unhealthy behavior, particularly lack of physical activity. The purpose of this study was to evaluate whether participation in C.H.A.M.P.S (6 sessions) is related to positive changes in perceived physical competence, self esteem and physical activity in participating boys. Prior to and following the conclusion of the program, participants completed: 1) an exercise questionnaire (EQ), 2) the Rosenberg Self-Esteem Scale (SE), and 3) a modified version of Harter's Perceived Physical Competence scale (PPCSC). Questionnaire results were analyzed to assess changes from pre to post participation in the program. Significant changes were noted on all measures: EQ (Mean<sub>pre</sub> 8.8 + 0.45, Mean<sub>post</sub>10.2 + 0.52, p < 0.01); SE (Mean<sub>pre</sub> 23.4 + 0.74, Mean<sub>post</sub> 25.4 + 1.1, p < 0.05); PPCSC (Mean<sub>pre</sub> 40.68 + 2.07, Mean<sub>post</sub> 46.1 + 2.09, p <0.05). Given that perceived competence in and enjoyment of physical activity are cited as being essential influences on young people's participation over time, it appears that CHAMPS is an effective vehicle to strengthen these influences, ameliorating inactivity in young boys and potentially obesity prevalence. In addition, the mentoring relationship has been found to be very effective in changing behavior and improving self esteem, both outcomes observed here. The effectiveness of the program and its relative low implementation cost have motivated the creation of a comprehensive guide and manual that can be used at other institutions to further promote active behavior and increased self esteem in boys.

### PHYSICAL EDUCATION IN US NEWS 2011: A CRITICAL CONTENT ANALYSIS

**Jasmine G. Jackson, Morgan L. Bailey & Stephen R. Rusterholz** (Dr. Amy J. Stringer) Department of Health and Human Performance

This research examines the dominant texts found in US newspapers involving Physical Education from 2009-2010 in comparison with the findings from 2011 (Stringer) in hopes of better understanding the messages presented to the general public and identifying trends concerning US public discourse regarding Physical Education. Surveying trends as sources of public knowledge about PE is essential for K-12 physical education teachers, as well as college and university physical education teacher education (PETE) to best frame content knowledge and comprehensively prepare future physical education teachers in an age of hypermedia. The sample includes US newspaper articles between January and December 2011 identified in a Lexus Nexus search that include the terms "physical education", "P.E.", "Phys Ed", and/or "Gym Class." Article themes were identified and codes determines for analysis. Themes included: health risk status of children, the obesity epidemic, changes or proposed changes to local/state policy related to physical education requirements, innovative programs, events, award announcements, and miscellaneous positive and negative behaviors of physical education teachers. Similar to findings from 2009-2010, in 2011 the most common theme found in newspaper articles was related to "innovative programs" followed by articles describing "requirement or substitute credit". Results provoke questions regarding whether physical education is still in the conversation about the obesity epidemic among school aged children and highlights missing links between reality of the typical physical education setting and the communication of information to the general public.

# HISTORY AND GEOGRAPHY

# WOMEN OF THE PRIMROSE LEAGUE: A REVOLUTION OF GENDER ROLES IN THE CONSERVATIVE PARTY, 1880-1900

### Katherine E. Anderson (Dr. Michael Carignan) Department of History

This research project essentially seeks to determine the inner workings of the Conservative Party that led a complete transformation of gender roles in the political atmosphere during late nineteenth-century Britain. How could a party so set on maintaining traditional gender roles regarding "separate spheres" for both men and women actually be the catalyst for giving a feminine voice in politics? Understanding the shifting gender roles within the Conservative Party would allow historians to trace the rise of Feminism and the Women's Suffrage Movement that began to form at the turn of the century. Using primary sources such as personal letters, diaries, newspaper accounts and political speeches from both genders, a sketch of the Conservative political arena of the time period was developed that showed a cunning plot by four men to usurp complete control of the party by attempting to raise their own "movement" to garner power and undermine the support of those in office. Research shows that while the men of the established off-shoot of the Conservative Party, known as the Primrose League, originally allowed a feminine voice as a bold political move to gain large numbers of unpaid volunteers, the women of the League used to open door to push for a more active role in an area previously denied to them. The paradox lay in that the men of the Conservative Party staunchly held on to the idea of "separate spheres" and "domestic" women, while at the same time politically educating the same women to publicly campaign. As time passed, Primrose League women would go from knocking on doors and passing out political tracts to giving rousing speeches in place of their husbands and running their own newspaper full of political commentary; the men did nothing to stop this. Although those campaigning for Women's Rights existed before this, it was not until the Primrose League that any major changes took place in Britain.

### AS HISTORY AFFECTS HUNGER: COSTA RICA'S DEVELOPMENT AND MODERN FOOD SECURITY

### Rebecca R. Berube (Dr. Michael Matthews) Department of History

Over one billion of the world's population fights undernourishment each day, making hunger a global concern more deadly than AIDS, tuberculosis, and malaria combined. Food security literature focuses on Southeast Asia and Africa as the most severe cases of food insecurity, leaving Latin America an underrepresented area of study. Within Central America, Costa Rica has long been considered "exceptional" by both its people and scholars of the country. Across multiple measures, including life expectancy, literacy, standard of living, and food security, the country enjoys higher quality of life standards than all of its neighbors. Undernourishment, a commonly used measure of food security, affects 19% and 12 % of the population respectively in Nicaragua and Honduras. In contrast, Costa Rica's undernourishment rates have remained below 5% since the 1990s. Food security represents a population's access, availability and utilization of food over time. This study examines how Costa Rica's the distinct pattern of historical development led to the current food security levels in the country. This necessitates a look at the broad patterns of Central American history and development, and then an in-depth examination

of Costa Rica more specifically. By examining the idea of exceptionalism, this work explores the long-held myths of Costa Rica's rural democracy, born from egalitarian roots and based on small and mid-sized family farms. Ultimately I found that Costa Rica's higher food security levels are not due to some mythical exceptional quality of the country, but a result of a unique set of factors, including its initial geographical isolation, pattern of land tenure, gradual implementation of democracy, and abolition of the military.

#### "LOVE SOUGHT IS GOOD, BUT GIVEN UNSOUGHT, IS BETTER": THE STATE OF LOVE AND MARRIAGE IN TUDOR AND EARLY STUART ENGLAND

Danielle L. Damren (Dr. Michael Carignan) Department of History and Geography

This study looks at the existence of love within both courtship and marriage during the Tudor and early Stuart period in England. In the past ten years, popular culture has demonstrated a keen interest in the romance, sex, and scandal associated with England during this era. And although the historical fiction and film would have you believe that the period was rife with sexual passion, the academic literature has historically focused on arranged marriages, a woman's lack of agency in courtship, and a general lack of intimacy. This research project aims to bridge the two, to better understand what factors contributed to marriage formation and to characterize the existence and experience of love within contemporary relationships. The study looked at a variety of secondary sources, both recent and more dated works to better comprehend the evolution of the historiography, in order to build a comprehensive platform from which to look at primary sources. Analyses were then conducted on both the Lisle Letters, a collection of correspondence between Arthur Plantagenet and his wife, Honor, and the Thynne Papers, a book of letters between Maria Thynne and her mother-in-law, Joan (Byrne, 1983; Wall, 1983). The Lisle letters demonstrate a relationship filled with love and mutual respect, characteristics not historically attributed to marital relationships of the era. Alternatively, the Thynne Papers chronicle the struggles that Maria Thynne faced with her mother-inlaw, after Maria's youthful and passionate clandestine marriage. These letters, supplemented by the secondary literature, illustrate the complex experience and expectation of love during early modern England. The Lisle Letters and the Thynne Papers prove that love, both passionate and companionate, was certainly at play in some relationships but that many other factors—such as social class, religion, birth order, geographical location, and gender-affected every relationship differently. The nature of love cannot be generalized for the entirely of early modern England. However, this research proves that love, of different forms, did exist in courtships and marriages during the Tudor and Stuart periods.

### LAND USE AND LAND COVER CHANGES IN ELON UNIVERSITY

Philip R. Grimes (Dr. Honglin Xiao) Department of History and Geography

Land use and land cover changes on the Campus of Elon University and surrounding areas in the town of Elon, North Carolina has experienced many social, economic, and demographic changes in the past several decades, which in turn have caused dramatic changes in land use and land cover (LULC) in the same period. In order to evaluate the

magnitude, amount, direction, and spatial extent of the LULC changes, satellite images from 1984, 1993, 2006, and 2011 were used to study part of the town of Elon, including Elon University. Both unsupervised and supervised methods were performed for the image classification. Field data and aerial photos taken at the same periods were used to assess the classification accuracy. Social, economic, and demographic factors were identified as the major contributors for the changes. At the same time, the impact of the LULC change on the local hydrology, environment, and quality of life was also examined.

### A TALE OF DREADFUL DERANGEMENT: A CASE STUDY OF THE MEDIA COVERAGE OF THE RUGELEY POISONING CASE

Kelly M. Herrick (Dr. Michael Carignan) Department of History and Geography

Criminality and insanity were two incredibly popular topics of discussion amongst British Victorians, and were also topics sensationalized and dramatized by the Victorian Press. The unrelenting press coverage of these two topics reached its apogee in the media coverage of Jack the Ripper in 1888. However, the earlier murders and trial of Dr. William Palmer in late-1855 and 1856 received an astounding amount of coverage by the British press, particularly the London *Times*. Adapted from the model that Walkowitz uses in her work City of Dreadful Delight this research will show how coverage of Palmer's trial represents a critically reflective moment of mid-century Victorians' views of mental illness, mainly due to the surprising fact multiple murderer Palmer was never once described in the media as mentally ill. The government, public, and media's choice to label Palmer as having "perfect sanity" raises the questions: Why were Victorians unable to see Palmer as mentally ill? And, what further insight can the media coverage of Palmer's case give us about Victorian society and whom they designated as the "insane" other? Palmer's case can be seen as a formative moment in the development of the definition of mental illness because it exemplifies what Victorians saw as mentally ill by identifying what they still saw as sane. By comparing the media's portrayal of Palmer to those portravals of people viewed as mentally ill in Victorian society, differences between the same and insame can be seen. An exploration of these portrayals shows, that in Victorian Britain, a main factor in determining insanity was a person's apparent lack of reasoning and logic. While those deemed mentally ill in Victorian society showed obvious signs of losing touch with reality and the ability to reason, reasoning and logic were ever-present themes in the media coverage of Palmer and his trial.

# **"MY OWN PEOPLE HAVE A NAME FOR ME": TWO-SPIRIT IDENTITY IN THE CONTEMPORARY AMERICAN INDIAN COMMUNITY**

### Katherine E. MacDonald (Dr. Clyde Ellis) Department of History and Geography

Traditionally, being Two-Spirit meant identifying with a third or fourth gender role in American Indian society and implied gender variance. Two-Spirits were afforded great reverence by many tribes before the late nineteenth century due to their role as negotiators, peacekeepers, and spiritual guides. However, Two-Spirit roles were suppressed in the late-nineteenth and early twentieth centuries, when assimilation based

on western models of gender was official government policy. By the 1960s, however, Two-Spirits had re- emerged as an identity claimed by gay American Indians who also felt unwelcome in American Indian society where they were shunned due to their sexual orientation. As a result, contemporary Two-Spirit identity has been used much like American Indian tribal affiliation- as a way to articulate ideas about who they are and their cultural heritage. This research explores how Two-Spirits present themselves to the public and how these presentations relate to their long term goals of reentry and acceptance into American Indian society, and also to the creation of a new sense of contemporary Native identity. Through this research, Two-Spirit can be seen as both an individual and group identity that varies greatly by geographic area, tribal affiliation, and a series of other factors. Two-Spirit people also have a complex relationship with the native community, and although they wish to be accepted in American Indian society, they also wish to continue to interact in a Two-Spirit community in which they feel there are others who identity as they do. As a relatively new and understudied identity, literature about modern Two-Spirits has done little to examine these kinds of representation and their meanings. Through the analysis of Two-Spirit society websites, including mission statements, pictures, and newsletters, this research helps us to understand more fully how this identity has changed over time, and it reminds us that contemporary American Indian is complex and diverse.

# **RASPUTIN: THE CREATION OF A POPULAR MYTH**

Elisabeth S. Maselli (Dr. David Crowe, Ph.D.) Department of History.

This presentation uses the life and the myth of Grigorii Rasputin as a case study with which to examine the multiple ways in which a historical figure may be transformed into a fictitious caricature of themselves in mass media. This presentation is based on a diverse selection of research, which encompasses both primary sources and secondary sources. The primary sources consist of Russian editorial cartoons, auto-biographies and memoirs, film, video games, and comics, while secondary sources include biographies and historical documentaries. I conclude with the idea that, while Rasputin was an important figure in Tsarist Russia, his legacy and biography have been exaggerated, warped, and ultimately falsified by popular media. Today, the Rasputin of film and memoir has little to nothing to do with the historical man. The manipulation of historical fact has changed the perception that people have of Rasputin, so much so that any serious historian or biographer of Rasputin is forced to spend a significant amount of text confirming or denying rumors regarding his life. This fact demonstrates the effect that mass media can have on history and historical research.

#### THREE DECADES OF CHANGE: THE HISTORY OF LESBIAN, GAY, BISEXUAL, TRANSGENDER, AND QUEER (LGBTQ) LIFE AT DUKE UNIVERSITY AND UNC-CHAPEL HILL

#### Jessica L. McDonald (Dr. Mary Jo Festle) Department of History and Geography

The first gay college student organization in the United States formed in 1968 at Cornell University. Following the 1969 Stonewall riots in New York City – a key catalyst of the gay liberation movement – such groups spread among colleges across the nation. In central North Carolina, Duke University officially recognized the Duke Gay Alliance in 1972, followed by the recognition of the Carolina Gay Association at UNC-Chapel Hill two years later. These schools were geographically close, but their size, student body composition, and governing board differed considerably. How did the history of LGBTQ life at Duke and UNC unfold, and what do the differences and similarities between each campus suggest? My research utilizes primary source documents such as organization newsletters, letters to and from campus officials, newspaper articles, and other archival sources in order to analyze three major areas: the evolving purpose of the LGBTQ organizations, the membership composition of groups over time, and the types of opposition and support they experienced. I argue that the history of LGBTQ student organizations at UNC and Duke was shaped predominantly by the national context of the LGBTQ movement. For instance, LGBTQ groups at Duke and UNC were influenced by challenges from conservative political leaders like Jesse Helms, lesbian feminist culture and organizing, and an awareness of the AIDS crisis. At the same time, campus climate at each school was shaped by specific campus incidents and the reactions of particular student leaders and administrators. These included sustained efforts to defund UNC groups, as well as an openly homophobia university president at Duke. My findings have significant implications for historians, LGBTQ students, and campus administrators.

# WERNHER VON BRAUN: SHOULD HE HAVE BEEN TRIED AS A NAZI CRIMINAL?

#### Kenton W. Porter (Dr. David Crowe) Department of History and Geography

Wernher von Braun is the most famous rocket engineer of the 20<sup>th</sup> century. As a German scientist he created the powerful V-2 rocket in WWII and then created the Saturn V rocket in America, which took the U.S to the moon. Despite his accomplishments, his pursuit in creating rockets under the Nazi regime made him commit war crimes. The goal of this study is to investigate all of the war crimes that Wernher von Braun committed as a Nazi rocket engineer and then analyze which post-war criminal trials he should have been tried at given his crimes. This research is significant because it shows that even though von Braun did so many great things for science and rocketry, his record shows it was not done in a humane way. Not surprisingly, questions of science and its relations to ethics are brought up within the study. My research will focus on von Braun's life and his association with the Nazi party as a youth through young adulthood until the war ended in Germany in early 1945. The research includes bibliographical information, interviews from Wernher von Braun, and personal accounts from Holocaust survivors who were directly affected by von Braun's work. After the war crimes are uncovered, the study shifts toward the Nuremberg International Military Tribunal and subsequent trials. The research includes government documents about the Nuremberg Trials, memoirs from leading prosecutors of these trials such as Telford Taylor and Robert

Jackson and further information from judge Francis Biddle. This research allows me to analyze what the definitions of all the different war crimes were, what the people tried for the war crimes did, and then show what the result was for the defendants when the trials were over. Given this information, the results of this research suggest that von Braun should have been tried as a war criminal in the Nuremberg Trials.

## PRUSSIAN MILITARY PLANNING AND THE GENERAL STAFF

Paul R. Rodriguez (Dr. David Crowe) Department of History and Geography

From the 18th century reign of Frederick the Great to the 1945 Battle of Berlin, the German army was one of the most respected and imitated in the world. Despite its relatively small size and poor geo-political location, the Germans often tackled and defeated foes many times their paper strength. This reputation has led militaries across the world to base everything from uniforms to organization upon the German model. Historians have often explored what made the German army so special and led others to imitation, notably American scholars Robert M. Citino and Trevor N. Dupuy. Of the German military innovations none are more fabled than the General Staff: a professional body of military men who year-round prepared for future conflicts. Despite near universal recognition of the General Staff as important to war making and its distinguishing characteristic as that of nonstop planning, very little historical scholarly attention has been given to the finer details of General Staff planning. Drawing from the body of scholarship on the General Staff and the translated writings of German military planners and thinkers, I will examine the General Staff's military planning alongside the development of the General Staff while focusing on the application of their planning in conflicts, chiefly those of the German Wars of Unification. The emphasis on the Wars of Unification allows an exploration of the General Staff's formation and the early applications of its planning in multiple military encounters in a relatively short span of time. I hypothesize that I will find that the role and organization of the General Staff did not crystalize until after the Austro-Prussian War of 1866 and that General Staff planning was most important during the strategic phase of military operations and more flexible during conflict.

# HUMAN SERVICES STUDIES

# THE IMMIGRATION DEBATE, PUBLIC CLIMATE, AND YOUTH LATINA SELF-ESTEEM: IS THERE A CONNECTION?

Jessica M. Gibian (Dr. Bud Warner) Department of Human Services Studies

Since 1990, Hispanic immigration to the United States has increased dramatically, with over half of new immigrants arriving from Latin America (Padín, 2005). Along with the increase in Latino immigration, negative stereotyping of Latinos and an unwelcoming

public climate have also arisen. Because of this, a debate over immigration policy has come to the forefront in American politics (Burns & Gimpel, 2000). Previous research on Latinas has focused on such topics as acculturation, standards of beauty, and identity; research on the immigration debate has generally been policy-focused. Numerous studies have examined how negative stereotyping affects Latino self-esteem and self-image; however, there are very few studies that have looked specifically at the impact of the negative public climate created by the immigration debate on the self-esteem of Latina youth, a population that must not only face the unwelcoming public climate, but is also still maturing and developing self-esteem. The purpose of this study is to examine if the negative public attitude towards Latinos, created by the current immigration debate, has affected the self-esteem of young Latinas (ages 18-23). Eleven college-age Latina participants took the Rosenberg Self-Esteem Survey and participated in a one-hour focus group on the immigration debate and their reactions to it. Participants were asked questions regarding stereotypes, political propaganda, familial and peer relations, school experiences, and a host of other topics. We expect the immigration debate and negative public climate to have a negative effect on Latinas' self-esteem. We also expect that Latinas will recall experiences in school, public, and personal environments in which negative stereotyping damaged their self-esteem. Such research will not only allow policymakers to effect policy changes that take all voices into account, but will allow school counselors, psychologists, educators, and the general public to become aware of how large-scale policies and public opinion affect a large segment of the United States population. Implications for human services providers will be explored.

### FAIR AND LOVELY? SKIN TONE SATISFACTION, SELF-ESTEEM, AND SKIN LIGHTENING PRACTICES AMONG ADOLESCENT FEMALES IN THE PHILIPPINES

### Meagan H. Harrison (Dr. Kristen A. Sullivan) Department of Human Service Studies

Skin lightening, using chemicals to lighten one's skin tone (aka whitening or bleaching), is a common practice throughout Asia where light skin is typically associated with beauty and privilege. Though this phenomenon is known to be prevalent in the Philippines, no prior research has examined these practices or if perceptions of one's own skin tone are associated with self-esteem. A survey was conducted with 80 adolescent females (average age 15) in Puerto Galera, Philippines. This study explored 1) respondents' satisfaction with their own skin tones 2) the association between skin tone satisfaction and self-esteem, and 3) respondents' skin lightening practices. Descriptive statistics and correlations between the variables were analyzed using SPSS. Seventy percent of respondents reported wanting lighter skin, with 71% agreeing that lighter skin would make them more beautiful. Feelings about skin color (on 5 point scale from strong negative to strong positive) were positively associated with scores on the Rosenberg Self-Esteem Scale (R = .220,  $\alpha$  = .026, 1 tail). Nearly 83% agreed that there is pressure for females to have lighter skin, and 85% of respondents reported using skin-whitening products one or more times in an average week. These findings begin to illuminate the skin-whitening phenomenon in the Philippines and the desire for lighter skin. Further research is needed to explore the long-term psychological and physical health risks associated with skin-whitening practices for this group.

## "WOULD WE CONSIDER ALL GUYS RAPISTS?": PERSPECTIVES OF UNDERGRADUATE FEMALES OF COERCED-CONSENSUAL SEXUAL EXPERIENCES

#### Devon McGowan (Dr. Kristen Sullivan) Department of Human Services Studies

Background: Partnered sexual interaction is traditionally defined as being either consensual or nonconsensual in nature. However, research has found that participation in unwanted, yet consensual sex is a common occurrence. Coercive tactics are often employed to gain consent, particularly within a college setting. Women who give consent as a result of coercion have been found to be at risk for experiencing symptoms of trauma. Little is known, however, about college women's perceptions of the use of coercive tactics to gain consent and appropriate responses. Objective: This study explored undergraduate women's perspectives on the prevalence of the utilization of sexually coercive tactics by undergraduate men to gain consent, if they label women who have been coerced into giving consent to sex as victims, and what forms of help, if any, they believe are appropriate and accessed. Methods: Six focus groups with undergraduate, female students from a small, southeastern university were conducted. A vignette illustrating a sexually coercive scenario where the female ultimately gives consent was presented, and a semi-structured discussion guide was utilized. Focus groups were transcribed and coded for emergent themes. Findings: Respondents widely consider sexual coercion to be the norm, citing alcohol as a contributing factor. Responses to the vignette varied; some participants identified the female as a victim, while others stated that she was not a victim because she "should have known," had not consumed enough alcohol to be considered a victim, and should have verbalized no better. Participants excused the male for his behavior on several occasions, saving things such as "I think boys are just always going to try," and asking "a lot of guys do things like that and so then, would we consider all guys rapists?" Most participants believed their friends would discuss a similar experience with them, but few would recommend a friend seek professional help.

### "AS MUCH AS I HATE THE DISEASE, I PROBABLY WOULDN'T BE WHERE I AM TODAY WITHOUT IT": EXPERIENCES OF ACCEPTANCE AND REJECTION IN HIV ILLNESS NARRATIVES

#### Kathryn H. Seringer (Dr. Cynthia D. Fair) Department of Human Service Studies

HIV is a serious health problem in the United States especially in the southeast region of the country which has been disproportionately affected (CDC, 2009). People living with HIV must contend with both physical and social aspects of their illness. Illness narratives are one way to better understand the lived experience of those with HIV. Previous illness narrative research has explored how individuals make sense of their illness in light of the stigma associated with HIV. However, little research has explored where or how those living with HIV find acceptance. The aim of this research study is to analyze how adults living with HIV incorporate experiences of acceptance, as well as rejection into illness meaning narratives. The collection and analyses of narratives can improve quality of life of those who share their stories. It is therefore clinically important to understand how individuals incorporate both negative and positive experiences into their illness narrative. Narratives were collected through a series of interviews with 18 adults living with HIV

(16 males, 14 African-American, mean age 48.0 years) and 4 personnel (1 male, 4 Caucasian, mean age 45.2 years) from an AIDS organization in mid-size southeastern city. Interviews consisted of questions designed to facilitate a discussion of illness meaning as well as positive and negative experiences related to living with HIV. Interviews were taped, transcribed, and coded for emergent themes. Qualitative analyses identified three themes related to acceptance from others and self-acceptance including a clearer life purpose, making a new normal, and punishment turned positive. Themes surrounding rejection included specific rejection from family and general stigma from society. Explanation of illness meanings fell into three primary categories: assumed immoral behavior, failure of self protection, and a means to correct problematic behavior. Findings indicated that HIV can serve as a positive catalyst for life change. However, this change usually occurs over a period of time often beginning with struggle and changing to a pattern of increased self acceptance and self value. Findings suggest that clinicians should encourage clients living with HIV to discuss illness narratives paying attention to both positive and negative aspects.

## LEVEL III & IV RESIDENTIAL GROUP HOMES: COST-EFFECTIVE CARE FOR HIGH RISK ADOLESCENTS

Kristen N. Van Fleet (Dr. Bud Warner) Department of Human Service Studies

The 2012-2013 budget for foster care initiatives in the state of North Carolina is unable to support more than half of the typical services provided at Level III and IV residential facilities. These facilities provide a high standard of care for adolescents exhibiting high risk behaviors, severe emotional deficiencies, and/or severe intellectual handicaps, who are unable to care for themselves and unable to thrive without a structured, routine environment. Following extreme budget cuts in the 2009-2010 fiscal year, the North Carolina Department of Health and Human Services began requiring adolescents living in Level III and IV homes to be transitioned down to Level I and II. Because of the severe nature of their needs, those affected by this policy change cannot receive adequate care under the provisions available in the lower level facilities. Using a combination of needs assessment surveys and personal follow-up interviews with Guardian ad Litems across the state of North Carolina, this research examined how adequately the unique needs of this population are being met after the transition to lower level facilities. After qualitative analysis of the results of the interview transcripts, the researcher was able to determine several key areas where the level of care given to these adolescents is sub-par at best. Better coordination between social services and school systems, in-depth training for caregivers of residential facilities, and the lack of mentoring programs were frequently referenced as areas in need of great improvement. Additional conclusions were drawn regarding the arbitrary redistribution of funds for crucial public social services in North Carolina and the negative effect of this practice on those who don't have a voice to advocate for themselves. Now that realistic areas of improvement have been identified, future research should focus on discovering cost-effective ways to provide for high risk adolescents within the realm of the allocated state funds.

# **INTERNATIONAL STUDIES**

# EFFECTS ON PRESIDENTIAL ADDRESSES CONCERNING THE MIDDLE EAST PEACE PROCESS

### Daniel M. Baquet (Dr. Sharon L. Spray) Department of International Studies

This study examines what factors influence presidential statements on the Middle East peace process. Specifically, this study explores the effects of media coverage of the Middle East, the Arab-Israeli peace process, presidential diplomacy, violence in Israel, and the effect that these variables may have on the addresses made by the President. Much of the literature focuses on the relationship between media, senior politicians, and international issues. By examining the president of the United States and his relationship to the media, Middle Eastern state leaders, and circumstances of the international system (specifically violence), this study contributes to scholarship on media and foreign affairs. This study utilizes data from presidential addresses during the first year of William Clinton's presidency and George W. Bush's first term (1993, 1997, and 2001). This data is compared to the occurrence of *New York Times* articles, diplomatic meetings between the president and Middle East state leaders, violence in Israel, major events during these years of the presidency, and it seems that there is some relationship between the amount of media coverage on the peace process, presidential diplomacy and statements made by the president.

# MUSLIM WOMEN'S MOTVATIONS BEHIND THE COLORFUL HIJAB: A CASE STUDY OF SAKHNIN COLLEGE, ISRAEL

### Katharine E. Donovan (Dr. Brian Digre) Department of International Studies

Scholars of the Middle East and Islam have conducted research concerning the wear of the *hijab*, an increasingly popular head covering common among Muslim women that covers the head and neck but leaves the face clear. Due to the increasing number of women who have recently decided to become part of the *muhajaba*, or "covered women," the issue of the *hijab* has surged to the forefront of myriad academic studies.

Current research in the field focuses on the historical, symbolic, and literal interpretations and significance of the *hijab*; however, none of these studies make the distinction between color and/or decoration of the head covering. Furthermore, research in the field suggests that the modern Muslim woman's main reason for wearing the head covering is increasingly for fashion purposes, not necessarily as a result of religious dedication.

My research examines the perspectives of female Muslim university students at Sakhnin College, Israel, in order to explore the nuances of the colorful *hijab*. My question asks what the motivations are behind women choosing a colorful version of the head covering over a plain one. Through a series of surveys and fifteen-minute informal interviews, my case study of this specific population provides enlightening information on the religio-cultural status of the *hijab* today and sheds light on what it means to be a Muslim woman in the 21<sup>st</sup> century. I did not find a drastic difference between women's motivations for adopting the colorful *hijab* in comparison to a plain *hijab*; however, my findings indicate that women are more likely to wear a colorful covering before marriage and less likely to

wear it as they age. My research concludes that the colorful *hijab* is increasingly a cultural phenomenon used to mediate between social pressure to maintain an appearance of religiosity and youthful awareness of fashion and style. As the Middle East continues to experience dramatic change and a possible turn toward Islamism, my research is timely and expounds upon the complex issue of the colorful *hijab* as it continues to transform, both literally and symbolically.

## TWITTER AND THE ARAB SPRING

### Daniel F. Layman, III (Dr. Sharon Spray) Department of International Studies

Through the use of social media and other facets of Web 2.0, people and groups within large scale social upheavals (such as those currently taking place throughout the Arab world) are able to organize and promote themselves, as well as draw international recognition and support, in a manner that is novel and uncontainable by the forces of modern oppressive governments. Evidence from the revolutions in Tunisia and Egypt suggests that social media can be a powerful weapon in the destruction of an unpopular regime. However, scholars still lack an understanding of its specific roles and effectiveness in social uprisings. This study addresses the use of Twitter during the 2011 Arab Revolutions. It specifically investigates Twitter usage in Bahrain, Syria, and Yemen from October 3<sup>rd</sup> to 31<sup>st</sup>, 2011, using the primary revolutionary Twitter accounts from each country: @14FebRevolution in Bahrain, @RevolutionSyria in Syria, and @YemeniTweet in Yemen. Independent variables for this study were: the amount of coverage of revolutionary activities by state media and international media sources, the level of state media bias in reporting those activities, and the amount of revolutionary casualties sustained in each country during those activities. Bivariate analysis was used to explore the relationship between the number of Tweets and each variable. The data indicate that there was a statistically significant relationship between increased levels of biased state media coverage and citizen Tweet activity. However, there was no statistically significant relationship between Tweet activity and increased international media coverage or revolutionary casualties.

# CIRCULAR MIGRATION IN TURKEY AND THE MAGHREB REGION: OBSERVATIONS FROM THE GERMAN SOCIO-ECONOMIC PANEL SURVEY AND MIREM DATA COLLECTIONS

#### Kathleen E. Price (Dr. Betty Morgan) Department of International Studies

In light of current labor demands and development challenges, circular migration has entered into policy discussions in recent years. Although the term "circular migration" is not new, many scholars feel that there are many contemporary implications this form of migration policy could have on current economic, social, and political issues concerning it. The term essentially embodies the idea of a continuous engagement among countries where migration is repeated often and return is likely, making it temporary and circulatory in nature. Circular migration has recently been seen as a solution to the labor demands and shrinking populations of receiving countries and, also, an economic and social development benefit to sending, or origin, countries. It may promote the circulation of human, social, and financial capital over borders, while ensuring the social rights of the migrant while abroad.

This research focuses on return migrants in Turkey and the Maghreb region, specifically Algeria, Morocco, and Tunisia. It specifically compares migrants' socio-demographic characteristics (i.e. age, gender, marital status, occupation, etc.), length of stay abroad, the motivation for return, and post-return condition. The findings are based on data from the German Socio-Economic Panel Survey and the MIREM Database on Return Migrants to the Maghreb. The research finds that the historical differences of migration in both areas have created different migration environments, yet overall, circular migration is not highly facilitated in either region. However, return migration is common and can have positive impacts for those who choose to return to their country of origin. Important policy implications can be drawn for these countries and potential variables distinguished that may facilitate or hinder circular migration by comparing migrants' reasons for migration experience. The research suggests the importance of bilateral and multilateral agreements among individual countries in order to ensure the rights of migrants and to facilitate circulatory migration flows.

### **BUDDHISM AND VIDEO GAMES**

**Stephen W. Rosebaugh-Nordan** (Dr. Pamela Winfield) Department of International Studies

Video games have in recent years become a form of media that is globe spanning, not only in where they are designed, but in the material they cover, often borrowing history and myths from countries in Europe, Asia, and Africa, as well as the United States. However, they are often dismissed as a form of entertainment that, no matter how interactive, is mindless and has nothing to teach its players. However, is that true? Can video games offer an alternative learning environment for people seeking higher education? To this end, it was necessary to choose a particular subject that is offered academically, with a rich amount of written and visual material to draw upon, and compare it to video game offerings to see if they matched up with the material, thus providing an interactive way for people to better their knowledge on a particular subject. The topic selected for this study was Buddhism and an exhaustive number of games that appeared to have the potential to educate students on the subject were examined at length. Six games were chosen for their contents and it was discovered that they conveyed the teachings and history of Buddhism to their players in three distinct ways. The first was a tangential approach, where Buddhist elements were incorporated into a game but were not properly explained. While these elements could be fallacious given the context of the game, they encouraged players to do outside research to learn more about their surroundings in the virtual world. Next, there was a cultural approach, where a world was created in a video game modeled after a society during a certain historical period. This approach showed players how Buddhism existed in a historical sense, including rituals and attitudes towards the religion. Finally, there was the thematic approach, where video games incorporated Buddhist ideas or teachings in settings that were distinctly un-Buddhist, hiding their knowledge behind symbolism and themes. The major conclusion from these results is that given the right situation and subject, video games can be used to educate people in a more interactive method than traditional academics.

# THE EFFECT OF FRENCH INTERVENTION IN DOMESTIC AFRICAN CONFLICTS

### Rachel R. Stanley (Dr. Safia Swimelar) Department of International Studies

As humanitarian interventions continue to be an important part of contemporary international relations, there are gaps in the literature that require additional research. Literature on the subject thoroughly explores multilateral interventions, particularly those performed by the United Nations, but there is less attention paid to the actions of singular states. In addition, intervention literature tends to focus solely on military interventions, with less research on the effects of economic and diplomatic actions. France, as a former colonial power and a state that is hoping to maintain its status as a middle power, has participated in many interventions and hence provides ample data for the study of this topic. Due to colonial legacy and a desire to remain an influential player in international affairs, France has a history of intervention in foreign political conflicts, especially on the African continent. There was significant intervention by France in both the Rwandan civil war and subsequent genocide of the 1990s and the 2011 civil war in Cote d'Ivoire. This research uses a process tracing methodology to examine the effects of French intervention in these two conflicts to determine what effect there has been on the severity of conflict and the occurrence and outcome of peace negotiations. This study considers all types of interventions, not simply militarily but also economic and diplomatic, in order to broaden the range of conclusions that are possible to make. The process of data collection is still underway, but my hypotheses predict that the effects of intervention efforts by the French depend on several factors. The most likely to be significant include the intensity of actions taken as part of the intervention and the strength of the party that France supported in the intervention.

# MATHEMATICS AND STATISTICS

### CONFIDENCE INTERVALS FOR PROPORTIONS USING THE BINOMIAL DISTRIBUTION: TRADITIONAL METHODS AND IMPROVED ALTERNATIVES

**Theodore S. Z. Berkowitz** (Dr. Kirsten Doehler) Department of Mathematics and Statistics

A major goal of statistical inference is to determine the value of an unknown parameter, such as the number of business majors out of all American undergraduate students, based on the information provided by data from an experiment or observational study. Every conclusion of inferential analysis includes an estimate of certainty about the accuracy of its results. Confidence intervals (CIs) are ranges of values that are expected, with some degree of confidence, to include the true value of the unknown parameter. The default level of confidence in most situations is 0.95, or 95% confidence. If an experiment is repeated hundreds of times, producing hundreds of sets of observations, and a 95% CI is calculated for each set of observations, then it is expected that the true parameter value be contained within 95% of the intervals. This does not happen with CIs for proportions when using the standard method.

Our research was undertaken to determine the reasons behind the inadequacy of coverage for proportions given by the standard confidence interval calculation method and to consider several proposed improvements to the technique. The conclusions of this research are relevant to various specialties and industries, including manufacturing (to determine the proportion of defective products made daily), epidemiology (to predict the prevalence of certain diseases or disorders in a specific group of people), and research in various fields. To compare the accuracy of the standard and alternative calculation methods, we wrote code for simulations (run using R software) to determine how accurately the CIs produced by each method predicted a pre-determined proportion parameter. Our results support earlier findings by others that the CIs for proportions obtained using the standard method are terribly inadequate and often do not provide the expected level of coverage. Simple adjustments are available that vastly improve accuracy and reliability and also provide an acceptable quality of results. The poorly performing standard method for proportions can and should be replaced with the "Plus-Four" adjustment (in classrooms and for calculations by hand) or the Agresti-Coull method (for calculations by computers).

# NOT YOUR AVERAGE ESTIMATOR: EVIDENCE THE MEAN SHOULD RETIRE

Keyona D. Osborne (Dr. Laura Taylor) Department of Mathematics & Statistics

Not all data sets are created equal. The following study seeks to understand the role that the trimmed mean plays in effective statistical analysis of contaminated data sets. A contaminated data set contains incorrectly recorded observations and/or missing observations, which may be inconsistent with the true observations. Furthermore, the study defines the sample statistics best suitable for analyzing a contaminated data set. A majority of data sets used in research for all academic fields can be considered contaminated. David J. Hand argues that a large data set is almost guaranteed to be contaminated. Hand continues, "This is especially true when the data describe human interactions of some kind, such as marketing data, financial transaction data, or human resource data" (Hand 113). Through a Monte Carlo Simulation study using the statistical software package, R, many samples are generated from a population with set parameters, and the mean, symmetrically trimmed mean, and metrically trimmed mean are calculated. Adjustments to the estimators presently used are described and simulated, providing reason to suggest that the trimmed mean estimates the center of a distribution more precisely than the sample mean under certain conditions. A simple adjustment factor is proposed so that intervals generated from contaminated data will achieve 95% confidence. Currently, many introduction-level statistics courses brief students on the estimating capability of the sample mean, which this study suggests is less accurate than certain versions of the trimmed mean in scenarios less ideal than the example problems found in textbooks. The results of this study are applied to a real data set to demonstrate the simulated accuracy also translates to non-simulated data.

# **MUSIC**

# INFORMED PERFORMANCE THROUGH ANALYSIS: C.P.E. BACH'S CELLO CONCERTO IN A MAJOR Wq. 172

### Joshua R. Goldstein (Dr. Omri Shimron), Department of Music

Carl Philip Emmanuel Bach's Cello Concerto in A Major is one of the most compelling yet problematic works in the instrument's repertoire because it defies stylistic categorization. The concerto was written during a time of rapid stylistic shifts in Western music history when the Baroque period was coming to an end while the Classical period was just emerging. Local trends such as the style galant and Empfindsamer Stil (translated as courtly and sentimental respectively) also influenced the composer's output. The progressive and unpredictable nature of the Empfindsamer Stil, as embodied by C. P. E. Bach's three-movement concerto, presents challenges to the performer and music analyst. This research aims to gain a more thorough understanding of the work's stylistic idiosyncrasies through a study of structure and of performance practice. Methods used in the study of structure include Roman numeral analysis, motivic analysis, and a schematic diagramming of formal elements. The performance-practice discussion seeks to answer questions about interpretation and execution on the basis of treatises by major figures such as Leopold Mozart, Quantz, and C.P.E. Bach himself. Consulting these primary sources will aid in establishing a more historically informed performance and will particularly clarify issues regarding ornamentation, dynamics, articulation, and bowing. Findings gleaned from the structural analysis and the performance practice inquiry form an interpretation that is relevant to performers and contributes to a better understanding of C. P. E. Bach's work in the context of this time.

# LEARN BY DOING: THE COMPOSITIONAL PROCESS OF AN UNTRAINED COMPOSER

### Mary B. Safrit (Dr. Todd Coleman) Department of Music

As an Elon College Fellow, I was drawn into creative research in the area of music composition. I composed a large work, which was comprised of fourteen smaller pieces, and it will be performed on April fourth. Through the compositional process, I learned a great deal and had a unique compositional experience. This presentation will discuss these experiences. The essential question is as follows: How does one go about the composition process when one has no background or training in the area of music composition? This presentation will discuss such issues as musical influence, necessary research for the composition process, compositional techniques used, and directing rehearsal for a small ensemble. This question is important because, in the world of classical music composition, composing without any training is uncommon. This presentation will shed light on my personal process, and will be useful for other musicians who desire to compose. I analyzed my own music heavily and regularly notated my progress and process as I was composing and rehearsing in order to answer this question. I have found that, for someone of my particular learning style, learning to compose by actually putting notes on a page and figuring out what communicated my concept and what didn't communicate my concept was the best method. In addition,

working privately with Dr. Todd Coleman, who is an excellent composer, was instrumental to my compositional process. This is because, while I instinctively had interesting ideas, I lacked the experience to know how to best support those ideas.

# **NEUROSCIENCE**

# A MODEL COMMUNITY BRAIN HEALTH PROGRAM FOR MINORITY AND/OR LOW SOCIOECONOMIC STATUS OLDER ADULTS.

Ruth E. Robbins (Dr. Amy A. Overman) Department of Psychology.

Recent research demonstrates that social and cognitive stimulation may improve older adults' brain function and quality of life (Carlson et al., 2009). Little research has examined this in minority populations even though 15% of older adults age 55+ in the United States are racial or ethnic minorities and the older adult population is estimated to continue increasing in racial and ethnic diversity (US Census Bureau, 2012). Additionally, minority older adults have less access to health information and are at higher risk of health problems than Caucasian populations (Paasche-Orlow et al., 2005) and minority older adults show a greater functional decline than Caucasian older adults (Fuller-Thompson et al., 2009). Through partnerships with community organizations, two innovative pilot 10-week social/cognitive stimulation interventions were implemented with minority and/or lower socioeconomic status elderly adults. Participants experienced social and cognitive stimulation in the form of group participation in challenging brain games such as a card game variation of the N-Back task, SET, and Mastermind (Jaeggi et al., 2008). The use of commercially-available non-computerized materials was intentional because older adults are less likely to use technology and to feel comfortable when doing so, and this is especially true for minority older adults (Charness & Boot, 2009; Jung et al., 2010). Additionally, pilot work has shown that older adults are not as intimidated by games they recognize, which results in more engaged participation and better attendance (attrition is a serious challenge with multi-session community-based research). Lastly, the impact of the training is long-lasting because the program can be continued by the participants on their own and spread to others by the participants themselves. The participants participated in the games for 60 minutes each week for 10 weeks and were given pre- and post-neuropsychological testing. Participants (n=12) showed a significant improvement on Satisfaction With Life Scale ratings over training period (p=.004). There was a trend toward cognitive improvement. Future research will investigate this with a larger sample. This innovative community brain health intervention has the potential to improve quality of life, reduce disparities in health in old age, and serve as a model for implementation by community aging agencies.

# "A COUPLED ODE LATTICE MODEL FOR THE SIMULATION OF EPILEPTIC SEIZURES"

Adrienne M. Rouiller (Dr. Karen Yokley) Department of Mathematics

Complex partial epileptic seizures are believed to originate in the hippocampal portion of the temporal lobe. The abnormal firing patterns exhibited by this focal region spread

throughout surrounding normal brain tissue using a poorly understood recruitment mechanism. We are going to assume that potassium diffusion is the mechanism of communication between neurons, and that this is not instantaneous. It is proposed that a lack of inhibition mediated either by a reduction in the number of excitatory cells that synapse on the inhibitory cells, or the reduction of the release of GABA leads to seizures.

Altered inhibitory influence in the focus leading to pathological periodic behavior is necessary for the production of a behavioral seizure. However, without a temporal alteration in the conduction time from one region to next there will be no seizure. This is necessary for the abnormal focus to produce the widespread spatiotemporal coherence in partially normal neurons that is characteristic of a seizure.

It is likely that during surgery, a portion of brain tissue much larger than the actual focus is unnecessarily removed, leading to impairment in a variety of functions. Operations remove 4.5 to 6.0 cm of the affected temporal lobe, yet we still do not know how large the actual focal region is. The purpose of this model is to suggest new, non-surgical approaches to the treatment of the disease. It would be ideal to be able to spread the seizure-like activity to treat it.

We believe that our modified mathematical model has the potential to help to more fully understand seizures. Over this past summer, while participating in SURE, we worked on changing a previous seizure model to be a better simulator of seizures. The next step is to perform a sensitivity analysis on the model because we found that some of the parameters in our model may be too sensitive to change. We hope that further research in the fall could lead to some more insight into neuron firing during seizures.

### CATECHOL-O-METHYLTRANSFERASE GENOTYPE INFLUENCES COGNITIVE PERFORMANCE AND CONCUSSION HISTORY IN COLLEGE FOOTBALL PLAYERS

#### Mark H. Sundman & Drew Gardner (Dr. Eric Hall), Department of Exercise Science

Catechol-O-Methyltransferase (COMT) is a gene that is active in the breakdown of dopamine and norepinephrine in the prefrontral cortex. It has two alleles, Val and Met, yielding three possible genotypes (Val/Val, Val/Met, Met/Met). The Val allele promotes higher enzyme activity resulting in greater levels of dopamine degredation and lower dopamine levels in the prefrontal cortex. Research suggests that those with Met/Met and Val/Met genotypes have better cognitive performance due to the lower enzyme activity associated with the Met allele. Additionally, previous findings show that Val/Val and Val/Met populations have higher concussion rates, which may be due to higher levels of dopamine degredation due to the Val allele. **Purpose**: To investigate association between COMT and executive cognitive function in student-athletes and how certain genotypes affect concussion history. **Methods**: 18 male college football players (age  $18 \pm 0.77$  years) were genotyped for COMT. Participants then performed cognitive tests using Immediate Post-Concussion Assessment Cognitive Testing (ImPACT). ImPACT obtains concussion history and measures cognitive function by using several neuropsychological

tests involving word discrimination, attention span, response variability, working memory and recall, and reaction time. **Results**: 7 subjects were Met/Met genotype and 11 were Val/Met. Met/Met subjects scored higher on verbal memory test (p = .329), visual memory test (p = .080), and visual motor test (p = .163). Results also show that only 14% of Met/Met subjects reported history of concussions while 27% of Met/Val subjects reported suffering at least one concussion. **Conclusions**: While data collection is ongoing, our preliminary data supports previous findings that the Val allele decreases cognitive performance and increases risk of concussions.

# **PHYSICS**

# USE OF ARTIFICIAL CILIA FOR MICROFLUIDIC MIXING

Michael F. Berg & Willem Prins (Dr. Benjamin Evans) Department of Physics.

The absence of turbulence is a hallmark of fluid flow in the microfluidic regime, and so mixing is difficult to accomplish. Approaches to microfluidic mixing have varied widely, from passive devices which encourage complex flow with various modifications of the channel geometry to active mixers actuated by electric or magnetic fields. An ideal active mixer would be small enough to fit inside the narrowest microfluidic geometries and easily manipulated by external fields. We present here a novel material which is a composite of magnetic nanoparticles and silicone polymer. This material has a high magnetic content (up to 50% wt.) and is homogenous at length scales below 100 nm, making it ideally suited to the fabrication of micro-scale mixing devices. We optimize this material for use in microactuator applications and demonstrate a protocol for fabricating micro-mixers similar in scale to biological cilia (25 microns in length by 1 micron in diameter). A large array of these mixers may be fabricated within the confines of a microfluidics channel and actuated via an external magnetic field from a permanent magnet. Optimizing these systems has a huge impact on lab-on-a-chip applications. These applications are important for lowering the cost and waste for analytical tests and achieving faster results.

### USING NASA'S CHANDRA X-RAY OBSERVATORY TO STUDY BLACK HOLE VARIABILITY IN THE CENTAURUS A GALAXY

Todd M. Calnan (Dr. Daniel Evans) Department of Physics

Active Galactic Nuclei, or AGN, are the most luminous objects in the universe over a sustained period of time. Their extreme power is generated by accretion onto a supermassive black hole, the process where material falls toward the hole and converts its gravitational potential energy into radiation. But how do their properties change with time? We present data gathered by NASA's Chandra X-ray Observatory from Centaurus A, one of the closest and brightest Active Galactic Nuclei. We analyzed Chandra observations from the past decade to reveal the temporal variability of the X-ray spectra, and in so doing determine the structure of the material in the immediate vicinity of the black hole. We find that Centaurus A has remained mostly unchanged in luminosity, while showing a great deal of change in its structure. This finding suggests that the

material found closely around the black hole has a clumpy structure, and is not smooth as predicted by previous models of AGN phenomenology.

# MAGNETIC NANOPARTICLES FOR HYPERTHERMIA TREATMENT OF MALIGNANT TUMORS

## Alison E. Deatsch (Dr. Benjamin Evans) Department of Physics

In current methods of cancer treatment, the pharmaceuticals which kill cancerous cells are toxic to the rest of the body, resulting in adverse side effects. As an alternative, magnetic hyperthermia is a promising treatment with fewer side effects because it renders toxic chemicals unnecessary. In this treatment, magnetic material is localized inside the body, then heated *in vivo* upon exposure to a high frequency magnetic field. The resulting thermal energy kills tumor cells with minimal damage to surrounding tissue. In our lab, we have created a novel product for magnetic hyperthermia therapy which consists of iron oxide nanoparticles (~10 nm) each coated in a monolayer of a silicone polymer and agglomerated into micron-sized spheres (~1000 nm). The goal of my research was to maximize the heating efficiency of magnetic microspheres. Current literature suggests that small alterations in the size of the nanoparticles that make up the microspheres has a dramatic effect on heating efficiency. Accordingly, I followed an established protocol to produce two samples of differing nanoparticle size (31.3 +/- 12.1 nm and 467 +/- 121nm) and measured their specific absorption rates (SAR). SAR is a measure of the power absorbed per gram of material, thus a particle with higher SAR heats more efficiently. Finally, we have reason to believe that aggregation of nanoparticles will reduce SAR, and so I report on the SAR of bare nanoparticles (which are prone to aggregation) as well as that of nanoparticles coated in polymer (which resist aggregation).

# MAGNETIC MICROSPHERES FOR RECOVERY OF ORGANIC WASTE IN WATERWAYS

# Willem J. Prins (Dr. Benjamin Evans) Department of Physics

Over 150 million cubic meters of oil contamination in waterways occur every year. Must of this waste consists of the "BTEX" contaminants: Benzene, Toluene, Ethylbenzene and Xylene. A cheap and efficient method of removing such contaminants from waterways is therefore desirable. Researchers at NC State recently reported on the absorption of BTEX contaminants with millimeter-sized silicone spheres. We have a novel magnetic silicone composite material in our lab from which we can construct micron-sized spheres; in this work we demonstrate the utility of these spheres for absorbing BTEX spills from waterways. Our material has two distinct advantages over that used in the NC State study: the spheres are smaller (~ 1 micron), leading to a higher surface-area-to-volume ratio and therefore more rapid absorption of contaminants; in addition, the spheres are magnetically recoverable after soaking up BTEX compounds, improving speed and reducing cost in commercial application.

In this work, I demonstrate that our material can absorb more than twice its weight in BTEX compounds and use UV-VIS spectroscopy to explore the absorption rate of BTEX compounds at short time scales.

# FOLIC ACID CONJUGATED MAGNETIC MICROSPHERES FOR LIGAND-TARGETED DRUG DELIVERY

#### Julie C. Ronecker (Dr. Benjamin Evans) Department of Physics

Chemotherapy is a cancer treatment method that involves the delivery of drugs throughout the body. Targeted drug delivery is an attractive alternative to chemotherapy for its potential to maximize therapeutic effects and minimize side effects by localizing drugs specifically at malignant tissue. In ligand-targeted drug delivery, a carrier particle is conjugated with a ligand designed to preferentially bind to a receptor expressed on the membrane of a chosen cell type. A therapeutic agent can be adsorbed onto or absorbed within the carrier, and its release is often triggered by magnetic stimulation or other means. In this work, we present a novel silicone-magnetite microsphere as the drug carrier for ligand-targeted drug delivery. Each carrier contains up to 50% wt. magnetite nanoparticles (10nm diameter) each coated with a monolayer of an amine-functionalized silicone polymer for a total microsphere diameter scalable between 0.5-2.0 microns. The silicone matrix of this carrier facilitates compatibility with lipophilic drugs and an abundance of primary amines enables surface functionalization with a variety of ligands. In this work, we demonstrate the utility of these spheres for localized drug delivery by choosing folic acid as the ligand and HeLa cells as the target cell type. These cervical cancer cells expresses  $10^6$  more folic-acid-binding proteins on the membrane compared to healthy cells. We verify binding of folic acid to the microsphere surface via FTIR spectroscopy and explore preferential binding of these spheres to HeLa cells in a live-cell study with brightfield microscopy.

# POLITICAL SCIENCE AND PUBLIC ADMINISTRATION

# AMERICAN EXCEPTIONALISM AND THE INTERNATIONAL CRIMINAL COURT

#### James R. Dolphin, III (Dr. Safia N. Swimelar) Department of Political Science

Long known as a catalyst for the development of international institutions and the promotion of human rights, in recent years the United States has acted in ways that imperil that reputation. In order to better understand the decline in American efforts at multilateralism, this research investigates four explanations of American exceptionalism, which is the notion that this country is unique in its values, institutions, and power capabilities, in order to attempt to comprehend U.S. opposition to one of the most important developments of international law in recent history: the International Criminal Court (ICC). Those explanations, posited by scholar Michael Ignatieff, are realism, culturalism, institutionalism, and political conservatism. Previous literature has focused

on the existence and definitions of exceptionalism, rather than on which of those theories provides the best way in which to understand American opt-outs to certain facets of international law. This research moves one step further to test the explanatory power of these theories in the context of the ICC by pairing the use of a scale to evaluate the level of threat posed by the ICC according to the theory of realism in international relations with an in-depth analysis of official government documents concerning the Court. It is anticipated this study will find that while realism is able to explain much of U.S. behavior in relation to the ICC, the other three explanations also have limited, yet important interpretive usage. Importantly, the results of this study not only have implications for understanding American exceptionalism in relation to the ICC, but have the potential to further comprehension of American exceptionalism in a much broader, holistic context.

### CHARACTERIZING AMERICA'S POLITICAL GEOGRAPHY

John W. Hendrickson (Dr. Dion Farganis) Department of Political Science

The red state/blue state divide has been a dominant theme in American politics for over 20 years. Recently, however, in their influential 2010 book *Our Patchwork Nation*, journalist Dante Chinni and political scientist James Gimpel challenged this conventional wisdom by recasting the 3,141 counties in the United States into one of twelve demographic categories. Using a range of socio-economic, political, and geographic data, they provided an alternative representation of contemporary American society, moving beyond the simple red/blue electoral map.

Although *Our Patchwork Nation* has been influential in American politics, the authors openly recognize that their categorizations do not always provide the best representation of the given county. They acknowledge that some counties presented complex or conflicting results, and judgment calls about the classification were made. Chinni and Gimple do not elaborate on this, but admit it was part of their analysis. Consequently, it is possible that at least some of their categorizations, the basis of their book, are not accurate.

My project applies Geographic Information Systems (GIS) methodologies to test Chinni and Gimpel's categorizations. GIS approaches to presenting data have become an increasingly critical tool for researcher's ability to convey their theories, findings, and conclusions. GIS is a technological tool assisting in the comprehension of geography to better make intelligent decisions (ESRI, 2011). Formally, GIS can be identified as an integrated collection of computer software and data used to view and manage topographical information, analyze geographic relationships, and model spatial processes.

Focusing on one specific classification, "Military Bastions," my investigation uses GIS technologies to produce alternative results to those presented by Chinni and Gimpel. I examine three separate counties: two identified as Military Bastions and one that was not. I then apply GIS technologies to assess the accuracy and consistency of the Military Bastions classification. My findings reveal a variety of gaps in the consistency of classifying counties as Military Bastions. Moreover, while the primary category examined was Military Bastions, the examination uncovered other flaws to the methods used by the authors. My hope is that the alternative technique introduced here can be applied in future categorizations of America's political geography.

# **BIOLOGICAL AND CHEMICAL WEAPONS: LIKELIHOOD OF ACQUISITION AND USE BY NON-STATE ACTORS**

### Elizabeth A. Johnson (Dr. Sean Giovanello) Department of Political Science

This research examines an important issue in international politics - the proliferation and potential and actual use of biological, chemical or nuclear weapons by non-state actors. Given the belief that such attacks are inevitable, it is necessary to examine what types of groups acquire these weapons and under what circumstances they might be utilized (Allison, 2005). This research employs the method of structured, focused comparison, which has been widely adopted in scholarly works within the fields of international relations, security studies, and diplomatic history (George & Bennett, 2005). The method compares across cases in a systematic manner and is recognized for producing policy relevant analysis (Krepon and Caldwell, 1991). As such, this project analyzes the past acquisition and use of chemical and biological weapons by terrorist groups, examining in detail the use of these weapons by the Rajneeshees and Aum Shinrikyo. The study finds some interesting similarities and differences between the Aum Shinrikyo and Rajneeshee cases. First, while Aum Shinrikyo garnered far more media and government attention for its Tokyo Subway attack, the Rajneeshees followed a similar trajectory in planning and executing their attack inside the United States. These similarities included each group planning a variety of increasingly sophisticated and destructive attacks beyond the ones that were carried out. The study also finds that despite highly suspicious behavior prior to the attack, each group was able to plan and carry out a chemical or biological weapons based terror attacks while still being able to surprise the authorities. Finally, experts often assume that terror groups utilizing WMD have apocalyptic motivations (Smithson and Levy, 2000). However, in the case of the Rajneeshees, the group was instead driven by secular concerns that included acquiring political power through influencing electoral results. While more research in this field is necessary, analyzing these cases is essential to understanding the combination of motivations and capabilities that may lead other groups to attempt similar attacks in the future.

### INDIA'S NAXALISTE THREAT: EVOLUTION OF A MAOIST REBELLION AND STATE COUNTERINSURGENCY RESPONSES

Sarah Elyse Naiman (Dr. Jason A. Kirk) Department of Political Science

India has waged various counter-insurgency operations since independence against insurgencies of varying sizes, motivations, and with disparate degrees of influence. Until recently it has done this under the assumptions of a classical counter-insurgency framework. There exists a growing dichotomy between the unconventional nature of Indian insurgencies and the state's conventional response. At the center of this dichotomy are challenges posed by the evolving and expanding Naxalite movement. Through analysis of scholarly research, news articles, government documents, as well as publications produced by affiliated political parties, this paper seeks to analyze India's current framework for counter-insurgency and how it applies to the distinct challenges of the Naxalite insurgency. This research finds that the unique structure, ideology, and identity of the Naxalite movement poses significant challenge to India's counter-insurgency efforts and is already influencing the trajectory of India's counter-insurgency

development. This research highlights what the Prime Minister of India, Manmohan Singh referred to as "the greatest internal threat ever faced" by India (Singh, 2006). The ability of India to adjust to this insurgency could very well indicate the future of stability in the world's largest democracy.

# **PSYCHOLOGY**

# SYNESTHESIA AND THE EXPERIENCE OF CREATIVITY

Katherine N. Atkins (Dr. Alan C. Scott) Department of Psychology

Synesthesia is and automatic and involuntary perceptual experience that occurs when senses are "cross-wired" in such a way that sensory experience results in the typical perceptual experience, as well as a "linked" perceptual experience (e.g., hearing middle C may result in perceiving the color blue). Synesthetes differ from non-synesthetes in several ways, and there has been a persistent belief that synesthetes are more creative than non-synesthetes. Previous research has indicated that synesthetes are more likely to engage in creative professions and hobbies than the general population (Rothen & Meier, 2010; Domino, 1989), however, they score higher on some measures of creativity but not others (Ward, Thompson-Lake, Ely, & Kaminsky, 2008; Sitton & Pierce, 2004). It is possible that synesthetes enter creative fields and pursue creative majors due to increased pleasure derived from a different experience of certain sensory input or creativity itself, rather than increased creative ability. In order to better understand this phenomena, the Experience of Creativity Questionnaire (Nelson & Rawlings) was administered to both synesthetes and non-synesthetes and the groups were compared on several measures regarding how they experience episodes of creativity, and how they feel about creativity in general. Measures include: distinctness of the experience, anxiety and vulnerability related to the experience, absorption in the activity, sense of control and pleasure, sense of certainty and clarity about direction of the activity, importance of creativity in the person's life, transformative effect of creativity, and meaning associated with artistic creativity in a less personal context. The presence or absence of grapheme-color synesthesia was verified informally through an oral interview and formally by use of both the Color-Picker program and the Speed-Congruence test developed by Nelson and Rowlings (2009). Data collection is still ongoing in an effort to increase the sample size related to this special population; however, all available data will be analyzed as SURF nears and results will be presented.

# STUDENT MOTIVATION IN ACADEMIC SERVICE-LEARNING OVER THE SEMESTER

**Jenna R. Chenault & Margot E. Haglund** (Dr. Alexa Darby & Dr. Buffie Longmire-Avital) Department of Psychology

Faculty employ academic service-learning (AS-L) pedagogy to help students translate theory to practice, understand issues facing their communities, and enhance personal development (Eyler & Giles, 1999; Hardy & Schaen, 2000; Simons & Clearly, 2006). Students' motivation in AS-L increases when students gain insight into their values and

goals (Brody & Wright, 2004; Duffy & Raque-Bogdan, 2010). The purpose of this study is to identify factors that decrease student motivation in AS-L and to explore ways to support students throughout the course of the semester. The study included 134 college students, 37 males and 97 females, attending a private liberal arts institution in the Southeast. Participants completed questionnaires at the beginning, middle, and end of the semester pertaining to their current AS-L course. The questionnaire included items about students' reasons for enrolling in the course, expectations for the course, and changes in their level of motivation throughout the semester.

A preliminary repeated-measures ANOVA was conducted to determine if there was a significant change in students' self-reported motivation to visit their AS-L site over the semester. Analysis revealed that students reported a significant decrease in motivation to go to their site over the semester. A mixed-factor analysis conducted to assess the influence of gender on motivation to visit the site revealed a significant interaction between gender and motivation. Qualitative analysis of open-ended items revealed that motivation decreased as a result of communication problems with the community partner, lack of integration between the course and the AS-L experience, transportation issues, and difficulty with the time demands on students' schedules. Students recommend that faculty spend more time meeting with community partners, provide more direction, and be more supportive and understanding of the challenges students face in balancing other commitments with the demands of the AS-L course. A limitation of this study involves the unequal number of male and female participants. While students experienced a decrease in motivation, they nevertheless understood the value of AS-L courses and would recommend these courses to other students.

# WOMEN'S MOTIVATIONS FOR PRE-GAMING BEHAVIORS: A FOCUS GROUP STUDY

### Clea A. Colangelo and Sarah C. Connors (Dr. Gabie Smith) Department of Psychology

Pregaming, a common and risky drinking behavior among college students, consists of drinking a large quantity of alcohol in a short period of time before a social event (Read et al., 2010). Read et al. (2010) found that about two-thirds of college students that drink alcohol engage in pregaming behaviors. Further research examining college drinking patterns suggests that female students drink at similar rates as their male counterparts (Korcuska & Thombs 2003). With regards to pregaming, men and women have been found to participate in pregaming behaviors with similar frequency (DeJong, DeRicco, & Schneider, 2010); however, women are at greater risk of experiencing negative consequences due to alcohol than men (Nolen-Hoeksema & Hilt 2006; Burger, LaSalvia, Hendricks, Mehdipour, Neudeck, 2011). The current study extends previous research to examine processes specific to women's motivations to engage in pregaming behaviors. This project adds to literature on risky alcohol-use by investigating how gendered processes and personality combine to affect motivations towards risk.

Participants in this study were asked to complete a preliminary online survey that evaluated their drinking habits, n = 19. Participants included 20 undergraduate females (one participant was removed as she was under 21-years-old). After the survey was completed, participants attended focus groups that were led by the researchers. Focus groups lasted approximately thirty minutes, with three or four participants attending each

session. During the session researchers asked participants several discussion questions. These questions included requests for participants to define terms like disinhibition, and relate their definitions to drinking habits such as pregaming. Participants were also asked their opinions about pregaming, and to expand upon the positive and negative consequences of the behavior.

Preliminary quantitative findings show the median response of pregaming frequency is once a month, and the median response of alcohol consumption is 3 drinks per occasion. Qualitative analyses are currently underway examining themes from the focus group study. For example, to the question "In general what reasons are there to pregame?" responses such as, "To loosen up," show a theme of social disinhibition. At our presentation the full quantitative and qualitative data and recurring themes will be discussed.

### INFLUENCE OF HOME AND SCHOOL CONTEXT ON THE ORAL NARRATIVES OF PRE-KINDERGARTEN CHILDREN

Lauren N. Deaver (Dr. Maureen Vandermaas-Peeler) Department of Psychology

This study explores oral narratives of low-income pre-kindergarten children and their families in home and school contexts. Oral narratives are important for literacy development; children who are able to build strong connections between speech and writing events have better literacy outcomes (Cooper, 2005). Narrative style differences between home and school can lead to difficulty in building these connections and impair academic achievement (Bloome, Katz, Solsken, Willett, & Wilson-Kennan, 2000). Most research has focused on middle-class European American families, but there is evidence that children's stories vary in narrative style between different economic and cultural groups (Heath, 1983; Price, Roberts, & Jackson, 2006). Twenty parent-child dyads produced three narratives at home, and children told multiple stories in their Head Start classrooms. Children's oral narratives produced at school were examined for narrative complexity (Petersen & Gilliam, 2008), and high variability was obtained on this measure. Narrative complexity was not significantly related to PPVT-III language scores. Results indicated that the children began to pay increased attention to the physical writing of the story by the researcher over time, mimicking the action of writing and dictating specific letters as if spelling out a name or word. A second research objective was to explore co-constructed narratives in low-income families. Three primary dependent variables included intersubjectivity, shared positive affect, and narrative complexity. Intersubjectivity and positive affect were positively correlated with narrative complexity in pretend-themed stories. Conflict, or opposition that occurs during story construction, was positively correlated with shared positive affect. A third research goal was to examine and compare the narratives produced in home and school contexts, which were coded for content, structure and function. Comparisons of the narrative style across home and school contexts yielded high variability. Case studies of three patterns will be presented, and implications of the findings for classroom teachers and researchers will be discussed.

# HAPTIC PERCEPTION AND SPATIAL PROCESSING OF TACTILE ILUSSIONS

#### Ashley Ann Guy (Dr. Alan C. Scott) Department of Psychology

Although much is known about how perceptual versus spatial information is processed within the visual system, less is known about distinctions in the processing of these types of information by touch. Current models of human vision include a functional vision-forperception and vision-for-action division related to a partial neurological separation of the visual system into two broad streams of projections leading away from primary visual cortex. Reviewed research suggests the possibility of distinct pathways for haptic processing which might reflect a touch-for-perception and touch-for-action division. However, additional research is needed to address this possibility; therefore, the present research is an attempt to identify key differences in haptic information processing of these two varieties (i.e., perceptual vs. spatial). Ultimately, this research will help inform the scientific community to better understand our haptic (i.e., touch) perceptual system.

During the study, participants judged the lengths of stimuli through touch – the critical stimuli being the center diagonal of pairs of Sander's parallelograms (a known illusion that produces inaccurate comparative judgments of length for the internal diagonals). Participants were seated in front of a screen that blocked their vision of the stimuli, but allowed left-handed exploration. In a counterbalanced manner, participants were asked to perform two different behaviors. In one set of trials, participants were asked to provide perceptual judgments, and in the other, they were asked to reach and grasp the target element of the stimuli in a haptically-guided manner. A 3D Guidance trakSTAR motion tracker was used to record movements of participant's right index finger and thumb. The motion tracking data from each participant was managed by software provided by the manufacturer and exported into Excel. It was then possible to calculate the distance between the two sensors when participants provided stationary perceptual judgments of line length and in real time during grasping trials. These two tasks were designed so as to assess the possibility of a touch-for-perception and touch-for-action division. Analysis of data is in progress but it is expected that the data will support the original hypothesis of two distinct pathways.

# THE EFFECT OF MULTIPLE PAIR REPETITIONS ON ASSOCIATIVE MEMORY

### Leslie A. Hart (Dr. Amy Overman) Department of Psychology

The focus of this research is to examine what role multiple presentations of information at encoding has on later memory for that information. We are particularly interested in the role multiple presentations played in memory for pairs of items because this required associating the two pieces of the pair. Compared to young adults, older adults displayed an impairment in memory for associations between items (Naveh-Benjamin, 2000), and a substantial amount of recent research has attempted to characterize the nature of this associative deficit. For example, elaborative strategies and repetition have been posited as aids for improving the formation of associations (Naveh-Benjamin, Brav, & Levy, 2007; Kilb&Naveh-Benjamin, 2011). Overman and Becker (2009) found that one repetition of pairs (using faces and abstract words for the pairs) did not improve the recognition ability

of older adults. However, Kilb and Naveh-Benjamin (2011) found that an increase in presentations of pairs of a face and scene *did* improve older adults' scores on the recognition tasks. Thus, the role of repetition in associative memory remained controversial. This study elaborated on the experimental design of Overman & Becker (2009) by increasing the number of presentations of pairs, which is similar to the design of Kilb&Naveh-Benjamin (2011). Pairs of a face and abstract word were shown in three conditions (exact, rearranged, and novel) across three study lists. At recall, participants identified exact pairs from the third study list, distinguishing from the other conditions and word lists. Among young adults, pair repetition improved list discrimination (p < .05) and did not cause interference for pairs that were rearranged across study lists (p > .05). Data from older adult participants are being collected this semester. Results from this study will contribute to our understanding of the differences in memory processing between young and older adults and to our understanding of whether repetition is effective in boosting older adult memory. Futhermore, this information could lead to realworld strategies to alleviate everyday memory frustrations of older adults and improve daily functioning and quality of life for these older adults.

# GLOWING REVIEW OR TOUGH LOVE? THE EFFECTS OF AUDIENCE AND FEEDBACK ON SELF-EDITING IN WRITING

# Alyson J. Hignight, Brittany C. Bowers, Jennifer K. Cox, Hayley L. D'Antuono & John M. Hollander (Dr. Kim Epting) Department of Psychology

Writing behavior is learned and developed through reinforcement and punishment and further influenced by the audience and feedback. This study investigates effects of a perceived audience (authority figure vs. peer) and feedback type (positive vs. negative) on self-editing behavior in writing. Self-editing monitors communication to ensure that it is appropriate and effective. Skinner (1957) proposed this judgment is based on the audience's reaction. Positive reactions advance the conversation, reinforcing the speaker's behavior. Negative reactions alert the speaker's self-monitor to a problem. The message is re-phrased until a positive reaction is achieved. The type of audience may affect editing behavior. An expert versus a peer evaluator may influence the way a student writes and edits. A writer's perception of a reviewer remains largely uninvestigated among studies concerning self-editing. The feedback itself may also influence writing and editing. Willingham (1990) suggests that providing positive feedback benefits writers a great deal. In Hyten and Chase's (1991) study, however, students who received negative feedback on essays tended to edit subsequent essays more than those who received positive feedback. The purpose of this study is to investigate whether feedback ostensibly from an expert occasions differences in writing and editing processes as compared to feedback ostensibly from a peer. Furthermore, this study investigates if positive feedback has a different effect on editing than negative feedback. The study intends to further our understanding of the effects of praise and rejection on editing, and how authority influences self-editing. Participants wrote two essays using a computer program that measured writing behavior. They were told that a professor, peer, or non-specified reviewer would provide feedback on their essays; however, the feedback was randomly assigned. They received either positive or negative feedback on their first essay before writing the second essay. Results show that after negative feedback, participants type less, submit shorter essays, and view the prompt for a longer amount of time; these results were more pronounced when the feedback came from a peer. The

results hold implications for understanding the writing process and for education, especially considering the increase in peer review in classrooms.

## LONG-TERM RETENTION OF LEARNING IN A SIMULATION GAME EDUCATIONAL PSYCHOLOGY CLASS

Kallan M. Holt, Hannah E. Smith, Megan E. Riddle & Emily M. Fogg (Dr. Corinne Auman) Department of Psychology

Previous results have shown that students in a simulation game Educational Psychology class have equivalent levels of learning as students in more traditionally taught classes (Auman, 2010). The purpose of this study was to examine the long-term retention of learning at a one-year follow-up. Students in 4 sections of Educational Psychology were tested on their Educational Psychology knowledge at the beginning of class (pretest), end of the semester (posttest), and one year later (long-term posttest). All tests were administered on Blackboard. Responses to the one-year follow-up resulted in a sample of 38 students from the simulation game classes and 18 students from the traditionally taught classes. An analysis of covariance (ANCOVA) was conducted, examining longterm posttest scores, and controlling for students' knowledge of Educational Psychology material at the beginning of class (pretest). Our findings indicated that students in the game simulation classroom were significantly more likely to remember the subject matter at one-year follow-up, as compared to students in traditionally taught classes, F(1,53) =36.52, p = .00, r = .63. The mean long-term posttest score for game simulation class was 17.73, while the mean score the traditional classes was 12.97. These results indicate that an engaged learning, simulation-based classroom fosters higher long-term retention rates of class material than traditional classroom settings.

# ONLINE DATING AND THE CONSEQUENCES OF CHOICE: THE PARADOX OF SO MANY POTENTIAL PARTNERS

Rachael E. Jones (Dr. Paul M. Fromson) Department of Psychology

Today we face a growing amount of purchase options, and the Internet makes these options more accessible than ever before via sites from Amazon to Zappos. This phenomenon has begun to permeate the world of dating. Online dating is becoming an increasingly popular way for people to create relationships, and users cite the access to a vast number of potential dates as one of its key appealing features. However, is having more options truly better? Furthermore, how do gender and decision-making styles affect the choosing process in online dating? This study examined the impact of these variables on satisfaction with date partner choice in a simulated online date selection task.

Participants answered a questionnaire about their preferences (e.g. hobbies, music preferences) to simulate creating an online dating profile. They then took Schwartz et al.'s (2002) maximization scale to assess their decision-making styles (i.e., is one satisfied with a good enough choice, or does one seek the absolute best choice). They were next randomly assigned to choose their preferred dating partner from a set of eight or thirty profiles. Upon reaching a decision, they took a final questionnaire to measure satisfaction with choice, anticipatory regret, confidence that they made a good choice,

confidence that they made the best choice, difficulty during decision-making, and response to the amount of options.

While number of profiles and decision-making style were generally not significantly correlated with the dependent variables, gender was related to less satisfaction and confidence, and more regret and difficulty in females. A regression analysis to predict satisfaction revealed that difficulty and confidence mediated the effect of gender, suggesting that the difficulty and confidence females experienced accounted for gender differences. In a separate analysis, anticipatory regret did not mediate the effect of gender on satisfaction with choice. These results together provide evidence that cognitive load (represented by difficulty) was more influential than the affective construct of anticipatory regret on satisfaction with date choice.

### THE RELATIONSHIP AMONG BODY DISSATISFACTION, RELATIONSHIP BELIEFS, AND SOCIAL INTERACTIONS WITH PEERS: A STUDY OF MALE AND FEMALE COLLEGE STUDENTS

Kelly A. Little (Dr. Maurice J. Levesque) Department of Psychology

Research on body dissatisfaction, defined as a negative assessment of one's appearance, often focuses on women and issues related to disordered eating and self-esteem. This study expands on previous research in two important ways. First, in addition to considering the relationship between body dissatisfaction and psychological well-being (e.g., depressive affect), it examines whether body dissatisfaction influences relationship beliefs and social interactions. Second, it studies relationships among both men and women. One hundred and thirty-five (79 women, 56 men) undergraduate students participated in this three phase study. For phase one, participants completed a survey of self-assessments regarding body dissatisfaction (e.g., overall dissatisfaction, muscularity concerns, and drive for thinness), relationship beliefs (e.g., interaction anxiousness and relationship avoidance), and psychological well-being (i.e., self-esteem). Participants were then provided instructions regarding phase two, which involved keeping a Social Interaction Journal. Participants completed 7 to 21 journal entries reporting on social interactions occurring during a week. Phase three involved a post-journal survey including measures of body image and psychological well-being. Analyses demonstrated that all assessments were reliable (all reliabilities were greater than or equal to .78). With respect to relationships between body dissatisfaction and the other measures, greater body dissatisfaction and higher drive for thinness were correlated with greater avoidance in social interactions, more fear of negative evaluation and more interaction anxiousness. Consistent with the literature, dissatisfaction was also significantly correlated with greater depression and lower self-esteem. Interestingly, dissatisfaction with muscularity was not related to measures of relationship beliefs or psychological well-being. Correlations conducted separately for men and women revealed a somewhat different pattern of results. Although the results for women mirrored the overall pattern, muscle dissatisfaction emerged as a more meaningful variable for men as it was associated with greater fear of negative evaluation, more interaction anxiousness, and lower self-esteem. Average level gender differences were also examined. Significant differences emerged such that women expressed more general body dissatisfaction, greater drive for thinness, and more fear of negative evaluation. The results are discussed in relation to our

understanding of how body dissatisfaction effects may differ by gender and the role of body dissatisfaction in personal relationships.

# THE EFFECTS OF SOCIAL ANXIETY, SENSATION SEEKING, AND ALCOHOL EXPECTATIONS ON PREGAMING

# Katherine D. McCaughey (Dr. Gabie Smith) Department of Psychology

Read et al. (2010) found that approximately two-thirds of college students that drink alcohol engage in "pregaming" behaviors. Considering the prevalence of this behavior on college campuses and the health concerns associated with the behavior, more research is needed regarding the motives and decision-making factors that influence pregaming. Very little research, however, has been performed to investigate the motives and factors that lead to pregaming. The current study investigated factors that may contribute to pregaming; specifically, we examined the influence of social anxiety (Leary, 1983), sensation seeking (Zuckerman, 1994), and alcohol outcome expectations (Leigh & Stacy, 1993). Previous research has shown that these variables influence alcohol use behaviors, in general. We hypothesized that social anxiety, disinhibitory sensation seeking, and positive alcohol expectancies would combine to predict frequency of pregamining behaviors. We predicted that both sensation seeking and social anxiety would positively relate to pregaming and that alcohol outcome expectancies would mediate these relationships. We further hypothesized that participants' motivations for pregaming would be affected by the variables under study.

College student participants (n = 159, ages 18-22) completed an online questionnaire assessing each of the variables. Using mediational regression analyses researchers found a positive, significant relationship between disinhibitory sensation seeking, alcohol expectations, and pregaming, which supports the hypothesis. However, researchers found a negative, significant relationship between social anxiety and pregaming, contrary to the hypothesis. Thematic coding of the qualitative data indicated that participants' motivation for pregaming included pregaming to feel more relaxed, to save money, and to become more excited for the upcoming event. Participants' responses showed that drawbacks to pregaming include overestimating the amount of alcohol consumed and experiencing negative physical effects. We conclude that cognitive expectations relating to alcohol use mediated the relationship between personality and pregaming behaviors but the direction of these findings was inconsistent with several hypotheses and warrants further investigation.

### LIST DISCRIMINATION AND ASSOCIATIVE RECOGNITION: EFFECTS OF ENCODING STRATEGY IN YOUNG AND OLDER ADULTS

### Kathryn J. Milizio (Dr. Amy Overman) Department of Psychology.

A recent study of memory in young and older adults (Overman & Becker, 2009) used list discrimination to provide evidence that older adults, compared to young, are more impaired in forming associations between items. Additional evidence (e.g., Naveh-Benjamin et al., 2007) suggests that for older adults, forming associations between items can be improved through the intentional use of strategies at encoding. Thus, the present study examined the effect of encoding strategies on remembering items and pairs within a

single task in young and older adults. Participants were asked to look at two study lists, each consisting of a face paired with an occupation. Participants used one of two strategies, each differing in the extent of association produced between items: one group visualized each face performing the occupation (high-association strategy; young n=31; old n=23), whereas the other visualized each face speaking the occupation (lowassociation strategy; young n=32; old n=24). Pairs appeared on either one or both lists. Of the items that appeared on both lists, some were repeated in identical pairs, and others were rearranged into new pairs across lists. At test, participants were presented with a pair and asked if it was from the second study list. Test pairs were comprised of new pairs, old pairs, and rearranged pairs. Among young adults, the high-association strategy improved memory for pairs relative to the low-association strategy (Condition X Strategy) interaction, p=.048). The use of strategy was not significant in older adults (Strategy effect, p=.066), meaning older adults did not display increased recall of pairs for either strategy condition. Additionally, event-related potential (ERP) data were collected from young and older participants. Among young participants, greater negativity in frontal electrode voltages of the ERP appeared for the high-association strategy in the 300-500ms range (p=.038), which is consistent with greater familiarity for test items in the high-association strategy. One application of these findings is that young adults may better remember real-life information, such as class material, by utilizing high-association study strategies. Although older adults do not appear to benefit from the strategies used in this study, alternate encoding strategies may allow for enhanced recall.

## MAINTAINING FACULTY MOTIVATION TO UTILIZE ACADEMIC SERVICE-LEARNING PEDAGOGY

### Gabrielle Newman (Dr. Alexa Darby), Department of Psychology

In higher education, faculty members' goal to provide students with experiential learning that genuinely engages them has led them to use academic service-learning (Eyler & Giles, 1999). The purpose of this study is to understand the main factors that contribute to faculty members' motivation to utilize academic service-learning (AS-L) pedagogy. The value of our research resides both in recognizing the challenges to persistence in AS-L faced by faculty members, and in its potential to address these difficulties by offering means of continued support and revitalization.

Researchers interviewed 27 faculty members from a private liberal arts university in the southeastern U.S. about the benefits and challenges of teaching AS-L courses and the factors that influence their motivation to continue with the pedagogy. Interviews were transcribed verbatim. Qualitative analysis involved coding each transcript, then looking for patterns across transcripts leading to themes. Once themes were identified, we reviewed various models of motivation. We adapted Bandura's (1997) model, which emphasizes forethought and retrospective reasoning in regulating motivation. This reasoning occurs through the interaction of the individual's cognitive goal, outcome expectancy, and perceived causes of success or difficulty.

We found that faculty members identified their cognized goals as helping students connect course material to the real world, making a difference in their community, and developing a sense of civic responsibility. Outcome expectancies included students and community partners valuing the experience, students transferring knowledge of the

course material to the real world experience, and community partners considering the collaboration to be meaningful. Perceptions of success were due to students valuing the experience, and to the creation of a meaningful collaboration with the community partner. Perceived causes of difficulty included negative student response, lack of recognition and support from the department and/or university, and a negative relationship with community partners. Faculty members recommended increasing external support, including but not limited to offering greater support for experienced AS-L faculty, course releases, and financial support for faculty and community partners. In conclusion, AS-L faculty members maintain motivation for AS-L pedagogy due to their continued desire to fulfill their goals.

# STUDENTS' UNDERSTANDING OF PUNISHMENT FOR CRIMES IN NORTH CAROLINA

### Marissa R. Semon (Dr. Meredith Allison) Department of Psychology

The goal of this descriptive study was to investigate whether people know the punishments for crimes as knowing the potential consequences of actions may deter people from committing crimes (Levitt, 2002). Students (N= 320) completed a questionnaire that included open-ended questions asking about possible punishments for first time offenses like underage drinking, attempting to buy tobacco while underage, being in possession of one ounce of marijuana, and reckless driving. The remaining four questions focused on sex and age of consent. Here, participants were given scenarios in which two individuals engaged in intercourse; the ages of the two individuals varied. For all of these scenarios participants were asked to state whether the actions were illegal by circling yes or no, and then, if yes, they wrote out a possible punishment for a first time offense. Participants' open-ended answers to all of the above punishment questions were coded as correct or incorrect using a detailed coding scheme. An acceptable level of inter-rater reliability was achieved (97%).

For the open-ended punishment questions, 53.5% of participants were able to identify appropriate punishments for drinking underage (e.g., fine). However, only 3.8% of participants were able to accurately state possible punishments for buying tobacco products while underage (e.g., warning); many participants incorrectly wrote "fine." Participants also had difficulty in providing correct punishments for possessing one ounce of marijuana as 73.1% incorrectly wrote prison or jail time as opposed to a correct response (e.g., fine). Punishments for reckless driving also proved difficult; 62.2% wrote things like suspension of license or points lost, which are incorrect.

For the closed-ended questions involving sex and age of consent, 95.9% of participants were able to correctly identify that three questions presented illegal examples (e.g., one party was underage and could not legally consent to sex). However, 99.1% of participants were inaccurate in writing a possible punishment for a first time offense of these illegal scenarios. For example, many participants wrote that prison was an appropriate punishment but did not correctly indicate an appropriate length of stay. The next most common answer was "sex offender registry" followed by "arrest/trial."

# ASSESSING STUDENT THINKING WITHIN THE CLASSROOM: DEVELOPMENT OF A CODING SCHEME USING BLOOMS TAXONOMY OF LEARNING

Hannah E. Smith, Megan E. Riddle, Kallan M. Holt, Sara K. Edwards, & Emily M. Fogg (Dr. Corinne Auman) Department of Psychology

There is concern in higher education today that students are not being challenged to achieve higher levels of thinking and analysis (Arum & Roska, 2011). Instead, instructors are criticized for focusing too much on memorization and regurgitation. This may be due in part to instructors focus on covering course content, rather than engaging students in higher level cognitive activities. However, in order for students to retain course content long-term, students must be actively engaged in the learning process (Shulman, 2002). One obstacle to teaching in engaging ways is the difficultly associated with assessing higher level cognitive activities in the classroom. This study examines the development and initial testing of a coding scheme designed to assess the learning and thinking processes of students in an Educational Psychology class. In class, students were asked to role-play using a simulation game pedagogy, and were required to research, present, and defend ideas, while also trying to persuade other students with their evidence. To assess student thinking during the simulation games, 23 class sessions were taped and transcribed. Coding was completed on a subset of these 23 classes, using a coding scheme we developed, based on Blooms Taxonomy of Learning. Student statements in class were coded as falling into one of 6 categories (Remember, Understand, Apply, Analyze, Evaluate, and Create). Preliminary data analysis suggests that interrater reliability has improved throughout the development process and is currently Kendall's W = .63, p < .00. These results indicate that the coding scheme can be used reliably by multiple raters to examine student cognitive activity in the classroom.

### FROM RECREATIONAL TO STRESS RELIEVER: THE RELATIONSHIP BETWEEN MARIJUANA AND PERCEIVED STRESS

Benjamin R. Unger (Dr. Buffie Longmire-Avital) Department of Psychology

According to the National Institutes for Drug Abuse research (NIDA), there is a relationship between stress and substance (ab) use. The experience and perception of stress from life events has been linked to higher rates of relapse among recovering alcohol and other drug (AOD) users, as well as greater consumption rates of AOD for non-addicted adolescent and adult populations. Researchers have consistently found a trend of greater consumption and/or chance of relapse when stress is present. Stress has frequently been associated with marijuana use; individuals suffering from Posttraumatic stress report increases in use as a means of coping. Previous research has also shown a relationship between psychological strain and low levels support to be associated with an increase use of marijuana. Other research has indicated that marijuana has been identified as an effective form of self-medication among adolescent populations. Research on

college samples has found support for the belief that marijuana and cocaine are effective means of alleviating stress. Building upon previous work, the purpose of this study is to examine how types of stress (i.e., perceived and daily hassles) are related to substance use frequency for adults (mean age = 32). One hundred and one participants (77 women and 24 men) recruited through online social networks completed an anonymous online survey that assessed demographics, psychological well-being (i.e., depression and stress) and substance use. A series of bivariate analyses revealed that perception of stress was related to self-reported depression symptomatology (r = 0.72); marijuana use (r = 0.20); and cocaine use (r = 0.33). Based on the results of bivariate analyses a 3-step hierarchal linear regression analysis was conducted to determine if substance use was a significant predictor of stress over and above demographic and depressive symptomatology. The results revealed that depression ( $\beta = 0.71$ ) in combination with marijuana use ( $\beta = 0.175$ ) predicted perceived stress. The final model accounted for approximately 55% of the variance explained. These findings suggest that even when demographic information and degree of depression are controlled for that marijuana use remains heavily associated to stress.

# **RELIGIOUS STUDIES**

# THE RELIGIOUS MINORITY EXPERIENCE UNDER MEDIEVAL ISLAM AND CHRISTIANITY: IMPACT OF RELIGIOUS BEGINNINGS AND EMPIRE

#### Daniel M. Baquet (Dr. Michael Pregill) Department of Religious Studies

The relationships between the major Abrahamic religions (Judaism, Christianity, and Islam) have significant impact on world history. Religion has played a key role in the history of the Middle East and the western world for centuries. Post-September 11<sup>th</sup>, the connection between the West and Islam emerged as a preeminent idea within Religious Studies and among the public as the world tried to understand how such catastrophic events could occur. This project problematizes the relationship between Islam and Christianity and their closely tied historical trajectories from the late antique politicization of each through the medieval relations between European Christendom and the Islamic world. It is especially important to examine how these religions use their political power in relation to the religious 'other' or minority. The resulting survey and discussion of late antique and medieval Islam and Christianity has significant implications for understanding their modern relationship and illustrates central similarities and differences between these two major religions. In particular, the contextual circumstances out of which Christianity and Islam emerged determined their treatment of religious minorities throughout Late Antiquity and the Middle Ages. In particular, Christianity's emergence in opposition to the Roman Empire was found to have heavily impacted theological positions taken toward non-Christians. On the other hand, Islam's emergence into the political vacuum left by a major war between the Roman and Sasanian Empires allowed the religion to develop with less of a threat from the two superpowers and thus take a somewhat different position toward the religious other in comparison to Christianity.

#### BUDDHA MEETS SHIVA, APOLLO, AND PU-TAI: MULTICULTURALISM AND CULTURAL BORROWING OF THE BUDDHA IMAGE ALONG THE SILK ROAD

#### Eryn A. Gorang (Dr. Pamela Winfield) Department of Religious Studies

Many Americans believe that Buddha is simply a fat, jolly Chinese man who offers good luck to those who rub his belly. However, few realize the complexities behind the creation of the Buddha image and the role the Silk Road played in its development. This research minimizes misconceptions of the Buddha image by offering insight into its evolution as well as its mobility and malleability throughout the historical and geographical range of the Silk Road, while specifically focusing on the ways the Buddha image was affected by cultural borrowing and multiculturalism on the journey. The research was conducted by tracing the Buddha image at different points throughout its Silk Road travels, including Sanchi, Gandhara, and China, and analyzing aspects of multiculturalism present in each of the images. In Sanchi, the Hindu artwork practice of depicting Hindu Gods using an-iconic imagery was adapted to Buddhist beliefs. This Hindu influence caused the original Buddha images to be portrayed using an-iconic imagery such as footprints and parasols. After leaving Sanchi, the Buddha image traveled along Indian trade routes to the region of Gandhara, known as present day Pakistan and Afghanistan. The Hellenistic influence in Gandhara eventually led artists to depict Buddha in an anthropomorphic form, causing Buddha to especially adopt physical traits of Apollo, the Greek Sun God in the process. The Buddha image finally reached China around 4<sup>th</sup> century C.E. while being carried by Buddhist monks along the Silk Road (Keown & Prebish 2007). However, it was not until about 10<sup>th</sup> century C.E. that the popular "laughing-Buddha" appeared when the figure was created to portray the Buddhist Monk Pu-tai, who claimed to be related to Buddha on his deathbed (Chapin 1933). The creation of the image of Monk Pu-tai allowed Chinese artists to combine the western-spread Buddhist beliefs with their own unique Chinese ideas of how a prosperous god should be depicted. The study concludes that the Buddha image is diverse in scope and spectrum and was influenced by various cultures along the Silk Road while also recognizing that the Buddha image continues to evolve in the modern world.

# SOCIOLOGY AND ANTHROPOLOGY

# POROTIC HYPEROSTOSIS, DISEASE OR DIET?: CORRELATING HEALTH AND MAIZE CONSUMPTION IN ANCIENT MAYA BURIALS

#### Jacob A. Canterbury (Dr. Rissa Trachman) Department of Sociology and Anthropology

In the field of Maya osteological study, perhaps no other topic is as widely discussed and debated as the frequent presence of sponge-like lesions on the cranium, known as porotic hyperostosis. While it is known that iron-deficiency anemia is the probable cause of this condition, the cause of such anemia remains much more ambiguous. One explanation holds that Maya dietary patterns are to blame, as it is widely accepted that non-elite Maya
subsisted almost entirely on maize, which contributes little iron to the body. While this theory is entirely plausible, little direct evidence exists to suggest that diet was the sole contributing factor, rather than other possible causes such as parasitic infection and various diseases. While causation may never be proven conclusively, further elucidation may be possible through existing stable isotope analyses of ancient Maya skeletal remains. From these isotopic studies it is clear that the pattern of maize consumption in relation to other dietary staples fluctuated among the Maya throughout their history. Similarly, the incidence of porotic hyperostosis in Maya burials has also shown identifiable variation in frequency of occurrence through time. If the chronological changes in these two factors behave in similar ways, then a causal relationship can be supported, with a positive correlation indicating the likelihood of diet as a cause of porotic hyperostosis, or potentially a negative or weak correlation suggesting that no such relationship exists. Therefore, this study will aggregate longitudinal burial data concerning both porotic hyperostosis and Maya maize consumption based on isotope analysis from separate and independent sources. Data from several different sites are analyzed to support generalizability. In the end this study will then demonstrate that a correlation exists between isotopic data and diet-related porotic hyperostosis.

#### **MUTUAL EMPOWERMENT: EXPERIENCES THROUGH PHOTOVOICE**

#### Virginia A. Huth (Dr. Tom Arcaro) Department of Anthropology

This study examines the concept of mutual empowerment. It makes the case that traditional conceptions of empowerment are problematic due to the unequal power dynamic present in their implementation. Building on support from post-modern theorists, this research hypothesizes that empowerment is a mutual phenomenon, experienced by all parties involved. In order to test this claim, the present study examines experiences among both participants and facilitators of Photovoice, a participatory photography methodology that has been noted for its positive empowerment outcomes. Adolescent girls aged 11-18 recruited from an inner-city summer program, as well as female facilitators from neighboring universities participated in a Photovoice project focused on bringing the two groups together in an environment of mutual learning. Individual follow-up interviews with both the participants and facilitators were coded for emergent themes, revealing that Photovoice did empower them to enact positive change in their communities, and that the mutual, shared experience was a significant element of their Photovoice experiences. This research holds implications for the future of empowerment theory and practice. It adds a new dimension of mutual experience to literature examining empowerment, and demonstrates that when traditional power dynamics are challenged, empowerment can be experienced mutually and is not limited to only participants of empowerment-focused programs. This research is based in the discipline of anthropology and used qualitative methods to observe and record the experiences of participants and facilitators contextually. The Photovoice methodology stems from the field of Participatory Action Research (PAR), typically applied in

Community Psychology projects. The goals of PAR, however, also fit within the field of Applied Anthropology, with both fields focused on benefitting research participants through a participant-centered approach to identify and solve problems.

## ANCIENT MAYA RITUAL PERFORMANCE AS REFLECTED IN THE MONUMENTAL ARCHITECTURE OF DOS HOMBRES, BELIZE

Katherine E. MacDonald (Dr. Rissa Trachman) Department of Sociology and Anthropology

Through the study and documentation of architecture and archaeological remains, this research explores ancient Maya ritual performance and performance spaces as reflected in the temples and religious architecture at the site of Dos Hombres, located in northwestern Belize. Ritual performance was essential in ancient Maya culture as a way of expressing religious ideology, maintaining political power, and expressing social class. It was integral not only in conveying these social values but also in constructing and reproducing them on a consistent and predictable basis. Religious performance spaces were designated by the ancient Maya through strategic placement and orientation of ceremonial buildings and the use of specific architectural features and materials. In order to analyze performance spaces at Dos Hombres, stratigraphic data from four ceremonial buildings was collected over the course of two summer field seasons; Temples A1, B8, C2, and C3, in order to determine 1) the construction sequence, 2) the architectural form, 3) the chronology of each, if possible, and 4) the building materials for each. Information was gathered from the stratigraphy of five looter's trenches in order to accomplish this assessment including two trenches in Temple A1 and one trench each in Temples B8, C2, and C3 at the site of Dos Hombres. Analysis of looters trenches on these monumental structures revealed the form and construction sequence of the ritual performance space, represented by the stratigraphy. It became evident that ancient Maya religious performance spaces vary in use and appearance based on location and time period. The work presented contributes to the overall research at the site of Dos Hombres, as well as our understanding of how the ancient Maya utilized ritual spaces, what function monumental architecture served, and what roles leaders and civilians played in ritual performances.

#### THE EXPRESSIVE AND SOCIAL FUNCTIONS OF FOOD IN THE CONSTRUCTION OF IDENTITY AMONG AFRICAN AMERICAN STUDENTS AT A PREDOMINANTLY WHITE UNIVERSITY

Lauren C. Needell (Dr. Tom Mould) Department of Anthropology

The instrumental function of food is quickly apparent: to satisfy hunger and nourish the body. Yet, as seen with many societies, food often represents a profound cultural symbol that has ramifications beyond the biological arena and enters into social and expressive levels (Palmie 2009; Counihan 1992; Jones 2007). Soul food as a relevant cultural category provides a useful entry into understanding the symbolic, social, and expressive elements among southern African American college students. In particular, comparisons between soul, southern, and northern food reveals how food is used to negotiate family traditions, gender roles, and ethnic identity within and outside the family. Limited

research is available on how African Americans or students view the social and symbolic function of food. In terms of regional foodways, scholars have failed to address the context-dependent boundaries between southern and northern food, and southern and soul food. In order to understand how African American college students understand and construct the role and power of food in their lives, in-depth interviews with 15 African-American students were conducted at a predominantly White university. The research has revealed shared perceptions and functions of food among this group, conclusions that suggest broader parallels among African Americans in the South. Particularly relevant are the focus on interpersonal relationships, the use of food in facilitating communal activities, and the expression of love and individuality through family recipes. Equally significant were the conclusions about the construction of regional foods. Students framed their understanding of southern food in comparison to northern food and cited taste, meaning, and familial influence as defining factors. In this context, students had an overall positive attitude towards southern food while conveying a negative impression of northern food. Within this context, soul food was a category of southern food. However, when the focus of discussion was soul food, students contrasted southern with soul — a term used esoterically to describe African American food. This study provides insight into how food is contextually constructed and reveals differences among southern food and soul food has far more to do with the social relations invoked in the making and eating of the food.

#### **"WE SHOULD PROBABLY GO SIT WITH THEM": THE ROLE OF COLLEGE ACCESS PROGRAMS IN THE SOCIAL LIVES OF STUDENTS**

Molly K. O'Brien (Dr. Deborah Long), Department of Anthropology

The purpose of this research was to address the question "Does the Elon Academy influence the peer group development of its students and, if so, how" This study was designed to contribute qualitative analysis to the body of research surrounding college access programs and adolescent peer development and will lead to specific recommendations for how the Elon Academy can support peer group development that is correlated with higher academic achievement. In order to complete this research, four weeks of participatory observation and 13 semi-structured interviews were conducted with scholars in the Elon Academy. Interview participants were selected based on stratified convenience sampling and two scholars – at least one male and at least one female - were chosen from each of the five Elon Academy cohorts (Alpha, Beta, Gamma, Delta, Epsilon). The participants represented a range of ethnicities including African American, Hispanic, Asian American, biracial and white. Throughout this study, I took fieldnotes documenting my observations and experiences living among the scholars for the duration of the four-week summer session. In order to maintain confidentiality, all of the scholars in this study were assigned pseudonyms. Through analysis of my data, I found four major recurring themes: (1) To a certain extent, there is dissociation among the Elon Academy scholars based on age and year in school, (2) although the scholars are forming relationships with one another within the Saturday programs and during the summer sessions, they spend very little time together outside of these venues, (3) friend groups within each of the five classes are based primarily on gender and sexual orientation, and (4) most of the scholar friend groups are initially formed within the dormitories, but in many cases, friendships are not as strong between roommates. The overall conclusion of this research is that the Elon Academy does in fact

contribute to the peer group development of its students; however, while it seems that many individual scholars would enjoy fostering deeper relationships among the cohorts, the hierarchy established in their schools seems to feed over into the Academy, making it more difficult to branch out from the tightly-knit age groups.

# SPORT AND EVENT MANAGMENT

## BASEBALL PLAYER PERFORMANCE IN HIGH LEVERAGE SITUATIONS

**Gregory S. Ehrenberg** (Dr. Anthony Weaver) Department of Sport and Event Management

Major League Baseball (MLB) players come to bat approximately four times per game. During a 162 game season, players often find themselves batting in particular situations with more pressure to perform than others. Players that succeed during high stress at bats are often described as clutch. However, research has been limited in determining if a player performance in clutch situations different than in other at-bats (Albert, 2001; Albert & Koning, 2008; Carluccio & Owens, 2011; Tango, Lichtman & Dophin, 2007). Therefore, the purpose of this undergraduate research project is to examine batting performance in clutch versus non-clutch situations for MLB players.

In order to determine clutch situations, the measure of Leverage Index (LI) will be used. Leverage Index measures how important a particular situation is in a baseball game depending on the inning, score, outs, and number of players on base (Tango, 2006). An average (or neutral) LI is one, high leverage is 1.5 and above, and low leverage is below one (Slowinski, 2010). Previous research has found multiple criteria to both define what is 'clutch' and the effects of clutch situations on player performance. There is virtually no evidence that suggests a correlation between clutch situational at-bats success and nonclutch situational players' success (Tango, Lichtman & Dophin, 2007). However, past studies have not used the Leverage Index to measure the type of at-bat each player has throughout multiple seasons. This project encompasses players' performance in clutch situations from 2002-2011. Players who have amassed at least 4,000 plate appearances during 2002-2011 will make up the sample (n=118). Using On-base plus slugging percentage (OPS), which is calculated as the sum of a player's on-base percentage and slugging percentage, the success of the at bat would be separated between high leverage at bats (determined by a rating of 1.5 and above) versus all other at-bats (1.49 and below). Students t tests will be utilized to examine differences in clutch vs. non clutch performances. Results will provide descriptive statistics on individual players, as well as determine if, over time, players perform differently in clutch situations. The significance of this study will aid general managers in sport as they make salary decisions, aid coaches and managers as they make in game decision.