Spring Undergraduate Research Forum

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| Welcome to SURF 2016*The 23rd Annual Celebration of Achievements* *in Undergraduate Research at Elon University* |
| The Spring Undergraduate Research Forum 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 205 proposals for presentation were submitted for presentation. These abstracts were submitted after having been reviewed by two Elon faculty with disciplinary expertise.SURF is an integral part of CELEBRATE – a weeklong series of events that 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**

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| Dr. Eric Hall | Prof. Joel Hollingsworth |
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| Dr. Meredith Allison (Associate Director) | Dr. Paul Miller (Director) |

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. |

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| PROGRAM LISTING by SESSION and TIME |
| [**POSTER SESSION I**](#Poster1)  (8:30am – 10:30am; Authors Present 9:00am - 10:30am)\_\_\_\_ [**POSTER SESSION II**](#Poster2)(3:30pm – 5:30pm; Authors Present 4:00pm – 5:30pm)\_\_\_\_\_ | **4****7** |
| [**SESSION I**](#Oral1) (10:40am-12:20 pm)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **11** |
|  | McKinnon D\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **11** | Moseley 215\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **13** |
|  | McKinnon E\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **11** | Isabella Cannon Room\_\_\_\_\_\_\_\_ | **13** |
|  | McKinnon F\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **11** | Global Commons 103\_\_\_\_\_\_\_\_\_ | **13** |
|  | Lakeside 212\_\_\_\_\_\_\_\_\_\_\_\_\_ | **12** | Yeager Recital Hall\_\_\_\_\_\_\_\_\_\_\_ | **14** |
|  | Lakeside 213\_\_\_\_\_\_\_\_\_\_\_\_\_ | **12** | Inman 112\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **14** |
|  | Lakeside 214\_\_\_\_\_\_\_\_\_\_\_\_\_ | **12** |  |
|  [**SESSION II**](#Oral2)(12:40am- 2:20 pm)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **15** |
|  | McKinnon D\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **15** | Moseley 215\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **17** |
|  | McKinnon E\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **15** | Isabella Cannon Room\_\_\_\_\_\_\_\_ | **17** |
|  | McKinnon F\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **15** | Global Commons 103\_\_\_\_\_\_\_\_\_ | **17** |
|  | Lakeside 212\_\_\_\_\_\_\_\_\_\_\_\_\_ | **16** | Yeager Recital Hall\_\_\_\_\_\_\_\_\_\_\_ | **18** |
|  | Lakeside 213\_\_\_\_\_\_\_\_\_\_\_\_\_ | **16** | Inman 112\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **18** |
|  | Lakeside 214\_\_\_\_\_\_\_\_\_\_\_\_\_ | **16** |  |
|  [**SESSION III**](#Oral3) (2:40am- 4:20 pm)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **19** |
|  | McKinnon D\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **19** | Moseley 215\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **21** |
|  | McKinnon E\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **19** | Isabella Cannon Room\_\_\_\_\_\_\_\_ | **21** |
|  | McKinnon F\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **19** | Global Commons 103\_\_\_\_\_\_\_\_\_ | **21** |
|  | Lakeside 212\_\_\_\_\_\_\_\_\_\_\_\_\_ | **20** | Yeager Recital Hall\_\_\_\_\_\_\_\_\_\_\_ | **22** |
|  | Lakeside 213\_\_\_\_\_\_\_\_\_\_\_\_\_ | **20** | Inman 112\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | **22** |
|  | Lakeside 214\_\_\_\_\_\_\_\_\_\_\_\_\_ | **20** |  |

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| **ABSTRACTS BY DEPARTMENT** |
| [**Accounting**](#Accounting) | 24 | [**Leadership**](#Leadership) | 93 |
| [**Biology**](#Biology) | 24 | [**Management**](#Management) | 94 |
| [**Caret Essay Winners**](#Caret) | 37 | [**Marketing**](#Marketing) | 96 |
| [**Chemistry**](#Chemistry) | 39 | [**Mathematics/Statistics**](#Math) | 99 |
| [**Communications**](#Communications) | 49 | [**Music**](#Music) | 104 |
| [**Computing Sciences**](#Computing) | 56 | [**Performing Arts**](#Peforming) | 105 |
| [**Economics**](#Economics) | 56 | [**Philosophy**](#Philosophy) | 107 |
| [**Education**](#Education) | 62 | [**Physical Therapy Education**](#Physical) | 108 |
| [**Engineering**](#Engineering) | 64 | [**Physics**](#Physics) | 110 |
| [**English**](#English) | 66 | [**Political Science**](#Political) | 113 |
| [**Environmental Studies**](#Environmental) | 74 | [**Psychology**](#Psychology) | 114 |
| [**Exercise Science**](#Exercise) | 79 | [**Public Health Studies**](#Public) | 123 |
| [**Finance**](#Finance) | 86 | [**Religious Studies**](#Religious) | 126 |
| [**Health/Human Performance**](#Health) | 88 | [**Sport/Event Management**](#Sport) | 130 |
| [**History**](#History) | 88 | [**Sociology/Anthropology**](#SOC) | 130 |
| [**Human Service Studies**](#Human) | 89 | [**World Language and Cultures**](#World) | 134 |
| [**International & Global Studies**](#International) | 92 |  |  |

**Poster Session I**

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

***The Great Hall, Global Commons***

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| **Catherine Cooke** (Dr. David Vandermast)Winter Photosynthesis of Chines Privet (Ligustrum Sinese)  |
| **Emma Eskeland** (Dr. Jen Hamel)Examining Two Closely Related Insect Species for Evidence of Selection Against Hybridization |
| **Emily Ann Galloway & Dr. David Vandermast** (Dr. David Vandermast)Setting Ecological Parameters for Defining a Forest of Continuity |
| **Bethany C. Davis** (Dr. Victoria Moore)Examining Apoptosis in a Sepsis Cell Culture Model |
| **Ian R. O’Leary** (Dr. Kathryn Matera)Stabilization of Toxic Aβ Oligomer Aggregates Using Phenolic Compounds: Alzheimer’s Disease |
| **Flo Ravaud** (Dr. Lawrence Garber)The Validity of Practitioner’s Rules of Thumb for Visual Merchandising: Optimization of the Shelf Facings of Retail Stores Using A/B Testing |
| **Clare E. Burton** (Dr. Karl Sienerth)Exploring Quenching of Electrochemiluminescence by Rdx |
| **Morgan L. Fleming** (Dr. Karl Sienerth)Is Human Life on Mars Possible? |
| **Megan C. Halkett** (Dr. Patricia Liwang)Silk Fibroin Based Materials for Time Release Drug Delivery of HIV Entry Inhibitors |
| **Christian G. Seitz** (Dr. Joel Karty)Why Does the Acetaldehyde Enolate Favor Reaction at the Oxygen Atom During Gas-Phase Nucleophilic Substitution? Contributions by Resonance and Inductive Effects |
| **Xernay Aniwar** (Dr. Amanda Sturgill)Strategies for Building Credibility Within the Content of Informational Podcasts |
| **Nicole Ammerman** (Dr. Mary Knight-Mckenna)Partnering With Families to Foster Language Development and Emergent Literacy in Young Children |
| **Sabrina Campelo** (Dr. Christopher Arena)Evaluation of Irreversible Electroporation Ablation Thresholds in Human Prostate Cancer |
| **Jordan Stanley** (Dr. Cassie Kircher)Discorded Eating Discovered: Using Creative Nonfiction to Unravel a Familiar Past**Rachel C. Weeks** (Prof. Paula Patch) Reducing Sexual Assault on Campus Through Active Bystander Intervention: A Leadership Prize Project**Poster Session I….*Continued*****Caroline M. Zybala** (Dr. Rebecca Pope-Ruark)Circle the Wagons: Generating Social Media Discourse for a Small Market Football Team**Hannah L. Rolland** (Prof. Steve Moore)Utilization of Solar Pasteurization to Reduce Waterborne Illness on Central America **Kathryn D. Rue** (Dr. Paul Moersdorf)Global Warming and its Impact on Coastal New Jersey**Bryn Bonner, Alex Brownlow, Samantha Horowitz, Nate Houston, & Connor Rudnicki** (Dr. Joyce Davis)Lower Body Kinematics of the Relevé While Barefoot and en Pointe: A Case Study**Rachel DiCioccio, Kara Rollock, Alys Cook, Sarah Humphrey, & Matt McDougal** (Dr. Srikant Vallabhajosula and Dr. Jane Freund)Concurrent Validity of Zeno Walkway and APDM Opal Sensors**Kailey Tracy** (Prof. Elizabeth Bailey)Variables Affecting Physical Activity Habits Among University Employees and University Students **Nicky Kratzer** (Dr. Bud Warner)The Role of New Student Orientation in Providing Social Support and its Effect on Anxiety and Depression Symptoms Among First-Year College Students**Dionna D.S. Stanton** (Dr. Bud Warner)Understanding Help-Seeking Behavior in Black Undergraduate Students**Nicole Ciotoli & Jennifer Faig** (Dr. Todd Lee)Visualizing the Hyperplane of a Finite Geometry**Elyse D. Bierut** (Dr. Buffie Longmire-Avital)Frequency of Deliberate Calorie-Burning Exercise and its Relationship with Health Outcomes in College Women**Christopher R. Green** (Dr. Chris Richardson)Simulations of Emission Lines from the Narrow Line Region in Seyfert Galaxies**Maggie A. Bailey** (Dr. Jason Husser)Do Walkable Neighborhoods Improve Attitudes Toward Immigrants?**Cecily Basquin** (Dr. Meredith Allison)English-as-a-Second Language Eyewitnesses: Interview Misunderstandings and Resolutions **Poster Session I….*Continued*****Elizabeth F. Knapp** (Dr. Katie King)When I Grow Up: The Effect of Career Intervention Programs on Career Decision Making in Undergraduates**Erin Martin** (Dr. Meredith Allison)Student Perceptions of Sex Offender Registries: A Cross-Cultural Comparison**Sabina Bains** (Dr. Kirsten Doehler)NCAA Outdoor Track Distance Running Trends**Alexandra N. Horowitz** (Dr. Laura Taylor)Statistical Analysis of the Statistical Analysis of SURF Projects |

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| **Poster Session II** 3:30pm - 5:30pm; Authors Present 4:00 pm – 5:30pm***The Great Hall, Global Commons***

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| **Paige Lillian Stover** (Dr. Jen Hamel)Assessing Viability and Development of Hybrid Offspring From Two Closely-Related Insect Species **India R. Gill** (Dr. Jennifer Uno)Dietary Soy and the Gut Microbiome**Tyler K. Lehmann** (Dr. Jen Hamel)Relative Costs of Between-Species Mating for Secondarily Sympatric and Allopatric Populations**Kate Levenberg** (Dr. Tonya Train)Establishing a Cell Culture Model to Study the Impact of Bupropion [Wellbutrin®] on Insulin Resistance**Kaitlin R. Snapp** (Dr. Linda Niedziela)Mechanisms of Oil Dispersants on Na+/K+ Atpase Α-Subunit Gene Expression in Zebrafish Ionocytes**Sarah Woidill** (Dr. Kathryn Matera)The Fight Against Alzheimer’s Disease: Combatting Aβ Aggregates Synthesized on Latex Beads **Jessica Graham** (Dr. Tonya Laakko Train)Effects of Methylphenidate (Ritalin) on Neuronal Development and Survival**Lindsey M. Christman** (Prof. Eugene Grimley)Characterization and Identification of Flavonoids in Poplar Honey**Jaclyn DeVincent** (Dr. Karl Sienerth)Electrochemiluminescent Quenching of Calcein Blue by TNT in Aqueous Solution**Taylor A. Glenn** (Dr. Kathryn Matera)Investigating the Oxidation of Β-Estradiol By Lactoperoxidase and its Effects on DNA Nucleotides**Leandra M. Nikont & Carly J. Weddle** (Dr. Karl Sienerth)Synthesis and Quantification of the Chemical Markers of Melanin to Enhance Early Diagnosis of Melanoma**Alyssa K. Romano** (Prof. David Zahner)Synthesis of New Gold Carbene Compelxes with Potential Catalytic Ability**Poster Session II….*continued*****Grace L. Catts** (Dr. Joel Karty)Determining the Contributions by Resonance and Inductive Effects Toward the Gas Phase Acidities of Nitric Acid and Nitrous Acid **Ashley J. King** (Dr. Joyce Davis)Chronic Injury, Leg Dominance, and Knee Strength in Female Collegiate Dancers**Aly Lucas & Robert Harper** (Prof. Elizabeth Bailey)The Effect of Physical Activity on Attention in Students in the 4th and 5th Grade |
| **Julia Filloon** (Dr. Sirena Hargrove-Leak)Aerospace Engineering: Design on a Smaller Level**Nicolas Meritt** (Dr. Sirena Hargrove-Leak)Building a Walk-In Cooler for the Loy Farm**Charlotte N. Bryan** (Dr. Rosemary Haskell)Exploring the Literary and Temperamental Factors that Led to George Orwell’s Rhetorical Success **Paul Kantlehner** (Dr. Scott Wolter)Production and Characterization of Carbon Nanotube Mesh**Ellen C. Lana & Jennifer J. Adams** (Dr. Janet MacFall)Exotic Invasive Plant Management on The Haw River Trail**Lindsay A. Luhn & Julia M. Mueller** (Dr. Janet MacFall)Erosion Effects on Soil Carbon and Extracellular Enzymatic Activity in Piedmont Streams**Julie C. Hibberd & Miranda E. Cullen** (Dr. Elizabeth Evans)Examination of Differences in Clinical Balance Measures and Perceived Fear of Falling in Breast Cancer Survivors**Kayla P. Harvey** (Dr. Eric Hall)Potential Factors Influencing Recovery from Concussion in Collegiate Student-Athletes**K. Warren, L. Standard, R. Hallman** (Dr. Caroline Ketcham)The Importance of Sleep in Concussion Baseline Neurocognitive Testing in Collegiate Student-Athletes**Claire J. Rosenberg** (Dr. Srikant Vallabhajosula)Changes in Balance Confidence, Fear of Falling, and Endurance Levels During Pregnancy **Alyssa N. Spagnuolo** (Dr. Carol A. Smith)Break Through the Glass: Empowering Women Through Leadership**Poster Session II….*continued*****Lena Caliari** (Dr. Barth Stempek)A Study of the American Rap Music Market**Eric J. Goding** (Dr. Crista Arangala)A Mathematical Comparison of World Cup Advertising**Michelle Rave** (Dr. Crista Arangala)Serotypes and Vaccines: A Mathematical Model of Dengue Fever**Josephine E. Gardner** (Dr. Heidi Frontani)A Case Study Assessment of Access to Healthcare Services Among Destitute Women and Vulnerable Children’s in Addis-Ababa: For the Establishment of Community-Based Non-Profit Organization **Benjamin C. Kaiser** (Dr. Anthony Crider)The Nearby Analogues of Pure Starburst Galaxies**Sydney R. Schilling** (Dr. Krithika Venkataramani)Optimizing the ezAFM for High Resolution Imaging of Nanoscale Components**Alexis B. Paul** (Dr. Maureen Vandermaas-Peeler)“Trip Trap Trip Trap Let Me Pass: I Want to Eat Some Fine Green Grass”; Preschoolers’ Play and Intersubjectivity in the Natural Environment**Ruthie Robinson** (Dr. Buffie Longmire-Avital)Exploring the Stressful Path to Depression in Emerging Adulthood by Racial Groups**Evan Skloot** (Dr. Chris Leupold)Comparing the Efficacy of Leadership Development Programs to Other Experiential Collegiate Activities**Bria T. Turner & Alaina D. Hall** (Dr. Stephen Byrd)Flow Facilitating Positive Mood States **Gabe Abbondandolo** (Dr. Carmen Monico)Self-Care Needs Assessment of College Students and the Establishment of Baseline Outcomes at Elon University and Lynchburg College **Samantha Jurgens** (Dr. Maureen Vandermaas-Peeler)“It Feels Like Bubbles in a Bathtub”: Inquiry and Discovery at the River**Alison G. Richard** (Dr. Amy Overman)Self-Generation Effects on Memory for Context**Poster Session II….*continued*****Shelby Lewis** (Dr. Lynn Huber)Ruth, Naomi, and the Lesbian Continuum: Reading an Ancient Text in Light of Twentieth-Century Literary Lesbians**Nicole Miller** (Dr. Craig Schmitt)Parents' Perceptions of Children's Socialization During a Recreational Sports Season**Kelly Siewers** (Dr. Tony Weaver)Uncovering the Rationale: A Document Analysis of Reclassification to Division I**Stephanie Lobaugh** (Dr. Laura Taylor)Evaluating the Effectiveness of Various Rules of Thumb**Jennifer L. Faig & Jessica M. Weiss** (Dr. Kirsten Doehler)An Analysis of Gender and Age Performance: Bank of America Chicago Marathon Data From 2000 to 2014 |
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| **Oral Presentations Session I (10:40 am - 12:20 pm)** |
| ***McKinnon D (Moderator: Jenna Dafgek) [Dr. Yuko Miyamoto]*** |
| **10:40 am Elisson Adrien** (Dr. David Vandermast)Cultural Uses of Traditional Plant Medicines in Rural Haiti |
| **11:00 am Emily E. Bujnoski** (Dr. Robert Vick)The Effect of Oral Hygiene on Cardiac Health as Determined by Heart Rate Variability |
| **11:20 am Adem L. Cosgel** (Dr. Yuko Miyamoto)The Interaction Between the mTOR and Cell Migration (Integrin) Signaling Pathways in T Cells |
| **11:40 am Zachary B. Fisher** (Dr. Yuko Miyamoto)Manipulating Fibroblast Activation Protein on Cancer Cells and Evaluating the Effects |
| **12:00 pm Emma Gierman** (Dr. Michael Terribilini)Investigation of Alzheimer's Disease Therapy Through the Modeling of Interactions Between Cellular Prion Protein and Amyloid-ß Peptide |
| ***McKinnon E (Moderator: Amanda Brechbill) [Dr. Karl Sienerth]*** |
| **10:40 am Michelle C. Landahl** (Dr. Sara Triffo)Creating a Suspended Lipid Bilayer |
| **11:00 am Kyle A. Lynch** (Dr. Victoria Moore)The Role of Apoptosis in Sepsis-Associated Acute Kidney Injury |
| **11:20 am Alyssa Romano** (Dr. Karl Sienerth)Ruthenium Centered Organometallic Catalysts for Benzimidazole Synthesis |
| **11:40 am Christian G. Seitz, Mai-Thi Nguyen-Kim, Jannik Borghs, & Jan Wallenborn**  (Dr. Alexander Böker)Multifunctional Polyurethane Hydrogels for Biomedical Applications |
| **12:00 pm Christian G. Seitz & Soo-Kyung Kim (**Dr. William A. Goddard III)The Predicted Ensemble of 3D Structures for Human Olfactory Receptor HOR1A1-4 |
| ***McKinnon F (Moderator: Sara Machi) [Dr. Alisha Horky]***  |
| **10:40 am Miriam Eltus** (Dr. Lawrence Garber)The Effects of Brand Personalization on Consumer Attitude and Choice |
| **11:00 am Sandra Graf** (Dr. Alisha Horky)Are Unmanned Aerial Vehicles (UAV; Also Referred To As ‘Drones’) a Feasible Future Logistics Concept For Deliveries in Urban Areas? |
| **11:20 am Erin Lanzotti** (Dr. Haya Ajjan)The Cultural Influence on Purchase Intent Through Facebook in the Middle East |
| **11:40 am Olivia Grigg** (Dr. Rosey Bao)Effects of Corporate Governance and National Culture on Earnings Management in Emerging Markets |

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| **12:00 pm Laura A. Orr** (Dr. Sean McMahon)Bridging the Gap: Obstacles and Opportunities for Knowledge Transfer in Evidence-Based Management |
| ***Lakeside 212 (Moderator: Andrew Adair) [Dr. Frances Ward-Johnson]*** |
| **10:40 am Karen N. Balas, Bennett G. Driscoll, Olivia O. Hobbs, & Gabrielle A. Vance**  **(**Dr. Frances Ward-Johnson)A Cross-Cultural Comparison of Ethnic Narratives from the Civil Rights Movement |
| **11:00 am Janae Y. Williams & Shannon A. Rush (**Dr. Frances Ward-Johnson)A Comparison and Contrast of Civil Rights Knowledge Among Elementary School Students and College Students |
| **11:20 am Audrey Zullinger & Nathan** **Calem** (Dr. Frances Ward-Johnson)Beyoncé, the Super Bowl and the Black Panther Party: A Content Analysis of the Controversy Surrounding the Half-Time Salute to the Militant Group  |
| ***Lakeside 213 (Moderator: Amanda Feldman) [Dr. Steven Bednar]*** |
| **10:40 am Alex Battaglia (**Prof. Kathryn Rouse)How does the Young Adult Mandate Affect Wages and the U.S. Labor Market for Younger Workers? |
| **11:00 am Ameya D. Benegal (**Dr. Steven Bednar)The Effects of Armed Conflicts on the Incidence Rates of Infectious Diseases |
| **11:20 am Michael Keenan** (Dr. Steve DeLoach)Microfinance, Disasters, and Their Impact on Business Outcomes: Evidence from Indonesia |
| **11:40 am Sarah Krulewitz (**Dr. Brooks Depro)The Effect of Renewable Energy on Electricity Prices |
| ***Lakeside 214 (Moderator: Dr. Paula Rosinski)*** |
| **10:40 am Margaret R. Bryant** **(**Prof. Michael Strickland)And the Beat Lives on: Preserving and Celebrating the Impact and Legacy of the Beat Generation  |
| **11:00 am Alexandra Buchanan** (Dr. Cassie Kircher)Gender Diversity or Gender Gaps in the Florence Police Force?  |
| **11:20 am Kelley Dodge** (Dr. Paula Rosinski)Don’t Call Me: Discrepancies in Out-of-Class Communication Preferences of Faculty and Students |
| **11:40 am Hanna Elmgren** (Prof. Tita Ramirez)The Silence Inheritance: Stories - An Exploration of the Influence of Gender on Character |

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| ***Moseley 215 (Moderator: Skyler Cowans) [Dr. Brian Pennington]*** |
| **Investigating Yoga Across the Disciplines Symposium** |
| **10:40 am Stephanie A. Bedard** (Dr. Julie Lellis)Breaking Barriers to Build More: Portrayals of Females in Advertisements in the Yoga Journal Magazine  |
| **10:40 am Lillian DeNunzio** (Dr. Kenn Gaither)Branding India: How Prime Minister Narendra Modi is Using Yoga as a Communication and Image-Building Tool |
| **10:40 am Alexandra F. McCorkle** (Dr. Pamela Winfield)Clinical Spirituality: A Critical Examination of the Academic Use of the Word “Spiritual” and the Application of Yoga to Clinical Psychology |
| **10:40 am Amanda R. Carberry & Molly A. Sullivan** (Dr. Svetlana Nepocatych and Dr. Elizabeth Evans)Effects of High and Low Intensity Yoga on Psycho-Social Well Being in College-Aged Females |
| ***Isabella Cannon Room (Moderator: Alison Richard) [Dr. Amy Overman]*** |
| **10:40 am Kara E. Kneeland, Rachel E. Paxton, & Meredith A. Sullivan** (Dr. Mathew Gendle)Alcohol Use and Performance on the Iowa Gambling Task |
| **11:00 am Kaitlin R. Snapp** (Dr. Mathew Gendle)Relationships Between Total Cholesterol Levels and Performance on the Conners’ Continuous Performance Test II |
| **11:20 am Michelle E. Stocker** (Dr. Amy A. Overman)Differing Effects of List Repetition on Between-Trial Associations in Young and Older Adults |
| **11:40 am Julianne C. Beck (**Dr. Caroline Ketcham)Somatosensory Processing and Neurocognitive Performance During Recovery From Concussion |
| **12:00 pm Kathleen E. Hupfeld** (Dr. Caroline Ketcham)Transcranial Direct Current Stimulation (TDCS) to Broca's Area: Persisting Effects on Non-Verbal Motor Behaviors |
| ***Global Commons 103 (Moderator: Shakori Fletcher) [Prof. Janna Anderson]*** |
| **10:40 am Allison M. Gloninger** (Dr. Laura Roselle)Mission Accomplished? A Comparative Analysis of Strategic Narratives Found in French and American Newspapers During the Iraq War  |
| **11:00 am Michael Joseph Manduley (**Dr. Heidi Frontani)Refugees Who Made a Global Impact: A Case Study into the Flaws of International Organizations, Refugee Qualifications, and With Special Focus on Notable Refugees: Albert Einstein and Henry Kissinger |
| **11:20 am Natalie Brown (**Dr. Brian Digre)The Role of Radio Broadcasting by Revolutionary Movements in Africa |
| **11:40 am Leena Dahal & Jacqueline B. Pascale (**Prof. Janna Anderson)Connecting the Next Billions: Global Internet Leaders' Policy Plans for Reaching Everyone Everywhere |
| **12:00 pm Margaret Liston** (Dr. Brian Digre)From Laws to Last Names: Examining Popular Opinions of Adoption in Morocco |
| ***Yeager Recital Hall (Moderator: Carolyn Rauch) [Dr. Michael Carignan]*** |
| **10:40 am Nicole Ackman** (Dr. Michael Carignan)Madame Du Deffand and Julie De Lespinasse: A Salonniere and Her Apprentice  |
| **11:00 am Grace Rubinger** (Dr. Mary Jo Festle)Catholics and Contraception: Exceptional or Conventional in the American Context of the 20th Century?  |
| **11:20 am Manda K.S. Adam** (Dr. Rissa Trachman)Ancient Maya Economy: Early Classic Obsidian Sourcing at the Site Of Dos Hombres, Belize |
| ***Inman 112 (Moderator: Megan Vorpe) [Dr. Olivia Choplin]*** |
| **10:40 am Jackson Edwards** (Dr. Olivia Choplin)(Pre)-Occupation: The Diary of Hélène Berr in Nazi-Occupied France |
| **11:00 am Taylor M. Kelly** (Dr. Olivia Choplin)Marginalization and Racial Tension in Mathieu Kassovitz’s *La Haine* and *Métisse* |
| **11:20 am Laura K. Poe** (Dr. Olivia Choplin)Existentialist Theories of Jean-Paul Sartre and Simone De Beauvoir / L'existentialisme Chez Jean-Paul Sartre et Simone De Beauvoir |
| **11:40 am Erin N. Robertson** (Dr. Olivia Choplin)L'exil À Travers Les Sens |

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| **Oral Presentations Session II (12:40 pm - 2:20 pm)** |
| ***McKinnon D (Moderator: Sarah Gilley) [Dr. David Vandermast]*** |
| **12:40 pm Curt Hoffman** (Dr. David Vandermast)Comparison of the Characteristics of Edge Forests to those of Interior Forests on Elon University Forest |
| **1:00 pm Katie Kurowski** (Dr. Michael Terribilini)Molecular Simulations of Amylin Aggregation Associated with Type 2 Diabetes |
| **1:20 pm Olivia A. Murray** (Dr. Robert Vick)The Correlation Between Heart Rate Variability and Diet |
| **1:40 pm Margaret Small** (Dr. David Vandermast)Changes to Soil Characteristics During Secondary Succession on Elon University Forest |
| ***McKinnon E (Moderator: India Gill) [Dr. Jennifer Uno]*** |
| **12:40 pm Emily Swanson** (Dr. Joel Karty)Why is Perchloric Acid Stronger than Sulfuric Acid but Phosphoric Acid is Weaker? Determination of the Contributions by Inductive/Field Effects and Electron-Delocalization Effects |
| **1:00 pm Jacquelyn M. Bement** (Dr. Yuko Miyamoto)Evaluating T Cell Activation by Measuring Expression of Three Molecules |
| **1:20 pm Kirsten L. Deprey** (Dr. Jennifer Uno)Amoxicillin Decreases Intestinal Microbial Diversity and Increases Stress-Associated Behaviors in Zebrafish |
| **1:40 pm Susan C. Reynolds** (Dr. Kathryn Matera)The Oxidation of Lipids by Lactoperoxidase |
| ***McKinnon F (Moderator: Kiley Shannon) [Dr. Chad Awtrey]*** |
| **12:40 pm Peter Jakes** (Dr. Chad Awtrey)Degree Six Polynomials and Their Solvability by Radicals |
| **1:00 pm Taylor Cesarski** (Dr. Chad Awtrey)Symmetries of Degree 7 Polynomials |
| **1:20 pm Michael Keenan** (Dr. Chad Awtrey)Quartic Polynomials and their Galois Groups: Computational Efficiency  |
| **1:40 pm Jessica Weed, Nicole Soltz, & Sara Rodgers** (Dr. Chad Awtrey)Galois Groups of Degree 15 P-ADIC Polynomials |

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| ***Lakeside 212 (Moderator: Cameron Jackson) [Dr. Vanessa Bravo]*** |
|  **12:40 pm Cameron E. Allsteadt** (Dr. Cassie Kircher) The Fomo Phenomenon: An Examination of Instagram’s Effect on the American Study Abroad  Student Experience |
|  **1:00 pm Alex Lewis** (Dr. Anthony Hatcher) Sharing the Good News: How Megachurches Tell Their Story Through Their Digital  Communications |
|  **1:20 pm Katherine M. Nichols** (Dr. David Copeland) Advertising in an Era of Hard Times: Campaign and Strategy Effectiveness in Print During the  1930s and 1940s |
|  **1:40 pm MaryClaire Schulz** (Dr. Lucinda Austin) Brand Partnership Gone Bad: An Analysis of Lego's Response to the Attack on its Partnership  with Royal Dutch Shell |
|  **2:00 pm Tara R. Wirth** (Dr. Vanessa Bravo) Turkey's Framing of its Economy, Foreign Policy and Human Rights in Comparison to the  Country's Public Reputation |
| ***Lakeside 213 (Moderator: Dr. Tonmoy Islam)*** |
| **12:40 pm** **Samantha M. Lutz** (Dr. Andrew Greenland)Microfinance in Bangladesh: The Impact of Microfinance Loans on Domestic Violence  |
| **1:00 pm Danae Macleod** (Dr. Stephen DeLoach)Formal Savings and Child Labor in Indonesia |
| **1:20 pm Carolyn Powell** (Dr. Gregory Lilly)Saving for Retirement: A Behavioral Economic Approach |
| **1:40 pm Jeremy Revelise** (Dr. Tonmoy Islam)Job Mobility and Wage Progression Among TANF Recipients |
| ***Lakeside 214 (Moderator: Abigail Peel) [Dr. Rosemary Haskell]*** |
| **12:40 pm Lauryl Fischer** (Dr. Rosemary Haskell)Publishing Orwell: Understanding Orwell’s Socialism in a Professional Context |
| **1:00 pm Lauren Phillips** (Dr. Janet Warman)Beautiful, Uneducated and Unequal: Feminist Concerns and Female Representation in 20th Century Young Adult Literature |
| **1:20 pm Miranda L. Romano** (Dr. Kevin Boyle)What I Won't Tell You: An Exploration in Poetic Introspection, the Written Word, and the Human Heart |
| **1:40 pm Miranda L. Romano** (Dr. Jessie Moore)A Woman by Design: A Visual Rhetorical Analysis of Posters from the Three Waves |

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| ***Moseley 215 (Moderator: (Moderators: Ben Bridges and Noah Rossen) [Dr. Tom Mould]*** |
| **Ethnography across Disciplines: Understanding Global and Local Communities – PERCS Symposium** |
| **12:40 pm Amber Adams-Kuebler** (Dr. Scott Morrison)The Bridges & Barriers to Environmental Education on an E.C.O. Campus |
| **12:40 pm Leena Dahal & Osca Opoku** (Dr. Mussa Idris)Refugee Resettlement Experiences from Sub-Saharan Africa and Asia in Greensboro, North Carolina: Needs and Services Impact Assessment  |
| **12:40 pm Melina T. Oliverio** (Dr. Amy L. Allocco)Migration and Negotiation: Religious Identity in a North Carolina Sikh Community |
| **12:40 pm Jennifer Osborne** (Dr. Tom Mould)Creating Community: Navigating the Complex Relationship Between Town and Gown |
| ***Isabella Cannon Room (Moderator: Sara Corning) [Dr. Eric Hall]*** |
| **12:40 pm Lauren Brown** (Dr. Srikant Vallabhajosula)Effect of Dual-Task on Turning Characteristics While Walking Among Collegiate Athletes |
| **1:00 pm Nicole B. Doolen** (Dr. Wally Bixby)Impact of an Affect-Based Exercise Prescription on Aerobic Fitness and Exercise Adherence |
| **1:20 pm Nicole O. Razor** (Dr. Eric Hall)Influences of Psychological Factors on Delayed Onset Muscle Soreness |
| **1:40 pm Lauren N. Shaver** (Dr. Svetlana Nepocatych)Effects of Drinking vs. Rinsing with Water on Physiological and Affective Response During a 15-Km Running Session |
| ***Global Commons 103 (Moderator: Filippos Rempoutzakos) [Dr. Geoffrey Claussen]*** |
| **12:40 pm Daniela Ceron** (Dr. Lynn Huber)The Virtual Church: How the Internet is Changing the Way People Form Religious Community |
| **1:00 pm Allison D. Ginsburg** (Dr. Geoffrey Claussen)Conceptions of Spirituality Among Informal Jewish Educators |
| **1:20 pm Alexandra F. McCorkle** (Dr. Lynn Huber)“In Wod We Trust”: An Interpretation of Crossfit as a Religion |

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| ***Yeager Recital Hall (Moderator: Dr. Mark Enfield)*** |
| **12:40 pm Ashley M. Hunt** (Dr. Bud Warner)Deployment Policy and Family Planning Decisions in the U.S Army |
| **1:00 pm Casey B. Morrison** (Dr. Mark Enfield)The Best Thing in the World: What Engagement in Out-of-School Activities Can Tell Us About Youths' Well-Being and Development |
| **1:20 pm Jenna Nelson** (Dr. Cynthia Fair)Was That All I Got? “You’re Too Young To Have Sex’”: Adolescents’ Experiences Accessing Sexual and Reproductive Health Services and Recommendations For Providers: A Leadership Prize Project  |
| **1:40 pm Sophie L. Rupp** (Dr. Dr. Cynthia Fair)Transition: The Role of Social Support in Self-Management Within Education and Employment Settings for Adolescents and Young Adults with End-Stage Renal Disease |
| **2:00 pm Anna deDufour** (Dr. Bud Warner)Modalities of Health Care in a Global and Social Context: Theory and Practice in Ecuador |
| ***Inman 112 (Moderator: Anna Dellicker) [Dr. Elena Schoonmaker-Gates]*** |
| **12:40 pm** **Allison M. Gloninger** (Dr. Olivia Choplin)War by Proxy: An Analysis of Rhetoric in French Newspapers During the Iraq War in 2003 |
| **1:00 pm Margaret Liston** (Dr. Olivia Choplin)Doubly Orphaned: Identity Construction in the Aftermath of the Algerian War of Independence |
| **1:20 pm Simone Jasper** (Dr. Elena Schoonmaker-Gates)El Sesgo En El Periodismo Sobre El Conflicto Dominicio-Haitiano (Bias In Journalism About The Dominican-Haitian Conflict) |
| **1:40 pm Erin E. Luther** (Dr. Elena Schoonmaker-Gates)Dialectal Accommodation Between Spanish-Speakers From Panama and Puerto Rico |

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| **Oral Presentations Session III (2:40-4:20)** |
| ***McKinnon D (Moderator: Dr. Jen Hamel)*** |
| **2:40 pm Megan M. Sibree** (Dr. Linda Niedziela) The Role of N-Nitroso-N-Ethylurea (Enu) in the Induction of Chromosome Abnormalities in Zebrafish (*Danio Rerio*) |
| **3:00 pm Lenka N. Malec** (Dr. Linda Niedziela)The Effect of Aspartame and Sucrose on the Behavior of Adult Zebrafish |
| **3:20 pm Sarah M. Vaughan** (Dr. Michael Terribilini)Guardian of the Genome: Computational Modeling of P53 Interactions with S100b |
| **3:40 pm Dawson W. Nance** (Dr. Jen Hamel)Examining the Effects of Parasitism on Female Mate Choice and Copulation Duration |
| ***McKinnon E (Moderator: Cassidy Levy) [Dr. Amanda Chunco]*** |
| **2:40 pm Jennifer N. Archis** (Dr. Amanda Chunco)Predicted Impact of Climate Change on the Geographic Range of the Eastern Coral Snake (Micrurus Fulvius) |
| **3:00 pm Margaret R. Bryant & Caitlin C. O’Connell** (Prof. Steve Moore)The Science of Portable Beehives and the Importance of Honeybees Education |
| **3:20 pm Brittany R. DiRienzo** (Dr. David Vandermast)Visualizing Forest Characteristics of Elon University Forest in GIS |
| **3:40 pm Sarah A. Gilley** (Dr. David Vandermast)Carbon Sequestration and Changes in Aboveground Tree Biomass on Elon University Forest |
| **4:00 pm Liz Van Hise** (Prof. Michael Strickland)Ferry the Falcon: An Environmental Children's Book Series |
| ***McKinnon F (Moderator: Christopher Greene) [Dr. Chris Richardson]*** |
| **2:40 pm Nathan M. Pool** (Dr. Jeff Clark)The Connection Between Sound & Dimension of Fractal Music |
| **3:00 pm Kelly A. Reagan** (Dr. Karen Yokley)A Mathematical Model of Dengue Fever Incorporating Human Travel |
| **3:20 pm Daniel Schneider** (Dr. Megan Squire)Should I Shout or Say Thanks? A Computational Analysis of The Discourse Patterns ofLeaders of the Linux Community |
|  **3:40 pm Helen Meskhidze** (Dr. Chris Richardson) What Will Hubble 2.0 See?: Predicting Emission Line Observations for the James Webb Space Telescope |
| **4:00 pm Maria Temming** (Dr. Tony Crider)The Order of the Dolphin: Origins of Seti |
| ***Lakeside 212 (Moderator: Dr. Naeemah Clark)*** |
| **2:40 pm Danielle R. Deavens** (Dr. Naeemah Clark)The Framing of the Civil Rights Movement Through Jet Magazine Event Coverage |
| **3:00 pm** **Tony Weaver, Jr.** (Dr. Naeemah Clark)Transforming the Images of African Americans in Television Programming: A Leadership Prize Project |
| **3:20 pm** **Michelle Alfini** (Dr. Glenn Scott)"Friendship, Solidarity and Fair Play": Exploring Political Implications of U.S. Framing of Huma Rights Violations of Modern Olympic Hosts |
| ***Lakeside 213 (Moderator: Danielle Brown) [Dr. Steve DeLoach]*** |
| **2:40 pm Rebecca Jean Sansale** (Dr. Steve DeLoach)The Predictive Power of Personality on Labor Market Outcomes: Evidence from American Millennials |
| **3:00 pm Justin A. Schweitzer (**Dr. Gregory Lilly)Crowdfunding Viability in Low-Income Nations: An Experimental Study |
| **3:20 pm Stephanie G. Tizik** (Dr. Andrew Greenland)Prison Overcrowding and Recidivism |
| ***Lakeside 214 (Moderator: Melissa Purgert) [Dr. Kristina Meinking]*** |
| **2:40 pm Margaret K. Miller** (Dr. Megan Isaac)Revolutions in Reading: Exploring Changing Relationships Among Author, Reader, and Publisher in Young Adult Multimedia Publishing |
| **3:00 pm Courtney Laine Vereide** (Dr. Scott Proudfit)The Woman With a Past: Examining Female Archetypes in Fin De Siècle Drama |
| **3:00 pm Megan Sweeney** (Dr. Kristina Meinking)Hearing Helen: An Analysis of Voice, Choice, and Audience in Representations of Helen of Troy |

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| ***Moseley 215 (Moderator: Cassie Kircher)*** |
| **Caret Essay Contest** |
| **2:40 pm Lauryl Fisher 1st Place**The Changing Rhetoric of Revolution: Thomas Jefferson, Martin Luther King Jr., Michael Brown and Black Lives Matter |
| **2:40 pm Gregory M. Fulcher 2nd Place**King and Jefferson: The Challenges of Modern Democracy |
| **2:40 pm Greg Melanson 3rd Place**Echoes in History Between Thomas Jefferson and Dr. Martin Luther King Jr. |
| ***Isabella Cannon Room (Moderator: Dr. David Buck)*** |
| **2:40 pm Jacquelyn E. Lanphear** (Dr. Maureen Vandermaas-Peeler)Inquiry and Intersubjectivity in a Reggio Emilia-Inspired Preschool |
| **3:00 pm Heather McDonough-Caplan** (Dr. India Johnson)Implicit Ambivalence Toward Depression: The Role of Discrepant Attitudes on Information Processing and Information Search |
| **3:20 pm Taylor N. Obzud** (Dr. David Buck)Gender Differences in Attitudes Towards Transgender Men and Women |
| **3:40 pm Michael A. Nedvin** (Dr. David Buck)Mating Motives and Anti-Transgender Prejudice |
| **4:00 pm Anna A. Patterson** (Dr. Alexis Franzese)Resourceful, Adaptive, and Connected: Fostering Resilience in Girls Through an Online Well-Being Program and Mentoring Relationship  |
| ***Global Commons 103 (Moderator: Ryan Struble) [Dr. Kate Upton]***  |
| **2:40 pm William Burke** (Dr. Susan Anderson)An Examination of Corporate Whistleblower Protection |
| **3:00 pm Martin Enssle** (Dr. Kate Upton)Asset-Based Style Risk Factors for Benchmarking Hedge Fund Performance |
| **3:20 pm Chris Shannon** (Dr. Chris Harris)The Impact of Oil Price Volatility on Investment in Alternative Energy |
| **3:40 pm Allison Weiler** (Dr. Yilun Shi)Family Firms, Corporate Governance, and Firm Performance |

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| ***Yeager Recital Hall (Moderator: Lexi Hirvo) [Dr. Susanne Shawyer]*** |
| **2:40 pm Meagan L. Schrock** (Dr. Susanne Shawyer)Environmental Theatre in Contemporary Context: Bridging the Marginalized and the Mainstream |
| **3:00 pm Danielle Dulchinos** (Prof. Karl Green)Exploring Iconology in Fashion Through Research and Practical Application |
| **3:20 pm Marie C. Bolona** (Prof. Jack Smith)Olés and Duende: The Case of Spanish Flamenco as a Dance of the Margins  |
| **3:40 pm Addison Horner** (Prof. Clay Stevenson)Hashtag Music: Using Instagram as a Platform for Teaching Popular Piano Technique |
| ***Inman 112 (Moderator: Joseph Hiles) [Dr. Stephen Bloch-Schulman]*** |
| **2:40 pm Lauren K. Garretson** (Dr. Stephen Bloch-Schulman)Nation of the “Walking Dead”: Exploring the Causes of Psychic Breakdown in Rwandan Genocide Survivors |
| **3:00 pm Claire A. Lockard** (Dr. Anthony Weston)Reimagining Diversity: Toward a More Aspirational Alternative in Higher Education |
| **3:20 pm Sean Wilson** (Dr. Stephen Bloch-Schulman)Pearl Diving with Murray Bookchin: A Critical Reassessment of Murray Bookchin’s Social Ecology |
| ***SURF Reception (4:30 pm - 5:30 pm) The Great Hall, Global Commons*** |

***ACCOUNTING***

**AN EXAMINATION OF CORPORATE WHISTLEBLOWER PROTECTION**

**William Edward Burke** (Dr. Susan Anderson) Department of Accounting

A recent survey of senior executives found that in 2013, 70 percent of their companies had experienced at least one occurrence of fraud (Kroll 2014).  Most corporate frauds are revealed by whistleblowers who may subsequently become the targets of harassment and termination.  In order to encourage employees to report fraudulent activities, Congress enacted two laws to protect whistleblowers from employer retaliation:  Sarbanes-Oxley (2002) and Dodd-Frank (2010).  These laws require very specific processes for reporting fraud, and if not exactly followed, the whistleblowers will not receive protection.  This project examines the problem of corporate fraud, existing law governing whistleblowers, and the gaps in the law, which have left many whistleblowers unprotected from employer retaliation.  Recent court decisions involving whistleblowers have resulted in conflicting rulings and confusion as to the proper fraud reporting procedures to receive protection.  This confusion discourages employees from reporting fraud, a result opposite to that intended by Congress.  The paper concludes with recommendations to improve Sarbanes-Oxley and Dodd-Frank’s whistleblower protections.

***BIOLOGY***

**CULTURAL USES OF TRADITIONAL PLANT MEDICINES IN RURAL HAITI**

**Elisson Adrien** (Dr. David Vandermast) Department of Biology

In rural Haiti the use of traditional medicines, including plant preparations, are a common method of treating health issues. The purpose of this study was to interview people who commonly use traditional medicinal techniques to begin to compile a list of such practices in rural Haiti. Here we report on the preliminary findings of data collected in December of 2015 and January 2016 in two rural Haitian villages: Layaye and Anse-Rouge. A convenience sample of 40 people were asked what plants they used, what part of the plant was used, what ailments they treated, and how they were prepared and administered. Interviewees included citizens who commonly use plant medicines to treat their own ailments and people who practice traditional medicine and are known as ‘healers’. In total, we collected 577 treatments for 39 ailments. In excess of 50 unique species, mostly woody plants, are used medicinally by rural Haitians. The most frequent ailments for which traditional plant medicines were used were fever (20.6% of treatments), stomach ache (13%), gas (11.4%), flu (9.2%), and headache (8.3%). At least two interviewees reported using plant medicines to repel curses. By far, the most commonly used part of the plant was the leaves (70.8% of treatments), followed by roots (7.3%) and bark (4.9%). The most common preparation method was boiling material to consume as a tea or bathe in it (70% of treatments). Amendments like castor oil or moonshine were often used. The preparations were most commonly administered as a consumable, but poultices and other topical administrations were noted. Our data indicate that the use of plants in traditional medicines is a common practice in rural Haiti, both by the citizens of Layaye and Anse-Rouge and by lay people and healers. Further analysis of our data will examine the way traditional knowledge about plants is acquired, the preferences rural Haitians have for traditional medicine vs. western medicine, and whether a medicinal value or active compounds are known for the plant species we could identify.

**THE EFFECT OF ORAL HYGIENE ON CARDIAC HEALTH AS DETERMINED BY HEART RATE VARIABILITY**

**Emily E. Bujnoski** (Dr. Robert Vick) Department of Biology

Cardiac disease is the number one cause of death throughout the world. An indicator of physiological cardiac health is heart rate variability (HRV). HRV, determined using an electrocardiogram, measures the variation of time between R-intervals, or peaks, of consecutive heartbeats due to autonomic, unconscious regulatory influence. Higher variability between these R-intervals indicates better cardiac health, because it suggests that one can better adapt to outside stressors. HRV can be divided into low frequency and high frequency oscillations, mathematically calculated using a Fast Fourier Transformation. Increased low frequency oscillations indicates increased sympathetic (“fight or flight”) activity and, conversely, increased high frequency oscillations indicates increased parasympathetic (“rest and digest”) activity.The aim of this study is to relate the autonomic functions of the heart to oral hygiene, because little research in this field exists today. Over the course of five months, a random and voluntary sample of college-aged individuals completed oral hygiene surveys including information on brushing, flossing, numbers of dental caries (cavities), and instances of dry mouth. HRVs were subsequently taken from the sample group. Initial analysis showed significant positive correlation between low frequency HRV and number of cavities (>2) (n=55, r=0.71, p=0.014), indicating a positive correlation between high number of cavities and increased heart rate variability, and therefore a relationship between high numbers of cavities and increased autonomic heart health. The findings of this study, and the further investigation that it encourages, could have immense meaning in the field of dentistry as the importance of oral hygiene as a contributor to overall health is implicated.

**EVALUATING T CELL ACTIVATION BY MEASURING EXPRESSION OF THREE MOLECULES**

**Jacquelyn M. Bement** (Dr. Yuko Miyamoto) Department of Biology

Aberrant changes in stimulatory and inhibitory signaling pathways in T cells can cause a wide range of diseases. Insufficient inhibition leads to development of autoimmune disorders while insufficient stimulation in the presence of rapidly dividing body cells leads to tumor growth and cancer. Developing methods to measure such changes in the pathways are important in evaluating the efficacy of immunotherapy approaches that alter T cell activation to treat diseases. This project aims to determine whether changes in T cell activation can be effectively evaluated by measuring three different types of proteins; expression of a surface protein (CTLA-4) and transcription factors (NFAT, and NF-kB), in addition to a secreted protein (IL-2)*.* Jurkat T cells were cultured and activated with PMA (100 ng/mL) and ionomycin (500 ng/mL) for five hours. Staining for IL-2 and CTLA-4 with antibodies and transfection of the cells with genetic constructs that link NFAT and NF-kB to fluorescent proteins provided a way to connect the expression of fluorescence to expression of the molecules of interest. Flow cytometry was then used to measure changes in the expression of the four proteins (CTLA-4, NFAT, NF-kB, and IL-2) in response to the induced changes in activation. Activation of T cells resulted in significant (p<0.05) increases in expression of all four molecules. By measuring these key elements of T cell signaling pathways in addition to IL-2, these methods provide a potentially effective alternative to current methods for evaluating the efficacy of immunotherapeutic treatments.

**WINTER PHOTOSYNTHESIS OF CHINESE PRIVET (LIGUSTRUM SINENSE)**

**Catherine G. Cooke** (Dr. David Vandermast) Department of Biology

Chinese privet (Ligustrum sinense) is invasive woody shrub that is widespread in the forests of the eastern United States. In the North Carolina Piedmont, privet is a semi-evergreen plant that may be photosynthesizing in the winter enhancing its success as an invasive plant in this region. Leaves are metabolically expensive to grow and maintain, especially when conditions are not optimal, so the benefits of privet keeping leaves in the winter should outweigh the costs. However, the degree to which privet photosynthesizes during winter months is not known. To determine whether privet is photosynthetically active during the winter, we collected weekly measurements of quantum yield (QY) from privet growing in seven locations in Elon University Forest (EUF) for one year. In four of the locations the privet was shaded by canopy trees (shade) and in three of them the privet was growing in an open area where it was in direct sunlight (open) for at least part of the day. In addition, we calculated chlorophyll concentration from leaves collected from privet each season. Our results indicate that QY is strongly influenced by temperature (R2=0.79). Furthermore, we found that QY varies significantly (p=0.05) between seasons but that wintertime values for privet are similar to those of agricultural plants that grow during the winter months. Annual measurements of QY from shaded privet were not significantly different than that of open privet. However, shaded privet had significantly lower QY than open privet during spring and summer seasons. Finally, we found that there was no significant annual difference in chlorophyll concentration between shade vs. open privet. Our findings indicate that privet is photosynthesizing during the winter months and that this additional energy capture may help its invasive potential.

**THE INTERACTION BETWEEN THE mTOR AND CELL MIGRATION (INTEGRIN) SIGNALING PATHWAYS IN T CELLS**

**Adem L. Cosgel** (Dr. Yuko Miyamoto) Department of Biology

The mammalian target of rapamycin (mTOR) is a highly conserved protein kinase involved in a pathway responsible for controlling cell growth and metabolism. This pathway can be inhibited by an immunosuppressant, rapamycin, to inhibit mTOR1 and further downstream proteins.  mTOR has also emerged as an important modulator in certain human cancers and it is therefore important to study how its modification affects other functions of the cell.  The mTOR pathway intersects with other signal pathways to regulate functions of the cell.  This research focused on the integrin pathway that is responsible for regulating cellular migration.  The integrin proteins on the cell transfer signals from the outside of the cell (extracellular matrix) and allows for cells to move.  This study looks at the integrin cell migration pathway to see how it intersects or is affected by the mTOR pathway in the presence of the drug rapamycin. Jurkat T cells were used and the integrin pathway was activated by plating cells onto 7.5ug/mL fibronectin in cell culture plates.  Subsets of cells were also treated with 1uL/mL PMA, 5uL/mL ionomycin and 100ng/mL SDF1 (molecules that causes cells to move). Following the activation of the integrin-signaling pathway, changes to specific proteins of this pathway were studied following 20 nM rapamycin treatment for 24 hours, specifically the proteins PYK2 and paxillin. Western blot analysis of these proteins showed a 43% decrease in PYK2 phosphorylation and a 66% decrease in paxillin phosphorylation in the presence of rapamycin. These results show that rapamycin can inhibit integrin signaling through the inactivation (de-phosphorylation) of key proteins in the pathway. This research exposes some novel insight into the connection between these pathways (something not previously understood) and how the actions of one can affect the outcome of the other.  Specifically it is important to understand the side effects of inhibiting the mTOR pathway, which is currently being done in cancer research.

**EXAMINING TWO CLOSELY RELATED INSECT SPECIES FOR EVIDENCE OF SELECTION AGAINST HYBRIDIZATION**

**Emma E. Eskeland** (Dr. Jen Hamel) Department of Biology

In nature, individuals of different species can sometimes be observed mating together. Such hybridization is usually costly, especially for females who invest more resources into offspring production than males. We therefore generally expect females to discriminate against males who are not of their own species (i.e. heterospecifics). However, in locations where a species does not occur together with any close relatives, females may not recognize heterospecifics. Thus, if formerly separated species come back together, females may not distinguish between males of their own species and the heterospecifics they now encounter. Here, we looked for evidence of selection against hybridization between two closely related species of insect (*Anasa tristis* and *A. andresii*) that occur together in some locations, but not others. In laboratory no-choice tests, we compared receptivity toward male *A. andresii* by female *A. tristis* from two populations: one in which the two species have occurred together for 80-100 generations, and one in which they have never co-occurred (Florida and North Carolina, respectively). We found no evidence that female *A. tristis* from either population are less likely to mate with heterospecific males than with male *A. tristis* (contingency analysis: *χ*2 = 3.01, *P* = 0.22), and no evidence that heterospecific males expend more effort than male *A. tristis* to achieve mating with females from either population (Kruskal-Wallis test: *H* = 2.90, *P* = 0.23). However, copulations between conspecifics are significantly longer than copulations between heterospecifics (one-way ANOVA: *F*2.33 = 11.28, *P* < 0.05). We suggest that future work examine sperm transfer, which may be affected by copulation duration, and copulatory courtship, which occurs in these species and has been shown to affect copulation duration and fertilization in other insect species.

**MANIPULATING FIBROBLAST ACTIVATION PROTEIN ON CANCER CELLS AND EVALUATING THE EFFECTS**

**Zachary B. Fisher** (Dr. Yuko Miyamoto)Department of Biology

The cancer microenvironment surrounds tumors and consists of various cell types that cancer cells utilize to support their growth and invasion. One of the most prominent cells in the microenvironment is the cancer-associated fibroblast (CAF). CAFs are derived from normal fibroblasts after being altered by signals from cancer cells. Normal fibroblasts secrete proteins, including collagen, that form the extracellular matrix (ECM), the structure on which cells attach to form tissues and organs. In contrast, on their surface, CAFs display fibroblast activation protein (FAP), which functions by breaking collagen bonds in the ECM. This creates open space around the tumor, allowing cancer cells to migrate and metastasize. CAFs also secrete cytokines, which are molecular signals that influence the behavior of surrounding cells. These cytokines include stromal cell-derived factor-1 (SDF-1) and interleukin-6 (IL-6). SDF-1 causes cancer cells to migrate away from the initial tumor, which leads to metastasis. IL-6 attracts endothelial cells to the tumor environment to form new arteries, supplying the growing tumor with more oxygen and nutrients. This study seeks to determine if there is a link between the expression of FAP and the production of SDF-1 and IL-6. Cells were grown in culture, and the expression of FAP was verified in 50.6 % of fibroblasts and 4.8% of melanoma cells. Treating the melanoma cells with transforming growth factor-β (TGF-β), another signaling molecule that often activates CAFs, increased the proportion of FAP-expressing melanoma cells by 50%. By blocking the ability of cells to create FAP, the percent of FAP-expressing cells was reduced in both the fibroblasts, by 48.4%, and the melanoma cells after TGF-β activation, by 11.6%. Preliminary data suggest that SDF-1 and IL-6 production both increased in melanoma cells in direct correlation to FAP expression, but may be inversely related in fibroblasts. Future studies will further analyze the FAP expression levels and cytokine secretion of both cell types to elucidate the relationship between FAP expression and the secretion of SDF-1 and IL-6.

**SETTING ECOLOGICAL PARAMETERS FOR DEFINING A FOREST OF CONTINUITY**

**Emily Ann Galloway** (Dr. David Vandermast) Department of Biology

Most eastern forest habitat has been cutover at least once and significant patches of old-growth forest are found only in some of the most remote and inaccessible areas. However, historic land-use practices of farmers and other landowners left small patches of forest that were never clearcut. We call these small patches of remnant old-growth forests “forests of continuity” (FOC). FOCs show evidence of past human use but are woodlands that have been continuously forested. Elon University Forest (EUF) is a 22.5 ha research forest, about 6 ha of which is a putative FOC. The purposes of this study were to collect data to estimate the age of forest types on EUF, and to compile what is currently known about the forests on EUF and what is unique about the FOC. To estimate forest ages we collected increment cores from five trees on each of eight permanent vegetation plots (N=40). We found that trees on the two plots in the FOC had significantly higher estimated ages (121.2 and 118.3 years, respectively vs. 63.1 years for all younger forest plots; p<0.01). Because old forests should have trees with a wide range of ages while younger forests should have more even-aged trees, we used standard deviation (SD) to measure this variation. We found that the FOC plots had a higher SD (46.7 vs. 15.2 years) than the younger forests, though the difference was not significant (p=0.1). Previous studies have found that the FOC has larger tree species that are typically found in late-successional forests, is less susceptible to invasive plants, has soil deeper O and A soil horizons and reduced soil fertility, and was less damaged by a recent ice-storm than were younger forests. The characteristics of the FOC on EUF are very similar to those expected of an old-growth forest.

**INVESTIGATION OF ALZHEIMER’S DISEASE THERAPY THROUGH THE MODELING OF INTERACTIONS BETWEEN CELLULAR PRION PROTEIN AND AMYLOID-β PEPTIDE**

**Emma C. Gierman** (Dr. Michael Terribilini) Department of Biology

Alzheimer’s disease is the world’s most common neurodegenerative disease. Recent studies on the disease have indicated a neurotoxic relationship between amyloid-β oligomers, as they interact to create aggregations of harmful plaques throughout the central nervous system. The aggregation process is expedited by interactions with the Normal Cellular Prion Protein (PrPC). This research utilized a computer-based modeling approach to simulate and analyze the 3D structures of amyloid-β and PrPC, as well as the implications of their interactions. The long term goal of this study is to elucidate the size and structure at which amyloid-β oligomers are most stable and how the aggregation process can be stopped. The structural stability of a specific protein data bank (PDB) model of amyloid-β42 (Aβ42) was analyzed using molecular dynamics simulations. Five multimeric structures ranging from the dimer to the hexamer of Aβ42 were modeled by replication of the monomer unit in a stacked orientation and then simulated for 25 ns each in an aqueous environment. The Root Mean Square Deviation (RMSD) is the measure of the average distance between the atoms of superimposed proteins. RMSD values were obtained via simulation runs for the multimeric structures. Analysis of the RMSDs revealed an increase in structural stability as the number of chains increased. The Root Mean Square Fluctuation (RMSF) is the measure of the average atomic mobility of backbone atoms during simulations. RMSF values were calculated for each amino acid across all five forms. Analysis of RMSF revealed steady increases in stability of residues in the center of each monomer, with the N and C terminal residues having much higher mobility. A particular model of the prion protein was obtained from PDB and docked with the hexameric form of amyloid- β to generate ten separate models of the prion-amyloid interaction. These ten possible forms of the complex were simulated for 10 ns each. Three models were selected to run 50 ns simulations, based on stability. The future of this research on amyloid-β oligomer will analyze therapeutic implications regarding the introduction of certain molecules into the prion-amyloid-β environment and how signal transduction interactions are disrupted.

**DIETARY SOY AND THE GUT MICROBIOME**

**India R. Gill** (Dr. Jennifer Uno) Department of Biology

The bacteria that reside in the distal gut are deeply involved in the breakdown of dietary components and can greatly influence the type of compound produced. The metabolism of daidzein, a major compound of soy, produces equol in the presence of intestinal bacteria. Equol is more biologically active and its role in human health remains controversial. It has been shown to have links to tumor regression, tumor progression, cardiovascular health and neurologic function. Soymeal is a common product used in the mouse chow of research labs. Given its controversial role in host health, mouse facilities at the University of North Carolina at Chapel Hill switched to a non soy-based diet. The purpose of this study is to examine the impact that the removal of soy has on bacterial communities of the gut. We hypothesize that there will be a decrease in phyla such as *bifidobacteria* that play a role in the metabolism of isoflavones like daidzein. Mice were fed a soy-based diet (Prolab Isopro RMH 3000) and a non soy-based diet (Harlan Laboratories). Bacterial DNA was extracted from stool and phyla of bacteria were examined and quantified by qPCR. In soy fed mice, we saw a slight decrease in universal gut bacteria as well as increases in *bifidobacteria* and *lactobacillus*. *Bifidobacteria* was the only phyla that changed significantly, with a 13.63 fold increase (n=7, p=0.05). In order to determine if soy is directly responsible for the microbial changes, we employed the use of zebrafish. Zebrafish were first treated with amoxicillin to clear bacterial flora and bacteria were allowed to recolonize in the presence of or absence of soy. We saw 12.5% and 13.5% less *lactobacillus*and *bifidobacteria,*respectively(n=5, p=0.046 and p= 0.05*)* in the soy fed fish*.*There was no significant change in total bacteria. This indicates that dietary soy can cause a significant change in the composition of the gut microbiome. This study warrants further research into the role soy plays in regulating microbial communities and emphasizes the need for diet regulation in research facilities.

**EFFECTS OF METHYLPHENIDATE (RITALIN) ON NEURONAL DEVELOPMENT AND SURVIVAL**

**Jessica C. Graham** (Dr. Tonya Laakko Train) Department of Biology

Methylphenidate (Ritalin, MPH) is a common medication used to treat Attention Deficit Hyperactivity Disorder (ADHD), which currently affects 6.4 million children in the United States. Most research on MPH has focused on how it influences the activity of dopamine, a neurotransmitter involved in reward-motivated behavior, and the cellular pathways associated with its metabolism.  However, little research has been conducted at the cellular level on the direct effects of MPH exposure on the generation, development, and survival of adult-generated human neurons. This study investigated the effect of different concentrations of MPH on human neuronal generation in an *in vitro* cell culture model. After treatment of the SH-SY5Y human neuronal cell line with various concentrations between 10ng/mL and 1μg/mL MPH for 24 hours, flow cytometric analysis showed a statistically significant increase in the number of neurons in each sample compared to the control condition. Preliminary results show that the addition of MPH at each concentration resulted in a 2 to 3 fold increase in cell number. This result indicates that MPH increases survival or increases proliferation. Future studies will investigate if MPH has a protective or proliferative effect, and the cellular mechanism that is responsible for this increase in cell concentration.

**COMPARISON OF THE CHARACTERISTICS OF EDGE FORESTS TO THOSE OF INTERIOR FORESTS ON ELON UNIVERSITY FOREST**

**Curtis C. Hoffman** (Dr. David Vandermast) Department of Biology

In the past 300 years eastern North American forests have transitioned from very large contiguous forests to patches of forest separated by open areas such as roads, fields, and suburban sprawl. Forests at the edge of open areas can be warmer, windier, and dryer than those in the interior. These abiotic changes may cause edge forest composition and structure to differ from that of interior forest. The purpose of this study was to examine how forest’s characteristics differ by aspect and to compare data from edge forest plots on Elon University Forest (EUF) to data from permanent plots in the forest interior. During summer and fall of 2015 we collected data from 16 100m2 modules located on the east-, west-, north-, and south-facing aspect of EUF. On edge sites, tree density was 743.8 stems/ha (ranging from 450/ha on west-facing sites to 925/ha on north-facing sites) and basal area was 37.5 m2/ha (ranging from 21.6 on west-facing sites to 46.2 on south-facing sites). Interior forest tree density and basal area were lower than that of the edge (552.1 stems/ha and 32.8 m2/ha, respectively). The differences between edge and interior forest were statistically significant for tree density (p<0.01) but not for basal area, because the great variation in basal area values in edge forests. Furthermore, edge forests contained invasive species not found in the interior forests. We further analyzed our data to compare edge forests in the forest of continuity (FOC) versus the edges of younger forests. FOC edge forests tree density was lower than that of non-FOC edge forests (625 stems/ha vs. 780 stems/ha) but basal area was higher (43.6 m2/ha vs 35.4 m2/ha). Our data indicated that edge forests have characteristics that make them different than interior forests and that edges of older patches of forest, such as those on the FOC, will retain some of those differences.

**MOLECULAR SIMULATIONS OF AMYLIN AGGREGATION ASSOCIATED WITH TYPE 2 DIABETES**

**Kathleen M. Kurowski** (Dr. Michael Terribilini) Department of Biology

Type 2 diabetes, a chronic condition that affects the ability of the body to regulate and control blood sugar, affects 25.8 million people a year. Type 2 diabetes is characterized by an inability to produce insulin, a glucose regulation protein, in β cells of the pancreas. Human islet amyloid polypeptide (amylin) is a 37-residue protein cosecreted with insulin in the pancreas, aiding in glucose metabolism and glycemic regulation. Although diet, activity level and genetics all play a role in the development of type 2 diabetes, the exact mechanism for the disease is not known. Recent studies have shown that protein aggregation in the pancreas causes buildup of amylin leading to insufficient insulin secretion and eventual death of β cells. Amylin shows a tendency to aggregate in the β cells of the pancreas, creating toxic amyloid deposits in these β cells. Deposit buildups increase the rate of apoptosis, therefore decreasing insulin production. Human islet amyloid polypeptide molecule interactions were examined using a variety of computational modeling techniques. The structure of amylin was modeled using the I-TASSER server. Molecular dynamics simulations were run to investigate the dynamics and the stability of full-length amylin. Full-length amylin was simulated for 100 nanoseconds in an aqueous environment. Results show that the amylin structure remained relatively stable throughout the simulation, with the Root Mean Square Deviation (RMSD) stabilizing around 5 Angstrom compared to the initial structure., indicating that the structure was stable. Analysis of secondary structure during the simulation showed a stable alpha helix that was present throughout. The alpha helix and a disulfide bond between residues 2 and 7 contributed to relatively low Root Mean Square Fluctuations (RMSF) values for the first half of the peptide. The second half of the peptide had higher RMSF values and more variable secondary structure state. Docking software was used to create dimers for testing. Binding energies for dimers were evaluated to quantify the stability of the dimers. Characterization of the dynamics and stability of the amylin peptide is an important initial step in determining amyloidogenic properties that could contribute to protein aggregates. Future experiments in this study will model oligomers of amylin.

**RELATIVE COSTS OF BETWEEN-SPECIES MATING FOR SECONDARILY SYMPATRIC AND ALLOPATRIC POPULATIONS**

**Tyler K. Lehmann** (Dr. Jen Hamel) Department of Biology

When closely related species come back into contact after being geographically isolated, hybridization can occur. In North Florida, individuals of two closely related species of insects (*Anasa tristis* and *A. andresii*) are commonly observed mating in the field (male *A. andresii* with female *A. tristis)*. Throughout the rest of the Southeastern U.S., *A. tristis* is present, but *A. andresii* (which is native to the Southwestern U.S.) does not occur. Because mating between individuals of different species commonly results in reduced reproductive success, we predicted that heterospecific pairs (i.e. male and female of different species) would produce fewer offspring than conspecific pairs (i.e. male and female of the same species). Because selection has had >80 generations to act in North Florida, we also predicted that female *A. tristis* from North Florida would produce fewer eggs and offspring when paired with male *A. andresii* than would female *A. tristis* from North Carolina. We compared the numbers of eggs and offspring produced by conspecific *A. tristis* pairs with those produced by heterospecific pairs (female – *A. tristis*, male – *A. andresii*); we also compared eggs and offspring produced by the heterospecific pair females from North Florida and North Carolina*.* We recorded female fecundity and reproductive success in a greenhouse under controlled conditions for 28 days. Females in conspecific pairs produced significantly more eggs and offspring than did females in heterospecific pairs (eggs: LMM, Tukey test: *z* = 2.394, *P* < 0.05; offspring: binomial GLM, *P* < 0.001). We found no significant difference in the numbers of eggs produced by heterospecific pairs with female *A. tristis* from North Florida versus North Carolina. However, eggs from heterospecific pairs were less likely to hatch when produced by females from North Florida (binomial GLM, Wald *χ*2(1)= 8.1, *P* = 0.014). Our findings suggest that there are reproductive barriers during or after copulation that prevent *A. tristis* eggs from being fertilized by male *A. andresii*, that some of these barriers existed prior to secondary contact, and that selection against hybridization in North Florida is occurring. Future research should examine possible mechanisms preventing fertilization, including cryptic female choice and mechanical incompatibility.

**ESTABLISHING A CELL CULTURE MODEL TO STUDY THE IMPACT OF BUPROPION [WELLBUTRIN®] ON INSULIN RESISTANCE**

**Kate R. Levenberg** (Dr. Tonya Laakko Train) Department of Biology

The pathogenesis of type II diabetes is attributed to a decreased response to insulin, a hormone that regulates blood sugar levels. The pro-inflammatory protein, TNF-alpha, is thought to contribute to insulin resistance by interfering with insulin’s signaling pathways. Due to TNF-alpha’s reoccurring role in inflammatory response, numerous drugs focus on its inhibition. One medication, bupropion, also known by its generic name, Wellbutrin SR**®**(GlaxoSmithKline), is used as an anti-depressant medication and is known to inhibit TNF-alpha. Compared to other TNF-alpha inhibitors, bupropion results in minimal long-term side effects. However, its effect on insulin resistance is unknown. This study investigates the impact of bupropion on insulin resistance through a cell culture model. The 3T3-L1 fibroblast cell line was differentiated into adipocytes by exposure to dexamethasone (0.25 pM) and methylisobutylxanthine (0.5 mM) for two days, followed by exposure to insulin (2 pg/ml) for two days. Differentiation was evaluated by lipid droplet accumulation. The differentiated adipocytes were estimated to contain an average of 40 lipid droplets with a diameter of 7-15 μm each, as compared to an average of 4 droplets, with a diameter of 2-3 μm, in each fibroblast cell. Insulin resistance will later be induced in the adipocytes by prolonged insulin exposure. Flow cytometry and ELISA will be used to verify insulin resistance and TNF-alpha secretion. Changes in insulin resistance due to bupropion treatment will then be evaluated. Discoveries elucidated from this research could have implications for diabetes treatment, as well as confirm TNF-alpha’s role in insulin resistance.

**THE EFFECT OF ASPARTAME AND SUCROSE ON THE BEHAVIOR OF ADULT ZEBRAFISH**

**Lenka N. Malec** (Dr. Linda Niedziela) Department of Biology

Aspartame is a common artificial sweetener that can be found in products such as diet soda or Crystal Light[Symbol]. As a result of the increasing emphasis on maintenance of a healthy weight in the human population in the United States, many adults and children are using sugar free products. Previous toxicology studies have looked at the behavioral effects of aspartame on adult zebrafish, but the results of these studies were inconclusive. The purpose of the current study is to determine the behavioral effect of aspartame and sucrose (table sugar) on adults and juvenile zebrafish, specifically looking at anxiety related behavior and behaviors related to attention deficit/hyperactivity disorder (ADHD). Adult and juvenile zebrafish were placed in five different concentrations, the higher of each being what is found in soft drinks: 0.79 g/L and 0.079 g/L aspartame, 65.5 g/L and 6.55 g/L sucrose, and a control of treated tank water. The adult zebrafish were exposed for five days then filmed for further behavioral analysis. The Novel Tank Diving Test is a behavioral test that was performed on the adults and quantitative variables were collected to determine the level of anxiety. Results showed a significant difference between the anxiety indicators of the control compared to both the sugar and aspartame exposed fish. Specifically, the treated fish tended to display a greater number of anxiety indicators, which signifies an increase in anxiety. Based on the results it seems that it does not matter what type of sweetener is ingested, both aspartame and sugar caused an increased anxiety; therefore, aspartame may have unwanted side effects on consumers.

**THE CORRELATION BETWEEN HEART RATE VARIABILITY AND DIET**

**Olivia A. Murray** (Dr. Robert Vick) Department of Biology

Heart function can be affected by lifestyle choices.  Heart rate variability (HRV) is the variation in the time interval between heartbeats and is used to assess cardiac health (Stein & Kleiger 1999).  A high HRV is indicative of good cardiac health and increased parasympathetic activity, while a low HRV has been associated with poor outcomes in adults (Kristal-Boneh et al. 1995).  This study investigated the correlation between diet and HRV.  Although specific foods have been correlated to HRV, there is not any previous research about how overall diet impacts HRV.  Thirty-two participants were surveyed and categorized based on diet.  Diets represented included vegetarian, gluten-free, and participants with no dietary restrictions.  An electrocardiogram was performed on each participant.  Software supplied by ADInstruments was used to generate a spectral analysis of HRV by applying a Fast Fourier Transformation (FFT).  Frequencies were subdivided as Very Low Frequency (VLF) and Low Frequency (LF), correlating to a combination of sympathetic and parasympathetic effects, and High Frequency (HF), correlating to parasympathetic effects. Time and frequency domain measures of HRV were analyzed through SPSS.  No significant differences between diet groups were found.  There were differences in the standard deviation of all normal RR intervals (SDRR) of each group (vegetarian=104.66ms, gluten-free=81.5ms, healthy=66.34ms, unhealthy=59.13ms, and control=87.07ms).  A moderate negative correlation was found between consumption of fast-food and frequency HRV measures (HF power: r=-.397, p=.024), indicating that, with increasing fast-food consumption, there is an increasing risk for adverse cardiac outcomes.  In general, diet does seem to result in small differences in HRV, especially between the unhealthy diet group, characterized by high consumption of red meat, fast food, and sweets, and the vegetarian diet group, specifically for the LF domain (p=0.17).  After analyzing the data through time domains, it was found that the vegetarian group had a SDRR greater than 100ms, correlating with a low risk of cardiac problems (Torres et al. 2008).  In today’s society, individuals are choosing to adopt restrictive diets although the long-term health effects are unknown.  Therefore, it is essential to investigate the potential beneficial or adverse relationship between cardiac health and diet, as measured through HRV.

**EXAMINING THE EFFECTS OF PARASITISM ON FEMALE MATE CHOICE AND COPULATION DURATION**

**Dawson W. Nance** (Dr. Jen Hamel) Department of Biology

In many species, individuals are choosy about prospective mates, expressing preferences for traits that can increase the number or quality of offspring they will produce. Predators and parasitoids may also influence mate preferences, for example by reducing an individual’s reproductive opportunity. Although interactions with parasites are ubiquitous in animal populations, how parasitoids affect mate preferences is largely unknown. In North Carolina, the squash bug (*Anasa tristis*) is parasitized by a fly (*Trichopoda pennipes*): larval *T. pennipes* develop in the host’s abdomen and cause death within ~14 days. In the field, parasitized female squash bugs are more frequently found *in copula* than are unparasitized females (logistic regression, n = 215, *P* < 0.05). To explain this pattern, we hypothesized that parasitized females are less choosy than unparasitized females, because their lifespan and reproductive opportunity are reduced. Alternately, copulations by parasitized female squash bugs may have longer durations than those of non-parasitized females. To determine how parasitism affects the likelihood and duration of copulation, we manipulated parasitism of female *A. tristis* and paired parasitized and non-parasitized females with male *A. tristis*. We scored male mating attempts, copulations, and copulation durations. We found that non-parasitized and parasitized females are equally receptive to male mating attempts  (Fisher’s exact test: n = 57, *P = 0.43*), and that whether a female is parasitized does not affect male mating effort (Wilcoxon Rank Sum test: n = 56, *P* = 0.82). However, our data suggest that parasitized females copulate for longer than non-parasitized females (two-sample *t* test: n = 8, *t* = -2.89, *P* < 0.05). We suggest additional comparisons of copulation duration between parasitized and non-parasitized females and evaluation of whether extended copulations benefit the parasite or host.

**THE ROLE OF N-NITROSO-N-ETHYLUREA (ENU) IN THE INDUCTION OF CHROMOSOME ABNORMALITIES IN ZEBRAFISH (*DANIO RERIO*)**

**Megan M. Sibree** (Dr. Linda Niedziela) Department of Biology

Cancer is caused by changes in the genome that result in the rapid production of compromised cells. Carcinogens including ENU have been shown to cause these changes through a variety of mechanisms. Although these mechanisms are studied intensively in the cancer research field, the role of chromosome instability in cancer induction is not well understood. Because chromosome instability is frequently observed in cancer patients, it is essential to determine how it occurs to further understand cancer disease progression and discover more effective prevention and treatment plans. In this study, adult zebrafish were used as experimental models to investigate if ENU utilizes genomic instability as a mechanism of cancer induction. DNA was isolated from muscle tissue and analyzed using optimized primers from the GE Healthcare Ready-To-GoTM RAPD Analysis Kit. Random amplified polymorphic DNA (RAPD) analysis uses DNA primers to amplify random DNA sequences. Although the sequences are random, the primers are very specific to them. Therefore, the amplification of these sequences should be consistent in fish that have not been exposed to ENU. When chromosome instability is induced, alterations in the amplified DNA can be visualized using gel electrophoresis. A greater number of changes in banding pattern compared to control DNA suggests greater genomic instability. RAPD analysis utilizing one of the optimized primers resulted in highly variable bands in control and experimental samples, making it difficult to discern what bands were created due to exposure to ENU. RAPD analysis with another primer resulted in bands that were stable and consistent in experimental and control samples, and no significant changes in banding pattern were observed in experimental samples. The results found using RAPD analysis were inconclusive, suggesting that RAPD may not be the best tool for investigating the mechanism of cancer initiation utilized by ENU.

**CHANGES TO SOIL CHARACTERISTICS DURING SECONDARY SUCCESSION ON ELON UNIVERSITY FOREST**

**Margaret A. Small** (Dr. David Vandermast) Department of Biology

Elon University Forest (EUF) is a 22.5 ha former farmstead that experienced anthropogenic disturbance in the form of plowing and planting and harvesting of agricultural crops. This activity possibly altered the structure, amount of organic matter, nutrient status, and microbial community of the soil. EUF also contains forested land that remained relatively untouched, and has been identified as a forest of continuity (FOC). While the agricultural land has since returned to early successional forest communities, the FOC retains an old-growth forest structure and composition. In order to determine how these prolonged disturbances have altered soil quality, this study compared soil composition and structure of the younger plots to that of the FOC.  Environmental variables such as slope, aspect, and McNab indices for landform did not vary significantly between plots. The O and A soil horizons in the FOC were significantly deeper than those in the young forests (p=.035 and p=.011, respectively). In the FOC, soils in both the A and B horizons had Cation Exchange Capacity and concentrations of soil cations such as Ca, Mg, and Na that were less than 50% of those in the younger forests. Our results provide support for the hypothesis that the FOC is, in fact, different from younger forests within EUF in meaningful ways. Because the FOC was never cutover and plowed, and hence no soil was lost to erosion, it has retained the soil strata depths expected of an old forest. Consistent with our results, older forests in the Piedmont region also typically exhibit reduced fertility due to reduced CEC and cation concentrations as reported for the FOC. Our data provide further evidence that the FOC is a remnant of the primary forests that existed in this region before colonization by Europeans.

**MECHANISMS OF OIL DISPERSANTS ON NA+/K+ ATPASE α-SUBUNIT GENE EXPRESSION IN ZEBRAFISH IONOCYTES**

**Kaitlin R. Snapp** (Dr. Linda Niedziela) Department of Biology

As the need to transport petroleum between countries increases, so does the number of oil spills in marine ecosystems, leaving aquatic life vulnerable to toxicity.  Oil dispersants have become a seemingly quick and efficient resolution to these environmental threats.  However, past literature implicates oil dispersants as destructive to osmoregulation processes in marine life, specifically toxic to Na+/K+ ATPases (NKAs).  Important for cellular homeostasis, these enzymes facilitate ion transport across cells by creating electrochemical gradients.  This study explored the mechanism by which oil dispersants disrupt ATPase activity in the skin and gill cells of zebrafish (*Danio rerio*).  Zebrafish were exposed to various concentrations of Dispersit SPC-1000TM (0, 0.05, 0.125, 0.275, 0.5, 0.75, 1 ppm) and skin and gill tissues were dissected for genetic analysis.  Total RNA was extracted and converted to cDNA.  Comparative quantitative Real Time PCR was used to determine levels of the NKA alpha-subunit isoform atp1a1a.1 expression in treated ionocytes compared to untreated control samples.  Concentration of cDNA for use in Real Time PCR was quantified in two ways: through a traditional spectrophotometer and through use of a more sensitive Nanodrop Lite spectrophotometer, both using 260:280 absorbance ratios.  Real Time PCR performed on samples quantified using the traditional spectrophotometric quantitation, showed statistically significant differences in NKA gene expression (p<0.001 between 0.05 and 0.5ppm). On the contrary, Real Time PCR performed on samples quantified using the Nanodrop Lite failed to show statistically significant differences in NKA gene expression across various levels of oil dispersant exposure.  Traditional spectrophotometry is thought to be a less accurate quantitation method, yet the variability in Real Time PCR data for Nanodrop quantitated reactions also limits the ability to draw conclusions around the data.  Thus, it is unknown whether results from the traditionally quantified or the Nanodrop quantified Real Time PCR reactions more accurately reflect how Dispersit SPC-1000TM affects NKA gene expression.  These contradictions should be addressed in future studies.

**ASSESSING VIABILITY AND DEVELOPMENT OF HYBRID OFFSPRING FROM TWO CLOSELY-RELATED INSECT SPECIES**

**Paige L. Stover** (Dr. Jen Hamel) Department of Biology

In nature, copulations between individuals of different species rarely produce viable offspring. In North Florida, individuals from two closely-related species of insect (*Anasa tristis* and *A. andresii*) are commonly observed mating together in an area where the species are sympatric, or live in the same geographic area. Although *A. tristis* has historically occurred in Florida and throughout the Southeastern US, *A. andresii* appears to have been introduced to North Florida in the 1970s (native range: Southwestern US and Mexico). Copulations between *A. andresii* and *A. tristis* individuals produce hybrid offspring; however the viability of these hybrids is unknown. We predicted that survival of hybrids to adulthood would be reduced relative to survival of offspring from a single parental species. In the laboratory, we compared the survival and developmental rates of hybrid offspring to those of offspring from conspecific pairs (both parents *A. tristis*). We found that many more offspring from conspecific pairs survived to adulthood than did offspring of heterospecific pairs (*χ*2 = 16.95, *P* < 0.001). However, there was no significant difference in developmental rate between hybrid and *A. tristis* offspring. Our data suggest that females can incur high fitness costs when they mate with heterospecifics. Future research should evaluate the frequency of mating between these species in the field, and whether females who mate once with a heterospecific male pay high lifetime fitness costs.

**GUARDIAN OF THE GENOME: COMPUTATIONAL MODELING OF p53 INTERACTIONS WITH S100B**

**Sarah M. Vaughan** (Dr. Michael Terribilini) Department of Biology

The tumor suppressor gene TP53, coding for the p53 protein, is one of the most important suppressor genes involved in cancer. The p53 protein is mutated in one half of all human cancers, making it an important target for cancer research. One of its binding partners, calcium-binding S100B, binds to p53 and prevents it from tetramerizing to perform optimally. However, the mechanism by which S100B and p53 bind is not known. It is hypothesized that simulations will provide information about the mechanism by which p53 and S100B interact and how S100B prevents p53 from forming its final structure. The full-length structure of p53 was modeled using I-TASSER and the protein data bank file 1DT7 for S100B was docked to this structure. The modeled structures for p53 are consistent with experimental data from other studies of partial p53 structures. Molecular dynamics simulations were then run for p53 alone and for the p53-S100B complex using the AMBER software package. Analysis of p53 alone showed stable conformation with the RMSD stabilizing at approximately 5Å when compared to the initial structure. Each of the simulations of p53 exhibits structural variations which supports the hypothesis that p53 does not form a stable structure on its own but only when bound to one or more of its several binding partners. Simulations were then run on the p53-S100B complex to investigate how this interaction affects p53 tetramerization. Initial analysis of this interaction indicates that p53 was unable to fold into its secondary structure when bound to S100B. Alpha helices seen in the initial simulations of p53, specifically in the C terminal domain, were reduced almost completely in the complex and the presence of beta sheets was extremely limited. Further analysis will reveal the specific effects of the interaction on p53 residues and can give insight into inhibitors that may be used to block this interaction. Furthering an understanding of the interaction between p53 and S100B will help in the design of medicinal compounds for advanced direct treatment in those cancers that the p53-S100B interaction is causing significant problems.

***CARET ESSAY WINNERS***

**The Changing Rhetoric of Revolution: Thomas Jefferson, Martin Luther King Jr., Michael Brown and Black Lives Matter**
Lauryl Fischer, Caret Essay Contest, 1st Place

“The Changing Rhetoric of Revolution: Thomas Jefferson, Martin Luther King Jr., Michael Brown and Black Lives Matter” explores the rhetorical traditions of Thomas Jefferson and Martin Luther King Jr. as important revolutionary figures in American history in order to frame the current “Black Lives Matter” movement inside this historical context, thus seeking to understand the evolution of American values along these lines. The essay therefore analyzes “Letter from a Birmingham Jail” from Martin Luther King Jr’s *Why We Can’t Wait* and Jefferson’s Declaration of Independence as texts of their revolutions, but does so through a creative, third person lens—asking how a man like Michael Brown would answer the question posed. Using the third person creates a different ethos, which marries the past with the present. The essay analyzes typical rhetorical devices in this manner, such as word choice, point of view, audience, and allusion, weaving contemporary context through the essay’s body as well.

**King and Jefferson:  The Challenges of Modern Democracy**
Gregory M. Fulcher, Caret Essay Contest, 2nd Place

This paper attempts to establish, describe, and contextualize the biggest difference in the documented beliefs of Thomas Jefferson and Dr. Martin Luther King Jr. regarding the most effective form of American democracy. By using a range of Jefferson’s speeches and letters, the paper contends that Jefferson was a loyal devotee to a pure, basic, constitutionally sound interpretation of our government. That interpretation holds to the principle that the majority’s decision should be represented in government, and while dissenting opinions are certainly to be given fair consideration, in the end what is good for the majority is good for the Republic. That stance is presented as an opposing force to the one put forth by Dr. King in his book *Why We Can’t Wait*. Through his exploration of the situation in Birmingham, Alabama in 1963, and the larger racial climate on the cusp of full integration, King makes a strong case for the government serving as an agent that ensures safety and equality for all of its constituents. Indeed, King’s voice was initially one that represented the minority population, appealed to common human sensibilities, and offered a revised form of democracy. That form of democracy was not too far from Jefferson’s, it leaned heavily on the Bill of Rights, openly condemned tyranny, and promised a type of revolution, but the cardinal difference in their messages and the nature of their origins led to a clearly delineated line between the two. Indeed, King’s democracy and Jefferson’s can appear altogether different, or almost identical, depending entirely on one’s viewing angle. Nevertheless, their respective messages are still crucial to our understanding of our current system of government as it undergoes constant change.

**Echoes in History Between Thomas Jefferson and Dr. Martin Luther King Jr.**
Greg Melanson, Caret Essay Contest, 3rd Place

Dr. Martin Luther King Jr. and Thomas Jefferson were both great leaders in the American cultural landscape during their respective times, and as has always been the case in America at the heart of the cultural discussion is race. Jefferson, like so many others during his time employed questionable scientific practices and reasoning to justify his racial prejudices. Jefferson applied his regal, authoritative tone to systematically define the inferiority of African-Americans, and serve to comfort anxieties of white people during the late 1700’s in America of the awful injustices they had carried out against slaves for centuries. In 1963, Dr. King addressed the same questions of the plight of African-Americans but applied the same type of sound reasoning to explain that there was in fact no legitimate reason why the African-American individual should be segregated, or in any other way denied liberties that white people enjoy. Dr. King was able to prove the worth of African-Americans through peaceful means, earning massive victories for the advancement of African-American rights in the United States.

***CHEMISTRY***

**EXPLORING QUENCHING OF ELECTROCHEMILUMINESCENCE BY RDX**

**Clare E. Burton** (Dr. Karl Sienerth) Department of Chemistry

When electricity is applied to an electrode immersed in a solution containing certain types of compounds (luminescors), they will emit light in a process called electrochemiluminescence (ECL).  Explosives are known to decrease, or quench, the ECL of the luminescor luminol in aqueous solution.  The amount by which the explosives quench the ECL is proportional to the concentration of explosives added.  This relationship between ECL and concentration of explosives can be utilized in forensics and bomb analysis at crime scenes to determine the chemical makeup of explosives.  In the past, our research group has demonstrated the linear relationship between luminol quenching and concentration of a known explosive, TNT.  The current study focused on extending the previous investigations to include RDX, Research Department Explosive, a common explosive that has yet to be studied as a luminol ECL quencher in aqueous solution.  It was hypothesized that it will behave similarly to TNT in quenching ECL of luminol.  Our results indicate that RDX indeed quenches the ECL of luminol under these conditions and that the relationship is linear.  A proof of concept study at very low concentrations of RDX was also conducted, demonstrating that this new method can detect RDX competitively with substantially more expensive currently used methods.

**DETERMINING THE CONTRIBUTIONS BY RESONANCE AND INDUCTIVE EFFECTS TOWARD THE GAS PHASE ACIDITIES OF NITRIC ACID AND NITROUS ACID**

**Grace Catts** (Dr. Joel Karty) Department of Chemistry

The goal of this research is to determine the contributions of resonance and inductive effects towards the gas phase acidity of nitric acid (HNO3), and nitrous acid (HNO2). Resonance effects and inductive effects are two fundamental phenomena that occur within HNO3, HNO2, and their conjugate bases, affecting their stabilities. Resonance effects involve the interactions among *p* atomic orbitals, whereas inductive effects involve the presence and location of electronegative atoms. By finding the contributions of these two factors, we can better understand what makes one acid stronger than the other. This research used a computational approach using Gaussian software to calculate the gas phase acidities of each. Parallel and perpendicular vinylogues of the different molecules were conducted virtually, whereby various numbers of vinyl groups (HC=CH) were inserted in-between the acidic OH group and either the HNO2 group (in HNO3) or the NO group (in HNO2). In each parallel vinylogue, the NO2 or NO group is in the same plane as the vinyl chain, and in each perpendicular vinylogue, the group is rotated 90°. Reference vinylogues were also constructed by replacing the NO2 or NO group with a CH3 group. By calculating the acidity of each parallel, perpendicular, and reference vinylogue, we were able to determine the resonance and inductive contributions to each of the parallel vinylogues. Extrapolating these values from the n=1 to 5 vinylogues to the n=0 allowed us to determine the contributions to the parent acids. For HNO3, we determined the contributions by resonance effects to be 13.5 kcal/mol, and we determined the contributions by inductive effects to be 35 kcal/mol. For HNO2, we determined those contributions to be 27.5 kcal/mol and 21 kcal/mol, respectively.

**CHARACTERIZATION AND IDENTIFICATION OF FLAVONOIDS IN POPLAR HONEY**

**Lindsey M. Christman** (Dr. Eugene Grimley and Dr. Keely Glass) Department of Chemistry

Flavonoids are naturally-occurring molecules found in many fruits ad vegetables as well as in nectar of flowers. Reported health benefits of flavonoids have raised the interest in natural sources like honey.  The flavonoid profile of a specific type of honey depends on the plant from which the honeybee derives its nectar.  Since each flavonoid exhibits different properties and medical benefits, it is important to identify the flavonoids present in each specific type of honey. The purpose of this study was to develop protocols to analyze flavonoid standards and utilize them to identify the flavonoids isolated from local poplar (*Liridendron tulipifera)* honey. Flavonoids were extracted from poplar via separation on a column of Amberlite XAD-2 resin.  After separation, flavonoid samples were analyzed using high- performance liquid chromatography (HPLC) and gas chromatography mass spectrometry (GCMS). Initial analysis of standards using HPLC and GCMS was successful and allowed for development of protocol for poplar honey samples.  Early isolation via separation on a column showed promising results that allowed for further analysis on the HPLC and GCMS.  Through this investigation, I determined that the flavonoid profile of honey samples can be analyzed using the developed HPLC and GCMS standard protocol.

**EXAMINING APOPTOSIS IN A SEPSIS CELL CULTURE MODEL**

**Bethany C. Davis** (Dr. Victoria Del Gaizo Moore) Department of Chemistry

Sepsis is a systemic inflammatory response to infection of the blood by pathogenic organisms. Pro-inflammatory cytokines are released to fight the infection but many times lead to organ damage such as Acute Kidney Injury (AKI). Common among critically ill patients, the development of AKI is believed to be due, in part, to apoptosis. Apoptosis, or programmed cell death, is controlled by a multitude of cellular mechanisms. Cytokines can initiate the extrinsic pathway of apoptosis by binding to death receptors on the cell surface. While it is clearly evidenced that apoptosis plays a large role in immune cell decline under septic conditions, its influence in AKI is not entirely understood. The objective of this study is to determine an efficient means of examining the role of cytokines in inducing apoptosis in kidney cells in order to elucidate the pathogenesis of sepsis-associated AKI. Human immune THP1 cells were stimulated to secrete cytokines. Cultured human embryonic kidney (HEK) cells were treated with either these naturally secreted or recombinant cytokines, stained with a fluorescently-tagged apoptosis-binding protein, Annexin V-FITC, and analyzed by flow cytometry. Flow cytometry data demonstrates that recombinant cytokines allow for quicker analysis than naturally secreted cytokines. Apoptotic HEK cells treated with recombinant cytokines for 48 hours was comparable to treatment with naturally secreted cytokines for a duration of 120 hours. Treatment with recombinant cytokines excludes the time necessary for THP1 stimulation and cytokine recovery as well as significantly reduces the duration of treatment with cytokines. Recombinant cytokines also have the benefit of easily picking precise concentrations. With the greater understanding of the apoptotic processes associated with sepsis, the biochemical mechanism at the foundation of AKI can be further elucidated and more effective treatments for this disease may be possible.

**AMOXICILLIN DECREASES INTESTINAL MICROBIAL DIVERSITY AND INCREASES STRESS-ASSOCIATED BEHAVIORS IN ZEBRAFISH**

**Kirsten L. Deprey** (Jennifer K. Uno) Departments of Chemistry and Biology

Anxiety disorders affect approximately 18% of the population in the U.S. Research indicates that antibiotic exposure may contribute to the onset of anxiety. The gut-brain axis is a bidirectional communication pathway between the gut and the brain. Evidence supports the role of the microbiota in this relationship. This study employs zebrafish to observe the impact of amoxicillin-induced changes to the microbiota on stress-related behaviors. In general, a stressed zebrafish will demonstrate reduced exploratory movements and freezing behaviors than its unstressed counterpart. We hypothesize that a decrease in intestinal microbial diversity will increase anxious behavior. Adult zebrafish were administered amoxicillin or vehicle and challenged via death-induced odors and a net-stress. Top-to-bottom and side-to-side movement over time was recorded. Intestinal bacterial-DNA was extracted and bacterial phyla was examined and quantified by qPCR. Results confirmed amoxicillin significantly decreased the quantity and diversity of intestinal bacterial communities, indicated by a 20% change in universal gut bacteria in the treated fish (n=14, p value <0.05), and a slight increase in *Lactobacillus*. Antibiotic treatment also correlated to behavioral changes in the fish, illustrated by a significant decrease in top-to-bottom and side-to-side movement in fish (35%, 54% decrease in top-to-bottom and side-to-side, respectively, n=12 p value <0.01, p value <0.001). Behavioral studies after reestablishment of the gut microbiota also demonstrated a significant decrease in top-to-bottom swimming (n = 12, p value <0.01). Collectively, these results signify that decreased intestinal microbial diversity may elicit anxiety in zebrafish. These data warrant further investigation into the mechanism behind which microbiota-induced behavioral changes are associated with antibiotics.

**ELECTROCHEMILUMINESCENT QUENCHING OF CALCEIN BLUE BY TNT IN AQUEOUS SOLUTION**

**Jaclyn C. DeVincent** (Dr. Karl Sienerth) Department of Chemistry

Certain compounds, called luminescors, emit light when stimulated with an electrical current, a phenomenon referred to as electrochemiluminescence (ECL).  Explosive compounds are able to diminish, or quench, the intensity of the emitted light from electrochemiluminescence. In most cases, ECL is quenched proportional to the concentration of explosive, indicating that this is a promising avenue for analysis of the concentrations of explosives at crime scenes. Our study focuses on investigating the specific quenching relationship between TNT and the luminescor calcein blue to discover if calcein blue is suitable to play a part in a larger-scale field-deployable device.  The ECL of calcein blue is generated by applying a positive voltage to a platinum wire electrode in a pH 12.5 aqueous solution.  The ECL is measured in a black box using a photomultiplier tube detector.  Sequential aliquots of TNT were added to the solution in a continuous flow system.  Our initial results demonstrate that, although calcein blue is a weak electrochemiluminescor, its ECL is quenched by TNT, and the quenching is proportional to the concentration of TNT present.

**IS HUMAN LIFE ON MARS POSSIBLE?**

**Morgan L. Fleming** (Dr. Karl D. Sienerth) Department of Chemistry

Even though Mars is composed of 98% CO2 and not viable for human life, colonization of the planet is not as far-fetched of an idea as some may think. It is imperative to find a method for efficiently converting carbon dioxide to more useful substances. If humans want to explore the option of living on Mars, this research will determine whether the organometallic compound ruthenium (II) bis(2-pyridylcarbonyl)amide, or Ru(bpca)+, will facilitate reactions that convert carbon dioxide into other chemical compounds such as methane. The experimental design was conducted in three phases: synthesis, characterization, and electrochemical studies. Ru(bpca) was synthesized and characterized using FTIR and NMR spectroscopies.  Additionally, solubility studies provided information on the optimum solvent for use in electrochemical measurements. After the compound was characterized and purified, it was tested electrochemically using cyclic voltammetry (CV), where a series of voltages are applied through an electrode to a solution in which the compound is dissolved.  Initial results indicate that, while significant changes occur in CV studies after CO2 is added, the nature of those changes are not as expected for typical CO2 reduction catalysts.  Instead, it appears that a new ruthenium complex is generated produced in the presence of CO2, and that the process is reversible when CO2 is removed.  Further work will be needed to definitively determine if Ru(bpca)+ will serve as an effective catalyst in the transformation of CO2, and to determine what unique substance might be formed from Ru(bpca)+ when CO2 is present.

**INVESTIGATING THE OXIDATION OF β-ESTRADIOL BY LACTOPEROXIDASE AND ITS EFFECTS ON DNA NUCLEOTIDES**

**Taylor A. Glenn** (Dr. Kathryn Matera) Department of Chemistry

Model studies of oxidation were performed with the hormone β-estradiol and known oxidizing agents, and each oxidation reaction was monitored spectroscopically in order to quantify the oxidative change. The estradiol product from each model system was analyzed by 1H-NMR to identify molecular structure. The reaction between β-estradiol and lactoperoxidase (LPO) in the presence of H2O2was then analyzed the same way, comparing the results to each model system. Similarities in product structure suggest similarities in known reaction mechanisms. 1H-NMR and HPLC data of LPO-oxidized β-estradiol support two one-electron steps, resulting in a reactive quinone derivative. The addition of guanosine to LPO-oxidized β-estradiol causes a further reaction with the oxidized estradiol, as confirmed by the disappearance of reactive β-estradiol species peaks on both 1H-NMR and 13C-NMR. Future work would have to be done to elucidate the specific characteristics of this interaction.

**SILK FIBROIN BASED MATERIALS FOR TIME RELEASE DRUG DELIVERY OF HIV ENTRY INHIBITORS**

**Megan C. Halkett** (Dr. Li Zhang and Dr. Patricia J. LiWang) Molecular Cell Biology and Chemical Biology and Health Sciences Research Institute, University of California, Merced

HIV infects more than 2 million people each year, so prevention of this virus is very important to human health. The goal of this project is to formulate HIV inhibitors into silk materials that can be used to prevent the sexual spread of HIV. Several proteins have been found to be very potent at inhibiting HIV entry into human cells. However, in order for these proteins to be effective, they require a delivery material that will slowly release a constant dose of the medication over the course of treatment. Silk fibroin, a natural and biocompatible protein, has the potential to form the ideal drug delivery material as its manipulable secondary structure allows researchers to optimize the material’s physical properties to fit their purpose. We report the formulation of HIV inhibitors in silk materials that have been processed by water vapor annealing to be insoluble in solution that mimics human body fluids and to allow the slow, constant release of our inhibitor over the period of a week. Various water annealing conditions, silk concentrations and silk to inhibitor ratios were tested to optimize the time release profile of our silk fibroin delivery materials. Enzyme-linked immunosorbent assays (ELISA) were performed to quantify the amount of inhibitor released each day.

**CREATING A SUSPENDED LIPID BILAYER**

**Michelle C. Landahl** (Dr. Sara Triffo) Department of Chemistry

Phospholipid bilayers form the membranes of cells throughout the body and are an integral part of cell-cell communication and proper functioning of cells and body systems. Bilayers are also home to a variety of membrane proteins whose functions and signals affect nearly all areas of the living cell. This means that lipid bilayers and the proteins they contain are major areas of research in the scientific community. However, harvesting or culturing live cells is often time-consuming, difficult, and expensive. An alternative to this method is to create a synthetic lipid bilayer that can be more easily created and controlled. The overall goal of this research is to determine a successful method for painting lipids and creating a suspended lipid bilayer that can be studied, manipulated, and used in continuing research involving lipid membranes. Previous research was used to develop a protocol. First, a mount is built on a circular microscopy apparatus that consists of a channel to allow standard PBS buffer to flow freely along the cover glass, a layer of thin polytetrafluoroethylene (Teflon) with a small (microns wide) pore in the center of the apparatus (on top of the first layer of buffer), and a layer of buffer covering the top of the pore. Then, a lipid mixture with fluorescent stain is painted over the pore, and the pressure from the buffer on both sides should cause the lipids to form a suspended bilayer across the pore; this bilayer can then be observed under fluorescence microscopy. Preliminary viewings of the apparatus under fluorescence microscopy indicate that this protocol is sound and, with refinement, is likely to produce a suspended bilayer. When this goal is met, this protocol will allow other researchers to utilize the procedure in their own research or to use as an experiment in a teaching lab.

**THE ROLE OF APOPTOSIS IN SEPSIS-ASSOCIATED ACUTE KIDNEY INJURY**

**Kyle A. Lynch** (Dr. Victoria  Moore) Department of Chemistry

Sepsis is a condition in which the body initiates a system-wide inflammatory response mechanism due to massive infections throughout the body. While sepsis is the third leading cause of death in the world, researchers admit that little is known about how the condition affects vital organs. One organ that is affected greatly in sepsis is the kidney, as up to half of septic patients in the United States develop Sepsis Associated Acute Kidney Injury (SA-AKI). There is some evidence supporting the notion that apoptosis, or regulated cell death, plays an important role in decline of renal function. In order to adequately design therapeutic agents that could lead to improved clinical outcomes, researchers must first develop a further understanding of the role that apoptosis plays in these injuries. This project aims to analyze the Bcl-2 family of proteins, which are apoptotic regulatory proteins, in septic models of kidney cells in order to adequately characterize the mechanism by which SA-AKI occurs. The initial stages of this work have used the HK-2 cell line, which is derived from the proximal tubule cells of the renal cortex. Initial research suggests that the activity of the pro-apoptotic protein HRK, which is a member of the Bcl-2 protein family, is contributing to cellular apoptosis in this cell line. Western blots, which analyze the level of a specific protein, have also been performed on this cell line in order to analyze the baseline levels of relevant apoptotic proteins within the cell. As this project continues to develop, HK-2 cells will be treated with cytokines in order to induce apoptosis, and then the protein expression profiles of these cells will be assessed for differences between the treated cells and the control group.

**SYNTHESIS AND QUANTIFICATION OF THE CHEMICAL MARKERS OF MELANIN TO ENHANCE EARLY DIAGNOSIS OF MELANOMA**

**Leandra M. Nikont and Carly J. Weddle** (Dr. Karl Sienerth and Dr. Keely Glass) Department of Chemistry

Melanoma diagnosis is clinically challenging and subjective. High discordance rates among experienced pathologists demonstrate the need for more chemically robust diagnosis methods. Melanoma is characterized by overproduction of the pigment melanin, which is present in two forms in human skin—eumelanin and pheomelanin. Current techniques to quantify melanin entail chemical degradation of the pigment into markers specific to each of the two natural forms. These chemical markers are then separated and quantified by high performance liquid chromatography with ultraviolet detection (HPLC-UV). While this characterization has proved useful, identification of the melanin chemical markers in complex biological matrices is limited by the presence of interfering signals. To overcome these limitations, two new methods have been developed for purifying and identifying the markers of eumelanin and pheomelanin: (1) Solid-phase extraction (SPE) is used to separate melanin markers from complex biological matrices based on electrostatic interactions between charged particles, and (2) HPLC in conjunction with mass spectrometry (HPLC-MS) generates the molecular weight of melanin markers and provides insight on their individual chemical structures. Previously published conditions that prevented the use of MS detection and decreased the lifetime of expensive equipment have been replaced with a compatible solvent system. Further, an alternative method for synthesizing an important chemical marker for pheomelanin was developed because literature methods were found to be unreliable. In the long term, separating, quantifying, and identifying the chemical markers of melanin using these techniques will be used to test the hypothesis that a high eumelanin to pheomelanin ratio corresponds to malignant melanoma.

**STABILIZATION OF TOXIC Aβ OLIGOMER AGGREGATES USING PHENOLIC COMPOUNDS: ALZHEIMER’S DISEASE**

**Ian R. O’Leary** (Dr. Kathryn Matera) Department of Chemistry

Small molecules containing a benzene ring and hydroxyl group, known as phenolic compounds, have been found to stabilize toxic amyloid beta (Aβ) oligomer aggregates. These oligomers, which are made of multiple interacting peptide strands, have been hypothesized to contribute to Alzheimer’s disease (AD); therefore analyzing and understanding how phenolic compounds interact with Aβ is essential to the treatment of AD. Research shows that phenols can stabilize toxic Aβ oligomer aggregates alone and also disaggregate larger fibril plaques to smaller toxic oligomers. This research specifically explores how different phenolic compounds interact with Aβ aggregates at a basic, physiologically relevant pH. Utilizing UV-visible spectroscopy, gel electrophoresis, thioflavin T fluorescence, and NMR results have given data on the phenols’ interactions with Aβ oligomers and fibrils that have suggested how the stabilization of toxic Aβ oligomer aggregates occurs.

**THE OXIDATION OF LIPIDS BY LACTOPEROXIDASE**

**Susan C. Reynolds** (Dr. Kathryn Matera) Department of Chemistry

Lactoperoxidase (LPO), an enzyme found predominantly in breast tissue, is known go through two pathways to reduce hydrogen peroxide (H2O2) to water physiologically, either via a harmful free radical mechanism or by oxidizing negatively charged halides to make an antioxidant species. LPO is also known to cause the oxidation of other biomolecules, including lipids, hormones and proteins. These oxidation reactions can be detrimental *in* vivo, as the oxidized biomolecules often result in cell death or diseases, such as cancer. This particular study analyzed three fatty acid lipids including oleic acid, linoleic acid and arachidonic acid to determine the binding of LPO to the fatty acids. Once the binding to free fatty acids was ascertained, a lipid more like those found in cell membranes, L-alpha-phosphatidylcholine (lecithin), was analyzed to determine its binding and oxidation by LPO. Solutions of LPO and various lipids were made with phosphate buffer and the resultant complex concentrations were measured quantitatively with ultraviolet-visible (UV-Vis) spectroscopy. A kinetics study to determine oxidation was conducted with H2O2, LPO and lecithin, again measuring absorbance changes with UV-Vis spectroscopy to determine rates of reactions. Binding curves and Michaelis-Menten curves were plotted and analyzed to calculate the dissociation constant (KD), a measure of how well the lipids bind to LPO, and the Michaelis constant (KM), a measure of the oxidation of a molecule. The binding studies found a KD value of 1.2x10-3 M for free fatty acids and a KD value of 1.8x10-4 M for lecithin. The KD and KM values indicate that LPO is binding and oxidizing lecithin better than the free fatty acids. These results indicate that LPO may be capable of oxidizing the lipids in cell membranes, and thus causing cell death within the breast tissue.

**RUTHENIUM CENTERED ORGANOMETALLIC CATALYSTS FOR BENZIMIDAZOLE SYNTHESIS**

**Alyssa K. Romano** (Dr. Karl Sienerth) Department of Chemistry

Human-synthesized compounds (known as catalysts) are used to reduce the energy requirement to carry out a specific transformation. This research dealt with synthesizing catalysts that enhanced the combination of simple carbon based compounds, formaldehyde and diaminobenzene, to form benzimidazole, an important ingredient in many molecules used in pharmaceutical drugs. Recent literature reported a compound containing a ruthenium atom in its center was found to significantly catalyze this reaction. In this research, additional ruthenium complexes were investigated as potential catalysts for making benzimidazole. The complexes [Ru(tptz)(H2O)Cl2]+ , Ru(dpk)(DMSO)2(Cl)2 and [Ru(tptz)2]3+ complexes have been synthesized and characterized. In addition, studies have been performed that analyze the effects of several parameters (light wavelength, exposure time, concentration) on the catalytic efficiency of these ruthenium compounds and [Ru(bpy)3]2+. This research has led to the determination of which ruthenium compound works as the best catalyzing complex for the reaction of diaminobenzene and formaldehyde to form benzimidazole.

**SYNTHESIS OF NEW GOLD CARBENE COMPELXES WITH POTENTIAL CATALYTIC ABILITY**

**Alyssa Romano** (David Zahner, Universität Heidelberg) Department of Chemistry

Organic compounds, which are an open chain of carbon atoms, are called acyclic compounds. Recently, acyclic compounds containing metallic, nitrogen and carbon atoms, otherwise known as nitrogen acyclic carbenes (NAC), have become an increasingly important topic in chemistry- particularly as substances that increase the rate at which chemical reactions take place. Carbenes are special compounds that possess fewer electrons than normal carbon atoms. Carbenes are also unique because they possess both positive and negative character in terms of charge, which promote binding to metal atoms, such as gold. Gold carbenes are particularly stable compounds, because of the phenomenon known as pi-backbonding, where the gold atom donates electron density into the empty p-orbital of the carbene carbon atom. In this research, an amine compound and seven NAC gold carbene complexes were synthesized. The amine was used in five syntheses and a previously synthesized, different amine was used for the remaining two syntheses. Nuclear magnetic resonance studies, mass spectroscopy and infrared spectroscopy were used to confirm crystal structures of the NAC gold complexes. In addition, the catalytic ability of three NAC gold complexes was assessed.

**MULTIFUNCTIONAL POLYURETHANE HYDROGELS FOR BIOMEDICAL APPLICATIONS**

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Lehrstuhl für Makromolekulare Materialien und Oberflächen, RWTH Aachen University Department of Chemistry

Polyurethanes represent a broad class of polymers widely applied in everyday-life. Although polyurethanes are easy to produce and have a broad range of adjustable properties, only a few polyurethane-based nanomaterials have been realized so far. Here we designed a novel class of water-soluble polyurethanes that combine multiple functionalities relevant for biomedical nano-applications. Their chemical and mechanical properties can change, triggered by both changes in pH inside the body and by intracellular redox reactions; combining these two aspects allows the polyurethanes to release drugs inside the body. Cross-linking water-soluble polyurethanes leads to hydrogels, which are materials with soft mechanical properties useful for applications like drug delivery or tissue engineering. However, previously reported methods to create polyurethane-based hydrogels are limited for biomedical use, since they are based on toxic prepolymers. Our novel gelation mechanism is based on physical interactions and does not require any toxic prepolymers, rendering our hydrogels non-toxic and applicable as drug delivery systems or injectable gels for in-situ tissue engineering.

**THE PREDICTED ENSEMBLE OF 3D STRUCTURES FOR HUMAN OLFACTORY RECEPTOR HOR1A1-4**

**Christian G. Seitz** (Dr. William A. Goddard III) Department of Chemistry and Chemical

Engineering, California Institute of Technology

Human olfactory receptors (hORs) are the proteins that allow humans to smell. They are members of Class A G protein-coupled receptors (GPCRs), which is the largest class of GPCRs;  the binding of molecules to hORs, known as odorants, give us our sense of smell. However, the 3D structure and binding details of most hORs are not known. The energetically-best 3D conformations were predicted for one specific GPCR, OR1A1-4, using mathematical sampling methods known as Monte Carlo methods to sample ~200,000 structures from ~40 trillion possible conformations. This allowed us to test a smaller representative sampling of structures instead of every possible structure, saving over a million years at the current computational rate. The top 25 structures for OR1A1-4 were ranked according to energy, and three structures were selected for ligand docking using criteria including structural diversity, hydrogen bond energy, and conserved interactions between the seven helices of the GPCR, known as 1-2-7 and 3-6 interactions. OR1A1-4 was then docked with two structurally similar odorants, one (nonanal) that had been previously determined to activate OR1A1-4 and one (hexanal) that did not activate OR1A1-4. Both odorants docked to a previously identified amino acid (Q100) that was a putative residue for activation. Five cycles of quench annealing (heating the structure to 600 K, then cooling to 50 K) were then run to lower the energy. After comparing the final nonbonding energies, the activating odorant showed stronger binding to OR1A1-4 than the non-activating odorant. These results suggest key activation characteristics in OR1A1-4 and the top binding residue for nonanal and hexanal. For the first time we showed the structure of an odorant bound to OR1A1-4, suggesting that a drug with a structure similar to nonanal or hexanal will bind to Q100. Knowing this structure and binding residue can allow future development of biased agonists, or drugs that can target GPCRs with greatly minimized or nonexistent side-effects.

**WHY DOES THE ACETALDEHYDE ENOLATE FAVOR REACTION AT THE OXYGEN ATOM DURING GAS-PHASE NUCLEOPHILIC SUBSTITUTION? CONTRIBUTIONS BY RESONANCE AND INDUCTIVE EFFECTS**

**Christian G. Seitz** (Dr. Joel M. Karty) Department of Chemistry

Enolate anions (containing the OC=C group) are important reactive components found in organic synthesis, and they can undergo reaction at the oxygen atom or the carbon joined to that atom, called the alpha carbon. In solution, the carbon atom is usually the more common reaction site, but in the gas phase (i.e., without solvent present), the oxygen atom is preferred. To better understand this preference in the gas phase, we carried out a computational study with the quantum theoretical software program Gaussian while using the vinylogue extrapolation method on a model reaction between the acetaldehyde enolate anion (CHOCH2) and methyl fluoride (CH3F). Specifically, this method was used to quantify the contributions by resonance effects (from the sharing of the negative charge) and inductive effects (from the overall negative charge) toward the activation energy of the reaction for each reaction site. Our results suggest that, for both sites of reaction, the loss of resonance from the enolate anion upon entering the transition state is more important than the loss of inductive effects. Even though this loss of resonance serves to disfavor the reaction at both carbon and oxygen, the reaction at carbon is disfavored significantly more than it is at oxygen.

**WHY IS PERCHLORIC ACID STRONGER THAN SULFURIC ACID BUT PHOSPHORIC ACID IS WEAKER? DETERMINATION OF THE CONTRIBUTIONS BY INDUCTIVE/FIELD EFFECTS AND ELECTRON-DELOCALIZATION EFFECTS**

**Emily G. Swanson** (Dr. Joel Karty) Department of Chemistry

The goal of this research was to determine how inductive effects and electron delocalization effects contribute to the acidity of perchloric, sulfuric and phosphoric acids, which are three of the most common inorganic acids in use today. By finding the contributions these two factors make to each acid we have a better understanding of what makes one acid stronger than another. The method being used in this research is a computational approach called alkylogue extrapolation. Calculations were carried out at the MP2 theory level using the Gaussian 09 software package. The gas-phase deprotonation enthalpies were determined for the alkylogues of perchloric acid, ClO3-(CH2CH2)n-OH, sulfuric acid, HOSO2-(CH2CH2)n-OH, and phosphoric acid, H2PO3-(CH2CH2)n-OH and were compared to the alkylogues of ethanol, H3CCH2-(CH2CH2)n-OH. The inductive/field in each acid’s alkylogues were found by subtracting the deprotonation enthalpies of each acid’s alkylogues from those of corresponding alkylogues of ethanol. This was done for the n=1-6 alkylogues, and then contribution by inductive effects toward each acid of interest was determined by extrapolating the values form n=1-6 to n=0. The electron-delocalization effects in each acid were found by subtracting the contributions by inductive effects in the acid from the different in deprotonation enthalpy between the acid and ethanol. Our results indicate that perchloric acid has the highest inductive/field effects, while phosphoric has the lowest. Phosphoric acid had the biggest contribution from electron delocalization, while perchloric acid had the smallest. Inductive effects therefore appear to be the dominant effect: the stronger the inductive/field effects are, the stronger the acid is.

**THE FIGHT AGAINST ALZHEIMER’S DISEASE: COMBATTING Aβ AGGREGATES SYNTHESIZED ON LATEX BEADS**

**Sarah C. Woidill** (Dr. Kathryn Matera) Department of Chemistry

Alzheimer’s disease (AD) is a neurodegenerative disease that causes dementia, memory loss, and cognitive dysfunction and does not yet have a cure. Aggregation of protein segments, called peptides, of amyloid beta (Aβ) have been found to play a central role in the development of Alzheimer’s disease, and often AD is diagnosed by the presence of insoluble Aβ fibril plaques in the brain. While the fibril plaques of Aβ are indicators of AD, the smaller aggregates of protein, called oligomers, have been shown to cause the serious cognitive dysfunction. This research uses a novel method to assess peptide aggregates by covalently attaching Aβ peptides on latex beads and non-covalently aggregating additional peptide strands onto the covalently bonded strands. The effects of various phenolic compounds, which are potential AD drug candidates, on the aggregation and disaggregation of peptide strands aggregated onto the beads were tested. In addition, this research tested how the oxidation of these phenolic compounds affects the formation of and separation of these aggregates in solution without the beads. Three different methods were used to assess the disaggregation and aggregation of the peptide oligomers in the presence of each phenolic compound:  UV-Vis spectroscopy, ELISA, and gel electrophoresis. Overall, the UV-Vis, ELISA, and gel electrophoresis results comparing bead and no-bead aggregates in the presence of phenols demonstrate that phenolic compounds interfere with the aggregation and facilitate the disaggregation process of A. Gallic acid, specifically, appeared to be the most active of the phenolic compounds tested and thus became the focus of further experimentation. The findings will lead to further understanding of how phenolic compounds interact with Aβ aggregates and thus can provide information to find more effective treatment options for Alzheimer’s disease.

***COMMUNICATIONS***

**FRIENDSHIP, SOLIDARITY AND FAIR PLAY: "EXPLORING POLITICAL IMPLICATIONS OF U.S. FRAMING OF HUMAN RIGHTS VIOLATIONS OF MODERN OLYMPIC HOSTS**

**Michelle Alfini** (Dr. Glenn Scott) School Communications

Every two years, as the global media spotlight shines on the arrival of the next Olympic Games, one key question is whether that spotlight extends to the host city’s human rights record. This project examines how two U.S. newspapers (the *New York Times* and *Washington Post*, three U.S. television networks (CBS, NBC, and PBS), and a sports magazine (*Sports Illustrated*) covered human rights in Russia and Brazil in the preparations for the 2014 Sochi Games and the 2016 Rio Games. A framing analysis of 329 news stories revealed that the newspapers covered human rights more extensively than did national evening TV news programs, though the coverage was much more so for Russia. Treatment of human rights issues in the two newspapers was more homogeneous than in the three TV broadcasts. Overall, more than half of the news stories that mentioned the Olympics also referenced human rights when covering the Sochi preparations, but not necessarily as the primary topic of the reporting.  Meanwhile, only about a fifth of coverage related to the Rio Games mentioned human rights. One noteworthy finding is that news stories almost never linked the topic of Olympic security with human rights. The most common aspect of human rights in Russia that U.S. journalists covered dealt with freedom of expression, while in Brazil it was forced evictions. The findings here conform with several previous studies, including the work of Black & Bezanson (2004), who foundthat coverage of human rights violations tend to take a back seat in the United States when the public is concerned about terrorism.

**STRATEGIES FOR BUILIDNG CREDIBILITY WITHIN THE CONTENT OF INFORMATIONAL PODCASTS**

**Xernay Aniwar** (Dr. Amanda Sturgill) Department of Communications

How does one make their voice heard in an online world full of media clutter? The purpose of this study was to analyze the methods in which successful, independent podcasters build a following and establish credibility with their audience. Channels were chosen from the “Top Podcast” menu on iTunes, as of April 2015. Independence was confirmed by further research into ownership and affiliates of each channel. The content for each podcast was analyzed to measure the presence of 16 variables. These variables included references to third party sources, personal experience, and means of identifying with the audience. Each time a variable appeared, it was accounted for and checked by another researcher. From our sample study we conclude that the categories in which successful, independent podcasters scored highest in often involved shared personal experiences, and attempts to identify with their audience, or with a specific culture. Moving forward, we may have a better understanding of what builds speaker-credibility in an online-media environment.

**A CROSS CULTURAL COMPARISON OF ETHNIC NARRATIVES FROM THE CIVIL RIGHTS MOVEMENT**

**Karen N. Balas, Bennett G. Driscoll, Olivia O. Hobbs, & Gabrielle A. Vance** (Dr. Frances Ward-Johnson) School of Communications

Prior to our research, we assumed the Civil Rights Movement from 1954 to 1968 in the United States was solely a fight for the civil rights of African Americans who lived in a segregated society, many of whom did not have basic rights of voting, eating in public restaurants or sitting at the front of a city bus. Indeed, these injustices for African Americans led to a time of social unrest across the country. During our research, we found other minorities also faced many of the same obstacles as African Americans during this time period. Interviews with Asian American and Hispanic American families who grew up during the 1950s and 1960s uncovered the stories of groups who are often overlooked when discussing civil rights. During our study, we toured museums and famous civil rights sites in Alabama and Georgia, interviewing people who were a part of the Civil Rights Movement, gaining new racial perspectives about the various minority groups who faced discrimination and benefitted from the movement’s outcomes. Our research questions included: What are your memories growing up during the Civil Rights Movement?  How do you think growing up during this time period affected your thinking about race or about segregation? Growing up during segregation, can you recall an early incident when you recognized a difference of treatment due to color? Looking back, what are the impacts on your life today as a result of growing up during this time period? Our research revealed that Hispanic Americans and Asian Americans were discriminated against in a different manner than African Americans, and we found discrimination prevalent in gender, race and religion. This study recognizes the expansive reach of the Civil Rights Movement and how it ultimately galvanized an entire country.

**BREAKING BARRIERS TO BUILD MORE: PORTRAYALS OF FEMALES IN ADVERTISEMENTS IN THE *YOGA JOURNAL* MAGAZINE**

**Stephanie Anne Nicole Bedard** (Dr. Julie Lellis) School of Communications

Since its introduction to North America in the 1960s, yoga has become a multi-billion-dollar industry of instructional classes, consumer products, and publications. This study investigates how females are portrayed within North American yoga-focused media. Specifically, the research explores portrayals and depictions of female models featured in advertisements in the *Yoga Journal*, a widely-circulated yoga lifestyle magazine. Content analysis was conducted using thirteen editions of the *Yoga Journal* magazine published in 2013 and 2014. Each advertisement including at least one female model was analyzed, leading to a final sample of 114 unique advertisements. Results suggest that while depictions of females in yoga advertisements diverge from the traditional female gender roles established in wider media, the portrayals of females remain largely homogenous. This homogeneity is shown through the prominence of thin Caucasian models appearing to possess superb physical fitness and ability in addition to aesthetic beauty. Additionally, African-American, Latina and women of diverse races and ethnicities were found to be significantly underrepresented in the sample. Finally, results suggest that advertisements portray ideal yoga females as practitioners not only of yoga, but also as followers of a yoga-centered lifestyle including particular clothing, food, and attitudes.  **CONNECTING**

**THE NEXT BILLIONS: GLOBAL INTERNET LEADERS' POLICY PLANS FOR REACHING EVERYONE EVERYWHERE**

**Leena Dahal and Jackie B. Pascale** (Prof. Janna Anderson and Dr. Kenn Gaither) School of Communications

The first billion was reached in 2005, the second in 2010, the third in 2014, yet 4 billion people across the globe still have no access to the Internet. How can they connect? Nearly 100 ethnographic video interviews were conducted with experts in November 2015 at the United Nations-facilitated Global Internet Governance Forum in Joao Pessoa, Brazil, where more than 2,000 stakeholders from 116 nations represented government, technology, business, academia and civil society. A six-student research team from Elon University recorded responses totaling more than five hours of content; the print transcripts total more than 75 pages. The interviews were posted as part of the Imagining the Internet Center’s documentary coverage of the Internet's ongoing evolution. In previous research studies it has been found that the ability to connect is top among the most-mentioned goals for those who are evolving the Internet. This research represents the views of participants from a range of social, political, geographical, and economic backgrounds who responded to a voluntary survey in a convenience sample gathered in the village square and hallways of IGF. Researchers collected statements from dozens of IGF participants who were asked to assess issues. The study yielded a diverse range of stakeholder attitudes about the ways to best develop Internet access. Participation 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.

**THE FRAMING OF THE CIVIL RIGHTS MOVEMENT THROUGH *JET* MAGAZINE EVENT COVERAGE**

**Danielle R. Deavens** (Dr. Naeemah Clark) School of Communications

*Jet* was a newsmagazine that chronicled Black American life from the publication’s start in the early 1950s through 2014 when it released its final print issue. This content analysis explores *Jet*’s framing of the Civil Rights Movement through coverage of ten newsworthy events between The Brown v. Board of Education decision in1954 and the assassination of Martin Luther King, Jr. in 1968. This study asked two questions: (1) what did *Jet* tell its audience about these specific events? and (2) how did *Jet*’s framing of those events paint a larger picture of the Civil Rights Movement? Articles directly addressing the ten selected events were categorized as addressing violence, advocacy, or policy. The findings showed that *Jet*’s coverage of the Civil Rights Movement indicated all three of these categories, and that the three were intrinsically connected to each other and to the success of the movement. This study is important because it addresses how a popular publication for African Americans told the stories essential to the evolution and uplift of this group at a pivotal historical period.

**BRANDING INDIA: HOW PRIME MINISTER NARENDRA MODI IS USING YOGA AS A COMMUNICATION AND IMAGE-BUILDING TOOL**

**Lillian V. DeNunzio** (Dr. Kenn Gaither) School of Communications

Since his inauguration as India’s Prime Minister in 2014, Narendra Modi has made sustained efforts to communicate yoga’s capacity as a change agentto both national and international audiences. This research suggests that because yoga is broadly associated with positive outcomes like peace, health, and wisdom, Modi is attempting to “reclaim” yoga as an authentically Indian cultural artifact to symbolize his leadership and to project a positive national image for India. Modi has declared himself a transformational leader who will direct India down a path toward securing prosperity, stability, and respect in the international community. By branding yoga to help him fulfill these ambitions, this research suggests he can form positive perceptions about his leadership and Indian culture. Modi’s strategy for branding yoga must be understood in the context of India’s immense diversity and the political controversies surrounding him and his affiliation with the Bharatiya Janata Party, whose Hindu nationalist ideology has aroused tensions between the country’s Muslim and Hindu communities. This study pursues an extended literature review to identify the link between nation branding and yoga through a cultural studies framework. It will examine Modi’s English language social media activity, political efforts, and other forms of publicity to track his messages about yoga.

**SHARING THE GOOD NEWS: HOW MEGACHURCHES TELL THEIR STORY THROUGH THEIR DIGITAL COMMUNICATIONS.**

**Clinton A. Lewis III** (Dr. Anthony Hatcher) School of Communications

The United States’ current megachurches have largely been established in the past 60 years. While large bodies of worship exist among various religions in the U.S., megachurches are defined by more than just large congregations. They are primarily Protestant and cater to those who want to receive spiritual enrichment in a less formal and more contemporary worship setting. With three-quarters of U.S. households using the Internet, megachurches are increasingly using their websites and social media channels as a means to break down barriers and reach people more effectively. Megachurches’ digital communications platforms convey a first impression to many potential first-time guests and serve as a source of information to current church members. This study profiled four of the fastest-growing megachurches in North Carolina, based on *Outreach Magazine’s* Fastest-Growing Churches in America by Region list as published in its 2014 and 2015 editions of *The Outreach 100*. The four churches’ websites and Facebook pages were analyzed to gain insight on how they tell their story through the content on these platforms. Through qualitative analysis of digital content, journalistic interviews with staff, and completion of field observations at each church, results revealed that megachurches represent themselves via digital communications as accessible, welcoming, supportive of spiritual growth, and evangelistic.

**BEYONCÉ, THE SUPER BOWL AND THE BLACK PANTHER PARTY: A CONTENT ANALYSIS OF THE CONTROVERSY SURROUNDING THE HALF-TIME SALUTE TO THE MILITANT GROUP**

**Audrey McLauren Zullinger** **and** **Nathan Calem** (Dr. Frances Ward-Johnson) School of Communications)

Singer and Producer Beyoncé’s Black Panther-themed performance at the 2016 Super Bowl led to harsh criticisms from many, including former New York Mayor Rudy Giuliani and others who quietly boycotted at NFL headquarters in New York. The swift backlash on social media and high profile media coverage showed how deep the impact of the Black Panther Party goes 50 years since its founding. This research study is a content analysis of the social media reaction to Beyoncé’s homage to the Black Panther Party and reveals positive and negative sentiments expressed by hundreds, including fans and former Black Panther Party members. Twitter users churned out an average of 147,000 tweets per minute about the incident, according to social-media-monitoring firm, Spredfast. This study also analyzes tweets and Facebook comments raised after the Saturday night live spoof of the Super Bowl incident. This research reveals what many do not know: that the Black Panther Party rose out of the Deep South during the Civil Rights Movement and has its origins in Lowndes County, Alabama, during the fight for voting rights for African Americans. The founders were former members of the Student Nonviolent Coordinating Committee who initially wanted to combat police violence and provide a grassroots social safety net for the poor. This study broadens students’ knowledge and awareness of the alternative groups that flourished during the Civil Rights Movement and helps the audience understand current social justice discussions and movements such as #BlackLivesMatter.

**ADVERTISING IN AN ERA OF HARD TIMES: CAMPAIGN AND STRATEGY EFFECTIVENESS IN PRINT DURING THE 1930S AND 1940S**

**Katherine M. Nichols** (Dr. David Copeland) School of Communications

This research details the antecedent factors in the advertising industry that gave increasing profit margins to five large name companies during times of economic hardship and American turmoil, the 1930s and the 1940s. Summarizing the severity of the Great Depression and World War II and their resulting effects on the U.S. economy, this project investigates common advertising practices during these decades, to determine their success in combatting gravely decreasing sales. The following research questions have been asked for this study’s completion: First, during this time of economic hardship, did companies through advertising campaigns continue to promote products in some way? Second, in the midst of this era of fiscal tragedy, what were the strategies that advertisers used in print to advocate consumerism? And lastly, what were the most effective and successful tactics utilized by ad men and why? Conducting a case study on the following companies, Coca Cola, Hershey, Procter & Gamble, the American Tobacco Company and General Motors, this work offers hypotheses on advertising techniques’ varying levels of success by comparing their use in relation to rising and falling advertising figures and company profits. The resulting analysis offers insights into both the advertising and communications industries during these two pivotal events of the twentieth century, with corroborating evidence on the effectiveness of certain ad techniques in times of faltering economic assurance. Conclusions reveal that during these two times of economic distress, the following advertising techniques led to the most profit increases: 1) Appealing to consumers’ emotions through relational experiences, 2) Vividly describing product innovations, 3) Attracting consumers with celebrity endorsements and 4) During wartimes, using patriotic messages to sell products. Throughout the Great Depression and World War II, therefore, properly targeted advertising led consumers to continue buying goods in various industries, despite depleted monetary funds.

**BRAND PARTNERSHIP GONE BAD: AN ANALYSIS OF LEGO'S REPONSE TO THE ATTACK ON ITS PARNTERSHIP WITH ROYAL DUTCH SHELL**

**MaryClaire E. Schulz** (Dr. Lucinda Austin) School of Communications

In 2014, Greenpeace launched an attack on a 50-year brand partnership between LEGO and Royal Dutch Shell. Through the qualitative analysis of Greenpeace’s campaign and LEGO’s responses over a three-month period, this case study examined how Greenpeace influenced LEGO’s communications toward its consumers and its subsequent decision to terminate its partnership with Shell. Findings suggest that the popularity of Greenpeace’s viral video “Everything is NOT awesome” played a role in LEGO’s decision, in addition to the NGO’s accusations questioning LEGO’s investment in children’s futures. Larger implications of this study include the growing use of viral media in activist campaigns and the importance of understanding stakeholder perceptions of brand partnerships.

**TRANSFORMING THE IMAGES OF AFRICAN AMERICANS IN TELEVISION PROGRAMMING: A LEADERSHIP PRIZE PROJECT**

**Tony Weaver, Jr.** (Dr. Naeemah Clark) School of Communications

Existing research shows that African Americans are negatively represented the most of any ethnicity in television. (Mastro and Greenberg, 2000).  According to communications researcher, George Gerbner’s cultivation theory, “The more time people spend ‘living’ in the television world, the more likely they are to believe social reality portrayed on television (Gerbner, 2000).” Negative portrayals of African Americans  have been linked to African Americans receiving less attention from doctors, harsher sentencing by judges (Rachlinski et al., 2009), lower likelihood of being hired for a job or admitted to school, shorter life expectancy (Entman, 2006), lower odds of getting loans, and higher likelihood of being shot by police (Greenwald, Oakes, & Hoffman, 2003). Though a great deal of research has been done on television portrayals of African Americans, there has not been any analysis of African American portrayals in online streaming platforms. To determine how African Americans are represented on these platforms, a content analysis was performed on the top 5 shows from Netflix, Hulu, and Amazon Prime. Initial findings from the content analysis suggest that there are disparities both on screen and behind the scenes, with 61% of analyzed shows having no African American characters in the main cast, 91% of analyzed shows having no African American writers, and 95% of analyzed shows having no executive producers of color. African American characters were most often stereotyped as being ghetto or criminals. Ultimately, though online streaming platforms offer more diversity than traditional television, misrepresentation and underrepresentation are still a major issue in this space. In accordance with the Leadership Prize’s dedication to finding solutions to pressing social issues, student researchers attended the American Black Film Festival, the South by Southwest Film Conference, and the Tribeca Film Festival to develop strategies to combat media misrepresentation of African Americans. These experiences culminated in the production of a series of short films based on the stereotypes found in the content analysis, which would premiere at this session.

**A COMPARISON AND CONTRAST OF CIVIL RIGHTS KNOWLEDGE AMONG ELEMENTARY SCHOOL STUDENTS AND COLLEGE STUDENTS**

**Janae Y. Williams and Shannon A. Rush** (Dr. Frances Ward-Johnson) School of Communications

Harvard historian Henry Louis Gates writes frequently about the importance of civil rights education and students’ ignorance (2013). He researched the number of students who were not familiar with *Brown v. Board of Education* when referencing the National Assessment of Education Progress U.S. History exam. On this particular exam, there were only a dozen questions (out of 441) about the Civil Rights Movement (*The Root*, 2013). A Southern Poverty Law Center report revealed that only 19 states require teaching *Brown v. Board of Education*, while 18 states require coverage of Dr. Martin Luther King. Rosa Parks is a required curricular topic in 12 states, the March on Washington in 11, and Jim Crow segregation policies in just six (Teaching Tolerance, 2011). Our qualitative study includes interviews with 45 college students and 45 elementary school students. It asks about the Civil Rights Movement as well as current social justice topics. The participants were asked what they know about the Civil Rights Movement, to name important figures and events in the movement, and to discuss a current social justice issue. Preliminary results reveal that some elementary school students retain more knowledge about civil rights when compared to college students. Thus, it is evident that a knowledge gap exists between elementary school and college in regards to the Civil Rights Movement. This research emphasizes the need for more civil rights education within K-12 grades as well as in post-secondary courses. The study aims to bridge the gap between civil rights awareness of yesterday and today. It also broadens students’ knowledge and awareness of the Civil Rights Movement and may help facilitate Elon’s own journey toward diversity and inclusion.

**TURKEY’S FRAMING OF ITS ECONOMY, FOREIGN POLICY AND HUMAN RIGHTS IN COMPARISON TO THE COUNTRY’S PUBLIC REPUTATION**

**Tara R. Wirth** (Dr. Vanessa Bravo) School of Communications

The purpose of the study “Turkey’s framing of its economy, foreign policy and human rights in comparison to the country’s public reputation” is to understand if the messages presented by the Turkish government to the international community about human rights, the economy, and foreign policy are perceived in similar or different ways than intended by publics located beyond Turkey. This qualitative study, which uses framing theory as its theoretical framework and includes conceptual descriptions of nation branding, collected 100 official information subsidies published by the Turkish government in its Minister of Foreign Affairs (press releases) and its Minister of European Union Affairs (announcements). A coding book and a coding sheet were developed for this study, and after measuring intercoder reliability with a subsample of the articles, the information subsidies were analyzed to determine emerging themes, main angles, trends and peculiarities. The key messages found in the information subsidies were then compared/contrasted to how Turkey is perceived beyond its borders in the areas of its economy, foreign policy and human rights, using independent indexes and rankings developed by The Reputation Institute, the Human Freedom Index, and Freedom House. Preliminary results indicate a discrepancy between Turkey’s perceived reputation of itself and the external reputation it has around the world. Implications are discussed regarding whether its messaging is helping Turkey’s intentions of joining the European Union. At issue is whether Turkey needs to make changes in its nation branding and international public relations strategies, especially in light of the recent crises involving the war in Syria and acts of terrorism at home.

***COMPUTING SCIENCES***

**SHOULD I SHOUT OR SAY THANKS? A COMPUTATIONAL ANALYSIS OF THE DISCOURSE PATTERNS OF LEADERS OF THE LINUX COMMUNITY**

**Daniel S. Schneider** (Dr. Megan Squire) Department of Computing Sciences

A controversy erupted in the Linux software community in July 2013 when one contributor to the project, Sarah Sharp, accused project leader Linus Torvalds of “advocating for physical intimidation and violence… [and]… advocating for verbal abuse” on the Linux Kernel Mailing List (LKML), and said he was “one of the worst offenders when it comes to verbally abusing people and publicly tearing their emotions apart.” To investigate the validity of these allegations, we use computational techniques to describe the patterns of speech and specific words used by Torvalds in his emails including expletives, grade level score, parts of speech, and most common words. Additionally, we use a Naïve Bayes Classifier to compare Torvalds’ text language patterns to that of another leader within the Linux community, Greg Kroah-Hartman, to determine both which words best differentiate Torvalds from this other leader, as well as assess how well automatic classification of these two leaders within the Linux community can be conducted. Finally, since a Code of Conduct was put into place in March 2015 for the LKML in response to these allegations, we study salient features of Torvalds' emails before and after the Code of Conduct to see if any noticeable changes occurred due to the stricter guidelines for speech. These findings may have implications for understanding leadership styles on the LKML as well as learning what impact a Code of Conduct can have on email communication.

***ECONOMICS***

**HOW DOES THE YOUNG ADULTS MANDATE AFFECT WAGES AND THE U.S. LABOR MARKET FOR YOUNGER WORKERS?**

**Alex E. Battaglia** (Dr. Kathryn Rouse) Department of Economics

I examine the labor market effects of the Young Adult Mandate (YAM), a provision under the ACA allowing young adults to remain covered under their family’s health insurance until the age of 26. Using the most recently available panel wave data from the Survey of Income and Program Participation (SIPP), as well as unemployment data from the Bureau of Labor Statistics (BLS), I examine wage, employment, and job mobility trends after the implementation of the policy using a differences-in-differences model. Because the targeted age group of the YAM is those aged 19-25, I mainly analyze the impact on this age group compared to those slightly older and slightly younger. This research builds upon Antwi et al. (2012) and Dillender (2013). While Dillender (2013) considers wages, the results reflect the wage effects in states with a law allowing dependent coverage until the age of 26 prior to the YAM. My paper is the first to observe the impact of the YAM on wages among young adults. Previously, Antwi et al. (2012) followed the YAM’s labor market effects until November 2011. I extend the period of analysis to December 2013, and find preliminary results similar to Antwi et al. (2013), but with a larger impact. The probability that a person between the ages of 19 and 25 became employed full-time was 0.44 less than other age groups after the implementation of the YAM. The number of hours a young adult worked also decreased by about 10% less hours per week.

**THE EFFECTS OF ARMED CONFLICTS ON THE INCIDENCE RATES OF INFECTIOUS DISEASES**

**Ameya Deepak Benegal** (Dr. Steven Bednar) Department of Economics

Since 1946, there have been over 245 armed conflicts that have occurred in Asia, Africa, Latin America, the Middle East, and Eastern Europe. Conflicts represent devastating economic shocks as they hinder growth through destruction of infrastructure, cause death and displacement of skilled workers, and reduce levels of private investment. However, in the economic literature, there is a lack of discussion of the effects of armed conflict with respect to public health, which is a key driver of growth. Using data from the Institute for Health Metrics and Evaluation, World Health Organization, World Bank, and the Uppsala Conflict Data Program, for the years 1990-2014, I examine how battle-related deaths, deaths from non-state actors, and one-sided conflicts affect the incidence rates of several types of infectious diseases. The results suggest that for every 1,000 one-sided conflict death, the disease rate greatly increases for Malaria, Diarrheal Diseases, and specified vector-borne diseases in the concurrent year. At the same time, every 1,000 non-state conflict death greatly increases the disease rate for Malaria, specified vector-borne diseases, and Neglected Tropical Diseases in the following year. Overall, the findings show that certain conflicts do have effects on disease rates, and the burden trends tend to be greater for women than for men.

**THE EFFECT OF RENEWABLE ENERGY ON ELECTRICITY PRICES**

**Sarah Challis Krulewitz** (Dr. Brooks Depro) Department of Economics

As states in the U.S. intend to wean off reliance on foreign oil, we have seen a shift in energy policy to promote the use of renewable technologies. One of the most frequently used policies for encouraging renewable energy sources for electricity generation is the Renewable Portfolio Standard (RPS). The effect of increased use of renewable energies is frequently disputed over potential monetary costs to end consumers. This paper addresses and examines the question: what is the effect of renewable energy generation on residential electricity prices. Lazard (2015) argues that the marginal cost of renewables has reached parity or dropped below the marginal costs of oil and other nonrenewable sources of energy. Data is collected for all 50 states from the years 1990-2013. Variables used as controls include price of oil, natural gas, and coal, population, renewable energy generation in mega-watt hours, regulation of a states electricity market, and whether or not a state has a renewable portfolio requirement. Using a log regression, the coefficients of each variable will be calculated to determine the correlation with residential electricity prices.  The main hypothesis is - as a state’s renewable electricity generation increases by 1%, residential electricity prices will decrease.

**MICROFINANCE, DISASTERS, AND THEIR IMPACT ON BUSINESS OUTCOMES: EVIDENCE FROM INDONESIA**

**Michael R. Keenan** (Dr. Steve DeLoach) Department of Economics

In 1983, Mohammed Yunus founded the Grameen Bank in Bangladesh with the simple idea that giving access to credit to the poor would help them to escape poverty. Since then, microfinance (credit and savings programs targeted to the poor) has spread across the globe, taking on many different forms.  Researchers have closely analyzed the impacts of microcredit and microsavings on households and businesses, looking at outcomes such as changes in income, female empowerment, child labor, education, and even stress. The purpose of this study is to use panel data from Indonesia to determine the impact of both microcredit and microsavings on business outcomes for family owned businesses. Specifically, we analyzed the ability of microcredit and microsavings to mitigate the negative impacts of village-level disasters on both non-agricultural and agricultural family businesses**.** In theory, microcredit and micro savings should provide family businesses with more means to cope with negative shocks to their household, and therefore lessen the negative impact of a community-level disaster. Although the results are preliminary, the data loosely support our theory that access to savings and credit can mitigate the negative impacts of disasters on the acquisition of business assets.

**MICROFINANCE IN BANGLADESH: THE IMPACT OF MICROFINANCE LOANS ON DOMESTIC VIOLENCE**

**Samantha M. Lutz** (Andrew Greenland) Department of Economics

This paper examines the possible negative effects on women when they receive microfinance loans. While microfinance has been proven by many economists to positively impact the community, several studies have indicated that there is a possible backlash on the women receiving these loans in Bangladesh. Domestic violence is becoming more widely investigated and many say small savings or microfinance loans can give women the leverage to leave their spouse. By giving the loans to women, however, they are opening up an already vulnerable population to more jealousy and scrutiny from their male counterparts and the empowerment that comes from more financial stability may not outweigh the burden of domestic violence. In countries such as Bangladesh where a large amount of these loans are given, the social norms that follow women of these cultures may cause repercussions from men and society that may inflict more harm physically and emotionally than is being investigated and considered. The question at hand is if giving a group of women a microfinance loan exposes them to additional violence due to the added empowerment and increased resources. The data to support this investigation will come from the Bangladesh Integrated Household Survey Questionnaire (BIHS) from the years 2011 and 2012. This survey includes panel data about household level statistics and composition, employment, savings, loans, agriculture, food consumption, and women’s status. It also allows for an instrumental variable of land ownership to control for endogeneity. Given the findings of the study, banks should consider the social implications of targeting Bangladeshi women in microfinance loan distribution.

**FORMAL SAVINGS AND CHILD LABOR IN INDONESIA**

**Danae M. MacLeod** (Dr. Stephen B. DeLoach) Department of Economics

For many children in emerging economies, legal barriers to child labor are weakly enforced or simply non-existent. In Indonesia, the International Labour Organization estimates that nearly 3.2 million children between the ages of 10-17 are in the workforce. When children take jobs instead of staying in school, they have lower lifetime wages, and they are more likely to take their own children out of school. Children are more likely to perform labor activities if their family experiences a health shock that takes one or more adults out of the workforce. The purpose of this paper is to analyze school enrolment rates after household health shock, and explore whether access to savings and credit can mitigate the income lost to the shock and keep children in school longer. This study uses data from the four-panel Indonesian Family Life Survey, which includes information from 1993, 1997, 2000 and 2007. The IFLS represents about 83% of Indonesian people and 13 out of 27 provinces, and provides detailed information about each household and community. We use the data from IFLS to create a fixed effects econometric model to estimate what effect health and access to financial services have on average school hours. We found that health has an extremely detrimental effect on education: girls in an unhealthy household spend almost five hours less at school per day than their healthy peers, and boys are at school almost two hours less than their peers. However, the results are promising, suggesting that in all cases, having access to savings and credit can fully counteract the effects of poor health, keeping children in school longer.

**SAVING FOR RETIREMENT: A BEHAVIORAL ECONOMIC APPROACH**

**Carolyn Powell** (Dr. Gregory Lilly) Department of Economics

Alongside increases in the human lifespan comes a fundamental need for elevated rates of saving. However, looking at the National Retirement Risk Index, it is evident that upon reaching retirement age, over fifty percent of individuals are unable to make this a smooth transition. This paper hypothesizes that this lack of adequate saving is caused by a disconnect between present and future selves. Hal Hershfield and colleagues (2001) tried to minimize this, and promote an emotional connection to the future self, by creating a virtual reality for participants where their desired savings were measured after interacting with a computer generated image of themselves at retirement age. It is the goal of this paper to examine if psychological priming, without the use of a virtual reality, can enable participants to bridge the gap between present and future selves; potentially creating the desire to increase current savings for retirement. This approach is then compared to the work of Richard Thaler (2004) and his support of automatic enrollment into 401K programs. IRB approval was obtained and data is being collected in an experimental setting at Elon University. Along with psychological scales that measure the connection between present and future selves, participants read a scenario and were instructed to fill out a sample retirement form. ANOVA testing will begin upon completion of the participant stage of research. It is expected that the primed group will indicate a higher percentage of desired savings, as compared to the control and automatic enrollment groups.

**JOB MOBILITY AND WAGE PROGRESSION AMONG TANF RECIPIENTS**

**Jeremy M. Revelise** (Dr. Tonmoy Islam) Department of Economics

The Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) was passed in 1996 by Congress, ending the Aid For Dependent Children Program, and replacing it with Temporary Assistance for Needy Families (TANF).  This policy reform fundamentally changed welfare in the United States, as beneficiaries were now dependent on finding work. Previous research suggests that while TANF has succeeded in pushing individuals to acquire labor market experience, after-tax income, a common measure of economic well being, has fallen among TANF recipients in the aftermath of welfare reform (Bollinger et al. 2009).Research on the various approaches of state implementation of TANF found that the human capital development approach, emphasizing education and vocational training programs for participants, leads to better long-term earnings and employment outcomes than labor market attachment approaches, aimed to place participants into jobs as quickly as possible (Hotz et al. 2006).  Considering these evaluations of TANF, it appears that determinates of wage growth among TANF recipients may lay at the intersection of job mobility and human capital accumulation.  The aim of this research is to examine how job mobility and job-related training programs affect wages of TANF recipients.  Using the 1979 National Longitudinal Survey of Youth (NLSY79), a sample of 12,686 individuals interviewed on a biennial basis, data is collected on labor market experience, human capital, program participation, and other control variables.  A regression analysis will be run to determine if job mobility and job training participation are correlated with wage growth among TANF recipients.

**THE PREDICTIVE POWER OF PERSONALITY ON LABOR MARKET OUTCOMES: EVIDENCE FROM AMERICAN MILLENNIALS**

**Rebecca J. Sansale** (Dr. Steve DeLoach) Department of Economics

Young workers, specifically millennials, were considered the sub-population most negatively affected by the Great Recession of 2009. According to the Bureau of Labor Statistics, millennials reported record high unemployment durations, most notably in 2009 when 45% of the unemployed population reported an unemployed status for 99+ weeks (Kory 2014). While labor economists historically have attributed labor force outcomes, such as unemployment duration, to cognitive measurements or socio-economic levels such as, education, or parental income, recent studies have begun to consider soft skills, or non-cognitive endowments, as pertinent explanatory information in regards to an individual’s propensity to attain and hold a job. Previous research has shown that depending on the industry, specific personality traits may even provide individuals a comparative advantage over others in the job market, which can be seen through higher wages as well as employment history. Few papers thus far have introduced personality measurements, specifically the Big Five Personality Inventory, into labor market analysis, and conclude that conscientiousness and agreeableness are the most influential and significant traits of the Big Five when predicting an individual’s probability of employment (Uysal and Pohlmeier 2011 and Viinikainen and Kokko 2012). In my research, I will use the National Longitudinal Survey of Youth 1997 data set to analyze how personality affects labor-market outcomes of American Millennials. I will estimate three different models in order to provide further insight on labor market outcomes including: Tobit analysis to determine cumulative unemployment duration; Poisson regression to model the frequency of unemployment spells; and Cox Proportional Hazard model to analyze the duration of individual unemployment spells. Preliminary results indicate that agreeable females experience more spells of employment, whereas those who are neurotic experience fewer employment spells. Additionally, the employment spells experienced by agreeable individuals are more likely to be longer in duration compared to others.

**CROWDFUNDING VIABILITY IN LOW-INCOME NATIONS: AN EXPERIMENTAL STUDY**

**Justin A. Schweitzer** (Dr. Gregory Lilly) Department of Economics

It can be very difficult for individuals without long credit histories to raise capital for their idea or businesses nowadays. This has led to the growth of two important methods of procuring funds: crowdfunding and microfinance. Crowdfunding is mainly used for causes, artists, and entrepreneurs in wealthier nations and has taken off due to the advent of the Internet. Meanwhile, microfinance was designed to combat extreme poverty in poorer countries by not relying on collateral to back up the loans. A combination of the two has been developed called prosocial lending, in which people, typically from rich nations, send funds to those seeking help from microfinance institutions. While this is beneficial, studies have shown that people are less likely to trust borrowers who are significantly different from them. This paper discusses the possibility of setting up a crowdfunded prosocial lending organization in a poorer nation, where the funders and borrowers are all citizens of the same state. This study experimentally investigates if such an institution could be effective in a place where all average income is significantly lower. Theoretically, someone with a lower endowment will have higher loss aversion because each dollar is worth more to their daily life. Therefore, they would be less willing to contribute to a crowdfunding campaign. However, there may be more trust between two members of the same country as opposed to ones from opposite ends of the Earth, resulting in a greater flow of money on the platform.

**PRISON OVERCROWDING AND RECIDIVISM**

**Stephanie G. Tizik** (Dr. Andrew Greenland) Department of Economics

Despite the decline in crime across the United States since the early 1900s, prisons throughout the country have been experiencing a rise in their population.  There are costs associated with this historically high national incarceration rate, particularly the decline in facility conditions due to overcrowding. Through this paper I hope to determine if the decline in prison conditions, as a result of overcrowding, has an impact on recidivism, or the likelihood of a prisoner reoffending upon release. Previous research suggests this relationship could be explained through a cost minimization model where exposure to overcrowding during imprisonment provides opportunities to gain more “criminal human capital” and limits the availability of rehabilitation resources.  I will use data on prisoners from a forced prison release in Illinois from 1979-1982 to test how overcrowding impacts prisoners. I am hoping to draw a connection between individuals who were part of the forced release program, and subject to overcrowding during their sentence, and recidivism. I believe some of the consequences of overcrowding, such as the growth of “criminal capital,” lead to an increase in an individual’s propensity to commit future crime since it leads to a decline in an individual’s probability of being caught, or at least an individual’s perception of the probability of being caught. These results could have implications for the prison system in the United States since they would challenge the current methodology that overcrowding prisons is not having a significant impact on crime.

***EDUCATION***

**THE BRIDGES & BARRIERS TO ENVIRONMENTAL EDUCATION ON AN E.C.O. CAMPUS**

**Amber K. Adams-Kuebler** (Dr. Scott Morrison) Department of Education

Previous research has shown that meaningful outdoor experiences are significantly more beneficial for the development of environmentally conscious habits later in life than more traditional forms of environmental education (Chawla, 1998; Sobel, 1996). More and more children, however, are growing up attached to electronic screens rather than exploring and appreciating nature. This “growing gap between human beings and nature,” is what Louv (2010) calls “nature-deficit disorder” (p. 26). This disorder not only comes from the ubiquity of technology, but also from windowless, natureless school buildings; the marginalization of environmental education (Saylan & Blumstein, 2011); the rise of standardized testing; and teachers who feel inadequately trained to take their students outside (Louv, 2010). In many cases, teachers also feel they lack the necessary resources to incorporate environmental education into their curriculum. This research project, based at a local elementary school with an Educating Children Outdoors (E.C.O.) campus, investigates the challenges and opportunities faced by teachers who have access to an outdoor classroom, butterfly garden, amphibian habitat, bird sanctuary, and nature trail. Data was collected through surveys, observations, and interviews in order to explore the following research questions: Which teachers are using the resources available to them, and how? Why are some teachers not using the resources? What obstacles do the teachers face, if any? What supports do teachers need in order to overcome the barriers? Twenty teachers from all grade levels and subject areas participated in the study. Preliminary analysis of the data reveals that even though the participants express an interest in taking students outside and utilizing the resources at the school, they struggle negotiating the multiple demands being placed on them. Findings will help teachers, administrators, and teacher educators to gain a better understanding of the kind of support needed for teachers to incorporate more environmental education into the curriculum and connect them with nature.

**PARTNERING WITH FAMILIES TO FOSTER LANGUAGE DEVELOPMENT AND EMERGENT LITERACY IN YOUNG CHILDREN**

**Nicole L. Ammerman** (Dr. Mary Knight-McKenna and Dr. Heidi Hollingsworth) School of Education

Childhood poverty greatly affects a student’s language development. Furthermore, falling behind in early childhood while a student is developing emergent literacy and math can cause a lasting impact that negatively affects their educational career. The Little Village is a service learning experiences associated with two early childhood courses offered at Elon that aims to intervene early and provide opportunities for children to engage with academic content. A key component of the Little Village is the partnership between the families of the students and the Elon teacher candidates. This research aims to analyze the relationship between teacher candidates participating in the Little Village and the families of the students with whom they are working. Reflection papers written by students over the course of their service learning experience are being reviewed and coded to determine certain themes highlighting the teacher candidates’ skills and dispositions. Specifically, in the early stages of research, the undergraduate research student’s responsibilities included creating a list of pseudonyms for all participates and changing those names within the data. Additionally, she created electronic files of the data. Currently, the research student has been focused on helping define different codes to categorize the data so that it is easier to analyze in the future. Although there have been no conclusive results found yet, there are some important themes beginning to emerge such as: family strengths, and skills. Furthermore, an interesting concept is how language has affected the relationship between the two parties. These themes will continue to be looked at as the data continues to be analyzed.

**THE EFFECT OF PHYSICAL ACTIVITY ON ATTENTION IN STUDENTS IN THE 4TH AND 5TH GRADE**

**Alyssa Christine Lucas and Robert Lawton Harper** (Professor Elizabeth Bailey) School of

Education and Department of Health and Human Performance

Schools have always incorporated some sort of physical activity into the school day, but of late many of these programs have come under pressure. Research suggests that physical activity, particularly bilateral and coordinated physical activity, has a positive effect on attention in adolescent children, offering support for the continued inclusion of physical activity in the school day. The purpose of this investigation is to compare the effects of bilateral and coordinated exercise, typical recess activities, and quiet reading on attention in elementary school children using the d2 test of attention. The d2 test measures processing speed, rule compliance, and quality of performance. Performance on the test is determined by evaluating the total number (TN) of items processed, the number of errors made during the test, and by calculating concentration performance (CP). Fourteen fifth grade students (6 girls and 8 boys, Age= 10.6±1 years) and 12 fourth grade students (8 girls and 4 boys, Age = 8.7±1 years ) were recruited from a local private school to participate. Informed consent was obtained from parents, and students signed an assent form.  Students completed 3 sessions, each separated by 7 days.  In the first session students completed the d2 attention test after a regular elementary class to act as a control. Subsequently, students were randomly assigned to a sequence of experimental conditions to be completed over the next 2 weeks. Fifth graders completed either 30 minutes of quiet reading, or coordinative exercise, while 4th graders completed either 30 minutes of typical recess activities or coordinative exercise. Coordinative exercise consisted of a sequence of bilateral activities requiring gross and fine motor movement using various balls. Ten minutes following the activities, students completed the d2 test again in a quiet classroom. Currently, our data isbeing processed. Differences between conditions and across time will be analyzed using a Multiple Analysis of Variance (MANOVA). When differences between conditions or across time are observed, specific differences will be evaluated using the Tukey post-hoc test. The results will be available in the next few weeks.  At that time, a conclusion will be developed based on the final results.

**FLOW FACILITATING POSITIVE MOOD STATES**

**Bria T. Turner and Alaina D. Hall** (Dr. Stephen Byrd) School of Education

Autism Spectrum Disorder (ASD) is a neurodevelopment disorder that impairs nonverbal and verbal social communication skills. It also hinders social interaction, sensory development, and self-regulatory issues. Art therapy has been shown to be effective for children facing ASD by improving skills such as social functioning, motor abilities, self-awareness and imagination. This is due to externalizing their actions through art making. Improvements in skills and emotions can occur when one learns how to release energy through art work, but it is an unconscious act—flow.  The purpose of this study was to examine the effects flow has on the emotions of children with ASD. It was hypothesized that if flow were to be reached in the art task, positive mood states would occur. An 11 year-old male with ASD was analyzed in this case study and was assigned to four different tasks. The tasks were designed to be challenging at different levels because in order to experience flow a perfect balance of challenge and skill must be attained. Positive emotional mood was assessed by the participant measuring his mood before and after the task on the Profile of Mood States- C (POMS-C; Terry, Carron, Pink, Lane, Jones, & Hall, 2000). Researchers accurately predicted that positive emotions resulted through each task. Additional studies will be necessary to determine if the change in positive emotion was due to flow, relationship, or positive effects of art therapy.

***ENGINEERING***

**EVALUATION OF IRREVERSIBLE ELECTROPORATION ABLATION THRESHOLDS IN HUMAN PROSTATE CANCER**

**Sabrina Campelo** (Dr. Chris Arena) Department of Physics

Irreversible Electroporation (IRE) is an emerging cancer treatment that utilizes non-thermal electric pulses for tumor ablation. The pulses are delivered through minimally invasive needle electrodes inserted into the target tissue and ultimately lead to cell death through the creation of nanoscale membrane defects. IRE has been shown to be safe and effective when performed on tumors in the liver, kidney, pancreas, and prostate located near critical blood vessels and nerves. Additionally, IRE offers sub-millimeter resolution by killing only those cells exposed to a threshold electric field. In order to plan treatment and predict the ablation volume, prior knowledge of the tissue-specific electric field threshold is required. To the best of our knowledge, this is the first study that attempts to define the electric field threshold for human prostate cancer tissue. A 3D reconstruction of the ablation volume from a one-week post-treatment MRI was imported into a finite element modeling software (COMSOL Multiphysics 5.2). Four electrodes were positioned within the ablation volume according to markers identified by the surgeons. In total, six treatments were performed between alternating pairs of electrodes with voltages ranging from 1650 V to 3000 V. One solution was obtained for a static conductivity (*σ*0 = 0.284 S/m) and a second was obtained using a dynamic conductivity step function to account for electroporation (*σ*(*E*)= 0.284 S/m if *E* < 200 V/cm and *σ*(*E*)= 0.927 S/m if *E* > 800 V/cm and) with a 600 V/cm transition zone. The electric field threshold was calculated by averaging the maximum electric field obtained over the surface of the ablation volume. For a single patient (Gleason 4 + 3 intermediate risk), the static conductivity model resulted in a threshold of 388 V/cm whereas the dynamic model resulted in a threshold of 469 V/cm. Knowledge of the electric field threshold for cell death will help ensure adequate coverage of the tumor and prevent recurrence. In future work, the remainder of the population will be analyzed to explore patient-to-patient variability.

**AEROSPACE ENGINEERING: DESIGN ON A SMALLER LEVEL**

**Julia C. Filloon** (Dr. Sirena Hargrove-Leak) Department of Engineering

In a paper entitled “Development of a new photocatalytic oxidation air filter for aircraft cabin,” a research team reported their work on the development of a modular filtration unit for the improvement of air quality in aircraft cabins. The filtration unit yielded promising results, but some questions regarding its performance under different operating conditions were left unanswered, such as seeing whether the experiment could be made on a smaller scale. We designed and built a benchtop model of this experiment over the summer through SURE. Exploring the effects of contaminant concentration and flow rate on filtration efficiency are two questions we will examine this semester after testing the benchtop model with a mass spectrometer to see if it works properly. Our research also incorporates another aspect of aerospace engineering that was explored over the summer: the development of a wind tunnel that first-year engineers and Elon Engineers’ Rocket Team can use for testing model rockets, fins, nosecones, aerodynamic vehicles/parts, etc. The completion of the wind tunnel and incorporation of the proper data collection instruments, in order to perform aerodynamic research, is underway.

**PRODUCTION AND CHARACTERIZATION OF CARBON NANOTUBE MESH**

**Paul C. Kantlehner** (D. Scott Wolter) Department of Engineering

Carbon Nanotubes are an exotic and useful material because of their unique properties and relative ease of production. One of their unique properties is their charge storage capacity. Because the nanotubes are incredibly small, conduct electricity and have a high surface area, they are able to store large amounts of charge on their surface. This makes them ideal candidates for super capacitors which are electronic charge storage components that fall between regular capacitors and rechargeable batteries. Super capacitors accept and deliver charge better than rechargeable batteries but also hold more charge than regular capacitors; the only problem is that super capacitors are ten times larger than a battery of similar charge storage. To create a smaller, more efficient super capacitor would mean to make a better way to store charge. Our research seeks to understand the viability of Carbon Nanotube meshes for use in super capacitors by utilizing a simple and quick method for creating varying thicknesses, densities, and uniformities of meshes, then testing their charge capacity. We create the meshes by making a simple solution of Carbon Nanotubes suspended in water. This solution is then pulled through a fine filter paper by a vacuum. The filter paper is dissolved, leaving a mesh of Carbon Nanotubes. We are currently evaluating the density and uniformity of the Carbon Nanotube mesh, as well as testing the mesh’s ability to be used for charge storage by setting up a mock capacitor and measuring the amount of charge it is able to store per unit area. We have found the process to be able to be plausible for the rapid production of meshes varying in thickness, density and uniformity. Their charge storage capacity has yet to be proven and so our future research will seek to better quantify this charge storage capacity.

***ENGLISH***

**THE FOMO PHENOMENON: AN EXAMINATION OF INSTAGRAM’S EFFECT ON THE AMERICAN STUDY ABROAD STUDENT EXPERIENCE**

**Cameron E. Allsteadt** (Dr. Cassie Kircher) Department of English

The slang term “FOMO,” which stands for “fear of missing out,” is a relatively new social construct. “FOMO” is the anxiety one experiences when missing out on an exciting event happening elsewhere (Oxford Dictionary). This social phenomenon is especially relevant to study abroad students, as students often cope with feelings of “FOMO” through the use of social media platforms like the photo-sharing application, Instagram. Conversely, study abroad students also incite feelings of “FOMO” in friends through using Instagram to broadcast their own abroad experiences. This study, which was conducted in Florence, Italy, aimed to examine how study abroad students’ experiences were affected by Instagram use related to this fear of missing out. The study seeks to answer two questions: How do the Instagram use habits of students change when they study abroad? How do these behaviors affect the study abroad student experience? Research was collected from a group-administered questionnaire of American study abroad students studying in Florence, Italy in the fall of 2015. Additionally, through personal interviews, qualitative data was collected from a variety of open-ended questions. Through this research, it was found that students used Instagram more heavily when they were living abroad. Findings also suggested that the elevated reliance on Instagram could detract from the study abroad experience by causing students to disconnect from their day-to-day activities and surroundings. The findings from this study are significant and will allow students to remain conscious of their social media habits so that they can make the most of their study abroad experiences by living in the moment, instead of through the screens of their smartphones.

**EXPLORING THE LITERARY AND TEMPERAMENTAL FACTORS THAT LED TO GEORGE ORWELL’S RHETORICAL SUCCESS**

**Charlotte N. Bryan** (Dr. Haskell) Department of English

George Orwell’s rhetorical methods have been widely studied and admired.  Richard Filloy, a rhetorical critic, insists Orwell’s success was due to the creation of a unique and relatable ethos in order to persuade the reader politically (Filloy, 1998, 47-63).  Yet the suggestion that Orwell’s personality was a rhetorical instrument rather than genuine temperament is dependent upon the interpretive strategy applied to his texts.  In this study, George Orwell’s ethos and audience appeal are explained through the Myers-Briggs Type Indicator.  Multiple similarities between his works and the INFP (Introverted, iNtuitive, Feeling, Perceiving) personality type are evident.  Characteristics such as self-deprecation, high standards, and idealism common to INFP’s are exhibited in “Shooting an Elephant,” “The Spike,” *Homage to Catalonia*, and *1984*, works that cover a broad spectrum of time and genre.  Interestingly, the products of other creative artists with the same personality type--John Lennon’s “Imagine,” Jean-Jacques Rousseau’s philosophy, and interviews with Kurt Cobain--all display characteristics similar to Orwell. Attraction to the qualities characteristic to the Myers-Briggs type INFP are explained by Jungian criticism, which suggests success is found in the ability to appeal to a collective conscious that transcends both time and culture (Murfin & Ray, 1997, 260-61).  The findings of this study then propose that the main factors leading to George Orwell’s success were his inherent idealism and self-deprecation.  These personality traits portrayed a uniquely average ethos, which was universally identifiable, and therefore held widespread appeal.

**AND THE BEAT LIVES ON: PRESERVING AND CELEBRATING THE IMPACT AND LEGACY OF THE BEAT GENERATION**

**Margaret R. Bryant** (Professor Michael Strickland) Department of English

Since January 2015, I have conducted research with and observed the Beat Generation winter term course twice, and documented my travels and interactions with many of the remaining members of the beat generation on the prototype version of my website, *And the Beat Lives On*. By definition, the Beat Generation is made up of post-WWII American writers who were known for challenging the constructs of society and their new, nontraditional writing and methodology. Members of the Beat Generation include William S. Burroughs, Jack Kerouac, Allen Ginsberg, Gregory Corso, and Amiri Baraka; and powerful women such as Anne Waldman, Joanne Kyger, and Diane Di Prima.The purpose of this research is not only to document and preserve the Beats and their work, but also examine their lasting impact today and in years to come. In addition, this experiential research also explores the Beat Generation in the context of a classroom as well as its significance off the page. There are precious few of the original Beat Generation writers left alive, as they having been dying off at an alarming rate in the past decade. My research question concerns how to best create the space for and facilitate the conversation revolving around the Beat Generation in a digital world through the lens of rhetorical theory. The purpose of the website that I am creating is to celebrate and explore the impact of the Beats while also functioning as an engaging educational resource and ultimately facilitating the conversation and housing the community revolving around the Beat Generation and it’s continued evolution. My research methods include user and usability testing, interviews, and focus groups; and is heavily grounded in feminist rhetoric; visual and multi-media rhetoric, Burkean Identification and Burkean Parlor Theory. Ultimately, by facilitating the conversation and community around the beats, I intend to foster a space that is far more inclusive (in terms of diversity in voices and perspectives) than was permitted at the time, or can be identified when looking at the original group.

**GENDER DIVERSITY OR GENDER GAPS IN THE FLORENCE POLICE FORCE?**

**Alexandra S. Buchanan** (Dr. Cassie Kircher) Department of English

Gender diversity is an important topic in any institution; however, it is especially important within police forces, which should be representative of the community they are protecting. If this diversity appears to be apparent, then no community members will question it, which is why it is important to uncover the major aspects of diversity that are or are not apparent. This study analyzes the gender differences in the Florence, Italy police force. Through observing police officers working on Florence’s Ponte Vecchio, an important and historic bridge with heavy foot traffic, it was found that diversity was not what it looked like within the police force. A codebook was created to group observations into specific behaviors that are related to gender diversity or gender gaps (e.g. confrontational conversations and conversational interactions of officers). In Florence, the police units seem extremely diverse, more so than in the United States. However, after this research, it was concluded that the gender roles these officers follow limit the authority of the female officers and make it more difficult for them to fulfill job expectations.

**DON’T CALL ME: DISCREPANCIES IN OUT-OF-CLASS COMMUNICATION PREFERENCES OF FACULTY AND STUDENTS**

**Kelley C. Dodge** (Dr. Paula Rosinski) Department of English

While there are now more opportunities than ever for faculty and students to communicate with one another outside of the physical classroom, such as Skype video calls, social media, text messages, or emails, there is currently little research about which forms of communication are preferred by students and by faculty. The purpose of my research project is to identify the kinds of out-of-class communication that Elon faculty members offer to students, to determine which forms of communication are preferred by students and which are preferred by faculty, and to identify which forms of communication are most appropriate for different purposes. Identifying discrepancies between student and faculty preferences will allow recommendations to be made about the best platforms for faculty members to communicate with students. Using a variety of methodologies in order to triangulate my data, I administered online surveys to both faculty and students, interviewed faculty members one-on-one, and conducted focus groups with students. Preliminary results suggest that students prefer methods of communication that are convenient and that facilitate immediacy. Faculty, on the other hand, favor face-to-face communication during office hours, pre-arranged meetings, or before or after class because they believe these interactions are more personal, thoughtful, and meaningful. Ultimately, the results of this project will determine how different forms of communication can extend engagement outside of the classroom and will identify the most effective ways for faculty and students to communicate for different purposes.

**THE SILENCE INHERITANCE: STORIES - AN EXPLORATION OF THE INFLUENCE OF GENDER ON CHARACTER**

**Hanna G. Elmgren** (Professor Tita Ramirez) Department of English

In an effort to explore the representation of gender in contemporary fiction, I read ten published collections of short stories and analyzed them to determine ways in which the author constructed or represented gender. What I have observed both in fiction and in the very real world that this fiction reflects has informed my own approach to writing about these issues for my undergraduate thesis. This research takes the form of a collection of original short stories that explore the influence of culture’s normative ideas about gender on character construction. With creative writing pieces, it is important to ground the work in character as opposed to speaking towards social messages, so these stories serve as microcosms for greater issues in society. In particular, this thesis addresses the systematic silencing of women and others who are discriminated against based on gender and sexuality. To maintain the status quo, society teaches these groups that their feelings, values, and thoughts are unimportant or inferior. The primary focus of these stories then is to examine how this systemic problem operates within relationships between individuals, specifically in regards to how women are told by those close to them that their thoughts are invalid. I am seeking, in essence, to give voice to those who are silenced based on gender. However, rather than simply trying to spread this message, the purpose of the thesis is to examine how this silencing process can be translated into fiction, which ultimately involves examining the impact that process has on the characters. An important element of this thesis is also a short reflection paper on how the stories fit into the greater context of contemporary fiction. The paper will explore how short stories in the past thirty years have dealt with or incorporated issues of gender and sexuality, as well as how this thesis contributes to this discourse.

**PUBLISHING ORWELL: UNDERSTANDING ORWELL’S SOCIALISM IN A PROFESSIONAL CONTEXT**

**Lauryl Fischer** (Dr. Rosemary Haskell) Department of English

This paper examines George Orwell's developing political ideology in the context of his relationships during the 1930s and 40s with his principal British publishers ---Gollancz,  and Secker and Warburg---and in the context of his conflicts with those who did  *not* publish him.  Little attention has been paid to the context in which Orwell was published, and how that context informed the maturation of his political identity. Understanding his publishing history reveals the influences of dialogic voices on his career.  This paper deploys New Historicist principles and values, in conjunction with Bakhtinian concepts of dialogics, to explore the dynamics of Orwell's development within this complicated cultural milieu. Specifically, this paper considers four Orwell texts: The *Road to Wigan Pie*r (1936), *Homage to Catalonia* (1937), *Animal Farm* (1945) and *1984* (1949). Analyzing Orwell's conversations and conflicts with publishers, this paper maps out Orwell’s journey to consolidate his socialist sensibilities (on the left) with the Christian ethics he was raised on (on the right). This dichotomy was what would thrust him outside both these movements of his time and lead to his greatest works, *Animal Farm* and *1984.*

**REVOLUTIONS IN READING: EXPLORING CHANGING RELATIONSHIPS AMONG AUTHOR, READER, AND PUBLISHER IN YOUNG ADULT MULTIMEDIA PUBLISHING**

**Margaret K. Miller** (Dr. Megan Isaac) Department of English

In the last ten years, publishers of Young Adult literature have sought to implement new interactive reading technologies in order to entice new and tech-savvy readers to the genre. During this significant period of experimentation, the idea of “the book” has been complicated. This research examines four case studies of Young Adult multimedia publishing experiments in order to determine the effects of multimedia publishing on the relationships among author, reader, and publisher. Because each case study varies in length, platform, genre, and specific features, Magerko’s PC3 method of analysis was used to examine the shared structures that underlie any narrative, regardless of its genre or delivery system. Magerko identifies these structures as process, content, control, and context. The most significant of my four case studies focuses on John Green’s novel *The Fault in Our Stars* and his coverage of the novel’s creation and publication on his video blog, Vlogbrothers. In examining how these structures exist in the 29 Vlogbrothers videos about *The Fault in Our Stars*, I found that John Green has created a carefully crafted online presence and persona that allows him to seem like he offers readers significant control over his work. In reality, Green maintains control over his work and his readers by constructing areas wherein they can practice synthetic, or inauthentic, control. Both Green’s mystification of his online presence and the way he highlights instances of readers’ synthetic control on his vlog allow him to remain personable and in good standing with his readers. While they feel as though they are empowered, Green’s use of multimedia lets him exaggerate the power his readers think they have. This particular case study showcases one example of the shifting power structures between author and reader present in Young Adult multimedia publishing and helps establish a foundation for the development of hypotheses about the continued evolution and future of “the book.”

**BEAUTIFUL, UNEDUCATED AND UNEQUAL: FEMINIST CONCERNS AND FEMALE REPRESENTATION IN 20TH CENTURY YOUNG ADULT LITERATURE**

**Lauren C. Phillips** (Dr. Janet Warman) Department of English

Young women are demonstrably susceptible to the influence of media, including that of literature. This project explores the extent to which literature targeted toward young women fails to present them with appropriate role models. Young adult literature—books written for ages 12-18—was not formally recognized as a genre until the 1940s, though books were written for girls in this age range before then. From then on, this genre grew. These books were intended to entertain their young readers, but they also served as tools of socialization. Books for female readers presented them with role models who embodied the traits of obedience, quietness, and passivity. Literature throughout the 20th century offered young women docile role models who abided by patriarchal cultural standards and who failed to develop into fully realized individuals. A survey of young adult novels with female protagonists from 1930-2000, most of which are Newbery Medal winners or volumes in the Nancy Drew series, reveals that they depict women who, despite their superficial differences, are actually all quite similar. Many are presented as good examples for their young readers to follow. A close analysis of the women in these books accompanied by historical context drawn from critical feminist, gender, and culture essays reveals, however, that these women are not fully individuated. They are oppressed, unrealized, or confined in some way, and they present young women with unfulfilled role models who are not as independent and self-actualized as their male counterparts. They are overly concerned with their appearances; they neglect their educations; their actions aim to please or obey men. This study looks beyond the surface images of women in literature to explore potentially damaging messages presented by female young adult protagonists, highlighting flaws contemporary literature can attempt to avoid.

**WHAT I WON’T TELL YOU: AN EXPLORATION IN POETIC INTROSPECTION, THE WRITTEN WORD, AND THE HUMAN HEART**

**Miranda L. Romano** (Dr. Kevin Boyle) Department of English

Poetry is essential to our understanding of our culture, the culture of others, and our ability to navigate our lives. We cannot understand our humanity if we have no perspective of our history, no access to the emotions of our ancestors, and no way to cope with an ever-changing world. Poetry offers us these things. For the completion of her Elon College Fellows project, the researcher read the work of poets that vary in race, gender, sexual orientation, and writing style, which give a variety of examples to keep in mind as she created her own collection. Collections of poetry examined included those of: Dorianne Laux, Eduardo C. Corral, Catie Rosemurgy, Louise Glück, Simon J. Ortiz, Aimee Nezhukumatathil, Stephen Dunn, and Sharon Olds, among many others. Along with considering the creative process of writing, it is also important to be aware of the theoretical and structural aspects that make poems successful. The published poets studied have firm grasps of how to work with these elements and the researcher worked to understand the ways the poets use elements such as form, imagery, and metaphor so that she could implement that same components in her own work. The ultimate product is an original collection of poetry created throughout three years of reading, writing, and revising. This project was conducted as a part of Elon University’s Summer Undergraduate Research Experience, 2015.

**A WOMAN BY DESIGN: A VISUAL RHETORICAL ANALYSIS OF POSTERS FROM THE THREE WAVES**

**Miranda L. Romano** (Dr. Jessie Moore) Department of English

The researcher examines how the rhetorical design (choices in text, image, layout, etc.) of posters from the three waves affects the perception of feminism by contemporary women. The main method is a comparative rhetorical visual analysis of print posters created for feminism and feminist events. Considering that feminism is often divided into distinct periods, or “waves”, the researcher compares select documents from the three waves of feminism to consider how women are being portrayed through the use of rhetorical design elements. The approximate time frames for each wave are as follows:  First Wave 1848 – 1960, Second Wave 1960 – 1990, and Third Wave mid 1990s – Present. After a visual analysis, the researcher codes two documents from each wave, and through this process presents a comparison of documents in the same wave and documents created in the other waves. The researcher conducts focus groups involving Elon University’s feminist group (Elon Feminists for Equality, Change, and Transformation) to collect data on the views of modern women concerning the portrayals of women in these documents. The data collected through this research presents the application and possible effect of visual rhetorical design elements and their social implications.

**DISORDED EATING DISCOVERED: USING CREATIVE NONFICTION TO UNRAVEL A FAMILIAR PAST**

**Jordan E. Stanley** (Dr. Cassie Kircher) Department of English

Although eating disorders are a prevalent and growing issue in our country, there is still a form of disordered eating that remains underrepresented: Other Specified Feeding and Eating Disorders (OSFED). Named by the DSM-IV (Diagnostic Statistical Manual, Volume 4), a person can experience OSFED without meeting full physical standards of typical anorexia nervosa or bulimia nervosa, which can include anorexic habits while maintaining an acceptable BMI, or existent – but less frequent – binging and purging. ALL Eating disorders exist on a spectrum of physical versus mental manifestation, and although OSFED is still mentally unhealthy, the lesser physical indicators can cause it to go unnoticed and, therefore, untreated. This frequently neglected acknowledgment of the disorder make it~~s~~ difficult to pinpoint the cause and enact further preventative measures. My project, a collection of personal essays, strives to make readers aware of the mental health issues that surround OSFED by examining the relationships between unhealthy mindsets and eating behaviors. By studying OSFED and writing about seemingly separate moments of my development, I was able to draw clearer relationships between different aspects of my life—such as familial relationships and how I perceive food and the body, most of which I was unable to see previously. Eating disorder specialists are studying OSFED, but it was my goal to use the art of storytelling to synthesize the connections between one’s story, one’s identity, and how being able to articulate the origin of a past issue will affect a more permanent resolution for the present and future. Literary nonfiction lends itself to this process—allowing us to look not strictly from the perspective of a specific discipline, but from a human interpretation that takes into account that life is complicated by multi-faceted motives and stories.

**THE WOMAN WITH A PAST: EXAMINING FEMALE ARCHETYPES IN FIN DE SIECLE DRAMA**

**Courtney L. Vereide** (Dr. Scott Proudfit) Department of English

Problematic female archetypes are nothing new to English literature. From the Damsel in Distress to the Femme Fatale, literary depictions of women both reflect and shape the cultures from which they have emerged. A seldom-studied, but important female archetype surfaced in the British dramas of the *fin de siècle*: the Woman with a Past*.* Situated between the long-standing archetype of the Fallen Woman and the nascent archetype of the liberated New Woman of the twentieth century, the Woman with a Past functions as a hybrid and a bridge connecting these two major figures. This Elon College Fellows project seeks to define the Woman with a Past and understand her relationship with the Fallen and New Women. The methodology has been close reading of two primary types of literature: plays containing the archetype of the Woman with a Past and literary and historical criticism surrounding drama in the long nineteenth century. Dramatists Oscar Wilde, Arthur Wing Pinero, and George Bernard Shaw each bring to life an iteration of this briefly featured, yet significant archetype. Therefore, the central literary texts of this project are Wilde’s *Lady Windermere’s Fan* (1893), Pinero’s *The Second Mrs. Tanqueray* (1893)*,* and Shaw’s *Mrs. Warren’s Profession* (1894). Through studying, comparing, and analyzing the archetypes as depicted in these three texts, this research has revealed that the Woman with a Past is a woman who has engaged in a lifestyle or activities deemed inappropriate by her culture, but seeks to re-enter society, concealing her past and helping a younger woman to avoid her fate. This archetype combines aspects of the Fallen Woman and the New Woman, gaining popularity for a short time before becoming largely obsolete. One may question the significance of an archetype popularized over a century ago. However, while the archetype itself has dissolved, the attitudes that enabled the archetype remain largely unchanged from 1890 to 2016.

**REDUCING SEXUAL ASSAULT ON CAMPUS THROUGH ACTIVE BYSTANDER INTERVENTION: A LEADERSHIP PRIZE PROJECT**

**Rachel C. Weeks** (Professor Paula Patch) Department of English

I will present research undertaken to understand what constitutes effective elements of an active bystander program, what messaging strategies Elon students will respond to in such a program, and how to establish such a program here at Elon University through a tested pilot program in April 2016. The prevalence of sexual violence on college campuses is both a timely and substantial problem. According to the White House Task Force to Protect Students from Sexual Assault, the likelihood of being sexually assaulted while in college has risen to alarming numbers: 1 in 5 women will be sexually assaulted over the course of their college careers. Active Bystander Intervention programs attempt to address this problem, helping to challenge campus culture around issues of interpersonal violence, empowering all students to intervene on behalf of fellow students in potentially dangerous situations, and supporting survivors of interpersonal violence. Many active bystander programs exist across the country, such as Mentors in Violence Prevention (MVP), a national program, and One Act at UNC Chapel Hill, a campus-specific program. These programs and others like them have found success in challenging and changing campus culture to become one that recognizes and condemns sexual violence and unhealthy relationships. The results of my research reveal that Elon students will respond to a program that is student-driven, a program that facilitates frank conversations about sexuality, and a program that promotes empathy. In particular, students want a program that helps them to act compassionately and responsibly towards others. My research also reveals that program coordinators must be intentional and strategic about language used in programming and marketing. Language should be inclusive of all identities and be clear about what the program is asking of participants. Finally, recommendations will be made for how Elon can design and implement an Active Bystander Program.

**CIRCLE THE WAGONS: GENERATING SOCIAL MEDIA DISCOURSE FOR A SMALL MARKET FOOTBALL TEAM**

**Caroline M. Zybala** (Dr. Rebecca Pope-Ruark) Department of English

In today’s digital world, organizations have turned to social media to actively engage intended audiences with carefully crafted content. Similarly, genres act as categories in which we act, speak, and exist and are often the product of community agreement about how to effectively communicate membership in an organization or group. Organizations use social media to create discussion within defined discourse communities by offering news and commentary on relevant events. Social media platforms offer a place to gather and converse about common interests, but is it truly just a platform, or a new type of genre? This research aimed to determine how social media, specifically Twitter, fosters discussion within a community. A community in Buffalo, New York, created by loyal fans of the NFL team, the Buffalo Bills, shares unwavering support and dedication to its football team, year after year. Members bond over spending Sundays cheering on the team and the pain caused by the consistent losing. This tightly knit discourse community served as a case study to understand how the official Twitter account effectively reaches fans and cultivates dialogue. Using content analysis of targeted game weekends of the 2015 NFL season, I collected 937 tweets over three months and coded them based on established content categories such as ‘commentary’ and ‘request,’ referencing a coding matrix from John Jones (2014). The Buffalo Bills’ Twitter account and four opponents’ Twitter accounts were tracked for four game weekends, Friday through Monday, to observe tailored content for the respective online communities. Preliminary findings indicate NFL team Twitter accounts tailor content based on relevant external events and information and create ethos by retweeting accounts affiliated to the individual teams. Based on the account comparisons, quantity of content does not accurately reflect overall community support for the account. By observing how the tracked accounts tailor content to engage the audience, it is clear social media can be considered a type of genre. These findings demonstrate how to effectively generate dialogue around common interests within defined discourse communities. This case study contributes to the field of rhetorical knowledge by providing insight into social media as a genre.

***ENVIRONMENTAL STUDIES***

**PREDICTED IMPACT OF CLIMATE CHANGE ON THE GEOGRAPHIC RANGE OF THE EASTERN CORAL SNAKE (*MICRURUS FULVIUS)***

**Jennifer N. Archis** (Dr. Amanda Chunco) Department of Environmental Studies

Climate change is considered a significant global driver of biodiversity loss and species distribution change. Although it is postulated that many species may experience a range expansion at their northern limits, data on range shifts are still limited and studies on many taxonomic groups are lacking. One method of predicting distributional responses to climate change is species distribution modeling, which combines observations of species occurrence with environmental conditions to predict distributions across space and time.  Snakes are excellent for modeling possible range shifts because they are ectothermic and therefore depend heavily on climate conditions for metabolic function. We examined the influence of climate change on one snake species, the eastern coral snake (*Micrurus fulvius*). This species was chosen because it is locally rare and of high conservation concern. We had two primary objectives: (1) identification of current range and suitable environment of *M. fulvius* in the Southeastern United States, and (2) investigation of potential impacts of climate change on *M. fulvius* distribution, especially at the species’ northern range limits–the Sandhills of North Carolina. We applied the species distribution modeling program Maxent using 20 environmental variables and 105 occurrence records from museums across the country. Two future climate change scenarios from different agencies – MIROC-ESM and GISS-E2-R – were compared against current environmental conditions for the near (2050) and distant (2070) future. Current range appears to follow the range proposed by the International Union for the Conservation of Nature (IUCN), with temperature seasonality, mean temperature of the coldest quarter, precipitation of driest month, and precipitation of warmest quarter having the most significant contribution to model output. Both future models showed an increase in habitat suitability and a northward expansion of suitable habitat conditions. Results, however, also suggest that much of the Southeast will be well outside the range of typical climate conditions today, suggesting no-analog or novel environments in the future. Given the uncertainty over future climate conditions and the fact that *M. fulvius* is currently rare throughout its range and especially at the northern range limit, population monitoring of *M. fulvius* is recommended.

**THE SCIENCE OF PORTABLE BEEHIVES AND THE IMPORTANCE OF HONEYBEES EDUCATION**

**Margaret R. Bryant and Caitlin C. O’Connell** (Prof. Steve Moore) Department of Environmental Studies

In the United States, Honeybee pollination contributes $15 billion in increased crop value annually (USDA Department of Agriculture Research Service, 2015). Honeybees are the most important insect pollinators for crops grown in North Carolina. Although worldwide there has been a decline in the honeybee population in recent years, the national conversation does not reflect the importance of Honeybees and the damage that will result from their absence. This project is a collation of research on this topic that aims to add to the amount of public education on honeybees as it is disproportionate to the necessity of public awareness about the decline of our bee population.  The research deliverables consist of a manual and mobile demonstration hive.  Collating and presenting research on Honeybees, mobile observation hives, hive upkeep, and the best methods to inform the public on the importance of Honeybees into both formats creates an accessible educational resource.  The construction of a mobile observation hive and accompanying manual provides an interactive educational experience that allows for the presence of bees in a classroom setting without the long-term responsibility or liability of caring for the bees in a class.  The manual contains classroom instructions for observation and transportation as well as a guide to hive maintenance to take place at Loy Farm.

**VISUALIZING FOREST CHARACTERISTICS OF ELON UNIVERSITY FOREST IN GIS**

**Brittany R. DiRienzo**(Dr. David Vandermast) Department of Environmental Studies

The species composition of forested areas is strongly tied to their successional stage or the time since the last environmental disturbance. The 22.5 ha of Elon University Forest (EUF) contains former farmland which was abandoned and re-vegetated between roughly 40-70 years ago. In addition, there is an area of approximately six ha which has always been forested, and is considered to be a “forest of continuity” (FOC). The purpose of this study was to use GIS to show the spatial relationships of forest measurements such as forest age, basal area, woody plant diversity, similarity between sapling and tree strata, and ice-storm mortality. Carolina Vegetation Survey (CVS) protocol was used to collect data from eight 20 x 50m plots in forests of varying age and composition. Vegetation data from trees (woody stems >10cm DBH) and saplings (woody stems between 0.1 and 9.9 cm DBH) were collected in each plot. Overlays of forest composition and ice storm damage were created using Geographic Information Systems (GIS) applications. Tree abundance, basal area, and diversity (Shannon’s index) were consistent between the FOC plots while the variation in these measures was far greater in the younger forests. Furthermore, the forest sapling strata composition is more similar to the canopy in the FOC than it is in the younger forests (Sorensen’s index range: 92.1-93.9%) between sapling and canopy composition for the FOC versus (58.5-81.7%) for the younger, transitional forest. GIS analysis also indicates that the majority of ice-storm damage occurred in younger forest dominated by *Pinus virginiana*. The species of trees with the highest relative importance in FOC plots was *Quercus alba* and *Quercus velutina, and* the species with the highest importance in younger plots were *Liriodendron tulipifera* and *Pinus virginiana*. Our results are consistent with those of other studies in successional forests in this region.

**CARBON SEQUESTRATION AND CHANGES IN ABOVEGROUND TREE BIOMASS ON ELON UNIVERSITY FOREST**

**Sarah A. Gilley** (Dr. David Vandermast) Department of Environmental Studies

As trees grow they fix atmospheric carbon dioxide and convert it to biomass in the form of leaves, branches, roots, and trunks. Carbon in woody biomass is sequestered there for the life of the tree. The rate at which trees sequester carbon is dependent on several factors, including the species, forest age, climate, and land-use history. The southeastern United States has been identified as an area with especially high potential forest growth rates, and thus is significant in the understanding of forests’ role in the carbon cycle. This study aims to understand the rate of aboveground biomass (AGB) accumulation and carbon sequestration in Elon University Forest (EUF), a microcosm of Piedmont forest types. EUF contains a “forest of continuity”—a forest type with a high level of continuity in vegetation, structure, and disturbances—as well as a younger, more dynamic, pine-dominated forest. We used tree diameter (DBH) data gathered in 2011 and 2015 from eight permanent vegetation plots on EUF to calculate changes in AGB and carbon sequestered over the four-year period. Algorithms gathered from peer-reviewed sources were used to convert DBH measurements to estimates of AGB. Our overall results depict a forest with significant (p<0.01) declines in AGB (an average loss of 9.7%, from 1625.3 to 1467.2 Mg/ha) and carbon sequestered (from 731.4 to 660.2 Mg/ha) in living trees. However, the older plots showed a higher level of stability (loss of AGB of 5.7%) in biomass and carbon sequestered, and the younger plots showed more variability (loss of 10.7%). We believe the decrease in biomass across the entire forest can be attributed to a transitional phase in many of the plots, as well as a number of recent ice storms that have increased the mortality rate of the pine trees in the EUF.

**EXOTIC INVASIVE PLANT MANAGEMENT ON THE HAW RIVER TRAIL**

**Ellen C. Lana and Jennifer J. Adams** (Dr. Janet MacFall) Department of Environmental Studies

The presence of invasive species in natural areas poses an inherent threat to the structure and functions of native ecosystems. Allowing these species to continue to proliferate could result in negative consequences, including alterations in nutrient biogeochemical cycling, animal diversity, and trophic level irregularity. Riparian areas are most vulnerable to exotic plant invasion and distribution due to their proximity to water. The Haw River Trail was chosen as the study area. The goal of this project was to create park-specific exotic invasive plant species management plans for Shallow Ford Natural Area and Saxapahaw Island, both of which are located along the Haw River Trail. The goal of our field methodology was to determine the most prevalent exotic invasive species in the parks and their distribution between ecotones. Carolina Vegetation Survey (CVS) Protocol Level 5 was used, which uses percent coverage of a 100-meter square circular plot. Within each CVS plot, GPS coordinates were recorded for mapping purposes. In each park, we divided the region into separate ecotones, riparian, transitional, and upland, and set 5-10 plots. The prevalence of the most prolific exotic invasive species was determined by conducting a one-way ANOVA test. We found the percent cover of Japanese stiltgrass, Japanese honeysuckle, ground ivy, and Chinese privet to be significantly different between ecotones in Shallow Ford, however there were no significant differences noted between ecotones in Saxapahaw. Riparian ecotones were found to have the highest percent cover of exotic invasives, rendering the management of exotic invasive species critical to overall ecosystem health. This project also included suggestions about care of removal sites to reduce future invasions after the removal process. Two other deliverables included a pocket-sized handbook that will aid in identification of invasive species found in the parks and an informative kiosk design to be placed at trailheads. The completion of this project will enable the community to understand and experience an ecosystem closer to its natural form and sustain the ecological integrity of the area.

**EROSION EFFECTS ON SOIL CARBON AND EXTRACELLULAR ENZYMATIC ACTIVITY IN PIEDMONT STREAMS**

**Lindsay A. Luhn and Julia M. Mueller** (Dr. Janet MacFall) Department of Environmental Studies

The increase in anthropogenic activity since the eighteenth century has resulted in stream erosion in the Piedmont region of North Carolina.  The hyporheic zone is where both groundwater and surface water mix in the stream bank, supporting microbial enzymatic activity that is a mechanism of nutrient cycling.  Studying the hyporheic zone of streams provides insight into the effects of erosion on soil and water quality.  The level of enzymatic activity is indicative of the carbon presence in the soil.  To evaluate the impact of stream erosion, 21 sample sites were selected to allow sampling of a range of streams and degrees of erosion representative of the Piedmont region.  Four extracellular enzymes, phenol oxidase, acid phosphatase, β-glucosidase, and β-galactosidase, in addition to carbon, were studied in relation to bank height on fresh soil.  Carbon content was measured using the permanganate oxidation method on samples which were also tested for enzyme activity.  The enzymes exhibited a positive correlation of enzymatic activity with carbon presence. For all four enzymes, there was a negative correlation between bank height and enzymatic activity, revealing that as bank height was more eroded, there was less enzymatic activity.  These results reveal the influence of stream erosion on enzymatic activity and carbon in hyporheic soils and therefore the impact of erosion on nutrient cycling in stream systems.

**BUILDING A WALK-IN COOLER FOR THE LOY FARM**

**Nicolas J. Meritt (**Dr. Sirena Hargrove-Leak, Dr. Scott Wolter, and Dr. Janet MacFall) Department of Environmental Science

The objective of this project is to turn an enclosed trailer into a refrigerator and walk-in cooler. In order to turn a regular trailer into a refrigerator, two components are needed: a standard air conditioning unit and a CoolBot™. A CoolBot™ is an apparatus designed by Store It Cold, LLC.  The CoolBot™ unit is attached to the air conditioner and will regulate the inside temperature and when the air conditioner is powered. Insulation will be installed in the trailer. The unit will be stationed at the Loy Farm where it will serve as a mobile cooler to deliver fresh produce by simply attaching the trailer to a hitch.

**UTILIZATION OF SOLAR PASTEURIZATION TO REDUCE WATERBORNE ILLNESS IN CENTRAL AMERICA**

**Hannah L. Rolland** (Professor Steve Moore) Department of Environmental Studies

Consumption of contaminated water is an issue that impacts millions of people worldwide and has major health consequences including the spread of typhoid, Hepatitis A and diarrheal diseases. According to the World Health Organization, 663 million people rely on unimproved water sources, and 1.8 billion people use water that is contaminated with pathogens. In Latin America specifically, 77 million people lack access to clean drinking water. This research investigated the use of solar cookers to pasteurize water and provide clean drinking water to reduce waterborne illness within Central America. Three solar cookers were evaluated for their efficiency at heating 2.5 liters of water to the pasteurization temperature of 65oC. The HotPot™, an insulated glass pot, and the Sun Oven™, a box-type cooker, both achieved pasteurization in approximately 1 hour on sunny days, and in 2 hours on partly sunny days. The CooKit™, a reflective panel cooker, was largely inefficient but on sunny days pasteurization was reached in approximately 2-2.5 hours. These and other solar irradiance data from the testing location of Elon, North Carolina, were compared to solar irradiance data from Central America to determine the potential efficiency of these solar cookers in the region. Results indicate higher levels of solar irradiance in Central America, signifying that solar pasteurization would be even more successful in that region compared to the testing area in Elon. While solar pasteurization is not a complete replacement for other methods of water treatment, this research illustrates its viability as a sustainable supplement for treating contaminated water that has potential for reducing waterborne illness in Central America.

**GLOBAL WARMING AND ITS IMPACT ON COASTAL NEW JERSEY**

**Kathryn D. Rue** (Dr. Paul Moersdorf) Department of Environmental Studies

Global warming threatens to change the world as we know it. Through an overall predicted rise in both atmospheric and oceanic temperatures, climatic changes including glacial ice melt, rising sea level, and an increase in both the severity and frequency of natural disasters will be felt all over the world at some point in the future. Along the New Jersey coastline, the forces of global warming are already being felt. In the fall of 2012, Superstorm Sandy wreaked havoc throughout many states in both the northeastern and southeastern United States. New Jersey in particular experienced severe coastal flooding in all of its coastal counties. The storm caused nearly $40 billion in damages in New Jersey alone. Additionally, Sandy is also held noteworthy in regards to its record breaking low barometric pressure, average wave height, storm surge severity, overall size, and unique directional approach to the shoreline. Storms of Sandy’s size and intensity could become a more frequent occurrence as the result of global warming. In order to prepare, coastal home and business owners throughout the world must be well equipped for the future. While this research project primarily focuses on determining the impact of storms felt along the New Jersey coastline, it further extends to three other locations along the United States’ Atlantic coast. These locations include Virginia Beach County in Virginia, Charleston County in South Carolina, and Chatham County (Savannah) in Georgia. Comparatively speaking, these counties were assessed in relation to how severely they would have been affected had a storm on the same caliber as Superstorm Sandy directly hit them. Storm-proofing and future building recommendations for all locations were also assessed based off of information obtained from the Federal Emergency Management Agency (FEMA). Conclusions were reached based off of an assessment of research materials and web documents throughout the duration of this research project. Currently the timing, location, and type of events which will occur as a result of the ongoing warming of the Earth are unknown.  What is known, however, is that events, such as Superstorm Sandy, will be more frequent and of magnitudes outside what has been considered the "climate norm." Developing an understanding and awareness of what could happen in the future, is critical if we wish to minimize the impact of future severe storm events. Global warming is real and weather extremes will be more frequent and dangerous.

**FERRY THE FALCON: AN ENVIRONMENTAL CHILDREN’S BOOK SERIES**

**Elisabeth L. Van Hise** (Professor Michael Strickland) Department of Environmental Studies

My research has delved into the question of how to best engage elementary age students with children’s books and to help them understand and care about the environment from an early age. Children’s minds must be captured early so that they can more deeply connect to issues such as species diversity, extinction, and sustainability. I have had connections to early childhood education for many years, and I have been interested in raptors and initiatives of national parks, specifically at Acadia National Park in Maine, for many years. These combined interests led me to the creation of my three part children’s books series about Peregrine Falcons in Acadia. I began my research by reading other environmental children’s books during the summer of 2014 and created a prototype for the first book in the series during Winter Term of 2015 in my children’s book illustration class. Then, during summer of 2015 I had an internship during the summer of 2015 where I was able to tag baby Peregrine Falcons. As my books have progressed, I have begun to look into the publication process with the help of a winter term class based on publishing along with personal research. I have currently finished and self-published the first book in the series, with the second currently being printed and the third in the illustration stage. I have reached out to publishers in hopes that they will assist in the publication and marketing of my book. These books will be targeted toward children in Kindergarten through third grade, utilizing self-made illustrations, an engaging storyline, and a glossary of terms for children to aid in their understanding of this important topic.

***EXERCISE SCIENCE***

**SOMATOSENSORY PROCESSING AND NEUROCOGNITIVE PERFORMANCE DURING RECOVERY FROM CONCUSSION**

**Julianne C. Beck** (Dr. Caroline Ketcham and Dr. Eric Hall)Department of Exercise Science

BACKGROUND: Research has shown concussions impact neurocognitive performance as well as balance and gait. Also of interest is how somatosensory processing is affected with concussion and during recovery. PURPOSE: To determine the impact of concussions on somatosensory processing and assess the relationship between somatosensory processing and neurocognitive performance. METHODS: Fifty-one NCAA Division I collegiate student-athletes took the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACTTM) test and completed a somatosensory processing protocol (Tommerdahl et al., 2007) using a vibrotactile stimulator (Cortical Metrics, LLC) that delivered stimuli to the second and third digits as part of an ongoing concussion testing program. Temporal order judgment (TOJ) involved the ability to differentiate the timing between two sequential taps on the digits in the presence and absence of a conditioning stimulus. RESULTS: Preliminary results showed that the participants who had incurred a concussion and were tested less than 10 days after the concussion had smaller changes to the difference limens between TOJ with and without the conditioning stimulus (18 ms) compared to those who were tested more than 10 days following concussion and those tested at baseline (27 ms). While these were not significant, they were in the direction of what would be expected with somatosensory processing deficits. In addition, TOJ was significantly correlated with visual motor speed from the ImPACT (*r*=-0.33, p=0.01). CONCLUSIONS: Deficits in somatosensory processing and the relationship between visual motor speed may have implications in concussion recovery and return-to-play.

**LOWER BODY KINEMATICS OF THE RELEVÉ WHILE BAREFOOT AND EN POINTE: A CASE STUDY**

**Bryn Bonner, Alex Brownlow, Samantha Horowitz, Nate Houston, & Connor Rudnicki** (Dr. Joyce Davis) Department of Exercise Science

Ballet dancers experience many lower extremity injuries including knee ligament tears, ankle sprains, and foot problems. Although lower extremity injuries are a common occurrence in ballet dancers, there is an absence of literature examining the effects of wearing point shoes (en pointe) on movements of the lower extremities. This shortage of research has resulted in a lack of understanding of the effect of pointe shoes and the potential for injury during fundamental dance movements. The purpose of this case study was to use three-dimensional analysis to compare movements of the hips, knees, and ankles of a ballet dancer performing the relevé while barefoot and wearing pointe shoes.  The relevé requires the dancer to elevate from a flat foot position and balance on the toes. A 21-year-old female ballet dancer (height = 1.73 m; weight = 61.2 kg) with 18 years of experience volunteered for this case study. A 12-camera motion capture system (Qualisys AB, Gothenberg, Sweden) was used to observe lower limb kinematics during the relevé, both en pointe and barefoot. A kinematic model allowed the measurement of hip, knee and ankle joint angles in three planes of motion yielding results for flexion and extension; abduction and adduction; and rotational movements. Minimum and maximum joint range of motion values were obtained from which total ranges of motion were calculated. Basic temporal components of the movement (how long it takes to move up and down) were similar between legs and shoe conditions. There were differences in movement patterns with twenty degrees greater hip abduction on both sides when en pointe. On the right side, knee rotation was greater by four degrees en pointe and ankle rotation was six degrees greater barefoot. These findings suggest differences in lower body kinematics between left and right knees and ankles. The increase in hip abduction when in pointe is noteworthy. These differences are believed to be the result of additional length the pointe shoe adds to the foot segment. The additional length increases the width of foot position when rising up to relevé en pointe as compared to barefoot.

**EFFECTS OF HIGH AND LOW INTENSITY YOGA ON PSYCHO-SOCIAL WELL BEING IN COLLEGE-AGED FEMALES**

**Amanda R. Carberry and Molly A. Sullivan** (Dr. Svetlana Nepocatych and Dr. Elizabeth Evans) Departments of Exercise Science and Physical Therapy Education.

BACKGROUND: Female college students are exposed to stress on a daily basis.  Previous research has found that stressors and high-pressure situations can lead to negative impacts on a female college students’ emotional and mental health (Bulo, 2014). Yoga has been found to reduce negative impacts of high stress levels (Woodyard, 2011).  PURPOSE: To determine the effects of two different types of yoga on psycho-social well-being in college-aged females.  METHODS: Thirty-three females participated in the study, age (21 ± 2 y), height (165 ± 6 cm), weight (64 ± 11 kg), BMI (23 ± 4 kg/m2), body fat (23 ± 6 %), and Resting Heart Rate (60 ± 7 bpm).  Each participant completed three 1-hour sessions, which included power yoga, stretch yoga, and a control (watched the movie “Earth”). During each session, participants completed the Feeling Scale (FS), Feelings of Arousal Scale (FAS), and Attentional Focus questionnaire. In addition, the Activation Deactivation Adjective Check List (AD-ACL) was used to assess energy, tiredness, calmness, and tension.  RESULTS: Repeated measures ANOVAs indicated that there was a significant difference in FS and FAS scores observed between conditions (*p* = 0.02) and over time (*p* = 0.001), indicating that participants found power yoga session to be more enjoyable and energizing. A significant difference was observed in energy, tiredness, calmness, and tension between conditions (*p* = 0.02) and over time (*p* < 0.001), indicating that participants felt more energetic and less tired after the power yoga session. Significantly higher attentional focus was achieved during power yoga session (*p* < 0.001). CONCLUSIONS:  Results suggest that participants perceived the power yoga session as more pleasurable, energizing and less tiring compared to the stretch yoga and control sessions. Additionally, participants were more focused as indicated by higher association and lower dissociation scores during power yoga compared to the other sessions.  Stretch yoga was associated with the lowest activation, indicating the participants felt calm and relaxed.  Overall, our results indicate that power and meditative stretch yoga would be an effective way for college-aged females to improve psycho-social well-being.

**IMPACT OF AN AFFECT-BASED EXERCISE PRESCRIPTION ON AEROBIC FITNESS AND EXERCISE ADHERENCE**

**Nicole B. Doolen (**Dr. Walter R. Bixby) Department of Exercise Science

Feelings of displeasure experienced during exercise have been identified as a primary factor in the decision to terminate exercise. Specifically, traditional exercise programs that prescribe moderate intensity exercise using measures such as the Rating of Perceived Exertion (RPE) scale often induce a negative affective response during exercise, discouraging future exercise participation. The Feeling Scale (FS), which measures feelings of pleasure and displeasure, has been used to regulate intensity and promote positive affect during single exercise bouts. However, use of FS in longer-term exercise prescriptions is limited. **PURPOSE:** To compare the impact of an affect-based exercise prescription (FS) to an intensity-based exercise prescription (RPE) on changes in aerobic fitness and exercise adherence. **METHODS:** Participants were assigned to either an FS prescription (n = 26) or an RPE prescription (n = 24) for a 6-week cardiovascular exercise program consisting of at least 3 days per week of at least 30 minutes of exercise. The FS prescription required participants to adjust their exercise intensity so that they maintained a perceived FS value of at least 3 (*good*), and the RPE prescription required participants to adjust their exercise intensity so that they maintained a perceived RPE value of 12-13 (*somewhat hard*). A Forestry Step Test was used to assess aerobic fitness. Exercise adherence was measured through 1-week activity logs taken during the 6-week intervention and 1 month following. **RESULTS:** Repeated measures ANOVA revealed a significant main effect for time for estimated VO2 (F(1, 33) = 5.24, *p* = 0.029). Analysis of minutes per week revealed no significant differences between groups (FS time 1 = 124.24 (43.43), FS time 2 = 107.39 (103.40), RPE time 1 = 114.15 (19.62), RPE time 2 = 105.85 (82.40)). Between the start of the intervention and the 1-month follow-up, 54% of the RPE participants dropped out compared to 37% of the FS participants. **CONCLUSION:** The groups had similar improvements in aerobic fitness following the 6-week intervention, indicating that FS can be used as effectively as RPE to prescribe exercise. Further research seems warranted to uncover the long-term impact of the Feeling Scale as a tool to enhance exercise adherence.

**POTENTIAL FACTORS INFLUENCING RECOVERY FROM CONCUSSION IN COLLEGIATE STUDENT-ATHLETES**

**Kayla P Harvey** (Dr. Eric Hall) Department of Exercise Science

BACKGROUND: Concussions among collegiate student-athletes are frequent, with as many as 300,000 sport related concussions occurring each year. Recovery from concussion differs among individuals.  Therefore, additional research needs to be conducted on factors that may influence concussion recovery so that return-to-play guidelines can be made specific to each individual. PURPOSE: The purpose of this study was to determine potential factors that influence recovery from concussion. METHODS: The participants fill out a computerized survey which asked questions regarding their demographics, collegiate athletic experience, as well as medical conditions.  Athletes who sustain a concussion were then asked to fill out an additional section about their symptoms and how many days they experienced symptoms. 45 Division I collegiate student-athletes completed the surveys. These student-athletes came from football (n=17), women’s soccer (n=5), men’s soccer (n=2), volleyball (n=4), baseball (n=4), women’s basketball (n=5), men’s basketball (n=2), softball (n=3), cross country (n=1), lacrosse (n=1), track and field (n=2), and women’s tennis (n=1). This study examined whether sex, history of migraine, type of sport played, and previous diagnosis of Attention Deficit Disorder (ADD) or Attention Deficit Hyperactivity Disorder (ADHD) influenced recovery. RESULTS: Self-reported data shows that some sports had a longer recovery period based on the number of days post-concussion that they still experienced symptoms.  Track and Field had the longest mean recovery (13 days), followed by lacrosse (12 days) and volleyball (11.8 days). Females also showed a longer mean recovery period (9.3 days) as compared to males (6 days).  Additionally, participants who had a previous diagnosis of ADD/ADHD had a longer mean recovery period (8.5 days) compared to those who did not have a diagnosis of ADD/ADHD (7.5 days). CONCLUSION: Results of this study suggest that the makers of the return-to-play guidelines should be cognizant of different variables, such as sex, sport, history of migraine, and diagnosis of ADD/ADHD that may influence recovery from concussion.  Therefore, guidelines should be specific to each individual, rather than generalized for the entire student-athlete population.

**EXAMINATION OF DIFFERENCES IN CLINICAL BALANCE MEASURES AND**

**PERCEIVED FEAR OF FALLING IN BREAST CANCER SURVIVORS**

**Julie C. Hibberd and Miranda E. Cullen** (Dr. Elizabeth Evans) Department of Exercise Science

PURPOSE: To investigate potential differences in clinical measures of static and dynamic balance and perceived fear of falling in breast cancer survivors and women of similar physical capabilities. It has be determined that following breast cancer treatments, survivors may experience physiological changes that can contribute to balance instabilities. This may be due to the impact of certain cancer treatments on vision, somatosensory feedback, and/or vestibular function. These balance changes could negatively impact physical functioning and quality of life.

METHODS: Participants included 22 women, 40-60 years of age, who were 0-5 years post-treatment for breast cancer and 20 physically similar women without a history of cancer (controls). Subjects completed three clinical balance tests.  Static balance was assessed using the Single Leg Stance Test (with eyes open and eyes closed), and dynamic balance was assessed using the Timed Up and Go Test and the Fullerton Advanced Balance Scale.  Subjects also completed the Falls Efficacy Scale-International, a questionnaire designed to assess an individual’s fear of falling in various social and physical activities inside and outside the home.  Scores for each balance assessment as well as for the Falls Efficacy Scale-International were compared between study groups using Mann-Whitney U Tests.  RESULTS: Breast cancer survivors exhibited significantly poorer balance compared to the controls on the eyes open condition of the Single Let Stance Test (27.9 ± 13.9 seconds vs. 38.4 ± 11.1 seconds, p = 0.009) and the Fullerton Advanced Balance Scale (36 ± 2 points vs. 39 ± 1 points, p < 0.0005).  Additionally, breast cancer survivors tended to take longer to complete the Timed Up and Go Test compared to the controls (8.5 ± 1.3 seconds vs. 7.8 ± 1.0 seconds, p = 0.056). Performance on the eyes closed condition of the Single Leg Stance Test and perceived fear of falling were similar between groups (p = 0.290-0.380). CONCLUSIONS: These analyses suggest that recent breast cancer survivors may have some significant reductions in balance compared physically similar women who have not experienced cancer treatment, even if perceived fear of falling is similar.

**TRANSCRANIAL DIRECT CURRENT STIMULATION (TDCS) TO BROCA’S AREA: PERSISTING EFFECTS ON NON-VERBAL MOTOR BEHAVIORS**

**Kathleen E. Hupfeld** (Dr. Caroline J. Ketcham) Department of Exercise Science

BACKGROUND: Low-cost, portable, and user-friendly, transcranial direct current stimulation (tDCS) has been investigated as a novel therapy for treating various neurological impairments, including motor, cognitive, and speech deficits. tDCS passes a constant, weak electrical current between two electrode sponges—the anode and cathode—placed on the subject’s head; anodal tDCS modulates neuronal membrane potentials to facilitate neuronal activity. While a substantial body of literature has found that anodal tDCS applied to the primary motor cortex (M1) elicits improvements in motor behaviors, few studies have examined whether stimulation of other cortical areas involved in motor output produces similar or long-lasting effects. Although Broca’s area is associated with speech production and grammar acquisition due to cortical-striatal connections, it may also significantly contribute to motor planning/output even in non-speech tasks—especially in more complex tasks that require sequence-learning (Ullman, 2006). PURPOSE: This study involved applying anodal tDCS to Broca’s area and observing the effects on non-verbal motor output. METHODS: Twenty neurotypical young adults completed an experimental vs. sham testing session separated by 1 week. During each session, participants received one of two stimulation conditions: (1) 30 minutes of 1.0 mA of anodal tDCS to Broca’s area (FC5; cathode on right supraorbital area) or (2) sham stimulation. During stimulation (or sham), participants completed two motor tasks: (1) a limits of stability dynamic balance task (Biodex Balance System) and (2) a simple/choice reaction time task (MOART Reaction Time and Movement Time Panel). RESULTS: Initial results indicate that subjects who received stimulation of Broca’s area first performed significantly better on simple reaction time, (p<0.05), dynamic balance speed (p<0.05), and dynamic balance accuracy (p<0.001) when tested one week later compared to participants who received sham stimulation first. CONCLUSIONS: These findings indicate that Broca’s area is also involved in non-verbal motor behaviors. This persisting cortical motor response to stimulation has obvious implications for time-consuming novel combined speech and movement therapy interventions.

**CHRONIC INJURY, LEG DOMINANCE, AND KNEE STRENGTH IN FEMALE COLLEGIATE DANCERS**

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Previous studies have examined many aspects of injury with nearly 50% of dancers reporting chronic injuries that could affect strength, an important functional measure. The relationship leg dominance may have with knee strength in dancers is unclear.  The purpose of this study was to examine the relationships among chronic knee injury, leg dominance, and knee strength in female, collegiate dancers. Seven female dancers (mean age 19.0 ± 1.4 years) consented to participate. History of knee injury was examined to determine chronic injury or healthy knee status. Dancers completed a leg dominance test and performed knee strength tests on both legs using a Biodex dynamometer at three speeds (60, 180, 300 deg/sec). Peak torque to body weight ratios (PT), which represents knee strength divided by body weight, and strength ratios (SR) comparing anterior and posterior thigh muscles were calculated. All participants were right leg dominant. Three had chronic injuries on both legs while four had healthy knees on both legs. On the dominant leg, participants with healthy knees had significantly better PT values at 300 deg/sec (p=0.028) and better SR at both 60 and 180 deg/sec (p=0.0078, p=0.0067 respectively). No differences were observed in PT or SR between dominant and non-dominant legs. Differences may not occur as a function of leg dominance because loads imposed during training may be similar for both legs.Lower peak torques at higher speeds were expected across all conditions. However results suggest chronic injury has a negative influence on muscular contractions at high speeds on the dominant leg. Dancers with chronic injury may be more susceptible to repeated injury at slower speeds on the dominant leg due to muscular imbalance. Relationship between chronic knee injury and knee strength depends on movement speed. Leg dominance does not appear to influence knee strength.  Strength training of quadriceps muscles on the dominant leg at higher speeds is recommended for dancers with chronic injury. Attention should be given to maintaining muscular balance between anterior and posterior muscles of the thigh on the dominant leg, particularly for slower movements.

**INFLUENCES OF PSYCHOLOGICAL FACTORS ON DELAYED ONSET MUSCLE SORENESS**

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Research has shown that an athlete’s perception of pain has an impact on cognitive appraisals of injury, emotional and behavioral responses to the injury, and return to sport. According to the Fear Avoidance Model, when pain is misinterpreted as catastrophic, the athlete becomes fearful of pain, thus exhibiting avoidance behaviors due to kinesiophobia or fear of re-injury/movement (Leeuw, 2006). PURPOSE: To determine if psychological factors can predict an athlete’s perception of pain, following a muscle induced injury model. METHODS: 35 (24 males) Division I collegiate student-athletes underwent a high intensity conditioning session, following a week of inactivity of their respected sport, in order to induce muscle soreness. Prior to completing the exercise protocol, participants completed the Fear of Pain Questionnaire (FPQ –III), Pain Catastrophizing Scale (PCS), Athlete Fear Avoidance Questionnaire (AFAQ), Tampa Scale Kinesiophobia (TSK), and State Trait Anxiety Inventory Scale (STAI). Immediately following the protocol, participants completed the Pain Rating Numeric Scale. 24 and 48 hours post, participants were given the PCS, TSK, Pain Rating Numeric Scale, Brief Pain Inventory, and Quick Dash. RESULTS: Athletes who reported a high sense of fear avoidance were likely to identify their pain as catastrophic (r=.49; p<.05) and a lack of ability to perform his/her sport (r=.35; p<.05) 24 hours post.  Fear avoidant beliefs also had a positive effect on how they rated their pain(r=.49; p<.05), identified their pain(r=.54; p<.05), their level of fear of re-injury(r= .35; p<.05), and their ability to perform their sport (r=.41: p<.05) 48 hours post. Similar to fear avoidant beliefs, trait anxiety prior to the conditioning, had a positive effect on how an athlete identified his/her pain(r= .48; p<.05), and their capability to perform their sport(r=.43; p<.05) 24 hours post. At 48h post, trait anxiety also had an impact on how the athlete identified his/her pain (r=.47; p<.05) and level of fear of re-injury (r=.42; p<.05). CONCLUSION: Results suggest that an athlete’s fear avoidance beliefs and trait anxiety before injury may influence reports of their pain intensity and disability. Thus the following results provide support for the use of psychological constructs in predicting outcomes from muscle soreness.

**EFFECTS OF DRINKING VS RINSING WITH WATER ON PHYSIOLOGICAL AND AFFECTIVE RESPONSE DURING A 15-KM RUNNING SESSION**

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BACKGROUND: Hydration status can affect prolonged performance in the heat, especially if participants begin exercise. PUROSE: This study examined the effects of consuming water versus mouth rinsing with water during a running time trial. METHODS:Recreationally active female runners (n = 23; 26 ± 6 y; 22 ± 3 % body fat) completed two, 15-km time trials on an outdoor course (~20ºC; 87% RH) separated by at least one week in a randomized cross-over study design. Participants consumed 355 ml of water (CW) during their run or mouth rinsed (MR) with water every 3 km for 5 s. Completion time, heart rate (HR), ratings of perceived exertion (RPE), ratings of perceived thirst (PT), pre-run urine specific gravity (USG), and sweat loss were measured. In addition, ratings on the feeling scale (FS) and felt arousal scale (FAS) were recorded. RESULTS:There was no significant difference observed between treatments for pre-run USG (*p* = 0.63). CW or MR did not affect time (79.8 ± 7.0 min and 79.6 ± 7.1 min, *p* = 0.77), HR (*p* = 0.44), or RPE (*p* = 0.97), respectively. Sweat losses were greater (*p* < 0.01) for CW (1.5 ± 0.3 L) compared to MR (1.2 ± 0.3 L) and PT was greater (*p* = 0.03) for MR (7 ± 1) compared to CW (6 ± 2). A significant effect was exhibited for time (*p* < 0.01) but not conditions (*p* = 0.85) for FS and FAS. CONCLUSION:MR versus CW does not impair performance or alter affect during runs of  >1 h for female runners who begin exercise euhydrated. This strategy may reduce gastrointestinal distress for runners who do not like drinking during runs and allow for a reduction in volume of water carried.

**THE IMPORTANCE OF SLEEP IN CONCUSSION BASELINE NEUROCOGNITIVE TESTING IN COLLEGIATE STUDENT-ATHLETES**

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BACKGROUND: Baseline neurocognitive tests are used as a comparison to post-concussion assessments to aid in return-to-play (RTP) decisions. Previous research has shown that athletes who sleep for less than 7 hours before a baseline test are likely to score lower on neurocognitive tests. PURPOSE: The goal of this study was to understand the relationship between amount of sleep and sleep quality on baseline neurocognitive performance. METHODS: Seventy-seven NCAA Division I student-athletes took the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACTTM) test and the Pittsburg Sleep Quality Index questionnaire (PSQI) as part of baseline concussion testing. RESULTS: PSQI sleep quality was significantly correlated with reaction time (*r*=0.26, p=0.01), impulse (*r*=-0.24, p=.02); symptom scores (*r*=0.32, p=0.003). PSQI sleep duration was significantly correlated with visuomotor speed (*r*=-0.29, p=0.004). The number of hours slept (ImPACT) was significantly correlated with symptom scores (*r*=-0.17, p=0.01) and PSQI sleep quality (*r*=-0.21, p=0.058). When participants were grouped as good (n=67) or poor (n=10) sleepers there was a significant difference on symptom scores (p=0.002). CONCLUSION: Participants who had lower quality of sleep had slower reaction times as well as higher impulse and symptom scores. Those with less hours of sleep had slower visuomotor speed and lower sleep quality. The implications of this research are consideration of sleep duration and sleep quality for student-athletes when completing baseline concussion testing and concussion assessment in making RTP decisions.

***FINANCE***

**ASSET-BASED STYLE RISK FACTORS FOR BENCHMARKING HEDGE FUND PERFORMANCE**

**Martin Enssle** (Dr. Kate Upton) Department of Finance

Hedge funds have become increasingly important alternative investment vehicles over the past two decades with total assets under management amounting to almost $2.8 trillion as of 2015.1  Hedge funds are usually leveraged and use dynamic trading strategies. Due to their fundamental differences from traditional investment products, Fung and Hsieh (2004) develop a model with risk factors based on regular asset classes. They find that eight of these factors can significantly explain a large portion of hedge fund performance. These Asset-Based Style Factors make it easier to evaluate the return from a hedge fund’s strategy while accounting for their risk exposures. This research aims to identify additional asset-based factors accounting for novel profit sources in an increasingly complex and competitive hedge fund universe. In a cross-sectional regression of hedge fund returns similar to Fung and Hsieh, I identify a negative and significant relation between hedge fund returns and market volatility (VIX) and oil price volatility (OVX). This raises questions about how well hedge fund managers can actually profit in highly volatile environments. In addition, it was possible to identify a negative and significant relation between hedge fund and frontier market performance (markets not listed as emerging or developed markets). This research sheds more light into the exposure of hedge funds to certain risk factors and helps to provide a more accurate benchmarking tool for hedge fund performance.

**THE IMPACT OF OIL PRICE VOLATILITY ON INVESTMENT IN ALTERNATIVE ENERGY**

**Christopher T. Shannon** (Dr. Chris Harris) Department of Finance

The price of oil continues to be a hot topic in financial markets, since its effects are much more profound than gasoline prices at the pump. One such impact is alternative energy (AE). The general perception of investors is that AE is highly influenced by oil prices – when oil is relatively cheap, there is no need for other sources of energy, but when oil is relatively expensive, investment in AE increases with the goal of finding a suitable substitute for carbon-based energy. The goal of this study is to understand the relationship between oil price volatility (OPV) and growth in the AE sector, which is important in today’s world where OPV is high from year to year, so investments may vary greatly. Moving away from dependence on fossil fuels is necessary due to mounting environmental concerns, and understanding investment in AE is an important step in the transition. We test the validity of this relationship between OPV and investment in AE and then examine how it differs compared to normal firms and energy sector firms, as seen through seven factors: debt, debt-to-equity ratio, capital expenditures, research & development expenditures, share repurchases, cash holdings, and returns on equity. We also test those factors in years of high and low oil prices to determine if price level, in addition to OPV, has any effect on investment. We utilize regressions using previously reviewed financial models, modified with the addition of the OPV variable, and find investment in AE firms does respond very differently to OPV than normal firms and energy sector firms, especially in three categories: debt levels, research & development expenditures, and share repurchases. Using this information, we develop a plausible operating narrative for AE firms: AE firms take on debt in response to OPV and then use this debt to fund research & development for their technology, which also increases in response to OPV, especially in years when oil price is high. These firms also decrease their share repurchases in response to OPV, seeing greater potential in reinvesting funding in their operations than distributing it to shareholders.

**FAMILY FIRMS, CORPORATE GOVERNANCE, AND FIRM PERFORMANCE**

**Allison C. Weiler** (Dr. Yilun Shi) Department of Finance

The goal of financial management is to maximize shareholders’ value. In order to achieve such a goal, firms, as well as their shareholders, must identify and understand the key factors that help optimize firm efficiency and improve management quality. This study explores the interaction of corporate governance mechanisms and large stake or shareholders with firm performance. Specifically, we examine the difference between firms with outside management and ownership and those with the founder of the firm (or the founder’s descendants) involved in management or ownership. The latter we refer to in our study as “family firms.” Both corporate governance and family firms have been prevailing topics within corporate finance research for decades. Governance is costly and often endogenous. On the contrary, family ownership is exogenous by nature. Studying the interaction between the two will shed light on how we can improve firm performance given complicated firm structure in modern corporations. Previous literature suggests that family presence in management and/or ownership negatively affects both minority shareholders and firm performance (e.g. Anderson & Reeb (2003)). We investigate whether corporate governance will alleviate or enhance such a negative effect. Our sample is comprised of financial data taken from Compustat for more than 100 Fortune 500 firms from 2003-2007. We used a multivariable *OLS* regression to test the relationship between family presence and governance (independent variables) and firm performance (dependent variable). In addition, we included a series of control variables to account for other firm and industry characteristics that contribute to firm performance. The family variable data was collected using information from firm proxy statements. We base financial performance on several measures including: return on assets, return on equity, operating margin, market-to-book ratio, etc. Preliminary findings suggest that continued family presence in the management and/or ownership of the firm positively affects several financial and market performance measures. The positive effect is more evident when the firm has a better governance practice. Our findings support that family presence could be a complement to governance structure within a firm.

***HEALTH AND HUMAN PERFORMANCE***

**VARIABLES AFFECTING PHYSICAL ACTIVITY HABITS AMONG UNIVERSITY EMPLOYEES AND UNIVERSITY STUDENTS**

**Kailey A. Tracy** (Professor Elizabeth Bailey) School of Communications and Department of Health and Human Performance

Regular physical activity has been identified as essential to health and important in maintaining quality of life. Yet only a small percentage of individuals meet the national physical activity (PA) guidelines. Previous research has suggested that a number of barriers exist when considering PA. For example, socioeconomic levels have been found to impact social, psychological and environmental areas in one’s life, and these also impact PA habits. It has also been found that those who participate in daily sedentary activities have a greater risk of dying (Blair, 2012). Among working adults, sedentary behavior is pervasive with studies estimating 55-70% of time spent in sedentary pursuits daily. While students should have plenty of time for PA, a recent study suggests they spend as much as 8 hours a day in sedentary activities themselves (Rouse and Biddle, 2010). The purpose of this study is to investigate factors that affect participation in PA, as well as perceived and actual PA, using employees and students as our sample. Participants were recruited from the student body and all occupations via E-net. Sixteen Elon employees volunteered; 12 women and 4 men with a mean age of 37 ± 1 year.  Fourteen of these employees held jobs that are traditionally considered sedentary (i.e. professor, program assistant), while 2 worked for ARAMARK and/or Physical Plant. Twelve students volunteered; 10 females and 2 males, with a mean age of 19 ± 1 year. Informed consent and demographic information were obtained and participants completed the University of Cambridge’s Physical Activity Questionnaire to assess perceived daily PA. Each participant then wore an accelerometer, an electronic device that quantifies movement, and kept a log to document activity for at least one full day. All were instructed not to alter typical activity behavior while wearing the accelerometer. Currently, data analysis is ongoing but will be finished by late March. By identifying variables including socioeconomic status, perceived importance of physical activity, and occupation, and comparing time spent in sedentary activity vs. physical activities of low to vigorous intensities, researchers hope to gain information to help individuals maintain/improve daily physical activity and potentially health.

***HISTORY***

**MADAME DU DEFFAND AND JULIE DE LESPINASSE: A SALONNIERE AND HER APPRENTICE**

**Nicole B. Ackman** (Dr. Michael Carignan) Department of History

This presentation seeks to explore the relationship between two *salonnières*, Madame du Deffand and Julie de Lespinasse. It is part of a larger thesis about the relationships between *salonnières* during the Enlightenment-era in Paris. The presentation derives from research on a collection of 31 letters between and about the aforementioned mentor and mentee pair (Smith 1938). The main questions that animate my analysis are: What do these letters show about the relationship between Madame du Deffand and Julie de Lespinasse? And what does this relationship tell us about the relationships between the women of the salons and the training of *salonnières*? In order to better understand the nature of the apprenticeship model employed for training *salonnières* and whether it is closer to a traditional trade model or more familial, this paper looks at the type of information being exchanged between the women in their letters, the way they address each other, and the way they describe each other in letters to other people. This research will end in an open question about the relationships between *salonnières* and their apprentices.

**CATHOLICS AND CONTRACEPTION: EXCEPTIONAL OR CONVENTIONAL IN THE AMERICAN CONTEXT OF THE 20TH CENTURY?**

**Grace S. Rubinger** (Dr. Mary Jo Festle) Department of History

Historians of sexuality describe a new system of sexual liberalism that took hold in the United States between the 1920s and 1960s. One crucial component of this new set of cultural norms was the detachment of sexual activity from the traditional sole goal of procreation. American couples increasingly used birth control, especially after the development and marketing of “the pill” in 1960. Most scholars have assumed that Roman Catholics accepted the Church’s long-standing opposition to the use of contraception, even in the face of significant changes among other Americans in the 1950s and 1960s. But some historians now suggest that many Catholics disagreed with papal instruction on this matter. This research addresses the question: Did American Roman Catholics embrace the mainstream American sexual ideology of the 20th century about birth control? In order to investigate, I analyzed several different sources, including newspaper articles about Catholic responses to a papal commission in 1963 that considered birth control, research on family planning usage patterns by doctors and sociologists, public opinion poll data, writings by Catholic women in popular magazines and official papal encyclicals and addresses. After this research, I conclude that the 1960s was a significant period of change for American Roman Catholics. Some Catholic women expressed disappointment when the Pope reasserted its traditional stance about the purposes of sexual activity and the prohibition on using contraceptives in the 1968 papal encyclical Humanae Vitae and many couples began to use various methods of contraception. This direct defiance of church teachings has had lasting implications. As Catholics slowly embraced the sexual liberalism movement, they set a precedent for future generations to continue their legacy of disobedience, which ultimately undermined the Church’s authority in Americans’ personal moral decision-making.

***HUMAN SERVICE STUDIES***

**SELF-CARE NEEDS ASSESSMENT OF COLLEGE STUDENTS AND THE ESTABLISHMENT OF BASELINE OUTCOMES AT ELON UNIVERSITY AND LYNCHBURG COLLEGE**

**Gabriel J. Abbondandolo** (Dr. Carmen Monico) Department of Human Service Studies

According to the American Institute of Stress college students have experienced a 20% increase in stress over their daily lives. Research has shown college students report higher levels of stress than any other generation. The purpose of the present research is to determine whether or not a SELF-CARE model needs assessment would work in mitigating stress symptoms. The model stands for stress management, eat healthy, lifestyle, family and friends, connections, anticipation, rest and exercise. Each is equally important and relates back to the others. Research will involve a questionnaire broken down into the eight categories identified above plus two to three sub categories for each so as to provide better organization and understanding. Services provided by Elon University and Lynchburg College will be organized into the categories and students and faculty/staff will be asked to identify which of these services they use. A pretest will be carried out during spring 2016 to test utilization of services which are provided by the student wellness center, counseling services and other organizations on campus. Results should show faculty/staff who utilize the services provided by Elon may report lower stress levels due to the engagement of the model. Areas of the model that are most important will also be identified so as to help mitigate stress in students and faculty/staff in the future. Protective and risk factors will also be identified.

**MODALITIES OF HEALTH CARE IN A GLOBAL AND SOCIAL CONTEXT: THEORY AND PRACTICE IN ECUADOR**

**Anna C. deDufour** (Dr. Bud Warner) Department of Human Service Studies

The purpose of this study is to examine the holistic nature of integrative medicine in Ecuador, where traditional and modern ideological frameworks of health care interact.  In Ecuador and neighboring countries, health inequities are most evident among poor families, particularly within rural indigenous communities of the Sierra region. Stunting, malnutrition, mistrust in doctors, and poor sanitation are just a few risk factors that reflect systemic failures to reduce exclusion to health care  (Freire, Belmont, Waters et. Al, 2015, p. 17-18). Information was collected in Quito, Ecuador through a review of existing literature and interviews with informants both within and outside of the field of public health in order to better understand the development and inclusion of complementary medicine in formal health systems. The key findings show that traditional medicine has recently gained legal status in Ecuador, which has opened pathways for the harmonious coexistence of western and alternative forms of care (“República del Ecuador constitución de 2008”, 2011).  Nuanced social policies, with the help of local initiatives, have made training for the administration of complementary medicine possible, and traditional doctors can be found in several contemporary hospitals and clinics throughout the Sierra region (“Social Panorama of Latin America”, 2007, p. 252; Mafla, 2014, p. 9).  Qualitative observations support the notion that interpretations of health, illness, and proper treatment are malleable: internalized as cultural identity but shaped externally by policy. In light of this, primary health care policy must reflect social realities, cultural preferences, and environmental factors within marginalized communities, challenging systemic barriers and commonly-held stigma from the dominant culture.  This occurs in environments where traditional healers, community members, and trained practitioners work in mutually-supportive, interconnected systems (W. Waters, personal communication, January 15, 2016; World Health Organization and UNICEF, 1978, p. 3-5). Knowledge gathered surrounding the challenges and successes of these practices illuminate diverse interpretations of human ailments and reflect modern dilemmas between theory and practice in medicine and public health.

**THE ROLE OF NEW STUDENT ORIENTATION IN PROVIDING SOCIAL SUPPORT AND ITS EFFECT ON ANXIETY AND DEPRESSION SYMPTOMS AMONG FIRST-YEAR STUDENTS**

**Nicky Kratzer** (Dr. Bud Warner) Department of Human Service Studies

Transitioning to college results in many for students, as they are living in a new location, navigating new relationships, and are presented with new academic and extracurricular opportunities (Smith & Zhang, 2009).  The transition to college can also be a time when students’ mental health is fragile.  Students are often in high stress environments because of these adjustments, and this increased stress can lead to an increased risk for developing a mental illness (Mahmoud, Staten, Lennie & Hall, 2015; Pisanti et al., 2014). This study took place at a small, private, liberal arts university in the Southeast of the United States.  A random sample of twelve first-year seminar classes was selected, with a total of 178 students able to participate in the study.  Participants took a survey in the beginning of the semester (early September) assessing perceived social support, their New Student Orientation experience, and any anxiety and depressive symptomology during the first semester at the university.  Participants were then contacted at various points later in the semester and retook the survey.  The research aims to determine if there is a relationship between the students’ orientation experience and any anxiety or depressive symptomology during this transition period.

**UNDERSTANDING HELP-SEEKING BEHAVIOR IN BLACK/AFRICAN-AMERICAN UNDERGRADUATES**

**Dionna D.S. Stanton** (Dr. Bud Warner) Department of Human Service Studies

For centuries, race-based tensions, income disparities, and institutional racism have created a system in which few Black Americans are exempt from barriers inhibiting the achievement of optimum health in the United States. A recent report by the National Alliance on Mental Health (NAMI), estimates that “Approximately 1 in 5 adults in the U.S.—43.7 million, or 18.6%—experiences mental illness in a given year” (2015). As more Americans become comfortable recognizing issues relating to psychological and emotional disorders, research on interventions and strategies aimed at preventing and treating such issues grows as well. However, studies on the unique factors related to the mental health of Black Americans continues to lag behind research that has often focused on the White American experience. Ayalon and Young (2005) found that “Blacks underuse outpatient mental health services and overuse inpatient and emergency health services.” This suggests that preventative-level interventions are either ineffective, inaccessible, or lack perceived benefits by Blacks experiencing emotional or psychological distress. Black youth in particular often fail to receive care, resulting in continually high rates of suicide ideation as well as suicide attempts and completion. The purpose of this research is to understand the specific factors that prevent Black college students attending private, predominately White institutions (PWIs) from seeking professional care during times of psychological/emotional distress or need.  Additionally, our research seeks to understand the factors that promote help-seeking behavior in Black undergraduates. The researchers developed and published an online survey in order to collect appropriate data. Initial findings from 68 responses to the survey and suggest a myriad of factors that promote and inhibit help-seeking among Black students attending PWIs including perceived stigma, time constraints, and ineffectiveness of treatment.

***INTERNATIONAL AND GLOBAL STUDIES***

**THE ROLE OF RADIO BROADCASTING BY REVOLUTIONARY MOVEMENTS IN AFRICA**

**Natalie A. Brown** (Dr. Brian Digre) International and Global Studies Program

This research addresses how radio broadcasting played a role in revolutionary movements in Africa during the demise of colonial rule. By comparing the use of radio broadcasting by two different liberation groups, one in South Africa and one in Algeria, the research seeks to find out how radio contributed to their respective movements and why radio is an effective means of communication in Africa. In order to answer these questions, it is necessary to consider the role radio broadcasting played in the two revolutionary movements, the content of those broadcasts, and the differences in the way the two movements used radio. As the world becomes increasingly technologically advanced, the reliance on radio for acquiring information seems an outdated concept. Yet radio is still widely used in some areas of the world, and it is important to remember the role it played in the struggles for freedom in Africa. After examining statements and literature by those involved in the revolutionary movements, as well as newspapers and radio broadcasts from that time period, this work then compared how the two liberation groups used radio broadcasts. Although the precise impact of radio broadcasts on the revolutionary movements cannot be measured, this research concludes that radio broadcasting played a pivotal role in the fight for liberation in both South Africa and Algeria by inspiring and mobilizing listeners to take part in the revolutions. Furthermore, harsh government crackdowns in response to broadcasts suggest that the broadcasts effectively reached the intended population with their anti-colonial messages.

**FROM LAWS TO LAST NAMES: EXAMINING POPULAR OPINIONS OF ADOPTION IN MOROCCO**

**Margaret Liston** (Dr. Brian Digre) International and Global Studies Program

In our increasingly globalized world, international adoption is rapidly becoming much more common. However, although intercountry adoption allows for many orphans and abandoned children to be placed with families worldwide, it also creates friction between the diverse understandings and approaches to adoption that vary from culture to culture. This case study will examine attitudes toward adoption in Morocco, an Islamic state which defines adoption in a very specific but different way from the Western world. Despite the abundance of literature analyzing the historical and legal aspects of adoption in Morocco, there is a notable absence of research that examines the opinions of Moroccans on the institution itself. This study seeks to better understand attitudes regarding adoption by examining the views of university students in Rabat, Morocco. Through the distribution and collection of 332 written surveys to students at Mohammed V University, supplemented with the results from a small focus group of five English language students at the same institution, we are now able to begin to draw conclusions on issues specific to adoption in Morocco such as openness to adoption, gender preference, and the role of Islam and identity on the practice of kafala adoption, the equivalent of a wardship, tutelage, or “gift of care.” The relatively young age of our participants may also give insight on the direction of developments in adoption in the future. Our field findings are complemented with lengthy questionnaires completed by American adoption agencies that work with cases from Morocco, allowing for a more comprehensive look at the adoption process from different and varied perspectives.

**REFUGEES WHO MADE A GLOBAL IMPACT: A CASE STUDY INTO THE FLAWS OF INTERNATIONAL REFUGEE ORGANIZATIONS, REFUGEE QUALIFICATIONS, AND WITH SPECIAL FOCUS ON NOTABLE REFUGEES: ALBERT EINSTEIN AND HENRY KISSINGER**

**Michael Manduley** (Heidi Frontani) International and Global Studies Program

Millions of people were displaced from their home countries and became refugees. Refugees face some of life’s most desperate situations, yet two of the most influential men of the 20th century, Henry Kissinger, the first naturalized citizen to be US Secretary of State, and Albert Einstein, one of the world’s most famous scientists were also both refugees due to their German-Jewish heritage and the persecution of Jews in Nazi-controlled Europe. This paper seeks to understand how these men were able to be so successful in their adopted country, while many relocated refugees define success by survival on a day-to-day basis. Methods included an analysis of the men’s biographical information as well as examination of the writings on the qualifications for becoming an international refugee. A contribution of this study is that unlike most writings on refugees that focus on large groups and broader patterns, this paper focuses on two individuals’ lives. Findings include that within an international system unable to effectively protect all refugees, Kissinger and Einstein were very successful in part because of their strong, though rather different beliefs and because both resettled in the USA, which gave greater support to refugees than other countries. Einstein, an idealist, achieved celebrity status as a physicist prior to becoming a refugee. His celebrity helped him secure many university job offers, but did not translate into his being a successful advocate in the USA for Jewish refugees or for better treatment of African-Americans. Kissinger, a realist, had more difficulty securing acceptance to the USA, but used his knowledge of German culture to actively assist the US Army’s intelligence corps to apprehend Nazis after WWII and established his success in the USA post-migration. Kissinger’s success also stemmed from his willingness to undertake ethically-questionable actions in support of his adopted country. He supported US arms for Indonesia’s invasion of East Timor and ignored China’s human rights violations believing a benefit for the majority of people was often the best possible outcome. Einstein’s idealistic approach was not practical for achieving success in the USA and was fortunate to have carried his success with him.

***LEADERSHIP***

**BREAK THROUGH THE GLASS: EMPOWERING WOMEN THROUGH LEADERSHIP**

**Alyssa N. Spagnuolo** (Dr. Carol A. Smith) Department of Leadership

This study brings attention to a pervasive issue - why educated and hard-working women fail to obtain leadership roles and elevate to their full potential within the field of sports media. When women are not given or fail to take advantage of opportunities, valuable perspectives are lost and equality cannot exist in the workplace. The aim of this project is to more fully understand multiple factors as to why women are not succeeding in this male-dominated field, and to develop possible solutions in order to facilitate in-class discussions at Elon through the creation of a new course. The process of my research has incorporated three tiers. The first tier was to understand the problem in theory and identify recurring themes, such as growth, perception and adaptability, through literary reviews of “Lean In” by Sheryl Sandberg, “The Confidence Code” by Katty Kay and Claire Shipman, and other relevant sources. The second tier was connecting the theory to the contemporary field of sports media through informational interviews with various women who have achieved success, such as Claire B. Lang, Sirius XM host of NASCAR’s “Dialed In” talk show. Such discussions enabled the identification of field-specific problems in sports media, such as mentality and significance of appeal, as well as possible applications of solutions suggested in the first tier literary review. The third tier will seek to determine how such issues play out on Elon’s campus through a student opinion survey. The survey will query fifty male and fifty female Elon students regarding their views on one of the field specific sports media issues: attractiveness. We hypothesize that the survey results will indicate that there is still a problem with the sports media industry as women are at times hired more based on physical attractiveness than on qualifications. One way of insuring that the next generation to enter the workforce will have a more just and equitable perspective on females in sports media is to foster critical thinking in college students pertaining to gender issues in the workplace and potential barriers women may face there. My recommendation, based on this research, is the creation of a new interdisciplinary course at Elon that openly discusses the importance of women in leadership roles in the workplace.

***MANAGEMENT***

**ARE UNMANNED AERIAL VEHICLES (UAV; ALSO REFERRED TO AS ‘DRONES’) A FEASIBLE FUTURE LOGISTICS CONCEPT FOR DELIVERIES IN URBAN AREAS?**

**Sandra S. Graf** (Dr. Alisha Horky) Department of Management

The logistics industry, a key player in today’s supply chain management and mainly responsible for the transport and movement of goods, has faced many changes within the last decades. New concepts such as Just-In-Time deliveries for instance, have required logistics providers to continuously improve in quality and speed. With significant increases in both global urbanization and online shopping (also known as ecommerce), a new challenge with regards to city deliveries has evolved: up to 20% of all vehicles on the road are related to freight movements, hence causing a significant amount of pollution in an age concerned with global warming, as well as noise, congestion, deterioration of urban structure and a potential safety risk. Since all these factors have a negative influence on the environment, the attractiveness and livability of cities, authorities and logistics firms are searching for valid solutions to avoid or at least reduce the negative side effects of freight movements. One of the latest alternative concepts that has been embraced and driven forward by various well-known firms such as Amazon, Alibaba, DHL and Google is the use of UAVs (drones) for small parcel deliveries. Mainly known for their military and private use (e.g. for photography, videoing, etc.), UAVs are now being evaluated for their potential commercial utilization. With regards to the logistics industry, the main goal appears to be providing efficient express deliveries – according to some firms for instance within solely 30 minutes of placing an order. Hence, the aim of this research is to explore whether drone deliveries constitute a feasible future logistics concept for city deliveries. The main focus of this research is measuring consumer attitudes towards the commercial use of drones, including their perceptions of security, and the impact of these perceptions on their willingness to participate in or adopt drone services. Two surveys, one distributed in the U.S. and one in Germany, reveal the differences and similarities in perceptions in the two samples.

**EFFECTS OF CORPORATE GOVERNANCE AND NATIONAL CULTURE ON EARNINGS MANAGEMENT IN EMERGING MARKETS**

**Olivia Grigg** (Dr. Rosey Bao) Department of Management

The primary purpose of our research is to discover if the relationship between corporate governance and managers’ belief system affect the degree to which firms manipulate earnings. Prior research on Earnings management focus largely on the developed markets, ignoring how earnings management is done or controlled for in emerging markets. Our research fills this gap. In addition, there is abundant research examining what firm level factors affect earnings management. Our research builds on this stream to investigate if having independent directors will mitigate earnings management. Using a sample of 1400 firms across 24 emerging markets, we add to prior literature by postulating and finding that national culture dimensions of power distance and future orientation create an institutional context that further strengthen and mitigate the likelihood of earnings management above and beyond the effects of independent directors at the firm level. By doing this, we contribute to the literature that firm level governance factors do not function themselves alone, but are constrained by external institutions at the country level. Our research has practical implications that could assist managers and investors make informed business decisions. For foreign managers looking to partner with firms in emerging markets as well as foreign investors looking to invest in emerging markets, our research may be helpful to their respective decision making process. For instance, understanding the internal corporate governance of a firm, specifically the board structure may improve investor’s ability to effectively evaluate the acceptability of investment in the firm. Moreover, awareness of the interaction of internal corporate governance and external environment in affecting firm behavior will help managers and investors to not only select the best countries for foreign investments, but also develop managerial skills and practices to better cope with business norms and routines in firms operating in emerging countries.

**THE CULTURAL INFLUENCE ON PURCHASE INTENT THROUGH FACEBOOK IN THE MIDDLE EAST**

**Erin D. Lanzotti** (Dr. Haya Ajjan) Department of Management

As social media has expanded, it has provided a new medium for advertisers to access world markets, leading marketing managers to search for best practices of reaching consumers overseas. The Middle East, in particular, is a viable market with high incomes and rapid growth in social media use. Previous scholarship has discussed the successes of Facebook as an advertising tool and how different capabilities have influenced purchase intent with some insight to purchase behavior internationally, but there remains limited work specific to the Middle East. Therefore, this study examined what advertising characteristics determine purchase intent on Facebook in Middle Eastern nations. The research assessed the relationships between entertainment, referral, relevance, and brand equity with consumer purchase intent. Additionally, the study measured how the cultural dimensions of collectivism/individualism and uncertainty avoidance act as moderators to the relationship between advertising characteristics and purchase intent. In order to empirically measure these relationships, this study utilized a survey of accessible consumers in Lebanon and Egypt, administered by faculty correspondents at universities abroad. This survey used a 5-point Likert scale to measure the four characteristics and two cultural dimensions. The results indicate that advertisements that are interactive and stimulating will lead to an increase in sales, due to the significant direct impact of entertainment on purchase intent. Additionally, referral and relevance were mediated in their relationships to purchase intent by brand equity, showing that the constructs increase consumer perception of a brand, which leads to higher intention to purchase. Moreover, the results indicated that brand equity has less influence on consumers with high uncertainty avoidance, revealed in the significant negative moderation effect of the construct. The results of this research provide marketers with areas to focus on when creating advertisements for consumers in the Middle East. It also provides a springboard for scholars exploring other nations in the Middle East as well as those in other global regions.

***MARKETING***

**A STUDY OF THE AMERICAN RAP MUSIC MARKET**

**Lena Caliari** (Dr. Barth Strempek) Department of Marketing

According to Forbes, the rapper Sean Combs was worth $735 million in 2015 with most of his wealth being related to his ventures outside the music business. Today, we are aware that rap music has generated substantial wealth for its artists and represents an important share of the music industry. Yet few academics have researched and analyzed the genre. One can learn so much about different cultures through an understanding of rap music which the author has observed first hand and integrates into this research. The rap music market is booming in the United States. This study conducts qualitative research using interview transcripts, and content analysis from lyrics, biographies, and other sources. It is often said that rap is not music or that it only promotes certain negative stereotypes. However, this study emphasizes that much can be learned from the rap experience from both a business and a cultural perspective. The genre is used to convey a message and is a platform for launching successful businesses such as clothing lines, restaurants, and television networks.

**THE EFFECTS OF BRAND PERSONALIZATION ON CONSUMER ATTITUDE AND CHOICE**

**Miriam Eltus** (Professor Lawrence Garber) Department of Marketing

In 2011, Coca Cola launched a campaign called “Share a Coke” which was met with tremendous success all around the world. During this campaign, Coca Cola replaced its brand logo with common first names or phrases on bottles and cans, thereby personalizing them. This research is to determine the effects of such brand personalization on consumer attitude and behavioral intention in the field of convenience goods. 163 subjects were asked to evaluate three brands of potato chips (Pringles, Lay’s and Herr’s) and laundry detergent (Tide, Gain and Persil) in an online survey. Half the sample was exposed to images of the fronts of brand packages with common American first names (John, Matthew, William, Michael, Emily, Alexandra, Sarah, Elizabeth) and the other half of the sample was exposed to an image of the front of the package where the names were replaced with the neutral word “Original.” Using a regression model, it will be determined whether there are systematic differences in how the two groups evaluate the brands as well as whether the factors brand equity and gender play a role. Furthermore, it shall be discussed what marketing implications the results yield.

**BRIDGING THE GAP: OBSTACLES AND OPPORTUNITIES FOR KNOWLEDGE TRANSFER IN EVIDENCE-BASED MANAGEMENT**

**Laura A. Orr** (Dr. Sean R. McMahon) Department of Marketing and Entrepreneurship

Experts in fields as diverse as management, medicine, and education advocate for greater *evidence-based* practices, or “translating principles based on best evidence into organizational practices,” (Rousseau, 2006, p. 256). Yet, even as scientists publish 1.36 million papers annually in 23,750 peer-reviewed journals, only 4.6% are easily accessible to the public (Bjork et al., 2009). Instead, ‘authoritative’ insight is often transferred via popular literature, including approximately $3.3 billion in business books sold each year (AAP, 2005). In this study, I examined whether business books are suitable mediums of evidence-based practices. Specifically, (1) “Do readers believe that bestselling business books are authoritative sources of information?” and (2) “Are these books evidence-based?” I analyzed the top five best-selling business books in 2014 according to the *New York Times* and *USA Today*. Analyses involved coding 1,357 pages of text to isolate 1,001 author claims directed to readers, as well as analyses of reader ratings and reviews from *Amazon.com*. First, I established whether the texts were considered sources of legitimate business advice and not just ‘good reads.’ Results revealed that all five books were considered authoritative and statistically indistinguishable. Second, each claim was coded on a scale from 1-6 to assess whether author claims were evidence-based, with 1 being the least empirical and 6 being the most. Claims rated ‘1’ included, “*If you start a business, expect that you're probably going to be broke for a long time”* (Amoruso, 2014, p. 184)*,* while claims rated ‘6’ included, “*... the minimal wage that unemployed workers would accept for new employment averages 90% of their previous wage, and it drops by less than 10% with each year of unemployment.*” (Kahneman, 2013, p. 291). Results indicated significant differences in frequency, number, and the evidence-based nature of claims across the five books. Specifically, the modal claims of each book spanned the entire 1-6 range, with only two books sharing average claim ratings in t-tests pairing each book with the other four. Finally, I discuss the potential impact of this disparity and the need to more effectively diffuse evidence-based information beyond the scientific community.

**THE VALIDITY OF PRACTITIONER’S RULES OF THUMB FOR VISUAL MERCHANDISING: OPTIMIZATION OF THE SHELF FACINGS OF RETAIL STORES USING A/B TESTING**

**Flore Ravaud** (Dr. Aikaterini Manthiou, Department of Marketing - NEOMA Business School & Dr. Lawrence Garber) Department of Marketing and Entrepreneurship

Visual merchandising plays a crucial role in customer satisfaction and sales performance. Many practitioners follow a set of rules for their shelf management: eye-level, symmetry, repetition, color blocking, etc. However most of those golden rules have never been proven scientifically. The purpose of this study is to scientifically test the visual merchandising practices globally adopted by retailers. I propose an experiment to test the validity of practitioner’s rules of thumbs on visual merchandising on how to optimize shelf management using A/B testing. An experimental novel method for their testing is proposed, and expected results are discussed.

***MATHEMATICS AND STATISTICS***

**NCAA OUTDOOR TRACK DISTANCE RUNNING TRENDS**

**Sabina Bains** (Dr. Kirsten Doehler) Department of Mathematics and Statistics

Sports analytics is growing in popularity, but research related to distance running is sparse.  One aim of this study is to examine finishing times and pacing strategies of participants in the 5-Kilometer (5K) and 10-Kilometer (10K) races at the NCAA Division 1 Outdoor Track & Field Championships from the years 1998 to 2015.  We also investigate the variability in finishing times to examine whether this was correlated with the winning time. It was determined that finish times of female athletes had a higher variability than those of male athletes. In the 5K races the variability in finish times tends to be smaller when then winning time in that year is slower.  However, this trend is not observed in the 10K races.  Additionally, we investigate the participation rates of different Division 1 programs and provide our opinion on which colleges have exemplary distance running programs.  Stanford had 111 athletes (6.9% of all athletes) qualify for either the 5K or 10K race from 1998 to 2015, which is significantly more than any other school.  Data for this study was obtained from the flashresults.com website, which has information on NCAA Championship race times from 1998 to 2015.

**SYMMETRIES OF DEGREE 7 POLYNOMIALS**

**Taylor C. Cesarski** (Dr. Chad Awtrey) Department of Mathematics

Finding solutions of polynomial equations is a central problem in mathematics. Of historical importance is the ability to solve a polynomial "by radicals''; i.e., using only the coefficients of the polynomial, the four basic arithmetic operations (addition, subtraction, multiplication, division), and radicals (square roots, cube roots, etc.). Polynomials of degree four or less have been shown to be solvable by radicals, while the same is not true for higher degrees. How do we determine which polynomials are solvable by radicals? To answer this question, we study an important object that is associated with every polynomial. This object, named after 19th century mathematician Evariste Galois, is known as the polynomial's Galois group. The characteristics of the Galois group encode arithmetic symmetries of the corresponding polynomial's roots, and these symmetries can determine whether or not the polynomial is solvable by radicals.  We discuss a new algorithm for determining the Galois group of a degree seven polynomial which improves upon prior research.  In particular, previous methods rely on factoring two or more auxiliary polynomials while ours requires only one.

**VISUALIZING THE HYPERPLANE OF A FINITE GEOMETRY**

**Nicole B. Ciotoli and Jennifer L. Faig** (Dr. Todd Lee) Department of Mathematics and Statistics

This scholarship of learning sought to find a new and appealing way to utilize the game of SET (a specialized deck of cards) to engage people in the complex mathematical concept of an affine finite geometry through a video presentation. Understanding an affine finite geometry requires the grasping of ideas including axiomatic constructions, geometric models, and algebraic fields. It is a growing trend for YouTube speakers to discuss complex STEM concepts in similar ways using short, well-crafted videos, like the one created in this project. Papers on the topic of SET, and the math behind the game, were used to gain an understanding of the theoretical principles necessary for such a presentation. SET is a math game, which contains cards of varying attributes, including color, shape, number, and shading. The goal of the game is to find as many SETs as possible from a certain number of cards from the deck (a SET being three cards where each attribute is the same for all three cards or different for all three). Exploratory work was conducted using the SET cards to fully understand the geometries the cards were capable of modeling. The exploratory phase concluded with a finite geometry, modeled using all 81 cards in the deck, and containing thousands of different sets and hypercubes. It was verified that this final geometry satisfies the required axioms in order to be considered a model of an affine geometry. By assigning vector representations for each card and using linear algebra, or SET logic, the relationships between the initial cards and the other cards in the figure can be solved for in order to incorporate all 81 cards into the geometry. Both the linear algebra approach and the approach using SET logic are used in our demonstration, with explanation of how the two are equivalent. The final product is a comprehensive video, which utilizes animations, mathematical diagrams, and the actual SET cards to explain the concept of an affine finite geometry.

**AN ANALYSIS OF GENDER AND AGE PERFORMANCE: BANK OF AMERICA CHICAGO MARATHON DATA FROM 2000 TO 2014**

**Jennifer L. Faig and Jessica M. Weiss** (Dr. Kirsten Doehler) Department of Mathematics and Statistics

Marathon running is a global athletic event that millions of people take part in.  Women were not allowed to officially enter a marathon race until the New York City Marathon opened participation to women in 1971 and the Boston Marathon allowed women to run in 1972.   At first women’s finishing times in marathons seemed to be getting closer to men’s finishing times.  Controversy arose regarding gender differences in marathon running and this inspired many research studies.  The purpose of our study was to analyze numerous years of data, up to and including data from 2014, in order to generate an idea of trends over time and current gender differences in competitive marathon running. These analyses helped us predict whether it is likely that women will ever outrun men during a traditional marathon distance. We considered race times from the Bank of America Chicago Marathon from 2000 to 2014. In order to look at the relationship between finish times of each year and gender, a regression analysis was performed using results from the first place male and female finishers and the top ten male and female finishers in each race. Furthermore, numerous tables were generated to show average split times, finishing times, and pacing for each age group and gender. We also examined differences in split time between the first and second half of the marathon for all finishers.  These analyses allowed for general conclusions about the running community and the possibility of women outrunning men. Results indicate that there is a significant difference in the true mean finish time between males and females for all age groups except 80 years and older. It was also discovered that, on average, men tend to slow down more in the marathon than women.

**A MATHEMATICAL COMPARISON OF WORLD CUP ADVERTISEMENTS**

**Eric J. Goding** (Dr. Crista Arangala) Department of Mathematics & Statistics

Advertising analysis can be an important tool for social scientists who wish to understand values in a society because successful advertisements reflect these values. Researchers comparing based on their values can find it useful to examine attributes of advertisements. Qualitative content analysis is the most common method to compare advertisements cross-culturally or cross-generationally. However, quantitative methods, mainly chi-square tests, can also be used. These tests compare two countries based on one attribute, where the attributes are defined as present or absent within an ad. The result of the test gives evidence for a difference or no difference between the two countries. In our research, we replicate this process, but we also seek to compare more than two countries at a time using linear algebra techniques such as seriation and single-value decomposition. These techniques place countries within the rows of a binary matrix and attributes within its columns, with 1s or 0s in the cells depending on whether or not a country’s ads possess an attribute. Countries are reordered based on dissimilarity between the rows (countries) of the matrix. The output is a ranking where similar countries are close together and dissimilar countries are far apart. The output given by these methods matches output given by the chi-square testing, which supports that these methods are valid for comparing different countries’ advertisements. This research could provide new mathematical techniques to compare several countries’ advertisements and further understand which countries are similar and different.

**STATISTICAL ANALYSIS OF THE STATISTICAL ANALYSIS OF SURF PROJECTS**

**Alexandra N. Horowitz** (Dr. Laura Taylor) Department of Mathematics and Statistics

Using statistical analysis is valuable to almost every academic discipline when analyzing research data. Although most college majors do not have statistics requirements, many academic departments use statistics in research analysis, and students could benefit from an increased knowledge of statistical concepts. The purpose of this research was to investigate the use of statistics within past SURF projects. An online survey was sent to SURF participants in both 2014 and 2015 with various demographic, research based, and general statistics knowledge questions. If students responded that they had used statistical analysis for their research project, they were asked a series of questions regarding the types of analysis they performed, what outside resources were utilized, and the percentage of analysis done by their mentor. Additionally, the students were asked about their perception of the value statistics added to their research findings. For those who did not use statistical analysis, they were asked whether or not they believe statistical inference could have added value to their results. All students who chose to participate in the study were asked about the definition of a p-value. The results of this questionnaire showed that most SURF presenters who used statistics for their projects came from either STEM or social sciences disciplines. The majority of students who conducted research for SURF had taken at least one college level introductory statistics course, and were able to use a variety of types of data analysis. Although most respondents had taken at least an introductory statistics course, there were extremely mixed results on their ability to define a p-value. Only about 40% of respondents were able to choose a correct definition given two correct and three incorrect choices. The main results of this study show that although a large amount of students used statistical analysis to add to their research findings, there is still much room to improve in terms of increasing general statistics knowledge among students within all academic disciplines.

**DEGREE SIX POLYNOMIALS AND THEIR SOLVABILITY BY RADICALS**

**Peter L. Jakes** (Dr. Chad Awtrey) Department of Mathematics and Statistics

For about 500 years, formulas have existed to find exact roots to quadratic, cubic and quartic polynomials. However, it was proven later that not all solutions to quintic equations can be found exactly. This property is also called “solvable by radicals,” which means a polynomial’s roots can be found by only knowing its coefficients, square and other roots and the four basic arithmetic operations. As a result, in the 20th century, a method was created using a property of each function called its Galois group in order to determine which degree five polynomials could be solved exactly and which could not. This project expands upon this discovery by exploring degree six polynomials. By using computer software, the Galois group of a degree six polynomial can be determined by only using two resolvent polynomials, thus improving upon prior methods which use three or more resolvent polynomials. From this information, it can then be determined whether or not the polynomial is solvable by radicals. Further research can explore higher degree polynomials as well as reducible polynomials, which are polynomials that can be factored, as the current method is only viable for irreducible polynomials.

**QUARTIC POLYNOMIALS AND THEIR GALOIS GROUPS: COMPUTATIONAL EFFICIENCY**

**Michael R. Keenan** (Dr. Chad Awtrey) Department of Mathematics and Statistics

In the 1500s mathematicians discovered that all quartic polynomials are solvable by radicals, meaning we can find a quartic polynomial's roots using only the coefficients of the polynomial, the basic arithmetic functions (addition, subtraction, multiplication, and division), and radicals  (square roots, cube roots, etc.). It wasn't until the 1800s when mathematicians showed why quartic polynomials are solvable by radicals and why not all polynomials of degree greater than four are. By attaching a group structure to a polynomial (called the polynomial's Galois group), we can determine whether the polynomial is solvable by radicals.  We can also see the relationships among the roots. Naturally, a branch of mathematical research has emerged to develop methods to determine Galois groups of polynomials. Previous methods for determining Galois groups of quartic polynomials have involved factoring and creating larger polynomials (called resolvent polynomials); a process that can be computationally inefficient. The first aim of our research is to propose a new method of computing the Galois group of a quartic polynomial that does not rely on factoring large-degree resolvents.  Instead, we use only two pieces of data about the polynomial: (1) the number of roots in the field extension it defines, and (2) its discriminant. Our second goal is to compare the efficiencies of the previous resolvent-based methods with our new method. By coding an algorithm for each method into *Wolfram Mathematica* and measuring the time it takes for each algorithm to compute the Galois Group of quartic polynomials of various sizes, we are able to compare the efficiencies of each method. We find that our new method is not as efficient as other resolvent-based methods.

**EVALUATING THE EFFECTIVENESS OF VARIOUS RULES OF THUMB**

**Stephanie M. Lobaugh** (Dr. Laura Taylor) Department of Mathematics and Statistics

When investigators aim to compare the population means of two or more populations, an inferential method known as analysis of variance (ANOVA) is employed.  Experiments that use ANOVA analysis are common in social and biological sciences.  When investigators perform ANOVA, they must verify that their data satisfies several assumptions in order to ensure the validity of any conclusions drawn from the analysis.  One assumption requires that the population variances be equal; the populations must have equal distribution of data around their respective population means.  The purpose of this study is to evaluate the effectiveness of various rules of thumb used to check the assumption of equal variances for ANOVA. There is evidence of a general lack in checking the assumption of equal variance; this disregard can lead to an unacknowledged violation, which could profoundly impact the validity of ANOVA conclusions.  Such impact could result in Type I Error, or the false conclusion that at least one population mean is different.  This potential consequence demonstrates the significance of checking the assumption and, by extension, the importance of evaluating simple rules of thumb that are related to the ratio of the sample variances and used to verify the assumption.  The drive for this investigation stems from the existence of several variations on the rule of thumb presented in university-level textbooks.  This study aims to provide researchers with advice regarding assumption verification to ensure the validity of their conclusions derived from ANOVA.  Simulations were run in R in which samples were drawn from multiple populations with known variances. An ANOVA F-test was performed using these samples and the frequency of Type I Error was observed in order to quantify the impact of the violation.  The effectiveness of each rule of thumb is discussed based on the frequency of the observed Type I Error rates.

**THE CONNECTION BETWEEN DIMENSION & SOUND OF FRACTAL MUSIC**

**Nathan M. Pool** (Dr. Jeff Clark) Department of Mathematics

Have you ever gazed into a work of art, a coastline on a map, or even an aspect of nature like a leaf or a snowflake and noticed a repetitive pattern the closer that you observe it? Figures that have this quality, known as self-similarity, are considered fractals. Mathematically, these shapes transcend traditional dimension – dimension being a measure of visual complexity. An unlikely but interesting connection can be drawn between fractals and musical composition when considering the idea of self-similarity. Classical composers such as Beethoven and Bach composed their works utilizing self-similarity to establish themes in their music. This is where the idea of fractal music comes into play. Automated musical composition is the method of using mathematics to mimic music written by human composers. Fractal music is a specific branch of automated musical composition that focuses solely on recreating the self-similar, thematic, repetitive aspect of music. This investigation, never documented in research literature, maps the coordinates of fractals of designated dimension to musical notes by constructing algorithms in Wolfram Mathematica. Because the dimension of fractals is so variant depending on their construction, the project examines the correlation between the dimension of each fractal and the corresponding sounds. Specific correlations between the two are still to be found, but it does seem after examining the sounds of each fractal that compositions corresponding to larger dimension tend to be more melodically sporadic than compositions of smaller dimension. The purpose of fractal music and automated musical composition is to investigate the parallels between mathematical computation and music. What is the nature of musical composition and songwriting? Is it purely mathematical or are there some aspects of music that mathematics and computation cannot predict and recreate? While these questions are still left unanswered, there is vast potential for trends to be found between the behavior of fractal music compositions and their corresponding fractal dimensions. This is one step closer to more accurately imitating the human thought process in musical composition.

**SEROTYPES AND VACCINES: A MATHEMATICAL MODEL OF DENGUE FEVER**

**Michelle A. Rave** (Dr. Crista Arangala and Dr. Karen Yokley) Department of Mathematics and Statistics

Dengue fever is a virus that is transmitted by mosquitos. There is no vaccine or cure. There are four types of dengue that differ slightly in the antigens that identify them. The differing antigens lead to differing antibodies being created during the human body’s immune response. If someone is infected by one type, they have immunity to that type. However, they are more likely to be infected by the other types and become sicker upon infection. This is because the other types can use the similar but not identical antibodies to get into the body’s own cells. This phenomenon creates potential problems in the creation of vaccines against dengue. Vaccines cause the body to recognize viruses and attack them. In the case of dengue however, vaccines could cause generation of antibodies that the virus could use to attack the rest of the body’s cells. Mathematics can be used to model the spread of dengue and other diseases. Mathematical modeling provides a good way to examine how potential vaccines could affect the spread of dengue without testing them on large numbers of people. Models use previous data and research to simulate the spread of the disease. The mathematical models that we are exploring are based on previous models of dengue. This project attempts to adapt current models to better model the interactions between dengue types and then to incorporate the effects of vaccines that are currently in development. These models examine the rates at which people flow between four categories which include able to catch the disease, exposed to the disease, but not showing symptoms, able to pass the disease to mosquitos, and recovered from the disease. The models also examine the rates at which mosquitos flow between three categories including able to catch the disease, exposed to the disease, but unable to transmit it, and able to pass the disease to people. The long term goal of this research is to use the system of equations we create to predict the effect that vaccines may have on the spread of dengue.

**A MATHEMATICAL MODEL OF DENGUE FEVER INCORPORATING HUMAN TRAVEL**

**Kelly A. Reagan** (Dr. Karen Yokley and Dr. Crista Arangala) Department of Mathematics and Statistics

Dengue fever is a disease spread by mosquitoes in tropical, urban areas. There is currently no vaccine for dengue fever, so preventative measures are the only solution to slow the spread of the disease. Previous mathematical research on malaria (another disease spread by mosquitoes) and dengue fever provide supportive background information in order to develop a mathematical model on dengue fever. Mathematical models that include rates of change over time show how the disease can impact susceptible, infected, and recovered people. Mathematics, specifically in the application to public health, can be used to help investigate methods of intervention by predicting and estimating where the disease might spread without having to infect people with the disease. In order to develop a model to simulate dengue fever spreading between two populations, an in-depth analysis was conducted on a malaria model with human traveling aspects and on a general dengue fever model. Then, parameter values relevant to dengue fever were investigated and implemented into both of the models. The results from both the malaria model and dengue fever model were regenerated in *Mathematica*. A thorough investigation of previous research in the field allowed for a combination of the malaria model and the general dengue fever model by adding the human travel aspects to the dengue model. The combination resulted in ten ordinary differential equations, which simulate humans of two different communities visiting the other community. Further simulations have been conducted on how the spread of dengue fever is affected by the length of time spent in each community, the population size differences in the communities and on the mosquitoes’ biting rate. It has been seen that the time factor does heavily impact the rate at which dengue spreads across a community.

**GALOIS GROUPS OF DEGREE 15 P-ADIC POLYNOMIALS**

**Jessica S. Weed, Nicole A. Soltz, and Sara E. Rodgers** (Dr. Chad Awtrey and Dr. Kristen Mazur) Department of Mathematics and Statistics

First introduced by mathematician K. Hensel at the end of the 19th century, the p-adic numbers are now ubiquitous in many areas of current research in number theory. One area of research that has received much attention lately deals with classifying polynomial equations whose coefficients are p-adic numbers. A result of M. Krasner in the 1960s states the following: for a fixed prime number p and positive integer n, there exist only finitely many "distinct" degree n polynomials with p-adic coefficients. Krasner's result elicits several logical questions. How many distinct polynomials are there for a given degree and prime number? Can we write down what these polynomials are? Can we compute important characteristics of each polynomial, such as the polynomial's Galois group? The Galois group of a polynomial is a collection of permutations of the polynomials' roots that encode arithmetic information concerning the polynomial. Past research has completely answered each of these three questions in the following cases: (1) when n is less than 15, and (2) when p does not divide n. Our work focuses on degree 15 polynomials with 5-adic coefficients and therefore fills a gap in the research literature. Our approach for answering the above three questions involves using past work of S. Pauli and X.F. Roblot to compute all distinct polynomials. Our work shows there are 1012 distinct degree 15 polynomials with 5-adic coefficients. We then employ a combination of techniques in Galois theory to compute the Galois group of each polynomial. Our approach to determining Galois groups is significant, as one of our techniques is completely new.

***MUSIC***

**HASHTAG MUSIC: USING INSTAGRAM AS A PLATFORM FOR TEACHING POPULAR PIANO TECHNIQUE**

**Addison L. Horner** (Professor Clay Stevenson) Department of Music

With the advent of mobile communication and entertainment, there is an open niche for educational programs on social media apps like Instagram. This research project addresses the question, “Can Instagram be used to help students find enjoyment in playing popular piano?” I created Hashtag Music as a popular piano curriculum accessible through Instagram. This curriculum is video-based, easily accessible to anyone with Internet access, and free to use. The Hashtag Music curriculum is based on research into Béla Bartók’s “Mikrokosmos”, contemporary beginner method books for piano, and popular music styles. Lessons focus on basic practical theory and application. They are not designed to create virtuosos, but to develop enthusiasts who have a desire to make music. The test curriculum began on Instagram in March 2015 and concluded in January 2016. It contains four chapters that incrementally introduce students to popular piano technique. The chapters are made up of ten-to-fifteen-second video “micro-lessons” – lessons that introduce small concepts or skills that build up over time to form a solid base of knowledge and technique. With observation and practice, students can learn each lesson in less than five minutes – an ideal time commitment for those with busy schedules. Lessons can also be reviewed at any time to reinforce the material. I am collecting data from Instagram to determine the reach of the project and surveying individual college students for feedback on the effectiveness of the lessons themselves. I am also surveying college students who use the program and provide feedback. The statistics collected from Instagram show that the curriculum was successful in impacting a large audience – Hashtag Music’s engagement rate with its followers was 12.1%, which is much higher than Instagram’s average of 4.1%. Surveys collected from college students who used the program show that it was effective in conveying piano concepts and skills. Based on this information, my conclusion is that Instagram can be a viable and effective medium for teaching popular piano.

***PERFORMING ARTS***

**OLÉS AND DUENDE: THE CASE OF SPANISH FLAMENCO AS A DANCE OF THE MARGINS**

**Marie C. Bolona** (Professor Jack Smith) Department of Performing Arts

The flamenco art complex is a uniquely Spanish art form that consists of *cante* (singing), *toque* (guitar accompaniment), and *baile* (dance). Rooted in the southern region of Andalusia, flamenco is distinct in that it is a truly hybrid art form with indiscernible origins from among the most historically marginalized religious and ethnic groups in Spanish history: Muslims, Jews, sub-Saharan Africans, and, most importantly, the Romani. Traditionally, flamenco music and movement served as an artistic means for these groups to cope with their difficult circumstances, thus encompassing the portrayal of the sadness and angst of daily injustices, as well as the celebration of joyous occasions. With its rise to international fame over the last roughly 200 years, contemporary flamenco has largely undergone the evolution from folk dance to performance art and, consequently, to a profitable industry for the Spanish state. Part of this transition into the public economic sphere with increasingly non-Spanish audiences has provoked changes in the art form as a whole, and, as a result, many flamenco scholars have questioned the authenticity of the “new” flamenco that primarily caters to the Spanish tourism industry. However, these scholars have fallen short in articulating and pinpointing exactly what changes have resulted in what many experts refer to as a diluted or distorted version of this cornerstone of Spanish cultural expression. This work examines the history of Spain’s most marginalized groups, the physical and emotional essence that composes flamenco dance, and the factors that influenced its transition from folk dance to cultural industry in order to approximate why flamenco dance seems to have lost some of its *duende*, or charm. Ultimately, I conclude that changes in socioeconomic and ethnic demographics of the modern flamenco industry play a crucial role in the current authenticity debate surrounding the flamenco art complex.

**EXPLORING ICONOLOGY IN FASHION THROUGH RESEARCH AND PRACTICAL APPLICATION**

**Danielle N. Dulchinos** (Professor Karl Green) Department of Performing Arts

For my project, I looked into how iconology is used in fashion and then used that knowledge to create my own iconology-inspired garments. In fashion, iconology is taking objects and using them to inspire a design. To understand the industry that creates the garments we live in, one has to understand the thought and design process of the leading designers in the industry. This project is a continuation of my work in the costume shop and of my major’s concentration of costuming. It is the next step in delving into the world of fashion, which I hope to make my career. The culmination of my project is two outfits that I design and create, as well as the remnants of the design process, including a mood board and design sketches. To create my looks, I worked through the design process, which included researching inspiration, creating a mood board, sketching designs, mocking-up the garments, and then constructing them. The project is both traditional and applied research, as I researched iconology in fashion and the design process, as well as learned to create the looks. As a part of my research, I visited the Cameron Museum of Art in Wilmington to find my inspiration. I chose a piece by artist José Bernal entitled “Cuba.” This piece served as inspiration for my fabric choices, design types, and every other stylistic choice in my line. After the line was sketched, two designs were chosen to make into garments. I made a pattern and then a mockup of each, meaning that the paper pattern was transferred onto muslin and put together to ensure that garment was patterned correctly. Then the mockup was taken apart and used as a pattern for the final garments. Through the research and application of this project, I was able to better understand the professional design process, as well as learn construction techniques and acquire new sewing and design skills.

**ENVIRONMENTAL THEATRE IN CONTEMPORARY CONTEXT: BRIDGING THE MARGINALIZED AND THE MAINSTREAM**

**Meagan L. Schrock** (Dr. Susanne Shawyer) Department of Performing Arts

In a digital age, the amount of news, research and overall content available to a consumer is staggering. The average American citizen has an influx of news to choose from and is in need of a filter to be to be able to process and understand the myriad of information. This led me to question; how can theatre serve as a filter to explore and disseminate information to a mainstream audience, specifically a contemporary Elon audience? Through research of Environmental Theatre, I ask if Environmental Theatre, an alternative style of theatre that thrived in the 1960s, can be used to engage and educate an Elon audience about a given news or social topic. A hallmark of Environmental Theatre is the lack of delineation between the playing space and the audience. It is achieved through the use of unconventional “transformed” or “found spaces” in which the audience can choose to sit anywhere in the space and is invited to react to the show in any way they see fit. Within its time period, Environmental Theatre served a communal need in representing marginalized and outlying social issues neglected by mainstream society. The output of this research is a grant proposal with detailed plans for the creation of a piece of theatre that explores a mainstream topic, the influence of technology, in a way that is accessible and engaging to an Elon audience.

***PHILOSOPHY***

**NATION OF THE “WALKING DEAD”: EXPLORING THE CAUSES OF PSYCHIC BREAKDOWN IN RWANDAN GENOCIDE SURVIVORS**

**Lauren K. Garretson** (Dr. Stephen Bloch-Schulman) Department of Philosophy

This research project addresses the problem of discerning the causes of why many Tutsi survivors of the Rwandan Genocide suffered from complete psychic breakdown and a loss of their sense of self, often for several years. These survivors, called *bapfuye buhagazi* in Kinyarwanda, or the “walking dead” (Prunier, 1995), are mentioned frequently in the literature on post-genocide Rwanda, but the experience of being one of the “walking dead” and the particular causes of this type of psychic breakdown have yet to be examined in depth in the academic literature. The project uses data from eight interviews that I conducted with former *bapfuye buhagazi* and two staff members of AVEGA, the Association of the Widows of the Rwandan Genocide in combination with historical accounts of the Rwandan Genocide. In order to begin to discern the causes of complete psychic breakdown in Rwanda’s “walking dead,” I turn to accounts of the similar phenomenon of the “living dead” in Nazi Germany concentration camps. My approach ultimately used these sources specifically in combination with Arendt’s (1976) framework of the destruction of the individual in the creation of the “living dead.” I found that there were three central causal factors in the psychic breakdown of Rwanda’s “walking dead.” First, during the Rwandan Genocide, Tutsis’ actions no longer determined their punishment but instead, they were targeted for *being* Tutsi, thereby decoupling action from predictable penalties and destroying the *juridical* *person* in each individual. Second, the *moral* *person* was destroyed, which broke down the potential for future memory making as a result of rendering death meaningless and anonymous. Finally, with the destruction of the *individual*, psychic breakdown was complete. Certain acts of violence committed both before and during the Rwandan Genocide contributed to this three-step process of complete psychic breakdown. Ultimately, these “walking dead” had lost the “spark” that defines human existence, which is the ability to act spontaneously as an agent rather than merely *react* to external stimuli.

**REIMAGINING DIVERSITY: TOWARD A MORE ASPIRATIONAL ALTERNATIVE IN HIGHER EDUCATION**

**Claire A. Lockard** (Dr. Anthony Weston) Department of Philosophy

This presentation critiques dominant discourses of diversity in higher education and aims to develop a conceptualization of identity that can enhance existing efforts to recruit and support students from historically marginalized groups. I will focus on the following question: what would university communities have to conceptualize differently in order to do what we call “diversity” better? I argue that in addition to (and sometimes prior to) recruiting students from traditionally marginalized groups, universities ought to shift the way they conceptualize identity in order to generate institution-wide change. Specifically, I argue that if university communities conceptualize identity as more fluid than they do at present, new possibilities emerge. By foregrounding identity fluidity, or the openness to the possibility of change or movement, universities can begin to overcome two shortcomings of current diversity frameworks that treat identity as fixed. First, though diversity is often defended as important because it teaches students to navigate a diverse/multicultural society, this rationale unfortunately re-focuses the conversation on students with privilege, since students with marginalized identities would likely already have experience navigating difference. A university that foregrounds identity fluidity could do the kinds of interventions that would educate privileged students, but that more importantly would break down distinctions between privilege and marginalization in ways that make marginalized students feel safer and more welcome on campus. Second, framing social justice goals as diversity goals encourages universities to wait for “the diverse” to arrive on campus without first doing serious work to combat institutionalized racism, sexism, homophobia, ablism, and heteronormativity. A fluid understanding of identity could much more effectively prompt university communities to take action to transform themselves even if their communities are not yet particularly or invitingly diverse.

**PEARL DIVING WITH MURRAY BOOKCHIN: A CRITICAL REASSESSMENT OF MURRAY BOOKCHIN’S SOCIAL ECOLOGY**

**Sean P. M. Wilson** (Dr. Stephen Bloch-Schulman) Department of Philosophy

Murray Bookchin was a 20th century philosopher who was the principle figure of ‘social ecology.’ Social ecologists emphasize the tendency of nature to unfold toward diversity and complexity, view environmental troubles as the outcome of social hierarchies among humans, and consequently advocate political democratization and decentralization via the organs of local governance. I critically reassess social ecology by identifying the ideas and concepts within Bookchin’s works that may still be useful to contemporary environmental thought and practice. This critical reassessment is important because Bookchin was an ideological and divisive figure, and therefore prevented his work from fruitful engagement with other environmental and political thinkers. Indeed, of the few works that comprehensively engage with Bookchin’s thought, many bifurcate between outright dismissal and ideological acceptance. I aim to take an alternate approach, in considering Bookchin’s work apart from his sometimes-problematic character and context, and extrapolate whatever useful ideas may be found throughout. Two such ideas I identify within Bookchin’s works are (1) the connection between social justice and environmentalism and (2) the insistence that environmental advocacy take place at the local levels of governance. In examining Bookchin’s thought in a new light, I also consider how eco-feminist insights and lessons from ongoing environmental and social movements further inform Bookchin’s ideas.

***PHYSICAL THERAPY EDUCATION***

**EFFECT OF DUAL-TASK ON TURNING CHARACTERISTICS WHILE WALKING AMONG COLLEGIATE ATHLETES**

**Lauren A. Brown** (Dr. Srikant Vallabhajosula) Department of Physical Therapy Education

Many sports require athletes to complete turns during competition. While many studies have examined spatio-temporal gait parameters both with and without a concurrent cognitive load, there is little information on the turning characteristics while walking and performing a concurrent cognitive task. Such information could help evaluate the effects of concussion on an activity of daily living like turning while walking. Therefore, this study investigated the effect of dual-task on turning characteristics while walking in collegiate athletes. Fifty-three subjects performed 5 trials of a 10m walk under single- and dual-task conditions at self-selected speed. Each trial consisted of one turn. The Mini Mental Status Exam (MMSE) was used as the concurrent dual-task. MMSE consists of spelling five-letter words in reverse, subtraction by sevens, and reciting the months of the year in reverse order. Participants were fitted with 6 OPAL sensors as part of the Mobility Lab system (APDM Inc., Portland, OR). The trunk or lumbar sensor and a mathematical model developed by APDM was used to detect the exact moment of beginning and end of turning. Absolute and variability measures of turning velocity and duration were calculated. Number of steps during turning were also obtained. A paired samples t-test and Wilcoxon Signed Rank test were used to compare turning performance under single and dual task conditions. Results suggest that mean velocity, mean duration, and the standard deviation of the single task values were significantly different from the dual task measures. Furthermore, athletes turned significantly slower and took longer time to complete the turn while dual-tasking albeit taking similar number of steps to complete the turn. Whether these results hold true for post-concussion evaluation needs to be determined.

**CONCURRENT VALIDITY OF ZENO WALKWAY AND APDM OPAL SENSORS**

**Rachel DiCioccio, Kara Rollock** (Dr. Srikant Vallabhajosula and Dr. Jane Freund) Department of Physical Therapy Education

Systems such as 3D motion capture, electronic pressure sensitive walkways, and inertial measurement units (IMUs) are used to measure gait. Electronic walkways and IMUs are especially useful in clinical settings for spatio-temporal gait analysis. Few studies have compared these systems. **Purpose**: To determine the concurrent validity of Zeno electronic walkway (ProtoKinetics Inc., Havertown, PA) and Mobility Lab consisting of Opal IMU sensors (APDM Inc., Portland, OR) to measure spatio-temporal gait parameters like cadence, double support time, gait cycle duration, gait speed, single limb support, % of stance phase, step time, stride length, % of swing time in healthy older adults. **Methods:** 30 healthy adults (mean age 74.7 years, 19 females) completed 5 passes each at self-selected and fast walking speeds across Zeno Walkway while wearing the Opal sensors. The intraclass coefficient ICC(2,5), for spatiotemporal gait parameters was used to determine concurrent validity. **Results:** The ICC values ranged from 0.681 to 0.998 for self-selected speed condition. For the fast speed condition, the ICC values ranged from 0.741 to 0.969. **Discussion and Conclusion:** The concurrent validity of Zeno walkway and Opal sensors were moderate to strong for the variables compared. The software used with Zeno walkway outputs more spatio-temporal variables than the Mobility Lab system. However, the Mobility Lab system allows measurement of additional gait parameters, e.g. arm swing velocity, arm range of motion and foot clearance that are incalculable with walkway systems. Additionally IMUs are not constrained to a specified area for data collection as are walkways and may be used more easily in different environments. Use of a specific system for clinical purposes will depend on the intended use of the system.

**CHANGES IN BALANCE CONFIDENCE, FEAR OF FALLING, AND ENDURANCE LEVELS DURING PREGNANCY**

**Claire J. Rosenberg** (Dr. Srikant Vallabhajosula) Department of Physical Therapy Education

BACKGROUND: Pregnancy might affect balance and endurance in pregnant women, putting them at risk of falling during certain activities. There is limited literature that measures this risk of falling due to pregnancy. The current study aims to describe the utility of fall risk assessments that are commonly used in geriatrics for a pregnant woman.METHODS: We performed a descriptive case study on a 31-year-old Asian-Indian woman from the 25th to 38th week of her pregnancy. We used the Activities-specific Balance Confidence scale to understand our participant’s confidence while performing certain tasks. We used the Falls Efficacy Scale to measure the fear of falling. The Late Life Functional Disability Index instrument was used to measure how difficult it was for the participant to perform certain activities. All of these measures were self reported. Our participant also performed a 6-minute walk test to estimate endurance levels from the 30th week to the 38th week. In this test, the participant was asked to cover as much distance as possible in 6 minutes. RESULTS: The Activities-specific Balance Confidence scale showed a steady decrease (77% to 31%) in the participant’s confidence while performing different tasks. The Falls Efficacy Scale and Late Life Functional Disability Index instrument scores showed a slight increase in fear of falling (30 to 45) and difficulty performing functional tasks (52.5 to 30) as her pregnancy went further along. The 6-minute walk test results were relatively unchanged (417m to 421m). DISCUSSION and CONCLUSION: These results show that Activities-specific Balance Confidence scale might be a better self-reported outcome measure compared to the Falls Efficacy Scale and Late Life Functional Disability Index instrument to assess a pregnant woman’s fear of falling. Additional study of these and other more age and condition appropriate outcome measures may be needed.  Instrumented measures of gait and balance can also add additional insight into heightened risk of falls. Measuring endurance levels using a task other than 6-minute walk test may be necessary. Estimation of physical activity during pregnancy might also help estimate the endurance performance during pregnancy.

***PHYSICS***

**SIMULATIONS OF EMISSION LINES FROM THE NARROW LINE REGION IN SEYFERT GALAXIES**

**Christopher R. Greene** (Dr. Chris Richardson) Department of Physics

One of the biggest questions in astronomy and astrophysics is “How do galaxies form?”  Due to the large time scales involved, the only way to learn about the galactic formation is through studying galaxies outside the Milky Way through observation and simulation. The accretion disk of matter surrounding supermassive black holes in the center of certain galaxies produce more light than all of the stars within the galaxy, called active galactic nuclei (AGN).  When modeling gas clouds in the narrow line region (NLR), researchers produce a spectral energy distribution (SED) representing the spectrum of light generated by the AGN.  The can be empirically parametrized into a double broken power-law model using spectral indices, αx, αox, and αuv, which determine the slope of the curve at different wavelengths of light.  One aim of our research is to synthesize a regression model with data from previous studies that will compute all the spectral indices based on one index.  We statistically confirm our regression analysis with a chi square test.  Using the mean values of the spectral indices provided by past research, we craft an SED in the program Cloudy.  Preliminary results so far have shown that our regression model is statistically significant, and thus we have constrained the incident SED. The spectral indices are varied based on the regression model and the SEDs are supplied to Cloudy to simulate gas clouds in the narrow line region. We fit our model to emission line ratios produced by the simulated gas cloud as a consistency check for understanding the SED and elaborate on future work that can elucidate whether or not a more complex NLR model provide a more accurate prediction of emission line ratio observations than models using a single power law.

**THE NEARBY ANALOGUES OF PURE STARBURST GALAXIES**

**Benjamin C. Kaiser** (Dr. Tony Crider) Department of Physics

Within galaxies, there are a number of phenomena that can be present at a given time. The relationship between two such phenomena, active galactic nuclei (AGN) and star-formation, is poorly understood, partially due to galaxies exhibiting both AGN and starburst activity simultaneously. We have a sample of “pure” star-forming galaxies (SF) at redshift distance 0.1<*z*<0.12 as selected by mean field independent component analysis (MFICA). Unfortunately, the Sloan Digital Sky Survey (SDSS) telescope cannot pick out the individual star-forming regions at that distance. In order to better understand these starburst galaxies, we attempt to identify analogues that are closer to our own galaxy in order to be able to see their individual star-forming regions. We compare the magnitude (brightness), color, size, and concentration of several thousand NGC galaxies (a catalogue of nearby galaxies) to our pure star-forming galaxies to determine which NGC galaxies are most consistent with the pure SF galaxies. We use measurements from SDSS Data Release 7 for the pure SF galaxies, and we use SDSS Data Release 10 for the NGC galaxies. The analogues of the galaxies with lower star-formation rates appear to bear a strong resemblance to their pure SF analogue, but differences become apparent in the more rapidly star-forming galaxies. The NGC galaxies can now be examined for consistency with the local optimally emitting cloud model (LOC). The LOC model makes predictions for the distribution of star-forming regions within starburst galaxies, which have been previously tested with spectra of 0.1<*z*<0.12 galaxies, and may be further validated by examination of these nearby analogues.

**WHAT WILL HUBBLE 2.0 SEE?: PREDICTING EMISSION LINE OBSERVATIONS FOR THE JAMES WEBB SPACE TELESCOPE**

**Helen Meskhidze** (Dr. Chris Richardson) Department of Physics

Astronomers have been observing the light given off by distant star forming regions for decades using the *Hubble Space Telescope*. In many cases, computer simulations have played a vital role in interpreting the results of these observations. Comparing real and simulated light, we can tune our simulations to better match observations, which then allows us to infer what is occurring within the physical systems we are observing. In this project, we model starburst galaxies, galaxies undergoing exceptionally high rates of star-formation, to better understand the parameters that influence the strength of emission lines coming from these regions and to predict what the upcoming *James Webb Space Telescope* (JWST) will observe. Specifically, we present the results of hundreds of photoionization simulations spanning 15 orders of magnitude in hydrogen ionizing photon flux and 10 orders of magnitude in hydrogen density. The parameters we tune to better match observations include star-formation history, dust, and metallicity. The results of our photoionization calculations comprise our atlas, which we will post online, and should prove useful to observational astronomers analyzing starburst galaxy emission-line data. Finally, we predict that two emission lines, C III λ977 and C IV λ1549, will serve as especially useful diagnostic lines for upcoming JWSTobservations due to their strong emission under the conditions present in distant star forming r

**OPTIMIZING THE ezAFM FOR HIGH RESOLUTION IMAGING OF NANOSCALE COMPONENTS**

**Sydney R. Schilling** (Dr. Krithika Venkataramani) Department of Physics

The Atomic Force Microscope (AFM) is a ubiquitous tool in surface characterization of materials on the nanoscale in real space and has revolutionized the study of matter at this scale across all scientific disciplines. An AFM consists of a sharp tip mounted at the end of a cantilever that scans the surface of a specimen and analyzes the changes in forces between the tip and the surface atoms to create topography images of the specimen. The ezAFM in the physics department is a new table top Atomic Force Microscope from NanoMagnetics Instruments intended for micro and nanoscale imaging of materials under ambient conditions. In order to ensure that we obtain reliable images produced by the new ezAFM, we first tested the imaging capabilities of the AFM by scanning on standard samples and calibration grids such as a CMOS chip and a blu ray disc. Further, we analyzed the images obtained using the ezAFM and extracted precise quantitative values for parameters such as track pitch and pit length using line profiles which were found to be comparable to the reported values. While characterizing different standard samples, we found that an important factor that currently impacts the quality of images with the ezAFM is the environmental noise or vibrations. We will first analyze the effects of noise interference due to mechanical vibrations by scanning on standard samples while placing the AFM scan unit on different supports, including a block of solid marble support, a spring dampening system from NanoMagnetics Instruments, and an air table. A comparative study of the noise in the images obtained would provide insight into the characteristics of the noise as well as an effective vibration dampening support for future use that would eventually maximize the accuracy and clarity of the ezAFM images. We will present our analysis of the AFM images of relevant samples demonstrating the potential of the ezAFM and also our initial results on the study directed towards noise analysis in the images using vibration isolation systems.

**THE ORDER OF THE DOLPHIN: ORIGINS OF SETI**

**Maria C. Temming** (Dr. Tony Crider) Department of Physics

In 1961, the National Academy of Sciences (NAS) organized a meeting on the search for extraterrestrial intelligence (SETI) at the National Radio Astronomy Observatory (NRAO) in Green Bank, West Virginia. The ten scientists in attendance represented a variety of scientific fields. At the conclusion of the meeting, the attendees adopted the moniker “The Order of the Dolphin.” The Green Bank meeting of 1961 constituted the seminal SETI conference, but it is rarely discussed in popular SETI literature. The only in-depth account of the meetings origins come from Order member Frank Drake’s book *Is Anyone Out There?*, which was written three decades after the meeting. This research project investigated the origins of the conference to assess the historical accuracy of Drake’s story and explored the circumstances that led to three attendees (observational astronomer Otto Struve, physicist Philip Morrison, and neuroscientist John Lilly) receiving invitations to Green Bank. By examining historical documents from the NAS and NRAO archives, as well as accounts of the Green Bank meeting written by other Order members, I concluded that Drake’s narrative is historically inaccurate. Additionally, by reading biographical documents about and scientific papers by the aforementioned three Order members, I concluded the following about their invitations to Green Bank and their contributions to SETI: Otto Struve’s primary SETI connections were his theories and proposals regarding exoplanets, and his position as the NRAO director. Philip Morrison’s SETI connection was his authorship of the seminal radio SETI paper, and even though he was never directly involved in radio SETI research, his identity as one of radio SETI’s founding fathers pervaded the rest of his career as a high-energy astrophysicist. John Lilly’s primary contribution to SETI research was his interspecies communication work with dolphins and his broader research goal of preparing mankind for extraterrestrial encounters. This project also uncovered several thematic, personal, and professional connections between the Order of the Dolphin members that connect them in unexpected ways.

***POLITICAL SCIENCE AND POLICY STUDIES***

**DO WALKABLE NEIGHBORHOODS IMPROVE ATTITUDES TOWARD IMMIGRANTS?**

**Maggie A. Bailey** (Dr. Jason A. Husser) Department of Political Science

Does neighborhood walkability influence residents’ attitudes toward immigrants? Prior studies of the built environment have noted how different neighborhood designs influence certain political and social attitudes. Specifically, neighborhood structures that encourage widespread dependence on automobiles lead residents to walk less and consequently, have fewer encounters with a diverse social network. In turn, this insularity fosters lower levels of social capital and less political acceptance of some social differences. I hypothesize that residents of neighborhoods with higher walkability are more likely to exhibit positive attitudes toward immigrants. This hypothesis is tested by merging ZIP code-level WalkScore® data with individual-level data from a series of surveys of North Carolina adults. Results show residents of more walkable ZIP codes are more likely to perceive immigrants as a benefit, even when controlling for a variety of individual level factors such as gender and education. However, the impact of walkability is conditional on party identification. Living in walkable areas increased positive views of immigrants among Democrats, but had an insignificant effect for Republicans.

**MISSION ACCOMPLISHED? A COMPARATIVE ANALYSIS OF STRATEGIC NARRATIVES FOUND IN FRENCH AND AMERICAN NEWSPAPERS DURING THE IRAQ WAR**

**Allison M. Gloninger** (Dr. Laura Roselle) Department of Political Science and Policy Studies

The Iraq War in 2003 divided many of the world’s most powerful states, and provided a unique situation in which those states, many of them traditional allies and friends, openly opposed one another in the public sphere with dissenting views and differing perspectives on the war. My research looks specifically at the question of how elite newspapers in the United States and France portrayed the 2003 Iraq War. This study aims to determine if there are narrative differences deviation between U.S. and French newspapers in their depictions of the war. The newspaper articles analyzed were from January to May of 2003; one hundred articles were selected in total. Fifty New York Times and Wall Street Journal articles were used and fifty Le Monde and Le Figaro articles were used. The articles were then categorized into one of four possible strategic narratives. This work draws on the concept of strategic narratives developed by Miskimmon, O’Laughlin and Roselle (2014). The four narratives are: international system narrative, alliance politics, national narratives, and issue narratives. Issue narratives consist of homeland security and threat of terrorism, democratization and rebuilding of Iraq, economic or financial concerns, and a miscellaneous category. The research shows that both French and U.S. newspapers established narratives based on the international system and their own national narratives, but after those narratives were established all four newspapers focused more on specific issues surrounding the war. Additionally, Le Figaro and Wall Street Journal, both of which are considered “right-leaning,” emphasized the international system more than their left-wing counterparts.

***PSYCHOLOGY***

**ENGLISH-AS-A-SECOND LANGUAGE EYWITNESSES: INTERVIEW MISUNDERSTANDINGS AND RESOLUTIONS**

**Cecily A. Basquin** (Dr. Meredith Allison) Department of Psychology

Few studies have considered communication processes when eyewitnesses to a crime speak English-as-a-Second Language (ESL, Lee, 2009). Officers may use complex questions and incorporate low-frequency words that are unfamiliar to ESL witnesses (Gibbons, 1996). When there are misunderstandings, it is likely that both parties will work hard to make sure mutual understanding is achieved (House, 2002; Meierkord, 2000). In the current study, I examined whether misunderstandings occurred in interviews in which mock police officers interviewed ESL eyewitnesses using both free (tell me everything you remember) and cued recall (about the perpetrator, vehicle, and victim) questions. I also examined whether the misunderstandings were resolved and analyzed the process of misunderstanding resolution (*N* = 17 pairs). I operationalized misunderstandings as occurring when crime relevant utterances were followed by incongruent responses or by questions that clearly indicated a lack of understanding. Two raters independently analyzed three groups for misunderstandings using detailed rules. They agreed on 44/45 utterances, thus inter-rater reliability was very high. I then identified all misunderstandings that occurred during cued and free recall questioning. Next, two independent raters determined whether the misunderstandings were resolved (e.g., by giving a clear and confident answer). Inter-rater reliability for analyzing resolutions was calculated on 9 misunderstandings and they agreed on 8/9 decisions. One rater then analyzed all misunderstandings and determined if they were resolved. Finally, I analyzed the communicative processes that led to the resolution using a consensus method (e.g., simplifying, repeating, demonstrating). At this time, the analysts also noted what the misunderstanding was about (e.g., perpetrator’s car, his appearance, other) and who misunderstood (officer or witness). All disagreements were resolved. The results below reflect the final agreed-upon decisions. I found a total of 40 misunderstandings across all pairs. A trend in the data showed that misunderstandings may be more likely in cued rather than free recall questioning. Misunderstandings were significantly more likely to be resolved than unresolved (*p* < .001). The participants used a variety of strategies to resolve these misunderstandings, particularly when the misunderstandings were resolved (*p*s < .001).

**FREQUENCY OF DELIBERATE CALORIE-BURNING EXERCISE AND ITS RELATIONSHIP WITH HEALTH OUTCOMES IN COLLEGE WOMEN**

**Elyse D. Bierut** (Dr. Buffie Longmire-Avital) Department of Psychology

According to the United States Centers for Disease Control and Prevention, 69% of adults in the US are overweight or obese. Looking more closely, there are striking racial disparities in the rates of overweight and obesity. Nearly 48% of non-Hispanic blacks meet the criteria for obesity compared with 32.6% of non-Hispanic whites. Obesity is associated with several adverse health outcomes, including increased risk for cardiovascular disease, diabetes, and some cancers. Losing weight and reducing overall proportion of body fat requires that an individual burns more calories than he or she consumes, which can be done by way of caloric restriction, increase in calorie burning exercise, and/or a combination of the two. The present study examines the frequency of participation in high-calorie burning physical activity in female college students and the relation of frequency to various other factors including race, weight, perceived stress, body anxiety, and alcohol use. Participants responded anonymously to online surveys (total *N*=383, White females=243, Black females=149). The data were analyzed using a series of one-way ANOVAs and chi-squared analyses. Preliminary analyses suggest women who participate in two high-calorie burning activities frequently (i.e. at least once a week) report lower levels of perceived stress and body anxiety, but more frequent use of alcohol. An examination of differences by race shows that 78% of white female collegians engaged in two high-calorie burning activities compared with only 22% for black women [*X2* (2) = 23.462, *p*=.000]. These findings suggest a possible explanation for the discrepancy in overweight and obesity rates between black and white emerging adult women in the US.  Future research should investigate reasons for a racialdifference in engaging in or refraining from frequent calorie burning activity.

**“IT FEELS LIKE BUBBLES IN A BATHTUB”: INQUIRY AND DISCOVERY AT THE RIVER**

**Samantha C. Jurgens** (Dr. Maureen Vandermaas Peeler) Department of Psychology

The present research is an observational case study focusing on young children’s inquiry and discovery in the natural world, and the guidance provided by teachers in a Reggio Emilia-inspired preschool. This research also examines the importance of peers in collaborative experiences. The role of the teacher in the Reggio Emilia approach is to facilitate and guide learning by allowing the child to take an active role in their education (Hewitt, 2001). Children’s inquiry in outdoor settings can be fostered through open-ended questioning that encourages discovery and complex reasoning (Gelman & Brenneman, 2004). Seven children and their teacher were observed and video recorded for about 6 hours during three weekly visits to a local state park near the preschool. Teacher facilitation and guidance was coded in the following categories: asking open-ended questions, articulating goals, suggesting strategies, elaborating multiple perspectives, and using positive reinforcement. Children’s inquiry processes were coded as observing, predicting, questioning, and evaluating. Results indicate that the teacher used all five guiding strategies, but favored asking open-ended questions that prompted children to offer hypotheses.  For example, when one child discovered animal prints in the mud, she asked, “What do you think made those prints?” but never provided an answer, allowing the children to generate and evaluate multiple predictions. Inquiry was often initiated by a child’s discovery, which prompted social collaborations among the group of children as they observed and asked questions.  The children were mainly observant about changes in the environment due to weather conditions (e.g., a fallen tree after a storm). In addition, water existed as an environmental affordance and playing in the river prompted high levels of discovery and curiosity as the children waded in, climbed on rocks, and put sticks into the river to test currents. Further analyses highlighting the roles of the teacher, peers, and the natural environment on children’s inquiry and discovery will be reported in greater detail.

**WHEN I GROW UP: THE EFFECT OF CAREER INTERVENTION PROGRAMS ON CAREER DECISION MAKING IN UNDERGRADUATES**

**Elizabeth F. Knapp** (Dr. Katie King) Department of Psychology

Like many undergraduate institutions, Elon University offers career preparation programs in order to assist students in preparing for life after graduation. In addition to providing practical advice and resources, these programs are designed to boost students’ confidence in their ability to make career decisions and overcome perceived obstacles to career planning (Guichard, 2009; Leuwerke & Ergüner-Tekinalp, 2011). The present study looked at the effectiveness of Elon’s Career Strategies courses in helping students prepare for the transition into adulthood and develop career decision making strategies. It was predicted that students who took part in a career strategies course would have greater decision making self efficacy and perceive fewer barriers in the decision making process after taking the course. Using both the Career Decision Self-Efficacy Scale – Short Form (CDSE-SF; Betz, Klein, & Taylor, 1996) and the Career Decision Making Difficulties Questionnaire (CDDQ; Gati, Krausz, & Osipow, 1996), we examined how career intervention programs impacted career decision-making confidence in a pre- and post-test design. Participants were 14 students enrolled in Career Strategy courses during the fall of 2015 who volunteered to participate. Using a paired samples t-test, we found that on average, students’ career decision-making self-efficacy increased and perceived barriers decreased after taking the classes. However, our results were not statistically significant possibly due to a small sample size. This study will discuss some of the implications and potential uses of the results.

**ALCOHOL USE AND PERFORMANCE ON THE IOWA GAMBLING TASK**

**Kara E. Kneeland, Rachel E. Paxton, and Meredith A. Sullivan** (Dr. Mathew Gendle) Department of Psychology

Alcohol use has been shown to negatively affect prefrontocortical networks that are correlated with decision-making abilities. Alcohol users may value the immediate rewards of alcohol over potential negative long-term health effects. The objective of this study was to explore the relationship between alcohol use and decision making, as measured by the Iowa Gambling Task (IGT). One-hundred twenty-seven female university undergraduates completed a health behavior survey and completed the IGT, following standardized instructions. Participants who self-reported not consuming alcohol (n=21) won more money in dollars on the IGT (+$81) than those that self-reported consuming alcohol (-$430), but this difference was not statistically significant (p = 0.12). Although the difference between groups was not significant, the magnitude of this difference is notable and warrants further investigation. The unexplained variance in IGT performance in both groups was very large, and future studies should collect covariate data that could account for some of this variability, via a statistical method utilizing covariate control.

**INQUIRY AND INTERSUBJECTIVITY IN A REGGIO EMILIA-INSPIRED PRESCHOOL**

**Jacquelyn E. Lanphear (**Dr. Maureen Vandermaas-Peeler) Department of Psychology

This research is a longitudinal case study of children’s inquiry and intersubjectivity in a Reggio Emilia-inspired preschool with an innovative, child-centered curriculum. Through inquiry processes of observing, questioning, predicting, and evaluating, young children learn to investigate and use evidence to evaluate information. Through intersubjectivity, or social collaboration and mutual focus, children co-construct their understanding of the world (Rogoff, 1990). The influence of teachers and peers on communication and learning are examined in this study. Children and teachers were video-recorded for five months in various activities such as art, science, and play. Frequency and duration of relevant behaviors, such as making an observation, engaging in mutual focus, and showing mutual positive emotion, were coded when two or three children engaged in an activity for at least two minutes. In this mixed-age setting, younger children have myriad opportunities to observe and imitate the actions of older peers. Although younger and older children were equally likely to engage in the basic inquiry processes of observing and questioning, chi square analyses confirmed that older children were more likely to use advanced inquiry processes such as predicting and evaluating. Reciprocal conversation, or the back and forth talking between children that has an element of sharing ideas and/or co-constructing understanding of events, emotions, and/or thoughts, was more frequent in events with high levels of child interest in the activity and lower levels of teacher guidance, such as during constructive play. Further analyses and salient themes will be presented. This research is novel in that it investigates the relationship between inquiry and intersubjectivity, and thus contributes to a deeper understanding of preschoolers’ communication and learning.

**STUDENT PERCEPTIONS OF SEX OFFENDER REGISTRIES: A CROSS-CULTURAL COMPARISON**

**Erin Martin** (Dr. Meredith Allison) Department of Psychology

Sex offender registries are publicly available in the U.S. but not in Canada. North American law enforcement agencies use registries to log and track sex offenders living in the community. Several researchers have studied the impact of these registries on recidivism and offender reintegration and found that they do not reduce sexual offending behavior (e.g., Ackerman et al., 2012). Others have focused on offenders’ and psychologists’ opinions of the registries and found that registries are not perceived as helpful, particularly with community reintegration (Malesky & Keim, 2001). The few studies that have examined community members’ perceptions have shown that most people are not aware of the registries’ existence (Kernsmith et al., 2009). Given the difference in the accessibility and use of the registries in Canada and the U.S. (i.e., sex offender registries are publicly available only in the U.S.), it is surprising that no one has compared Canadians and Americans on their views. Do Canadians and Americans view the registries in similar ways? Undergraduates in both countries (*N* = 207) completed an online survey about their views of the registries and completed personality scales (Belief in a Just World Scale, Survey of Political Attitudes, and the Community Attitudes Towards Sex Offenders Scale). We hypothesized that Americans would believe the registries should be publicly available and would generally be more aware of the registries than Canadians because of community notification laws in the U.S. We also hypothesized that participants with more politically conservative attitudes and negative sex offender views (based on personality scale scores) would view the registries in a more positive light. Evaluations of Canadians and Americans tended to be commensurate with their respective countries’ policies. Canadians were less supportive of publicly accessible registries than Americans, *p* < .01. Further, more politically conservative views were associated with more positive views of the registries, *p*s < .05. These findings provide some insight into students’ perceptions of the registries. Future work will focus on the views of the non-student communities in both countries.

**IMPLICIT AMBIVALENCE TOWARD DEPRESSION: THE ROLE OF DISCREPANT ATTITUDES ON INFORMATION PROCESSING AND INFORMATION SEARCH**

**Heather M. McDonough-Caplan** (Dr. India Johnson) Department of Psychology

The Meta Cognitive Model (MCM) of attitudes assumes people have both positive and negative associations, and when one of these associations is invalidated, people can experience implicit ambivalence. Implicit ambivalence can be diagnosed by a discrepancy in the valence of an attitude uncovered by an explicit versus an implicit measure. (Petty et al., 2006). Prior research has found one downstream consequence of implicit ambivalence is individuals with greater explicit-implicit attitude discrepancies tend to process information related to the topic of the discrepancy more carefully (Briñol et al., 2006; Petty, Briñol, & Johnson, 2012; Johnson et al., 2014). Extending and building upon past work across two studies, the present research examines the downstream consequences of implicit ambivalence in the domain of depression attitudes. In both studies, participants completed the Revised Perceived Devaluation-Discrimination Scale (Link, 1982) to measure explicit attitudes and the Implicit Association Test (Greenwald, McGhee, & Schwartz, 1998) to measure implicit attitudes; these measures were used to calculate the magnitude of discrepancy, our index of implicit ambivalence. In Study 1, participants were presented with a persuasive message relevant to depression, and argument quality was manipulated to assess extent of information processing. Additionally, participants’ attitudes towards the persuasive message were also assessed. Replicating previous research, we found as the discrepancy between implicit and explicit attitudes increased, participants exhibited higher levels of information processing of a message relevant to depression, as evidenced by a bigger impact of argument quality on attitudes towards the persuasive message.  In Study 2, we examined a novel downstream consequence of discrepant attitudes: discrepancy-relevant information search. Specifically, participants reported their intent to engage in behaviors that would allow them to learn more about depression and selected to read a depression-related or non-depression related report. We found that as discrepancies between implicit and explicit attitudes increased, participants reported a greater desire to learn more about depression, and a preference for depression-related information. Together, these studies suggest individuals with discrepant attitudes toward depression are more likely to seek out information related to depression and to process this information more closely, which has important implications for mental health education programs.

**MATING MOTIVES AND ANTI-TRANSGENDER PREJUDICE**

**Michael A. Nedvin** (Dr. David Buck) Department of Psychology

Transgender individuals are a stigmatized group in much of Western society. People who do not identify with the traditional cisgender binary are harassed and threatened. This research examines how mating motives might impact anti-transgender prejudice. Mating motives are cognitive goals related to sex, reproduction, and mate-retention. Men with active mating motives are more likely to act aggressively towards other men, but not towards women. Mating motives activation can also increase prejudice in both men and women against sexual minorities (gay, lesbian, and bisexual individuals). Because transgender individuals are often thought of as being similar to LGB individuals, we thought that anti-transgender prejudice could be similarly impacted by mating motives. We hypothesized that mating motives would increase anti-transgender prejudice in both men and women, but that men would respond differently to transgender men and women. Participants were 182 self-identified heterosexual cisgender men and women (50% Female, 71% White, *M*age = 35.65) who completed an online survey posted on Amazon’s Mechanical Turk. They were randomly assigned to either a prime condition in which their mating motives were activated, or a control group. Participants then read descriptions of three fictitious job candidates, one of whom was randomly assigned to be a transgender man or woman, and provided evaluations of each candidate. The study had a 2(prime condition) x 2(candidate gender) experimental design. The participants’ evaluations of the transgender candidates were analyzed using a series of three-way ANOVAs, which included the two independent variables and participant gender. Results indicate that the mating prime affected women’s responses to transgender individuals broadly, significantly lowering female participants’ opinions of the transgender candidates. Men’s responses, however, were significantly moderated by the target’s gender identity. Whereas men in the control group rated the transgender woman more positively than the transgender man, in the prime group the transgender woman was rated significantly more negatively than the transgender man. Though the pattern of men’s responses corresponds to related work, the motivation behind them in this context is unclear. Future work should examine the different affective responses that men might experience in similar circumstances.

**GENDER DIFFERENCES IN ATTITUDES TOWARDS TRANSGENDER MEN AND WOMEN**

**Taylor N. Obzud** (Dr. David Buck) Department of Psychology

Research on attitudes towards the transgender community suggests that men possess more negative attitudes than women towards transgender individuals. However, this research often ignores the distinction between transgender men and women, despite the fact that attitudes towards these groups may differ greatly.  Further, research on attitudes towards gay men and lesbians suggests that the gender of target is indeed meaningful. More specifically, men’s attitudes towards homosexual persons were increasingly negative when the person was indicated to be a gay male, while gender difference in attitudes towards lesbians was basically nonexistent. Such studies on attitudes towards gay men and lesbians seem highly relevant because of the historic cultural grouping of the lesbian, gay, bisexual, and transgender communities. Additionally, there is evidence that suggests a possible association between transgender women and gay men, as well as between transgender men and lesbians. In the current study, we attempted to differentiate between men’s and women’s attitudes towards transgender women and transgender men. In order to properly assess attitudes, we created an online survey that included scales that separately measured attitudes towards gay men, lesbians, transgender women, and transgender men. Further, each participant was given one of two possible scenarios describing moving in with a hypothetical new roommate.  In one of the scenarios the roommate was identified as a transgender man and in the other she was a transgender woman. After reading the scenario they were asked to respond to the hypothetical situation. Analyses indicate that men had more negative reactions than women to the transgender roommate, regardless of the roommate’s gender.  However, men’s responses to the attitudes towards transgender men and women scales did differ, with male participants reporting more prejudice towards transgender women.  Further, regression analyses revealed that attitudes towards transgender men and women were differently predicted by attitudes towards gay men and lesbians.  These findings highlight some distinctions between attitudes towards transgender men and women, and suggest the need for future work that can further explore these differences.

**“TRIP TRAP TRIP TRAP LET ME PASS: I WANT TO EAT SOME FINE GREEN GRASS”; PRESCHOOLERS’ PLAY AND INTERSUBJECTIVITY IN THE NATURAL ENVIRONMENT**

**Alexis B. Paul** (Dr. Maureen Vandermaas-Peeler) Department of Psychology

This observational case study examined preschoolers’ play and intersubjectivity in an unstructured, outdoor environment. Previous research has shown that outdoor environmental affordances, such as water, bridges, and trees, have a significant positive impact on children's physical and socio-emotional development (McClain & Vandermaas-Peeler, 2015). Intersubjectivity in children includes interacting with each other for a shared purpose, using reciprocal conversations, group interactions, and negotiation. The purpose of this study was to investigate the kinds of play that occurred, the environment affordances used in play, and the nature of the peer interactions. Participants included 11 children and one teacher, with five children going to a state park on weekly visits with one teacher. The observational site includes a small bridge, hills, a river, rocks, and trails to walk on. Play coding was based on Rubin (2001), and included codes for functional play, constructive play, dramatic play, games-with-rules, and exploratory play. Intersubjectivity behaviors included reciprocal conversation, attentive observation, and helping. Data was collected on 16 days throughout the year for a total of 5 hours and 18 minutes of video before and after snacktime, when there was unstructured time for play. The children used dramatic (34%) and functional (31%) play most, followed by constructive (21%), exploration (6%), games with rules (2%), and no play (6%). There were many different themes of dramatic play observed across the 16 days.  One of the most common was cooking, when children used the dirt and water from the river to create pretend chocolate milk and cakes. Some other recurring themes included pretending to make a campfire with seaweed, and pretending to be firemen using a tree as the firepole. There were particularly high levels of intersubjectivity during functional and dramatic play. Of all the coded reciprocal conversations, 78.24% occurred during dramatic play.  Attentive observation (when a child watches intently but has not yet joined the play) occurred most often during dramatic play (40.66%) and functional play (34.14%). In this study, children utilized a diversity of environmental affordances in their play, which influenced play themes and social interactions.

**SELF-GENERATION EFFECTS ON MEMORY FOR CONTEXT**

**Alison G. Richard** (Dr. Amy A. Overman) Department of Psychology and Neuroscience Program

Understanding how the brain acquires, stores, and retrieves new information is critical for supporting successful learning. Although learning and memory have been studied for a long time, much is still unknown. For instance, the act of self-generating information, rather than passively hearing or reading it, has been demonstrated to be effective for many types of learning and memory, but detrimental to other types. Specifically, a positive self-generation effect has been consistently demonstrated for item memory (e.g., Hirschman & Bjork, 1988). However, an essential part of learning often includes not just the item, but also the context in which the item was originally learned. Currently, there are contradictory results regarding the self-generation effect and its influence on memory for context. A limitation of prior studies is that they have focused entirely on visual contexts without examining other types of contexts (e.g., Mulligan, 2006). In addition, previous PET studies found that the brain regions involved in perceptual processing are separate from those involved in conceptual processing (Blaxton, et al., 1996), suggesting that perceptual features and conceptual features are encoded by separate neural networks in the brain. Therefore, our hypothesis was that perceptual self-generation tasks should enhance context memory more than semantic self-generation tasks because the neural processes used for the perceptual self-generation task prime the perceptual features of the context. Younger adults (n=52) generated words from a cue-target pair in one of two contexts: visual (word color) and auditory (voice gender). As predicted, auditory self-generation resulted in better context memory when the context was also auditory (*p*=.021). Our findings support our hypothesis of differential effects of generation task and context type on memory. The current study extends prior findings (e.g., Mulligan, 2004) to a new type of context (auditory) and demonstrates support for a perceptual-conceptual encoding tradeoff. Our research makes a valuable contribution to the literature about human learning and helps determine what strategies can be used to improve student learning and comprehension.

**EXPLORING THE STRESSFUL PATH TO DEPRESSION IN EMERGING ADULTHOOD BY RACIAL GROUPS**

**Ruth W. Robinson** (Dr. Buffie Longmire-Avital) Department of Psychology

Numerous studies have found depression rates varying by race and gender, with the combination of being a woman and Black specifically disadvantageous. However, a majority of this previous research has been conducted using adult populations. There has been minimal research on depression that effectively considers the intersection of race and gender during emerging adulthood, a period of life known to have unique stressors and intensive social identity development. This comparative study explored the rates of depression and psychosocial correlates of depression for collegiate self-identified White and Black females. Women between the ages of 18 and 25 were recruited to participate in this anonymous online survey through a two-wave recruitment procedure utilizing convenience sampling. Three hundred and sixty-nine participants completed a demographic questionnaire, and were measured on their perceived stress and depressive symptomatology. Black females reported significantly greater amounts of depressive symptomatology (m =24.61) in comparison to the White females (m =15.68), (F (1,377)=61.434, p=.000). Bivariate analyses conducted while controlling for race, found that perceived stress and depression were equally correlated with one another for each racial group, suggesting that the relationship between depression and stress does not vary across these two racial groups. A series of Chi-square analyses were used to explore the relationship between depression and race. Black women (52.3%) were significantly more likely to have met criteria for major depression than White women (21.7%). These results suggest that the odds of having depression for White females are 1 in 5, but are 1 in 2 for Black females. The implication of these findings are discussed in consideration that race may serve as a protective factor for one group and as a risk factor for another in developing clinical depression. Further research is needed to understand what exactly about the intersecting experiences of being Black, a woman, and an emerging adult makes this demographic significantly more prone to suffering from depression.

**COMPARING THE EFFICACY OF LEADERSHIP DEVELOPMENT PROGRAMS TO OTHER EXPERIENTIAL COLLEGIATE ACTIVITIES**

**Evan C. Skloot** (Dr. Chris Leupold) Department of Psychology

Experiential education has become an integral part of many higher education institutions as a means to help students prepare for and thrive in the complex environments facing them (Cantor, 1997). As such, this influx of intentional experiential education warrants an investigation into the effectiveness and impact of these programs. Leadership development programs are among the most popular forms of such experiential programs, with over 1500 institutions currently registered with the International Leadership Association (Owen, 2012). This study explored the impact that formal undergraduate leadership development programming has on students’ resilience and leadership efficacy; in addition, it examined the impact of other experiential programs on these same outcomes. Using a survey methodology, data from the 2012 Multi-Institutional Study of Leadership (MSL) was examined for 2,028 participants from a mid-sized university. Correlations analyses found that, while participation in leadership programming was a statistically significant predictor of leadership efficacy and resilience, engaging in other non-leadership collegiate experiences were equally good predictors. These results suggest that universities’ experiential education programming does indeed yield, among other benefits, increases in students’ resilience and leadership self-efficacy. Implications of these results are discussed, as are suggestions as to how administrators and faculty can leverage them to enhance student experiences and desired outcomes.

**RELATIONSHIPS BETWEEN TOTAL CHOLESTEROL LEVELS AND PERFORMANCE ON THE CONNERS CONTINUOUS PERFORMANCE TEST II**

**Kaitlin R. Snapp** (Dr. Mathew Gendle) Department of Psychology

Considerable research has demonstrated the negative effects of elevated total cholesterol (TC) on cardiovascular health, however the relationship between plasma TC and central nervous system (CNS) functioning is not yet fully understood. This study examined the relationship between plasma TC levels and performance on the Conner’s Continuous Performance Test II (CPT), a task that directly measures attentional control and impulsivity. Based on past research, it was hypothesized that in regards to cognitive function, TC follows an inverse-U dose-response function, wherein both extremely high and low levels of TC would be associated with greater rates of commission errors, a measure on the CPT that indicates an impairment in behavioral control. For each participant (41 undergraduate students), fasting plasma TC levels were obtained. Demographic information was collected through self-report and all participants completed the CPT. After controlling for hormone therapy, self-identified sex, and self-reported caffeine intake, no significant differences in the rate of commission errors were observed between groups of TC ≥ 155mg/dL and TC < 155 mg/dL (p = 0.59). However, significant differences were observed between these groups for number of omission errors (p = 0.01) and perseverations (p = 0.003) committed on the CPT, after controlling for the same covariates listed above.  Both omission errors and perseverations occurred in low frequencies overall; however, both types of responses occurred more frequently in the group of participants with higher cholesterol.  This data suggests a specific and subtle impairment on the CPT that is related to TC; however, due to the small sample size, these conclusions merit confirmation with additional studies.

**DIFFERING EFFECTS OF LIST REPETITION ON BETWEEN-TRIAL ASSOCIATIONS IN YOUNG AND OLDER ADULTS**

**Michelle E. Stocker** (Dr. Amy A. Overman) Department of Psychology and Neuroscience Program

Younger and older adults both rely on the hippocampus in order to form associations. However, because of age-related hippocampal decline, there are often differences in memory performance between the age groups (Raz, 2000). This study examined if older adults process within-trial (cue-target relationship) and between-trial associations (categorical organization of targets in a list) differently than younger adults (Peterson & Mulligan, 2012). One paradigm in which this can be seen is the negative repetition effect, in which repeated study of cue-target word pairs, first presented in a disorganized list and then presented in a list organized by semantic categories of the targets, leads to worse recall of target words than when the pairs are studied only once (in semantically organized list). The disorganized-organized sequence impairs free recall by orienting participants to the within-trial associations at the expense of between-trial associations. In older adults, we might expect to see different memory performance than in younger adults because of structural and functional changes in the aging brain (Cabeza, 2001). Older adults (n=54) and Elon students (n=51) studied a list of cue-target pairs in the single-list condition or repeated list condition. The novel design had study lists containing multiple cue-target association types (rhyming, semantic, and arbitrary). Item, associative recognition, and free recall were tested. For item and associative recognition, both older and younger adults benefited from repetition of the lists (item - *p*<.001; associative recognition - *p*<.004). However, for recall only younger adults benefited from repetition of the lists (*p*=.023). This suggests that between-trial associations (category structure of list) was processed differently between age groups, but within-trial associations were not. Younger adults seem to not experience disruption of between-trial associations when the organized study list was preceded by a disorganized list. Older adults may be more susceptible to disruption of between-trial associations than young adults due to greater semantic knowledge, which could cause interference, or because of difficulty binding the pairs to their study list context. Our study is important because it is the first to examine the negative repetition effect in older adults and it contributes to the understanding of age-related memory changes.

***PUBLIC HEALTH STUDIES***

**A CASE STUDY ASSESSMENT OF ACCESS TO HEALTHCARE SERVICES AMONG DESTITUE WOMEN AND VULNERABLE CHILDREN’S IN ADDIS-ABABA: FOR THE ESTABLISHMENT OF COMMUNITY-BASED NON-PROFIT ORGANIZATION**

**Josephine E. Gardner** (Dr. Frontani) Department of Public Health Studies

Widespread poverty, hunger, low literacy rates and limited access to health services have contributed to Africans’ high disease burden and poor health. African countries are home to many of the world’s poorest people, including many homeless and near homeless in major cities. Although programs exist in Ethiopia and elsewhere to support the destitute, they are generally insufficient and little research has been conducted on them. To fill this gap in the literature and make use of a Ward Family in Action Award, the author, in collaboration with the Department of Social Work at Addis Ababa University, conducted semi-structured interviews with governmental officials, staff at five non-governmental organizations (NGOs), and with nearly two dozen destitute women in the Nifas Silk-Lafto sub-division of Addis Ababa, Ethiopia from June to November 2015. Interviews were used to identify inefficiencies in health service delivery and practices for the homeless and near homeless and to identify means to address them. Research findings include a disturbing trend of the destitute facing daily decision-making in which healthcare or food, or healthcare or safety, are the perceived or actual options. Of the few support programs for the homeless and destitute in Addis Ababa, those most welcomed by the population being served are initiatives that integrate health services with others, such as counselling, general education, vocational training, and most importantly, housing. A secondary goal of the research was to identify stakeholders that would participate in the design and implementation of a local non-profit organization established by the author and based in Nifas Silk-Lafto. In the long term, the intent is for the new organization to offer opportunities for Elon students to undertake service-learning initiatives with Ethiopians through internships and the WT Ethiopia/Tanzania course.

**DEPLOYMENT POLICY AND FAMILY PLANNING DECISIONS IN THE U.S ARMY**

**Ashley M. Hunt** (Dr. Bud Warner) Department of Public Health Studies

This project investigates the relationship between military deployment policies and the decisions that female officers in the United States Army and Air Force make regarding family planning. An increasing number of women have been pursuing careers in the historically male-dominated military, which has forced businesses to change their policies to accommodate the needs of female workers through deployment policies such as family care plans, deferment of deployment, and family support groups. Though progress has been made, many female officers still have concerns about the applicability of these policies to their male spouses and how having a family could negatively impact their military readiness and career. Forty- five current and former Army and Air Force officers were recruited through snowball convenience sampling.  Twenty-eight of those participants completed a qualitative survey concerning their opinions on their military career and how it has impacted their family life. These surveys were analyzed using Dedoose software through the use of coding for overarching themes. Findings suggest that traditional military culture surrounding gender roles and responsibilities, stigmas associated with female officers managing careers and families, and individual beliefs and choices are the most influential factors when it comes to making family planning decisions. Ultimately these responses can be used to help shape future policies that will impact women in the military.

**"THE BEST THING IN THE WORLD": WHAT ENGAGEMENT IN OUT-OF-SCHOOL ACTIVITIES CAN TELL US ABOUT YOUTHS' WELL-BEING AND DEVELOPMENT**

**Casey B. Morrison** (Dr. Mark Enfield) Department of Public Health Studies

This research examines how the nature of middle school students’ out-of-school time (OST) and their engagement in structured and unstructured activities impacts their well-being and dispositional development. Unlike existing OST research, this study takes an in-depth and individually-centered approach that uses multiple data sources to create a full profile of each participant. The study focuses on case studies of four 8th grade students at a predominantly white, middle-class school in a mostly rural county in the southeastern United States. Through interviews, time journals, and in-school observation, information was gathered from participants, their parents, and their teachers regarding their time use, attitudes, and perceived benefits of involvement in both in-school and out-of-school contexts. Data were collected between March and May 2015. Each participant recorded her or his activities in a time journal for two weeks, and was interviewed at the beginning and end of this period. Parents and teachers of the participant were generally interviewed during the same two week period. Using data from interviews and time journals, the participants’ behavioral, emotional, and cognitive engagement in each of her or his activities was rated on a scale developed by the researchers. The youths’ activity participation and engagement were found to be associated with a variety of positive youth development indicators, including the developmental assets designed by the Search Institute and Pittman’s Five Cs of youth development. Results indicated that the nature of participants’ involvement during OST activities, including their time commitment and level of engagement, had more impact on their well-being and development than did the specific types of activities in which they engaged. While popular dialogue tends to revolve around which types of activities will benefit youth, this study demonstrates the need instead for an increased focus on the characteristics of youths’ engagement in these activities.

**WAS THAT ALL I GOT? “YOU’RE TOO YOUNG TO HAVE SEX’”: ADOLESCENTS’ EXPERIENCES ACCESSING SEXUAL AND REPRODUCTIVE HEALTH SERVICES AND RECOMMENDATIONS FOR PROVIDERS: A LEADERSHIP PRIZE PROJECT**

**Jenna Ann Nelson** (Dr. Cynthia Fair) Department of Public Health Studies (Professor Alexis Moore) Department of Physician Assistant Studies

Previous research suggests that health care providers (HCPs) play a critical role in providing sexual and reproductive health (SRH) information to adolescents, helping prevent unintended pregnancy and sexual transmitted infections. However, Alexander et al. (2013) found that HCPs spend ~36 seconds discussing sexuality during adolescent health maintenance visits. This exploratory qualitative study examined experiences of adolescents accessing SRH services, with the goal of developing recommendations for providers to improve the quality and frequency of HCP- initiated SRH conversations.  A convenience sample of 25 college undergraduate students (16 women; 21 White; mean age 20.5 years) participated in four same-sex focus groups lasting approximately 45 minutes. Participants were asked about their comfort discussing SRH topics and related experiences with HCPs, and advice on how to facilitate more productive SRH conversations. Recorded and transcribed interviews were coded using grounded theory to guide analyses.  Emerging themes deemed important to SRH conversations included: environment, resources, relationship, and language.  Participants noted that a private and welcoming environment might make the conversation less intimidating. Resources such as pamphlets and signage allow gaps to be filled when appointments are time-limited. The importance of relationships also emerged.  Participants explained that provider personality, presentation, or (personal) history can impact comfort level during SRH conversations. A lack of clear language during an appointment such as not defining “sexually active” and “sexual violence” presents the possibility for misinterpretation of questions and information. Effective provider communication regarding SRH requires engaging patients in a redefined SRH setting – one that strives to engage both personal and disease domains and that considers the context of SRH in the individuals’ emotional and personal life and behavior. Future clinicians must be trained to look beyond disease treatment only, so that clinical encounters can serve as touchstones for increased patient-provider stability. Further research should explore whether the creation of settings more conducive to patient understanding and receptiveness improve patient outcomes.

**TRANSITION: THE ROLE OF SOCIAL SUPPORT IN SELF-MANGEMENT WITHIN EDUCATION AND EMPLOYMENT SETTINGS FOR ADOLESCENTS AND YOUNG ADULTS WITH END-STAGE RENAL DISEASE**

**Sophie L. Rupp** (Dr. Cynthia D. Fair) Department of Public Health Studies

This project explores the role of social support in self-management within education/employment settings through the Health Care TransitionResearch Consortium (HCTRC) model. While transition from pediatric to adult care can fosterindependence in adolescents and young adults (AYA) with end-stage renal disease (ESRD),this process is associated with treatment lapses. The HCTRC model of transition integrates factors outside medical settings to improve disease-management. Little research focuses on this population’s transition to adulthood and ways pediatric patients pursue academic/professional success while maintaining their health. Although social support in these settings is beneficial, forming relationships can be challenging for this population. Nineteen AYA with ESRD from kidney centers in North Carolina completed in-person semi-structured interviews focused on support and self-management within educational/vocational settings. The mean age of participants was 24 years (range 19-28). The majority were male (n=10), African American (n=9), and had completed some college education (n=9). Participants completed the Self-Efficacy for Managing Chronic Disease 6-Item Scale and the Social Support Questionnaire. A grounded theory approach was applied to transcribed interviews to construct analytic themes. Eleven participants had adult onset ESRD and most (n=13) were using dialysis. Six were employedwhile three were completing education programs. The average self-management score was 8.02 (range 4.12- 9.67). The average family support score was 1.99 (range 0- 4.33) while the average non-family support score was 0.90 (range 0-2.5). Qualitative analyses suggest that participants experienced challenges establishing social support necessary to manage their illness in academic/vocational settings. Failure to establish support resulted in a lack of health-related accommodations or posed health dangers to AYA. Barriers to support included fear of judgment, job-loss (anticipated and experienced), and the belief that their condition was too personal to disclose. Facilitators included perceptions of their illness as normal and awareness of disclosure as a way to access accommodations and facilitate emergency assistance. Educators and employers must be sensitive to the needs of AYA with ESRD to promote development into adulthood and success in educational/vocational endeavors. Communication and autonomy in patients’ medical and personal lives is necessary to their survival and quality of life.

***RELIGIOUS STUDIES***

**THE VIRTUAL CHURCH: HOW THE INTERNET IS CHANGING THE WAY PEOPLE FORM RELIGIOUS COMMUNITY**

**Daniela Ceron** (Dr. Lynn Huber) Department of Religious Studies

With the rise of the Internet many have turned to virtual churches as a way to supplement their spiritual lives, thus affecting the ways in which they form religious communities. The terms “virtual church” and “online church” is used interchangeably throughout this study, but refers to a church service administered through an online medium, usually the Internet, where people participate without entering a physical church building. Many question the authenticity of the virtual church, claiming it cannot take the place of a physical community. This research examines how sacred space and community are created in virtual spaces through online churches, arguing that online churches fulfill the spiritual needs and same communal function as non-virtual churches.  This presentation will examine the validity of the virtual church, using criteria drawn from Mircea Eliade and Emile Durkheim’s theories about sacred space and community. In addition to these theorists, supplemental studies regarding the Internet and the church as well as participant observation will be used. This analysis of Northland’s online worship service will examine the church’s formation of sacred space, promotion of spirituality, and creation of community. This study will show that, in Northland’s case, the relevant criteria were indeed met. This conclusion is significant because, at a time when traditional church membership in America is on the decline, the virtual church could serve as a new way for people to engage in religious practice that may be beneficial to traditional churches who are looking to attract more members. It also sheds light on how technology, specifically the Internet, is changing the ways in which people relate to their religious communities.

**CONCEPTIONS OF SPIRITUALITY AMONG INFORMAL JEWISH EDUCATORS**

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American Jews are increasingly favoring private and individualized models of personal spirituality over more communal and public expressions of Jewish identity, such as synagogue life. My research considers whether and how educators in positions of Jewish communal leadership align with this trend, especially in light of the pressures that their professional roles may place on them. I investigated how young informal Jewish educators, that is Jewish professionals working outside of a synagogue education or academic context, define their own sense of spirituality and how they see that in play with the members and participants of the organizations for which they work. Through a series of ethnographic interviews with informal Jewish educators in the Piedmont region, I explored the connections between their conceptions of spirituality and their professional roles. My research found that, as informal Jewish educators became more involved in communal Jewish life in their jobs, they became less inclined towards public expression of their own Jewish practices, perhaps because of a need for work-life balance. At the same time, as a result of their work, these Jewish educators came into contact with a wide variety of forms of Jewish spirituality, and therefore responded positively to a wider range of modes of Jewish spirituality than other American Jews. Moreover, as they discussed what they loved about their work and what they personally found most meaningful, they indicated parallels between their spirituality and their work, which may show how involvement in this kind of work can fill a growing desire of young Jews for spiritual experience.

**RUTH, NAOMI, AND THE LESBIAN CONTINUUM: READING AN ANCIENT TEXT IN LIGHT OF TWENTIETH-CENTURY LITERARY LESBIANS**

**Shelby A. Lewis** (Dr. Lynn Huber) Department of Religious Studies

Often employed in the context of heterosexual weddings, Ruth’s promise to her mother-in-law Naomi in the *Book of Ruth* that “where you go I will go” (1:16) commends this Hebrew Bible text as a fruitful site for queer lesbian biblical interpretation. In this research, I explore this relationship, attending to the complexity of the homosocial relationship, by employing Deryn Guest's strategies for reading biblical text from a queer lesbian perspective. These strategies include resisting heteronormativity, rupturing sex and gender binaries assumed in the text, and reclaiming troublesome texts for lesbian readers. As a way of deploying the final strategy, I bring the *Book of Ruth* into conversation with twentieth-century novels written by lesbian authors and with explicit lesbian themes: *The Color Purple* by Alice Walker, *Oranges Are Not The Only Fruit* by Jeanette Winterson, and *People in Trouble* by Sarah Schulman. The relationships in these novels are useful for interpretive purposes because each one reimagines the dynamics of age, race, and class that play into the Ruth and Naomi story in some regard. All of the relationships are analyzed in light of Adrienne Rich's "lesbian continuum," which posits a spectrum of relationships ranging from the homosocial to the homoerotic. My broad range of sources posits a wide definition of "lesbian," that is, a woman-identified, woman-loving person whose politics, gender expression, and sexuality all deviate from heterosexist norms. A wide definition encompasses a wide variety of readers who might otherwise be excluded from biblical and other literary canons; by expanding the notions of canon to include queer individuals, biblical and non-biblical texts alike can be used to reconstruct the norms by which we understand and affirm their existence.

**“IN WOD WE TRUST”: AN INTERPRETATION OF CROSSFIT AS A RELIGION**

**Alexandra F. McCorkle** (Dr. Lynn Huber) Department of Religious Studies

Over the past eleven years, CrossFit, an extreme fitness regimen has grown exponentially in popularity. Across the US (and in many places throughout the world), adherents make their daily trip to “the box,” or CrossFit gym, to complete an intense Workout of the Day (WOD). Whether subversively or with a sense of participatory pride, many have referred to CrossFit as a cult. But perhaps there is something to this claim quite different from folk-use of the word “cult,” which conjures up odd ritual and brainwashing in the popular imagination. CrossFit functions much like a religion by creating community, defining the sacred, and facilitating ritual. This paper will situate CrossFit against a backdrop of Protestant Evangelical Christianity, and place CrossFit in the historical development of gyms and Christianity in the U.S, beginning with the Young Men’s Christian Association (YMCA). Other accounts of exercise as religion and relevant scholarly sources about CrossFit will be discussed. The sociological approach of Émile Durkheim will be applied in explaining how one can justify the claim that CrossFit is a cult. Employing Durkheim’s functionalist approach, which taught that religious ritual serves to strengthen in-group identity, CrossFit resembles a religion through what I will argue is its chief ritual: the workout of the day, or “WOD” for short.  Finally, we will return to the trope of “muscular Christianity,” examining similarities between CrossFit and Protestantism, namely their mutual emphasis on the conversion narrative and proselytizing.

**CLINICAL SPIRITUALITY: A CRITICAL EXAMINATION OF THE ACADEMIC USE OF THE WORD “SPIRITUAL” AND THE APPLICATION OF YOGA TO CLINICAL PSYCHOLOGY**

**Alexandra F. McCorkle** (Dr. Pamela Winfield) Department of Religious Studies

Yoga and the mindfulness movement have swept the world as the latest and trendiest forms of self-help. Across America, yoga studios and retreat centers have cropped up offering these forms of ‘spirituality’ or ‘Eastern wisdom’ to Westerners. Therapists have followed suit, applying mindfulness practices like yoga and meditation to the treatment of diagnoses ranging from eating disorders to anger management issues. Although well intentioned and efficacious in many ways, the therapeutic use of yoga for eating disorder recovery programs poses several problems in particular:

1. the pervasive usage of the term “spirituality” in such applications is ambiguous and needs to be replaced with more precise terminology for the purpose of meaningful analysis and assessment;
2. the clinical adoption of yoga-based mindfulness practices often sanitizes and secularizes yoga in an attempt to quell the fear that an intervention which includes mindfulness may be an attempt to “sneak religion in the back door” (Farb, 2014).

This interdisciplinary study at the intersection of religious studies and clinical psychology proposes alternative language to the discourse of “spirituality,” and argues that the appropriation of religious traditions, such as yoga, to clinical settings, such as eating disorder treatment programs, needs to be evaluated for potential downfalls. Specifically, it offers a new distinction between purely physical “postural yoga” and the combined cultivation of the body-mind complex through “postural-soteriological yoga”(Jain, 2014). In addition, this study also critiques previous clinical trials conducted by Douglass (2009) and McIver (2009) that have stripped yoga away from its religious moorings and reduced its numerous forms and practices to a generic category of mindfulness practice.  In this way, this investigation speaks to larger issues of acculturation, and addresses the fine line between appreciation and appropriation of foreign traditions in America today.

**MIGRATION AND NEGOTIATION: RELIGIOUS IDENTITY IN A NORTH CAROLINA SIKH COMMUNITY**

**Melina T. Oliverio** (Dr. Amy L. Allocco) Department of Religious Studies

This project relies on extended ethnographic research at The Sikh Gurudwara of North Carolina in Durham, North Carolina, where I have been engaging in participant-observation and conducting semi-structured interviews for more than one year, from January 2015 to March 2016. Drawing on my observations as well as individual narratives and interview texts, my research offers insights into how Sikh Americans articulate and negotiate multiple identities in this transnational context. I foreground several themes that my participants identified as key to the construction and negotiation of their Sikh-American identities, including language, gender roles, and comparisons of religious freedom in the United States and India. In addition I also devote attention to conceptions of “home.” Many of my participants have active family connections in India and therefore conceive multiple “homes,” both within the United States and in India. This constant dialogue with their Punjabi homeland has led to the construction of hybrid identities among many Sikh Americans. The formation of such identities, in turn, suggests that community members are engaged in a dynamic process of negotiating multiple cultural contexts, allowing them to be what they regard as “better” Sikhs in the United States than they might have been had they remained in India.

***SPORT AND EVENT MANAGEMENT***

**PARENTS’ PERCEPTIONS OF CHILDREN’S SOCIALIZATION DURING A RECREATIONAL SPORTS SEASON**

**Nicole A. Miller** (Dr. Craig Schmitt) Department of Sport and Event Management

In the past decade, participation in traditional youth sports (i.e., soccer, baseball, and basketball) has decreased by over 20% (SBRnet, 2014). This is concerning because participation in youth sports can be developmentally beneficial (Blom, Bronk, Coakley, Lauer, & Sawyer, 2013). According to Lave and Wenger’s (1991) theory of situated learning, learning through participation includes more than knowledge of specific skills; it includes social and personal development that occur through participation in a specific environment (e.g., sports) with peers (e.g., teammates) that share the same goal. It is unknown whether parents, who control children’s participation in sports, perceive that their children acquire these benefits. Therefore, the purpose of this study was to determine whether parents perceived differences in social skills across gender and age prior to the start of the season, and whether growth was perceived as a result of participation in a recreational sports season. This study focused on three social benefits: communication skills, teamwork and cohesion, and personal social development. A survey that included five Likert-type items for each social benefit was developed using select items modified from existing instruments. The survey was distributed in-person to parents of children aged 3-10 enrolled in a recreational soccer program at the start of the season. A follow-up survey was e-mailed upon the conclusion of the season. Prior to analysis, reliability of all scales was tested using Cronbach’s alpha. The first part of the study employed a MANOVA to test for differences between genders and age groups on the three social skills categories from initial survey data. The second part of the study employed three paired sample *t*-tests to test for significant differences on the three social skills categories as a result of participation. A significant relationship between genders and perceived teamwork and cohesion was found with parents scoring boys higher than girls on teamwork and cohesion. Additionally, no significant changes occurred in how parents perceived their children’s social skills upon the completion of the soccer season. Recreation professionals can use the results to better market sports programs to parents.

**UNCOVERING THE RATIONALE: A DOCUMENT ANALYSIS OF RECLASSIFICATION TO DIVISION I**

**Kelly G. Siewers** (Dr. Weaver) Department of Sport and Event Management

The National Collegiate Athletic Association (NCAA) is recognized as a member-led organization responsible for overseeing college athletics at the Division I, II, III, and NAIA levels (NCAA, 2016). Programs within the Division I classification are competing at the highest level of college athletics As such, athletic departments are increasingly interested in reclassifying to Division I. In August 2011, the NCAA lifted a temporary moratorium on the ability of schools to reclassify to Division I. Reclassification has been defined as a “formal request to the National Collegiate Athletic Association (NCAA) for a change in division membership” (Schwarz, 1998, p. 3). There are currently 346 NCAA Division I teams and since 1987, 72 schools have reclassified their athletic department to Division I; of those schools, 33 are public. This research study focused on 18 public institutions of those 72 schools that have reclassified their athletic departments in the last 30 years. Only public schools have been chosen for this study because of the public access to university information. The main objective of this research study is to uncover the rationale behind why Division II/III schools reclassified their athletic departments to Division I. Qualitative data was collected from consultant reports, administrative documents, athletic department websites and newspaper articles that examine all public institutions that have moved to Division I since 1987 (n=18). Over 325 documents were examined totaling over 1,500 pages. Five questions specific to the benefits, challenges, resources, and communication involved in decisions to reclassify guided the analysis. Findings indicated that schools reclassified to Division I for various reasons, including increased visibility and recognition, financial benefits, and better alignment with the philosophy and mission of Division I. Finally, an additional theme identified the lack of acknowledgement of the importance of winning to become successful at the Division I level.

***SOCIOLOGY AND ANTHROPOLOGY***

**ANCIENT MAYA ECONOMY: EARLY CLASSIC OBSIDIAN SOURCING AT THE SITE OF DOS HOMBRES, BELIZE**

**Manda K.S. Adam** (Dr. Rissa Trachman) Department of Sociology and Anthropology

The use of obsidian prismatic blades by the ancient Maya was ubiquitous in domestic contexts, or households, throughout the Maya region regardless of the distance of the source of the raw material from which the blades were made. The natural volcanic sources of obsidian are found in southern Guatemala and central Mexico. By knowing the geologic source of the obsidian we gain insight into the economic relationships of the individuals who possessed obsidian and the economic role of the ancient city in which they lived. During the 1997 archaeological field season at ancient Maya site of Dos Hombres in northwestern Belize, a tomb was excavated at an Early Classic Period (AD 250-450) household near the ballcourt. Just above the tomb, in the subfloor stratigraphy, 23,074 obsidian artifacts were recovered. This research contributes data to a line of evidence regarding the economic relationships of the ancient Maya of Dos Hombres during the Early Classic, specifically to those individuals residing in this household as well as the individual interred in the Early Classic tomb. Fifty-two samples were selected from the tomb collection for X-Ray Fluorescence (XRF) analysis. Using XRF allows the obsidian artifacts to be sourced through the detection of trace elements that are unique to every geologic source of obsidian. The sample of 52 artifacts chosen was stratified by artifact categories as assessed by Trachman’s previous technological analysis of a 25% sample of the tomb collection (1998, 2002). The research proposed and samples selected were accepted for the NSF subsidy program through the Missouri University Archaeometry Lab at the Missouri University Research Reactor for non-destructive XRF analysis. The data resulting from XRF analysis of these 52 artifacts revealed that all samples originated from the El Chayal source, one of three sources in southern Guatemala and one which was controlled by the ancient Maya of the city of Kaminaljuyu during the Early Classic. The results help to elucidate the economic relations of the people of Dos Hombres, this particular household, and the individual in the tomb with the trade networks that extended from Kaminaljuyu to Dos Hombres during the Early Classic period.

**REFUGEE RESETTLEMENT EXPERIENCES FROM SUB-SAHARAN AFRICA AND ASIA IN GREENSBORO, NORTH CAROLINA: NEEDS AND SERVICES IMPACT ASSESSMENT**

**Leena Dahal & Osca Opoku** (Dr. Mussa Idris) Department of Anthropology

This undergraduate student and faculty collaborative research project uses ethnography to understand refugee resettlement in Greensboro, North Carolina, as a pathway to a community-based participatory impact assessment. Through semi-structured interviews and participant observation, emic and etic perspectives were collected to identify comparative needs, challenges and opportunities faced by refugee communities from Sub-Saharan Africa (the Democratic Republic of the Congo, Sudan and Eritrea) and Asia (Bhutan) resettled in Greensboro, N.C, through one non-governmental organization that provides services to newly arrived refugee communities during their first three months of arrival in the U.S. Findings of this research include both challenges and opportunities. Challenges faced by the refugee communities and the service providers include varying definitions of “self-sufficiency,” scarcity of resources, medical issues faced by communities suffering from pre-settlement hardships, communication challenges, and dissatisfaction after three months of post-resettlement experience due to the discontinuation of resettlement services provided to them by the refugee agency. From the perspectives of the refugee families themselves, having escaped several forms of hardship and persecution in their home and transitional countries, the overall “resettlement” narrative experience is socially disruptive but positive and hopeful, in terms of what they have faced after coming to the U.S. Opportunities of resettlement in Greensboro include obtaining safety, ability to establish a new life with better living conditions, job opportunities for adults, and better future for the children through education, positive impact of social, and a microenterprise initiative for refugees is starting to emerge in Greensboro, through the microloan support given by the resettlement agency and other public institutions. Thus, an applied anthropological perspective of a community-based impact assessment is used in this study to articulate challenges, opportunities, and lessons learned from the resettlement experiences and narratives of these communities coming from various cultures to the city.

**CREATING COMMUNITY: NAVIGATING THE COMPLEX RELATIONSHIP BETWEEN TOWN AND GOWN**

**Jennifer Osborne** (Dr. Tom Mould) Department of Sociology and Anthropology

Universities have historically functioned as isolated communities where students can study and live separated from the local community. However, the increasing numbers of students attending college have necessitated the expansion of student housing options into the surrounding community. This expansion creates a pressing need to understand the relationship between universities and campus-adjacent neighborhoods. Using traditional ethnographic methods, including participant observation and semi-structured interviews, this study focuses on the Morgan Place community in Elon, NC, in order to understand how community members conceptualize their identities, relationships, and boundaries within their community in relation to their neighbor, Elon University. Crucial dimensions of this research include community cohesion, processes of studentification, town and gown dynamics, and impacts of service-learning. The Morgan Place community has significantly changed in terms of how members form cohesion. The Morgan Place’s cohesion is also influenced by its relationship with Elon University, a relationship characterized primarily through community service. Both those affiliated with Elon University and Morgan Place residents define the relationship through economic and racial differences. As with much of the town and gown literature, these perceived differences function to keep the communities distinct and separate. However, the specific nature of the relationship between these two groups diverges dramatically from the literature in terms of the valence of impact.  This study challenges the uni-directional nature of previous studentification findings that focus on the negative psychological and economic impact on campus-adjacent neighborhoods, while ignoring the potential for positive impacts. This research not only provides a more comprehensive model for the variable processes of studentification, but also suggests strategies for avoiding possible pitfalls in developing mutually beneficial relationships between universities and the communities in which they are situated.

**RESOURCEFUL, ADAPTIVE, AND CONNECTED: FOSTERING RESILIENCE IN GIRLS THROUGH AN ONLINE WELL-BEING PROGRAM AND MENTORING RELATIONSHIP**

**Anna A. Patterson** (Dr. Alexis Franzese) Department of Sociology and Anthropology

Sociological factors demand attention when studying resilience. Historically, disciplinary perspectives on resiliency have differed in emphasis and scope. Within psychology, definitions emphasize concepts of adversity and positive adaptation (Fletcher & Sarkar, 2013) and resilience is considered an individual difference variable and is something that a person either possesses or lacks. Sociological approaches to resilience are often more expansive in scope, intersecting with the field of ecology to emphasize group processes and examine how communities navigate community-level traumas. The current study, which applies the sociological perspective, explores the potential of fostering resilience through an online well-being training program completed in the context of mentoring dyads alongside others in a mentoring program. Approximately 50 girls ages 9-12 participated in a multi-week emotional well-being program with modules on topics including emotional intelligence, resilience, optimistic thinking, and self-confidence. Three aspects of resiliency were measured using the Resilience Scales for Children and Adolescents: sense of relatedness, sense of mastery, and emotional reactivity. This work brings a sociological perspective, and in doing so, bridges the emphases and scope of psychological and sociological perspectives on resilience by employing a definition of resilience that incorporates adversity, adaptation, and social connection within group processes and by treating resiliency as an individual level variable and a characteristic of a collective body.  Preliminary findings suggest that participation is associated with an increase in overall resilience scores over time. Future research should employ an experimental design and assess differences between those who completed the online program independently and in mentoring dyads.

***WORLD LANGUAGES AND CULTURES***

**(PRE)-OCCUPATION: THE DIARY OF HÉLÈNE BERR IN NAZI-OCCUPIED FRANCE**

**D. Jackson Edwards** (Dr. Olivia Choplin) Department of World Languages and Cultures

In 2008, French publisher Tallandier released *Le Journal d’Hélène Berr*, the diary of a young Jewish woman living in Paris during the German Occupation. Through a close reading of the text, this research focuses on what Berr’s writing reveals about her comprehension of humanity, despite and as a result of her experiences in Nazi-Occupied France. Her diary recounts the ways in which the invasion and prejudices against French Jews impacted the life she led.  It details her frustration with the world’s lack of understanding, even while it often explains her own desire to want to understand the world. Textual analysis exposes how her descriptions of the beauty of nature and her surroundings go against her own feelings and thoughts, and how the world itself does not correspond to her mental state. In analyzing the text, I show how her comprehension of humanity does not match with those of society, and how the meaning of justice counters that of her own experiences.  I also argue how her emotions, from suffering, depression, curiosity, and the fear of the future contribute to Hélène Berr’s questioning of humanity, and ultimately her self-deterioration.  This is unique among the numerous depictions and accounts from victims and survivors of the Holocaust and worthy of consideration.  In my research, I examine the poignant and eloquent journal of Hélène Berr as an important text demonstrating history’s impact on individual experience: it is in her journal that she expresses her true emotions and how the downfall and destruction of society shape her before her arrest.  This presentation will be given in French.

**WAR BY PROXY: AN ANALYSIS OF RHETORIC IN FRENCH NEWSPAPERS DURING THE IRAQ WAR IN 2003**

**Allison M. Gloninger** (Dr. Olivia Choplin) Department of World Languages and Cultures

Before Charles de Gaulle began espousing French resistance to the United States’ overwhelming international power, France and the United States maintained a genial and supportive relationship. This was based on French support during the Revolutionary War and continued with French-American alliances during both World Wars. De Gaulle’s sentiments, however, touched on an underlying tension that existed between the two countries alongside this cordial relationship. An examination of French rhetoric indicates that this tension, which began before de Gaulle and continues to exist today, is a consequence of the French sentiment that their relationship with the United States is not an equal one. In this research, I begin by examining French-American relations and their cultural context, and I then analyze the coverage of the 2003 Iraq war as a prime example of French resistance to America’s global hegemony. Through a close reading of French rhetoric about the war in Iraq in three prominent newspapers (*Le Monde, Le Figaro* and *Libération)* from January to May of 2003, I argue that these articles insist upon the importance of a balance of international powers. I demonstrate how this insistence is achieved rhetorically in several key ways: through an emphasis on the role of the United Nations, through the deliberate coverage of opposition to the war by other countries, through a consistent questioning of the justifiability of the war, and through the highlighting of the lack of international approval for a U.S. invasion of Iraq. This presentation will be given in French.

**EL SESGO EN EL PERIODISMO SOBRE EL CONFLICTO DOMINICIO-HAITIANO (BIAS IN JOURNALISM ABOUT THE DOMINICAN-HAITIAN CONFLICT)**

**Simone J. Jasper** (Dr. Elena Schoonmaker-Gates) Department of World Languages and Cultures

In the journalism field, there is a debate about objectivity in the press during conflicts. One present-day conflict is the negative treatment of Haitian immigrants in the Dominican Republic. But academics have not studied if perceptions that Dominicans have toward Haitians have influenced journalists’ treatment of the Dominican-Haitian situation. The present study investigated objectivity in Dominican and international journalism. Four Dominican newspaper articles about the Dominican-Haitian conflict were compared with four from other countries. In order to determine if Dominican journalists follow the ethical responsibilities to be impartial, the articles were analyzed according to three indicators, including the presence of multiple points of view, evidence to support facts and the inclusion of quotations. It was predicted that Dominican journalists would use the objective structures with less frequency than those from other countries when describing the Dominican-Haitian situation due to preexistent prejudices toward Haitians. The data indicated Dominican journalists used fewer objective techniques in their articles. These results have implications for people who pay attention to the news during times of national conflict. They also signal a lack of following ethical guidelines within the journalism profession. This presentation will be given in Spanish.

**MARGINALIZATION AND RACIAL TENSION IN MATHIEU KASSOVITZ’S *LA HAINE* AND *MÉTISSE***

**Taylor M. Kelly** (Dr. Olivia Choplin) Department of World Languages and Cultures

French director, Mathieu Kassovitz, portrays the complex levels of marginalization as well as racial struggles in France in his two films, *Métisse (1993) and La Haine (1995).* Although these films have the same director and were released within two years of each other, they have very different structures and tone: one is a drama and the other a romantic comedy. In *La Haine,* the audience experiences a day in the life of three young men from the banlieues who encounter police brutality and marginalization issues on a daily basis due to their race. The viewer develops an understanding of their perspective in society and the consequences of these issues, especially when the film comes to a violent end. On the other hand, *Métisse* tells the story of interracial harmony through the story of two men with reversed stereotypes. *Métisse* is a fairytale story but reveals underlying conflicts and problems through a comedic form. These films were released during a time when France experienced riots as the result of a divided and unequal society. The 1995 riots commenced after the death of a youth due to police brutality, which infuriated young French citizens from the banlieues. This research examines what the two films reveal to the viewer about this time period and the underlying problems that were prevalent then and remain today. Through careful analyses of cinematography, dialogues and character development, I argue that while these films are very different in tone, they deliver a similar message about the existence of racial and class conflict in France. Furthermore, there is a clear connection between the two films through the insertion of an image of a globe at the beginning and ending of each film. This connection shows how Kassovitz reiterates the idea that these issues seen in the films are not only for French society but for global society as well. Through the films *La Haine and Métisse,* Kassovitz illustrates that there are underlying racial and marginalization issues that are prevalent in ~~s~~ociety and points to the consequences that come with them, whether told through a fairytale or a tragic story. This presentation will be in French.

**DOUBLY ORPHANED: IDENTITY CONSTRUCTION IN THE AFTERMATH OF THE ALGERIAN WAR OF INDEPENDENCE**

**Margaret Liston** (Dr. Olivia Choplin) Department of World Languages and Cultures

To be orphaned is, by definition, to be without parents. But what happens when a child has neither a parent nor a place, or more specifically a country, to call their home? The answer lies at the heart of this analysis, which seeks to situate the autobiographical works of orphans born in Algeria during the war of independence in the broader Franco-Algerian context. In doing so, we seek to identify common themes that emerge in each author’s respective attempts to define their own personal identities, as imposed by the state or created on their own accord. This research will focus on three autobiographies of orphans born in Algeria: *1962, La France m’a oublié* by Robert Palmade, *Fille de personne* by Louisa Maurin, and *Lettre à ce père qui pourrait être vous* by Mohamed Garne. Each narrator tells a story of battered inter-country relations: an Algerian child discovered in the rubble of war taken in by Catholic nuns to live a life in France, a child the product of a violent rape perpetrated by a French soldier during the war, and an abandoned French child left to grow up in the Algerian foster care system. Each narrator, forced to confront lingering questions of nationality, belonging, and their place in the midst the complex and strained Franco-Algerian relations, faces immense decisions with extremely high stakes. The authors of these works are not only orphans by absence of parents but also, and perhaps more importantly, by their sense of being alienated from a culture or true “home.” Algeria also, at this point in time, resembles an "orphan,” having severed ties with her "mother country" of France. In this sense, these individuals are victims of a double orphanage. Through the textual analysis of these autobiographical works, we will demonstrate how this double orphanage manifests itself in three themes: name, nationality and Franco-Algerian relations. This presentation will be in French.

**DIALECTAL ACCOMMODATION BETWEEN SPANISH SPEAKERS FROM PANAMA AND PUERTO RICO**

**Erin E. Luther** (Dr. Elena Schoonmaker-Gates) Department of World Languages and Cultures

Numerous studies have proven that people have a tendency to change their speech patterns when speaking to a person from a different dialectal region, a phenomenon called dialectal accommodation (Chinellato, 2011; Hernández, 2002; Martos, 2010; Wilson, 2011). Although there is a substantial amount of theory that supports the analysis of this phenomenon, and there are studies that prove this accommodation occurs in varying situations, no one has researched this trend in an informal setting between people who already know each other, without the researcher listening in the room, and analyzing more than one variable. For that reason, this study examines the tendency of dialectal accommodation and how it affects the speech patterns of two Spanish-speaking women from Panama and two from Puerto Rico that had all previously met each other, in face-to-face informal conversations. Each woman participated in two conversations, both without the investigator being present. There was a conversation between the two participants from Panama, another between the two from Puerto Rico, and two conversations between one Panamanian and one Puerto Rican. Looking at the speech of the participants, the investigator studied the accommodation in the use of one syntactic variable (the maintenance of subject pronouns) and the use of English. By comparing the participants’ use of these two variables in each conversation, we could see if the participants used less aspects of their native dialect in order to sound more like the other person in the conversation. The results demonstrated that the Panamanians converged with the Puerto Ricans using both variables, the number of times they used subject pronouns and English words, and each Puerto Rican participant only converged using one of the two variables. We conclude that there was partial accommodation, and that the themes of the conversation, and the amount of the participants’ previous contact with the other dialect could have influenced the results. Although this analysis did not discover a global trend of dialectal convergence in informal conversations between people who already know each other, it opens up the possibility of studying this type of dialectal accommodation in the field of sociolinguistics.

**EXISTENTIALIST THEORIES OF JEAN-PAUL SARTRE AND SIMONE DE BEAUVOIR / L’EXISTENTIALISME CHEZ JEAN-PAUL SARTRE ET SIMONE DE BEAUVOIR**

**Laura K. Poe** (Dr. Olivia Choplin) Department of World Languages and Cultures

Despite a vast array of research related to existentialism, there has been less work analyzing the role existentialism plays in the literary works of philosophers Jean-Paul Sartre and Simone de Beauvoir. This research examines the novels *L’Age de Raison* by Sartre and *Le Sang des Autres* by Beauvoir, for the similarities and differences within the existentialist theories described. These two novels are similar in theme in that they focus on couples who live in Paris in the 1930s-1940s. Moral crises and their solutions (or lack thereof) play large roles in both novels. Furthermore, both are centralized on the choices that the characters make given their time period, resources, and morality. This research compares the two novels in order to examine how Sartre and Beauvoir treat the fictional situations of the novels through the lenses of existentialism. Through a close reading of the texts, I argue that *L’Age de Raison* and *Le Sang des Autres* demonstrate a difference in how the two writers view existentialism: characters in *L’Age de Raison* tend to be immobilized by their moral crises, while characters in *Le Sang des Autres* tend to be more action-focused. This difference in approaches to existentialism is important because it highlights that there are multiple interpretations of how existentialism is represented in fictional situations. This presentation will be in French.

**L’EXIL À TRAVERS LES SENS**

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The five senses are a key part of human experience.  Connecting smell, sound, or taste to a given situation from our past helps us to create a more detailed memory.  This research project explores how two literary works use these senses to communicate how their characters experience exile in francophone countries.  *La petite fille de Monsieur Linh* by Philippe Claudel tells the story of an elderly man, Monsieur Linh, who comes to France with his granddaughter after having his home destroyed by a war. The book tells of Monsieur Linh’s adjustment to this new country including adventures, a friendship, and hardships.  *Ru* by Kim Thuy is an auto-fictive memoire about a young woman, An Tinh, who immigrates to Canada as a child with her family during the Tet Offensive of the Vietnam War. In *Ru*, Thuy tells the story of An Tinh by jumping between her life as a little girl in Canada and her life as an adult.  These two stories share the common ground of exile and difficult experiences. Through a close reading of the two novels, I argue that both Claudel and Thuy’s use of sensory descriptions allow us to understand the different ways that their characters experience exile.  I demonstrate that Monsieur Linh enters his state of exile with what I have termed “sensory baggage” from the life he loved in his home country. Monsieur Linh experiences a lack of familiar senses in his new surroundings, such as the smell of the sea and the taste of his soup, giving him an overall bad impression of the country. This positive sensory baggage combined with the lack of senses in France makes him long for his home country and inhibits his initial efforts at integrating and accepting his new country, France. It is not until a new friend welcomes Monsieur Linh that he is able to start defining France according to what he hears, sees, and smells. An Tinh’s sensory descriptions of her negative past related to the war and destruction in her home country makes her hopeful that her exile will bring opportunity, allowing her to integrate naturally. Her comments on her first sensory impressions such as the comforting smell of her teacher and the welcoming sounds of the city demonstrate how quickly she is able to connect with Canada via her senses. My analyses show how these works link sensory experience to specific emotions and feelings in ways that help readers understand what factors contribute to the experience of exile. It concludes that these two works show the evolution of the characters’ confrontation with their new countries is lived in large part through the senses.  This research project will be presented in French.

**HEARING HELEN: AN ANALYSIS OF VOICE, CHOICE, AND AUDIENCE IN REPRESENTATIONS OF HELEN OF TROY**

**Megan M. Sweeney** (Dr. Kristina A. Meinking) Department of World Languages and Cultures

In any study of Greco-Roman antiquity, one is likely to read about the Trojan War and thus about the infamous Helen of Troy. In this project, I reassess the representation of Helen across a variety of ancient Greek and Roman texts spanning the genres of poetry, history, and drama; while her presence in these texts is essential, close reading suggests it does not always support canonical or familiar views of her role. I analyze the perspectives from which Helen’s voice and action are written, whether from her own viewpoint or from an outside source, as well as her level of agency and authority. A distinguishing feature of this research is that I consider both the world of the text itself (that is, understanding Helen as she exists solely within the world of the text) and the way in which literature is received by an implied audience. As Doherty (1995) defines it, the internal audience is the present receiver of any character’s speech within the story; the implied audience is a “fictional persona, characterized indirectly by the ways the narrative is framed for it” (19). It is in reference to this latter audience that I suggest we find Helen’s speech being crafted in ways that breach the traditional roles and expectations for women within the text. While working within traditional roles (e.g. weaving, mourning) Helen is seen establishing her own story, taking on the role of poet herself. The implied audience can assess the author’s choices and identify the multiplicity of identities and interpretations of Helen and her role in antiquity. While Homer’s Iliad contains the “Helen” that is most commonly remembered, even here the nuances of her speech and choices can go overlooked. When we assess Homer’s text against the works of those such as Herodotus or Ovid, Helen’s value in the story of antiquity takes on new shape as the events surrounding Helen are changed or her choices are valued differently. This research will illustrate the significance of her role in ancient storytelling by complicating the Homer-centricity of her legacy and insisting upon a more nuanced reading of her character.