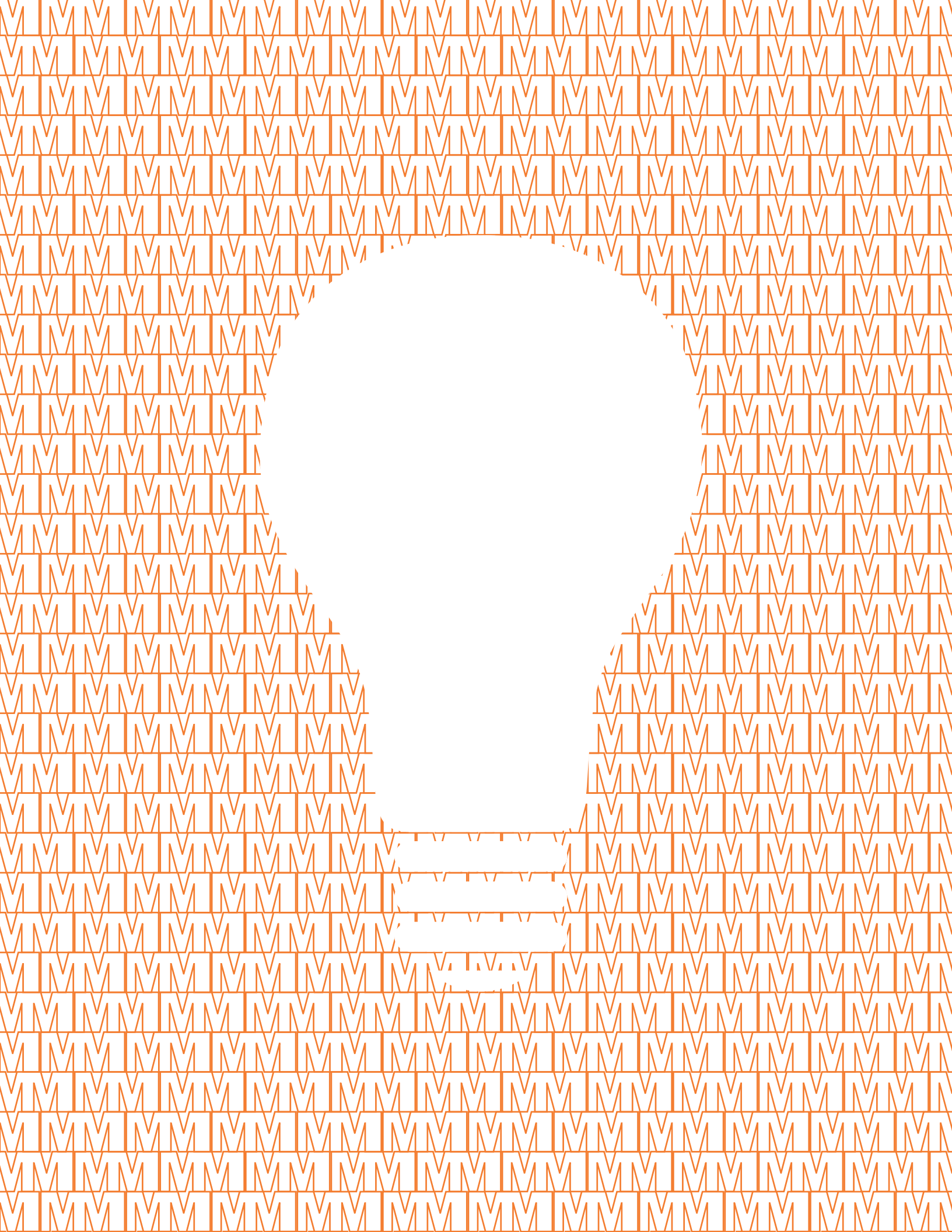
11th ANNUAL

ACC

MEETING OF THE MINDS

APRIL 8-10, 2016

SYRACUSE UNIVERSITY



ELEVENTH ANNUAL

ACC MEETING OF THE MINDS UNDERGRADUATE RESEARCH CONFERENCE

APRIL 8-10, 2016

SYRACUSE UNIVERSITY

Welcome to the 11th Annual Atlantic Coast Conference Academic Consortium (ACCAC) Meeting of the Minds. Syracuse University is proud to host this gathering of nearly 100 outstanding undergraduate student researchers and faculty advisors from the 15 member institutions in the ACC.

The ACC is well known for its strength as an athletic association, but it also strongly supports the educational missions of its member universities. This conference highlights the incredible academic strengths across the breadth of the conference and shows the powerful synergy that exists between academics and athletics.

Amazing things are happening at our universities today—cutting-edge research and scholarship and creative initiatives that are poised to have global impacts. You will get to see some of that this weekend. You will also have opportunities to make connections—some of the best activities and programs come to fruition through universities working together.

I hope that this weekend inspires you in your own work and in seeking out possible collaborations with other ACC institutions. We are so glad you are here to participate in this amazing experience.

Sincerely,

Elizabeth D. Liddy

Elizabeth D. Liddy
Interim Vice Chancellor and Provost
Division of Academic Affairs

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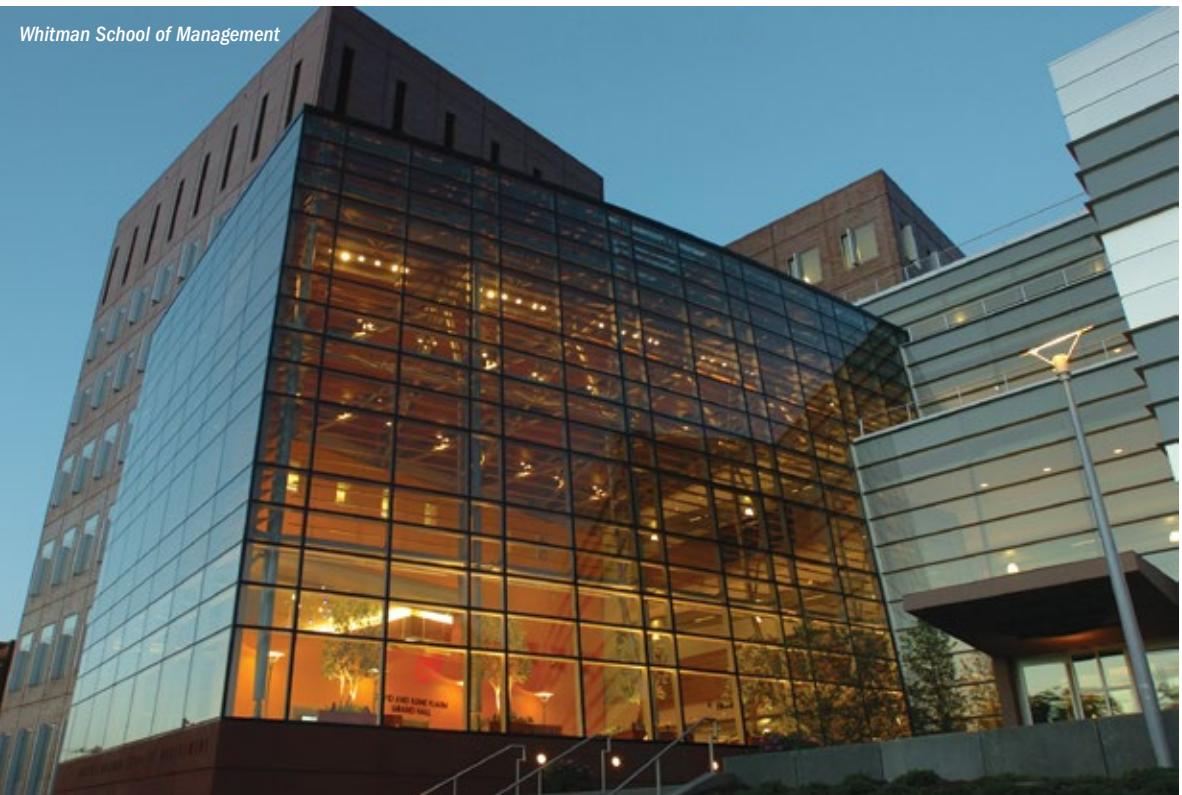
Tennity Ice Pavilion



Whitman School of Management

Life Sciences complex

SCHEDULE OF ACTIVITIES

FRIDAY, APRIL 8

1-5 p.m.	**Conference Registration Sheraton University Hotel Lobby** 801 University Avenue
3:30-5 p.m.	**Optional Campus Tours: *Syracuse Biomaterials Institute, Crouse College Bell Tower, Dick Clark Studios, Geographic Information and Analysis Laboratory*** Pre-registration required. We will meet in the hotel lobby and escort you to each tour location.
5:30-6:30 p.m.	**Welcome Reception** Whitman School of Management Atrium, 721 University Avenue
6:45-8 p.m.	**ACC University Representatives Dinner** Whitman School of Management, Milton Room, Room 411, 721 University Avenue
7 p.m.	**Student Dinner and Ice Skating** Tennity Ice Rink, 511 Skytop Road Transportation provided from the hotel lobby. Skates will be provided but wear warm clothes.

SATURDAY, APRIL 9

7:30-8:45 a.m.	**Breakfast** Rachel's Restaurant, Sheraton University Hotel
9-9:20 a.m.	**Welcome and Announcements** Life Sciences Complex Auditorium, Room 001
9:30-10:40 a.m.	**Oral Presentation Session 1** Life Sciences Complex
10:40-11 a.m.	**Break**
11-a.m.-noon	**Poster Session 1** Life Sciences Complex Atrium
12:10-1:10 p.m.	**Lunch** Shaw Dining Hall, Euclid Avenue at the corner of Comstock Avenue
1:15-2:25 p.m.	**Oral Presentation Session 2** Life Sciences Complex
2:25-2:45 p.m.	**Break**
2:45-3:15 p.m.	**Faculty Presentation** Life Sciences Complex Auditorium, Room 001
3:20-4:20 p.m.	**Poster Session 2** Life Sciences Complex Atrium
5:30-7 p.m.	**Dinner and Speaker** Goldstein Alumni and Faculty Center, 2nd floor, 401 University Place
7:30 p.m.	**Luke Bryan Concert**, Carrier Dome

SUNDAY, APRIL 10

7:30-8:45 a.m.	**Breakfast** Rachel's Restaurant, Sheraton University Hotel
9-10:10 a.m.	**Oral Presentation Session 3** Life Sciences Complex
10:10-10:25 a.m.	**Break**
10:30-11:40 a.m.	**Oral Presentation Session 4** Life Sciences Complex
12-1 p.m.	**Lunch and Speaker** Sheraton University Hotel Ballroom, 2nd floor
12:45 p.m.	**Closing Remarks** Sheraton Hotel Ballroom

PLENARY SPEAKERS

FRIDAY, APRIL 8, 5:30 P.M.

SHIU-KAI CHIN, Ph.D., Professor
College of Engineering and Computer Science
Cybersecurity and Formal Methods

Shiu-Kai Chin's research uses mathematical logic for the design and verification of trustworthy computer systems. Examples of computer systems that must be trustworthy are command and control systems, financial services, and distributed control of the power grid. His focus is on policy-based design and verification with an emphasis on using computer-assisted reasoning using higher-order logic theorem provers. Dr. Chin supports the Air Force's research in trustworthy systems and hardware-based security. His work with JPMorgan Chase was used to reason about the security and integrity of credentials and entitlements in large-value commercial transactions.

Dr. Chin is active in the community, where his leadership roles include finance officer and member of the Syracuse Regional Airport Authority Board, the governing body of Syracuse Hancock International Airport; treasurer of the board of trustees of WCNY Public Radio and Television, public broadcasting in Central New York; and vice chair of the board of directors of InterFaith Works of Central New York, an organization dedicated to building common ground through dialog, understanding, and collaboration among faith communities, and resettling and integrating refugee families into Central New York. Dr. Chin was also a commissioner on the Onondaga County/City of Syracuse Human Rights Commission. For a decade, he was a trainer in the Alternatives to Violence Project (AVP) at Auburn Correctional Facility, a maximum security prison. AVP, which was founded after the Attica, New York, prison riot in 1971, is an international, nondenominational program that teaches conflict resolution and communications skills. Dr. Chin was introduced to AVP by his undergraduate mentor and Ph.D. advisor, Professor Emeritus Edward Stabler of the Department of Electrical Engineering and Computer Science at Syracuse University. Stabler was a founding member of AVP.

SATURDAY, APRIL 9, 2:45 P.M.

M. LISA MANNING, Ph.D., Associate Professor
College of Arts and Sciences
Physics

Lisa Manning's research interests include defects and deformation in granular materials and glasses and emergent mechanical properties and pattern formation in embryonic, cancer, and asthma tissues. A Sloan Research Fellow, Dr. Manning earned her Ph.D. and M.A. in physics from the University of California, Santa Barbara, and B.S. degrees in physics and mathematics from the University of Virginia.

The Manning group uses theoretical and computational tools to understand collective motion in disordered, non-equilibrium "materials," and takes a broad view of the word "materials." The Manning group collaborates closely with experimental groups at Syracuse University and around the world to study how individual cells interact with each other to generate emergent macroscopic properties in developmental biology systems and in cell cultures on interesting substrates. The Manning group is also studying flow and plastic deformation in jammed and glassy non-biological solids, by identifying and analyzing the dynamics of "soft spots" or flow defects in these materials. Examples of glassy non-biological solids include bulk metallic glasses, emulsions, foams, granular materials, and many other materials that are important for industry and geology. By developing macroscopic equations to describe these materials, the group can better predict friction and failure in these solids.

SATURDAY, APRIL 9, 5:30 P.M.

JEFFERY A. MANGRAM, Ph.D., Associate Professor
School of Education
Social Studies Education

Jeffery Mangram received his B.A., M.A., and Ph.D. from Syracuse University. His research revolves around the question of how social studies teachers think about, negotiate, and use popular culture and media in their personal lives and in their pedagogical practices. He has published a number of articles concerning this area of research. He has published in the journal *Theory & Research in Social Education, the Journal of Instructional Research,* and *The Journal of Social Studies Research.*

Having taught at public and private schools for more than 25 years, Dr. Mangram has been publicly recognized for his teaching prowess. In 2003, he was a semifinalist for the New York State Teacher of The Year Award. He was named outstanding faculty in 2011 by the International Society for the Social Studies. As a master teacher and scholar, Dr. Mangram presents at conferences and workshops across the United States, focusing on media education, high leverage pedagogical strategies, and issues related to urban education.

Additionally, Dr. Mangram is known for being a member of the 1987 Syracuse football team that went undefeated and played in the 1988 Sugar Bowl in New Orleans.

SUNDAY, APRIL 10, 12 P.M.

BREAGIN K. RILEY, Ph.D., Assistant Professor and Co-Director, Whitman Behavioral Research Lab
Martin J. Whitman School of Management
Marketing, Affiliated Faculty of Psychology

Conducting and communicating research makes Breagin K. Riley very happy. Her interest in research started at the age of 4, and throughout her elementary school years Breagin was asking who, why, and how do you know? Never satisfied with the easy explanations, she conducted her own research to get proof and logical answers.

Breagin was raised in Atlanta, a city that conducted many education policy experiments, many of which she experienced firsthand. It bothered her that the people who thoughtfully designed and carefully implemented these policies were often (rarely pleasantly) surprised they had not worked as intended. After all, policy is intended to change, maintain, or create systems that promote human welfare. It is problematic when policies make more problems than they solve.

Because she was unsure of why so many policies did not function as intended, Breagin studied the creation of national policy as an undergraduate at the Massachusetts Institute of Technology. Perhaps policy makers had bad intentions? But that was not the case. So, in graduate school at the Kellogg School of Management at Northwestern University, she focused on learning all she could about human behavior as well as various research philosophies and methods used to study it. These years of research exposure led Breagin to conclude that designing effective policies requires incorporating science from disparate fields to more holistically understand individual behavior. In her interdisciplinary research, she builds and tests conceptual models. These models illuminate and explain the unknown and unintended consequences of fiscal, social, and managerial policy. Her recent papers examine how perceptions of fiscal policy impact consumption of status goods and the counterintuitive impact of social policy recommendations on extended warranty purchases. Additionally, Breagin teaches Consumer Behavior and Introduction to Marketing, mentors undergraduates who have research interests, and freely interjects research findings into the conversation.

ORAL PRESENTATION SCHEDULE

Saturday, April 9, 2016

ORAL SESSION 1 (9:30-10:40 a.m.)

Life Sciences Center, Room 001

9:30 a.m.	Merkl, Jackson	Georgia Tech	Extracting Pressure and Velocimetry in Vortical Flows
9:55 a.m.	Vuong, Hung	Louisville	Development of a Next-Generation Topical Pre-Exposure Prophylactic (PrEP) Technology Using siRNA-Encapsulated, Surface-Modified Nanoparticles
10:20 a.m.	Rao, Vishwas	NC State	Engineering the substrate specificity of enzymes involved in secondary metabolite biosynthesis: a route to new small molecule therapeutics

Life Sciences Center, Room 011

9:30 a.m.	George, Alex	Georgia Tech	Using Cardiac Progenitor Cell Derived Exosomes to Improve Cardiac Function Post-Myocardial Infarction
9:55 a.m.	Lane, Sidney	Miami	Flow Cytometric Evaluation of T cell Exhaustion in Aging HIV+ Patients and the Effect on Influenza Vaccine Response
10:20 a.m.	Jordhal, Alexa	Pittsburgh	The Role of the Lhs1 Molecular Chaperone in the Degradation of the Epithelial Sodium Channel

Life Sciences Center, Room 105

9:30 a.m.	Nwankwo, Nneoma	Virginia Tech	I Miss School Because There Are No Latrines: Exploring the Real Cost of Poor Sanitation Facilities on Schoolgirls in Underserved parts of sub-Saharan Africa
9:55 a.m.	Beck, Jacob	Miami	An investigation into colony losses in Florida's non-commercial honey bee populations

Life Sciences Center, Room 106

9:30 a.m.	Moseley, Maddie	Wake Forest	Personalization and Generalization in First-Year Academic Writing
9:55 a.m.	Hobson, Kaitlyn	Syracuse	"Blowing bodies to smithereens": Interpreting Hiram Sturdy's resistance to the war myth through trauma and corporeality in memoir
10:20 a.m.	Lee, Demetria	Virginia Tech	"The Same Neutral Hue": Phoebe Marks's Inconspicuous Success

ORAL SESSION 2 (1:15-2:25 p.m.)

Life Sciences Center, Room 001

1:15 p.m.	Larson, Lee	Wake Forest	The Shadow of the Nixon Pardon: The Impact of Gerald Ford's Decision on Politics and Economic Policy in the United States
1:40 p.m.	Niiro, Leslie	Duke	Pedagogy of remembrance: The Argentine quest to reclaim traumatic memory
2:05 p.m.	Cox, Phillip	North Carolina	Hercules and Antaeus: Copying the Antique in the Renaissance Print

Life Sciences Center, Room 011

1:15 p.m.	Zaki, Mark	Pittsburgh	Alterations in Cortical Neuronal Pentraxins and GAD67 in Schizophrenia
1:40 p.m.	Nassar, Layla	Miami	Understanding how sex modulates the female nervous system to drive distinct reproductive behavior states
2:05 p.m.	Inglis, Andrews	Virginia	Induction of freezing and anxiety-like behavior with C1 neuron stimulation in mice.

Life Sciences Center, Room 105

1:15 p.m.	McFrazier, Maya	Louisville	Nucleoside diphosphate Kinase-Dependent Suppression of Apoptosis in Esophageal Cancer Cells by the Oral Pathogen Porphyromonas Gingivalis
1:40 p.m.	Gambill, Lauren	Clemson	Identification of a xylose transport and interconversion pathway in the oleaginous yeast Yarrowia lipolytica
2:05 p.m.	Accardo, Joseph	Florida State	A Kinetic Investigations on Proton Triggered Ring-Opening in Rhodamine-Deoxylactam Derivatives

Life Sciences Center, Room 106

1:15 p.m.	Sisman, Lara	Virginia	The Sustainability of Algae-Derived Biofuels: Assessing Potentially Overlooked Climate Change Impacts of Algae-to-Energy Systems
1:40 p.m.	Herde, Zachary	Louisville	Towards Integrated Bio-refinery: Production of Activated Carbons from Sustainable Agricultural Biomass
2:05 p.m.	DiNapoli, Benjamin	Virginia	Re-Centering Delhi: The Daryaganj Park Community

Sunday, April 10, 2016

ORAL SESSION 3 (9-10:10 a.m.)

Life Sciences Center, Room 001

9:00 a.m.	Dolezal, Stephanie	Virginia Tech	Uncovering Antiquity: Hubert Robert's The Finding of the Laocoon
9:25 a.m.	Taylor, Stephanie	Pittsburgh	Researching as a Studio Artist: Perception and Printmaking
9:50 a.m.	Spahn, Madison	Duke	The Evolution and Future of Frauenliebe und -leben (A Woman's Life and Love)

Life Sciences Center, Room 011

9:00 a.m.	Patel, Terral	Clemson	The search for new drug targets in the battle against African sleeping sickness: Identification of signaling molecules involved in organelle regulation in Trypanosoma brucei.
9:25 a.m.	Sashidar, Diya	NC State	The role of healthcare workers in Clostridium difficile transmission in hospitals.
9:50 a.m.	Doerstling, Steven	North Carolina	Effects of Surgical vs. Non-Surgical Weight Loss on Mammary Tumor Burden

Life Sciences Center, Room 105

9:00 a.m.	Chandak, Resha	North Carolina	Women Entrepreneurs in the Triangle
9:25 a.m.	Brenner, Farrell	Syracuse	The Aryan-Passing Women and Girl Couriers of the Jewish Resistance Movement in Nazi-Occupied Poland
9:50 a.m.	Alms, Hannah	Wake Forest	Strange and Subtle Ways': Eleanor Roosevelt, Gender, and Political Persona

Life Sciences Center, Room 106

9:00 a.m.	Parks, Danielle	Florida State	The Effect of Economic Globalization on Transnational Terrorism
9:25 a.m.	Elsayed, Nourhan	Duke	The Ecology of Resilience: Predictors of Psychological Health in Disadvantaged Lebanese Youth
9:50 a.m.	Freeman, Pete	Notre Dame	Training Technopreneurs: Potential Solutions for Improving Female Technopreneurs' Self-Efficacy in Switzerland

ORAL SESSION 4 (10:30-11:40 a.m.)

Life Sciences Center, Room 001

10:30 a.m.	Gordon, Molly	Florida State	The Role of DNA Sequence in Replication Timing Control
10:55 a.m.	Gadsby, April	Georgia Tech	An Innovative and Sustainable Micro-milling and Thin Overlay Preservation Technology with High Impact Using 3D Technology
11:20 a.m.	Helstern, Rebecca	Clemson	Does who you grow up with matter?: The role of social environment in shaping female mating preferences in sailfin mollies (Poecilia latipinna)

Life Sciences Center, Room 105

10:30 a.m.	Fritz, Kaitlin	NC State	Olga Rozanova: Evolution of Individuality during the Russian Avant-Garde
10:55 a.m.	Latif, Abdul	Duke	On the Asl of Specious Arguments: Muslim Perspectives of Evolution
11:20 a.m.	Schramm, Anthony (AJ)	Syracuse	Investigation of substrate length dependency and inhibition of ghrelin acylation

POSTER PRESENTATION SCHEDULE

Saturday, April 9, 2016

POSTER SESSION 1 (11 a.m.-NOON)

Life Science Complex, Atrium

1	Barrett, Emily	Syracuse	Syracuse's Historic Water System 1892-1896: A lesson on the relevancy of archival research
3	Biscocho, Rachel Ann	Notre Dame	Food Deserts in NYC: Using Geographic Information Systems to Study Food Security in an Urban Environment
5	Currie, Miles	Florida State	Analyses in Support of the WFIRST Supernova Survey
7	Debra, Alyssa	Virginia Tech	Isolation of New Antimicrobials From Growth Inducing Soils
9	Fox, Ryan John	NC State	Novel Deactivation Strategies for Norovirus Using Copper-Infused Lignin Nanoparticles
11	Kaelin, Brenna	Louisville	Mechanistic Insight Into Vinyl Chloride-Induced Liver Injury: Role of Dietary Fatty Acids
13	Krumdick, Melissa	Notre Dame	Analysis of Volatility-based Option Trading Strategies
15	Kyle, Mari	Florida State	Building Worlds: An Analysis of the Market for Mass-Produced Virtual Reality Technology
17	Lim, Hui Yi Grace	Duke	How Do Cells Invade? Identifying Novel Regulators of Invasion
19	Liu, Yi-Ting	Virginia	A New Protocol to Visualize Dopamine in Whole Mount Drosophila Preparation
21	Lukasak, Bradley	Pittsburgh	Aryl Azides as Phosphine-Activated Triggers for Small Molecules
23	Lukianov, Cyril	Georgia Tech	Peptide-based nanoparticle as a vehicle for intracellular delivery of functional antibodies
25	Marrero-Rosado, José	Syracuse	Determining the Toxicity of PTE and PXE, two Chemicals Isolated from Onondaga Lake
27	Ou, Bai	Miami	Volatility of Volatility and its predictive capacity on S&P 500 returns
29	Pogson, Kaylyn	North Carolina	Fabrication and Characterization of Drug Delivery Systems for Resiquimod
31	Protti, Milena	North Carolina	The Celts: Brains and Stones
33	Robertson, Nicole	Louisville	Selective Ring Opening Reactions Using HF-DMPU
35	Sandoval, Sofia	Pittsburgh	The Material of Place and its Effects on a Process-Based Art Practice
37	Spencer, Matheu	Clemson	Using FRET to Determine Structural Dynamics and Inter-domain Interactions of Tandem PDZ1-2 Domains in PSD-95
39	Tavakol, Daniel	Virginia	Pericyte Recruitment in a Diabetic Mouse Model of Corneal Neovascularization
41	Voisin, Darby	Clemson	The Pricing of Study Drugs on a College Campus

POSTER SESSION 2 (3:20-4:20 p.m.)

Life Science Complex, Atrium

2	Acri, Dominic	Notre Dame	Diel flight activity behavior of wild caught Anopheles farauti s.s. An. hinesorum malaria mosquitoes from northern Queensland, Australia
4	Albanese, Katherine	Wake Forest	Cross-talk between metal and thiol redox homeostasis in *Bacillus subtilis*
6	Bahamonde, Amelia	Miami	Withaferin A: A Promising Novel Agent for Neuroblastoma Differentiation Therapy
8	Boone, Hailey	Virginia Tech	The Occupancy Dynamics of Ground-Dwelling Forest Birds in Ranomafana National Park, SE Madagascar
10	Bowman, Marissa	Notre Dame	Sex Moderates the Effect of REM Sleep on Emotional Memory Consolidation
12	Burris, Elizabeth	NC State	Changes in Risk and Protective Factors Associated with Recidivism among Adults with Mental Illnesses
14	Cashman, Lauren	Virginia Tech	Distributed Thermistor for Temperature Monitoring of Malnourished Infants
16	Crosby, Taylor	Florida State	Political and Aesthetic Discourse: Landscape Reform in Urban Eighteenth-Century Lima
18	Germirli, Asli	Syracuse	The Ottoman Han: Recovery of a Lost Typology
20	Hsain, Hanan (Alex)	NC State	Reverse Electrowetting for Energy Harvesting Devices
22	Hunt, Megan	Clemson	The Impact of Acetate-Utilizing Proteins AcuL and AcuH on Cryptococcus neoformans Virulence
24	Kerr, Caroline	Virginia	Multicolored Luminescent Difluoroboron Beta-Diketonate - Poly(ethylene glycol) - Poly(lactic acid) Nanoparticles
26	Krishnappan, Sharadha	Georgia Tech	Identification of Aging Genes in Rotifers using RNA Interference
28	Kunesh, Adam	North Carolina	Reducing the Angle Dependence of Light Emitted by Artificial Butterfly Wings
30	Lash, Blake	Georgia Tech	Developing novel drug-based therapies for uterine leiomyoma
32	Lockwood, Hannah	Miami	Comparison of Beach Management Practices and Bacteria Levels at 316 Florida Beaches
34	Malone, Margo	Syracuse	Evaluating the effect of arbuscular mycorrhiza fungi on crop plants
36	Oliver, Amber	Duke	Let's go fly a kite: generating coastal topographic maps using aerial photography
38	Radabaugh, Hannah	Pittsburgh	Abbreviated environmental enrichment confers robust neurobehavioral and cognitive benefits in brain-injured female rats
40	Udoh, Karen	Louisville	Inhibiting the Anaphase Promoting Complex/Cyclosome: An Innovative Approach for Cancer Chemotherapy

ABSTRACTS

Listed by Last Name of Presenter

Accardo, Joseph, Class of 2016, Biochemistry, Florida State University

Oral Session 2 Saturday, 2:05 p.m. Room 105

A Kinetic Investigations on Proton Triggered Ring-Opening in Rhodamine-Deoxylactam Derivatives

The design of efficient and rational optical sensors has stood as a valuable playground for synthetic organic chemists due to the pertinence of these molecules across various disciplines. The use of fluorescent organic molecules has found vast applications in biological chemistry, material chemistry, and polymer science. Biologically activated fluorescent organic molecules have fueled the investigation of previously unknown molecular processes, providing valuable insight into understanding cellular function. An important use of fluorescent dyes involves their applications in cell imaging, providing a visual connection to the molecular world. By carefully stitching together a unique atomic framework, organic molecules can be used for selectively sensing analytes of interest. Rhodamines are a class of organic compounds which belong to the family of fluorescein molecules, known for their exceptional photo-physical properties. Generally, rhodamines have high quantum yields, are photo-stable, and can produce fluorescent emission well across the visible spectrum (Beija et al).These molecules have had profound implications in cellular biology, due to their ability to respond to various biological ions such Zn2+ and Fe3+, as well as biologically relevant species such as nitric oxide, hypoclorite, and formaldehyde (Lin et al). Rhodamines are also capable of fluorescently responding to protons, and changes in their constitution makes them valuable in detecting various pH levels. The fluorescent abilities of rhodamines arise from their ability to convert between two forms, a ring-opened and a ring-closed form. The ring closed form is referred to as rhodamine spirolactam. In the ring closed form, rhodamines are either weakly fluorescent or fluorescently inactive. When rhodamines are exposed to their specific ring opening switch (such as metal ions or protons), they become highly fluorescent. Rhodamine deoxylactams are a class of organic molecules that differ from the original spirolactam by the reduction of the carbonyl moiety in the lactam-cycle. These reduced rhodamines have slightly different photo-physical properties, and have found a wide range of uses in biological chemistry. A kinetic understand of the ring opening process in rhodamine deoxylactams are still unknown; where knowledge of substituent effects on ring opening could drive the synthesis of faster molecular probes. Previously, Elizabeth J. Habron and students found that substitution differences on rhodamine spirolactams had tremendous effects on the ring opening processes; some rate constants measuring four times as fast as others. In this investigation we aim to see if deoxylactam ring opening kinetics are as dependent on substitution effects as the reported spirolactams. Moreover, we hypothesize that the rate at which deoxylactam's open is a much faster process than reported for spirolactams.

Acri, Dominic, Class of 2018, Neuroscience & Behavior; Film, Television, & Theatre, University of Notre Dame

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #2

Diel flight activity behavior of wild caught Anopheles farauti s.s. An. hinesorum malaria mosquitoes from northern Queensland, Australia

Species in the Anopheles farauti complex are the major malarial vectors in Australia and the surrounding areas. A behavioral study of trap-caught mosquitoes in Queensland, Australia was conducted to investigate the differences in diel flight activity between these two species and several reproductive states to form baseline data for trans-regional differences. Adult mosquitoes were caught and monitored using Locomotor Activity Motoring units. Activity profiles, measured by LED beam breaks, were arranged into bins, accumulation plots, and z-scored plots to be analyzed for statistically significant differences. Species-specific differences and a species difference at one reproductive state were observed in diel flight activity. An. hinesorum mosquitoes had an earlier onset and maximum peak in nocturnal activity and a higher activity at onset of darkness. Prolonged early night activity of virgin mosquitoes and a second peak in inseminated nulliparous An. hinesorum mosquitoes were observed. The species differences in diel flight activity between these two major malarial vectors of the An. farauti complex pose complications for the containment of a possible outbreak. This study provides baseline data for analysis of populations of mosquitoes from other geographic regions, especially important where selective pressures have and continue to occur using residual insecticides and insecticidal-treated bed nets.

Albanese, Katherine, Class of 2016, Chemistry and minors in Art History and Psychology, Wake Forest University

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #4

Cross-talk between metal and thiol redox homeostasis in *Bacillus subtilis*

A major challenge in health care is the effective treatment of microbial infections. This presents a serious problem since hospital-acquired infections are often caused by bacterial strains resistant to currently available antibiotics. Therefore, there is an urgent need to identify new targets suitable for the development of the next generation of antibiotics. One strategy is to uncover biochemical processes essential to the life and virulence of pathogenic bacteria. Iron (Fe) and Fe-S metabolism might offer an excellent target for metabolic intervention because they are both essential and vulnerable to stresses faced by the bacterium during infection. While free Fe levels are intrinsically low *in vivo* for most organisms, Fe is required for growth, enzyme function, and plays a critical role in oxidative stress defense. Interestingly, gallium (Ga) has been proposed as a promising antimicrobial agent due to its similarities in atomic structure with iron. However, the mechanisms by which Ga interferes with Fe metabolism have not yet been fully understood. We hypothesized that Ga causes growth inhibition by disrupting Fe-S clusters and thiol-redox homeostasis in bacteria. In this study, the possible mechanisms of gallium's antimicrobial efficiency were investigated through standard growth curves, Fe-S enzyme activity assays, WCAES and ICP-OES analysis, and by a redox sensitive bioprobe roGPF2 in *Bacillus subtilis.* Growth inhibition was caused by low micromolar concentrations of Ga and suppressed upon addition of Fe to the medium. Supporting our hypothesis, Ga challenge led to lower activity levels of the Fe-S enzymes aconitase and glutamate synthase, but did not affect the activity of non-Fe-S enzymes fumarase and malate dehydrogenase. Furthermore, *B. subtilis* strains lacking the low molecular weight thiol bacillithiol are more sensitive to Ga. Preliminary analysis using roGFP2 suggests that lack of bacillithiol does not affect the thiol redox homeostasis, but it impairs the activity of Fe-S enzymes, potentially through its participation on Fe mobilization to the biogenesis and/or repair of Fe-S clusters. WCAES and ICP-OES analysis has thus far shown that addition of sub-lethal concentrations of Ga causes uneven cellular localization, and Ga challenge alters the content and distribution of Fe and other metals.

Alms, Hannah, Class of 2016, History and minors in German and Linguistics, Wake Forest University

Oral Session 3 Sunday, 9:50 a.m. Room 105

Strange and Subtle Ways': Eleanor Roosevelt, Gender, and Political Persona

By examining Eleanor Roosevelt's syndicated newspaper column, "My Day", which ran six days a week from 1936 to 1962, this research attempts to reach a fuller understanding of the First Lady's public persona. More specifically, I examined the columns from 1936, 1940, 1944, 1952, 1956, and 1960 to compare how Roosevelt addressed her campaign work for FDR and Adlai Stevenson and to reveal gradual changes in the column (and Roosevelt's public image) over time. Additionally, secondary sources and primary documents accessed at the FDR Presidential Library in Hyde Park, New York and the Library of Congress were used to compare Roosevelt's involvement in different campaigns and understand how "My Day" was conceptualized and managed by United Feature Syndicate, Roosevelt's literary agents, and Roosevelt herself. Ultimately, great contrast was discovered between the 1936 and 1960 columns, including a rebranding of the column in 1960 that was not discussed in secondary sources. Furthermore, examining newspaper coverage of Roosevelt during FDR and Stevenson's election years demonstrates the extent to which gendered notions of power and personality dominated Roosevelt's public image. The extent to which these gendered stereotypes and descriptions remained prominent throughout Roosevelt's life challenges common narratives about progression toward gender equity throughout the twentieth century and demonstrates the need for further research into the scope and meanings of public femininity in the mid-twentieth century.

Bahamonde, Amelia, Class of 2017, Microbiology & Immunology, University of Miami

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #6

Withaferin A: A Promising Novel Agent for Neuroblastoma Differentiation Therapy

Neuroblastoma (NB), the most common extra-cranial solid tumor in children, accounts for 15% of childhood cancer deaths. Despite an aggressive treatment regimen, the prognosis for high-risk NB remains poor. Differentiation of NB cells into mature cells represents a promising strategy for NB therapy. Currently, retinoids are used as differentiating agents; however, their use is limited due to intrinsic or acquired resistance as well as toxicity. We sought to evaluate the potential of the natural product withaferin A (WA), a steroidal lactone derived from the medicinal plant Withania somnifera, to induce NB cell differentiation. For differentiation studies, NB cell lines (NB1691, SK-N-BE2C, SH-SY5Y and the primary cell line SVBM15) were exposed to WA (100-500nM) for 7-10 days. Light microscopy revealed that WA promoted morphologic alterations (neurite outgrowth) similar to retinoid-treated cells. Fluorescent microscopy and western blot analysis indicated that WA increased expression of neuronal differentiation markers (neurofilament, vimentin, -tubulin, MAP2) and decreased stem cell markers (BMi-1, musashi). The IC50 of NB stem cells was determined using MTS assay to be ~1M. Furthermore, WA significantly reduced the "stemness" of these cells even at sub-toxic concentrations (low as 50nM) as determined using sphere-forming assays. Lastly, effects of WA on NB cells was reversed with the anti-oxidant N-acetyl-cysteine, suggesting a mechanism of action whereby reactive oxygen species promote NB cell death and differentiation. By targeting NB stem cells and promoting NB cell differentiation; WA represents a novel and potentially less toxic adjuvant therapy for the treatment of NB.

Barrett, Emily, Class of 2016, Anthropology; Geography, Syracuse University

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #1

Syracuse's Historic Water System 1892-1896: A lesson on the relevancy of archival research

Water is a vital resource. It benefits the health, growth and security of a city. Yet, for Syracuse, New York a declining water infrastructure is presenting as a major concern both for the city's government and the community. Facing approximately one water main break every day, the city's historic, but aging water mains are in desperate need of investment and repair. However, without the financial resources to completely replace the system, it is imperative that the city of Syracuse understands where to best allocate its limited funds. As part of the larger efforts of Syracuse Community Geography and the City of Syracuse Office of Innovation, my research assessed the relationship between the location of the city's oldest pipes, their construction material and current areas of high density water main breaks. Drawing heavily on historic archives located at the Onondaga Historical Association and the Onondaga County Public Library, I utilized the technology of Geographic Information Systems to both digitize and analyze this valuable, but often overlooked data. Ultimately, whilst my research does not demonstrate a direct correlation between the age or material of the oldest pipes and areas of high density water mains breaks, it nevertheless demonstrates the value of historic archives, the power of GIS, and the relevancy of the past to modern processes of change.

Beck, Jacob, Class of 2017, Economics; Ecosystem Science and Policy, University of Miami

Oral Session 1 Saturday, 9:55 a.m. Room 105

An investigation into colony losses in Florida's non-commercial honey bee populations

Colony losses of European honey bees continue to be a problem for beekeepers worldwide, and national efforts such as the Bee Informed Partnership provide insight into the extent of these losses. However, it is difficult to use this data to examine how losses impact non-commercial beekeepers in Florida. We have used survey data from Florida's non-commercial beekeepers to interpret the extent of colony losses. Data examined includes the relationship between colony loss and location, between colony loss and use of Varroa destructor treatments, and economic costs to replace colonies. An estimated economic value has been assigned to the end product of Florida's noncommercial bee colonies, and perceived threats evaluated. A total of 2,331 survey invitations were sent in June 2015, with 658 returned for a response rate of 28.23%. The calculated total loss rate for the year was 32.78%, with 27.83% total loss from June 2014 to December 2014 and 14.74% total loss from December 2014 to June 2015. Average loss rates were 30.28%, 26.16%, and 11.72% respectively. Total loss rates have also been calculated for each county. Over the year, northern Florida experienced a total loss rate of 28.43%, while southern Florida experienced a total loss rate of 37.63%. Among respondents who reported treating for Varroa destructor, the total yearly loss rate was 41.28%, while total loss rate for those who did not report treating was 15.08%. Florida's non-commercial beekeeping industry contributes thousands of dollars to the economy through sales of honey, but colony losses threaten these contributions.

Biscocho, Rachael Ann, Class of 2016, Sociology; PreHealth Studies, Minor in Chinese, University of Notre Dame

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #3

Food Deserts in NYC: Using Geographic Information Systems to Study Food Security in an Urban Environment

Geographic Information Systems (GIS) is a tool used to analyze spatial data and it has recently been used in several studies to look at food security in the United States and internationally. Food insecurity occurs when people do not have reliable access to good quality and a good quantity of food, and food deserts are urban neighborhoods or rural towns without ready access to fresh, healthy, and affordable food (USDA 2009). New York City has fresh and healthy food readily accessible, but not by all of its residents. As one of the most expensive places to live in the world, good quality food is not always affordable. Are certain boroughs more likely to have food deserts? Do race and socioeconomic status affect the likelihood one will live in a food desert? Are fast food restaurants more common in food deserts? Using data from NYC Open Data and data from the United States Census 2014 National Projections, a map will be created in ArcGIS, showing the probability of food deserts in New York City. Linear regression models will be run on socioeconomic demographics as well as the final model containing all variables. Preliminary results show several areas on Staten Island, Brooklyn, and Queens as possible food deserts. The Bronx shows the most areas in which food deserts are highly likely. Manhattan shows the least number of possible food deserts, but this may be due to the population density of the particular borough. Racial demographics seem to have no significant effect. The results confirm that New York City does have possible food deserts, which may have some implications in food-related policies. Future studies could include interviews with New York City residents about their food shopping and eating habits. Another possible study would be longitudinal in which age or a certain generation would be the focus. Maybe younger generations will see food insecurity as more of an issue and access will improve dramatically over their lifetime.

Boone, Hailey, Class of 2016, Biological Sciences, Virginia Tech

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #8

The Occupancy Dynamics of Ground-Dwelling Forest Birds in Ranomafana National Park, SE Madagascar

Little is known about Madagascar's ground-dwelling forest birds throughout Madagascar, despite the increasing threats from habitat disturbances and exotic predators. From 2008 to 2013, we used photographic surveys of terrestrial wildlife from five sites having varying levels of disturbance in or near Ranomafana National Park. In 11,476 trap nights, we obtained 1,125 photographic captures of 29 bird species. We used the photographic captures to estimate landscape occupancy and monitor multi-season occupancy trends at three resurveyed sites for six species. All six birds decreased as landscape fragmentation increased. Landscape occupancy probabilities ranged from 0.50 (SE 0.12; Madagascar magpie Robin Copsychus albospecularis) to 0.12 (SE 0.06; Pitta-like ground roller Atelornis pittoides). Three species were detected more often at sites with high Ring-tailed vontsira Galidia elegans trap success. For our multi-season analyses, by year three two of the birds demonstrated an occupancy probability of 0. We provide the first landscape-scale study to simultaneously examine the effects of habitat disturbance and exotic species on multiple ground-dwelling forest bird species in SE Madagascar. The overlap in occupancy and/or detection between these various birds and multiple native and exotic predators, and humans, highlights a potential threat and calls for targeted management plans to ensure the protection of these endemic, threatened bird species.

Bowman, Marissa, Class of 2016, Psychology; International Economics, Minor in German, University of Notre Dame

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #10

Sex Moderates the Effect of REM Sleep on Emotional Memory Consolidation

Sleep benefits the consolidation of emotional memory. Although previous research suggests that rapid eye movement (REM) sleep may play a particularly important role in strengthening the memory traces of negatively salient information, it remains unclear if obtaining more REM sleep linearly predicts better memory for emotionally negative stimuli following long delays. The purpose of this study was to determine if the amount of REM sleep during the night following encoding of emotional and neutral stimuli would predict long-term memory performance (i.e. 12hr and 1 week later). To test this, thirty-four healthy undergraduate university students (ages 18-21; 22 females) rated the valence and arousal of 160 images – 80 negative and 80 neutral – and were then tested on their recognition of the images following a twelve-hour delay. Participants were randomly assigned into wake (n=17) and sleep (n=17) groups. Participants in the wake group were shown the images in the morning and were tested in the evening before sleeping in the lab. Sleep participants were shown the images in the evening and tested for recognition the next morning after sleeping in the lab. Polysomnography data were collected during overnight sessions. Both groups returned one week later for a second recognition session with 160 images (40 negative and 40 neutral from the encoding session, 40 negative and 40 neutral images that were new). REM sleep alone did not significantly predict better memory for negative images. However, further exploration using a multivariate regression analysis including the predictors quantity of REM, sex, and the sex x quantity REM interaction revealed that all predictors had significant coefficients when memory was tested 1 week later. Thus, the sex of the participants played a statistically significant moderating role such that the effect of REM sleep on negative emotional memory depended on the sex of the participant. Specifically, more time spent in REM sleep predicted better memory of negative images for males, whereas time spent in REM sleep was negatively correlated with memory for these images in females. These findings corroborate previous studies indicating that females do not experience the memory enhancing effect of sleep when they are either taking oral contraception (Genzel et al. 2014) or in the follicular phase of the menstrual cycle (Genzel et al. 2012). Importantly, all of the female subjects of this study were in one of these categories. This preliminary evidence that sex plays a moderating role in the relationship between sleep and emotional memory consolidation could be the result of the interaction of different hormones during sleep. This suggests that sex may be a critical variable to consider in future investigations into sleep and memory consolidation.

Brenner, Farrell, Class of 2017, Women's & Gender Studies; Citizenship & Civic Engagement, Syracuse University

Oral Session 3 Sunday, 9:25 a.m. Room 105

The Aryan-Passing Women and Girl Couriers of the Jewish Resistance Movement in Nazi-Occupied Poland

My research concerns the historiographical and critical value of the memoirs and testimonies left behind by women and girl couriers of the Jewish underground resistance movements in Polish ghettos during World War II. The couriers, who smuggled weapons, communications, publications, people, food, medicine, and morale in and out of the ghettos by passing as Aryan, have been sidelined in the mainstream historiography of the genocide of European Jews. However, feminist Holocaust scholars have asserted the political significance of these women for ghetto resistance movements. Lenore Weitzman writes of the couriers' centrality to resistance efforts that "It is, in fact, difficult to imagine a Jewish resistance during the Holocaust without them." Additionally, in passing, they were uniquely positioned on either side of the ghetto walls—and on either side of a deadly racial divide. Their self-writings depict a double-consciousness and a complex understanding of racial formations in Nazi-occupied Poland; these perspectives provide important contributions to contemporary critical race theories. The couriers' deft manipulation of race lies in a metaphysical realm; through the act of passing, the couriers were vigilantly attuned to racial cues and their own precarious position in Polish society. What they report back through testimonies, memoirs, and other self-writings is immensely telling; many of these older texts can be put into conversation with Black feminist theories in order to explain the violent and banal machinations of racialization in the modern nation-state. Read through a critical lens, the couriers' narratives spell out a flexibility and historical specificity of the category called race, which is not only socially constructed, but is also psychologically internalized through a collective semiotics.

Burris, Elizabeth, Class of 2016, Psychology, NC State University

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #12

Changes in Risk and Protective Factors Associated with Recidivism among Adults with Mental Illnesses

Despite efforts to reduce recidivism among offenders with mental illnesses, a subset continues to cycle through psychiatric and criminal justice settings. Theory and research suggest that changes in dynamic risk and protective factors may be associated with recidivism risk in this population. However, current empirical literature is limited in two important ways: 1) few studies have examined whether dynamic risk and protective factors do, in fact, change over time; and 2) even fewer studies have examined whether changes in dynamic risk and protective factors are associated with changes in recidivism risk. Therefore, in a large sample of mental health jail diversion clients, we examined whether risk and protective factors change over time and whether change in dynamic factors is associated with recidivism risk. In this study, risk and protective factors were assessed using the Short-Term Assessment of Risk and Treatability (START) instrument. The START was administered to 554 mental health jail diversion clients through routine practice at baseline and 315 (56.9%) clients were assessed at least once more. Recidivism was assessed through official records over a 12-month period. We used a conservative approach to identify reliable change at the individual level. Logistic regression and negative binomial regression analyses were conducted to measure associations between reliable change and recidivism. Time between baseline and follow-up was included as a covariate in all models. We observed that clients who evidenced reliable decreases in vulnerability total scores had fewer charges at follow-up than those who showed increases or no changes in their vulnerability total scores. In contrast with expectations, results also showed that clients who evidenced reliable decreases in strength total scores had more charges at follow-up, compared to those who showed increases or no changes in strength total scores. Reliable increases in strength total scores and reliable decreases in vulnerability total scores were associated with less days spent in jail at follow-up. However, reliable increases in vulnerability total scores also were associated with fewer days spent in jail during follow-up. Reliable changes in strength and vulnerability total scores were not significantly associated with the number of arrests at follow-up. These findings provide evidence that reliable changes in risk and protective factors are associated with recidivism, including number of charges and jail days. When present, reliable increases in protective factors and decreases in risk factors were associated with reduced likelihood of recidivism. Unexpectedly, however, we also found some associations in the opposite directions; that is, decreases in strength total scores and increases in vulnerability total scores associated with reduced recidivism. Findings suggest that risk management planning should emphasize ways of increasing protective factors and reducing risk factors to reduce recidivism risk in justice-involved adults with mental illnesses. Future directions include replication in other populations and over longer follow-up periods in order to develop better treatment approaches.

Cashman, Lauren, Class of 2016, Biological Systems Engineering, Virginia Tech

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #14

Distributed Thermistor for Temperature Monitoring of Malnourished Infants

One of the complicating effects of widespread malnourishment in low-resource communities is the tendency for calorie-conserving bodies to produce too little body heat and become hypothermic. Left untreated, this dangerous state can quickly lead to death. Additionally, the temperature of a hypothermic infant must be continually monitored as they are warmed to insure they do not become hyperthermic. To meet this need in the low-staff conditions common to low-resource health environments, we have developed a system designed to continually monitor the axillary temperature of infants and report the temperature wirelessly to a user's wireless device. The system uses an armband to secure a thermistor in the axilla to monitor temperature and Bluetooth technology to transmit regular temperature updates to an Android portable device. The device will be equipped with an app interface that can report which sensor is transmitting out-of-range temperature readings. The system was tested using an array of six bottles containing heated water under varying insulation and wireless thermistors were used to monitor their falling temperatures. This demonstrated preliminary success of the concept, showing a clear difference between the insulated bottles and a non-insulated control as they dropped in temperature. Human validation testing is planned in the USA in early 2016, with a limited deployment and additional testing in Malawi in mid-2016.

Chandak, Resha, Class of 2018, Business Administration, Economics, University of North Carolina

Oral Session 3 Sunday, 9:00 a.m. Room 105

Women Entrepreneurs in the Triangle

This project will investigate the trajectories of women-led entrepreneurial startups in the Research Triangle region. The aim is to recognize the factors that influenced or impeded the investor funding received by women entrepreneurs with respect to bioscience in the 1990s and after 2000. This investor funding data will further the analysis of the rate of growth of these companies. Besides that, I will compare the education histories of women entrepreneurs in the 1990s and those in the 2000s and hereafter and analyze the magnitude of its role in firm founding and growth. My paper constitutes the differences in education histories, firm founding and growth accelerators and blockades.

Cox, Phillip, Class of 2016, History, University of North Carolina

Oral Session 2 Saturday, 2:05 p.m. Room 001

Hercules and Antaeus: Copying the Antique in the Renaissance Print

In 16th-century Italy, the business of printmaking was consumed by copying. Printmakers freely duplicated motifs from a variety of often-interrelated sources: antique statuary, contemporary drawings, and the designs of competing printmakers. "Hercules and Antaeus," a 1533 engraving by Agostino Veneziano, curiously diverges from these trends. Traditionally thought to have been based on a drawing by Raphael, analysis of the print's anomalous design and unexpected iconography suggests alternative attributions. This presentation will examine the print, its maker(s), and its function as a mythological image for the cinquecento viewer.

Crosby, Taylor, Class of 2016, Art History, Florida State University

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #16

Political and Aesthetic Discourse: Landscape Reform in Urban Eighteenth-Century Lima

The construction of the Alameda of Callao, a road joining the "sister cities" of Lima and Callao, began soon after the earthquake and tsunami of 1746. Its conception and execution reveals Late Spanish Colonial-era values regarding urban planning and landscape, which mirrored the social organization of the Peruvian capital. The Alameda provided the public with access to open spaces and rural areas, maintaining access through the use of gateways, demonstrated by the Portado del Callo (1863) and the Portada de Maravillas (1868). The Lima cabildo, or town council, and the Tribunal del Consulado, an agency consisting of elite Creoles, or American-born Limeños promoted and funded the public works. The Alameda and its associated spaces and monuments would seem to suggest an imperial statement by Spanish royal officials aimed at legitimating Spain's imperial supremacy in one of the empire's most important cities in the Americas. However, the simultaneous promotion of such projects by both the Creole elites and the viceregal authorities exposes a more complicated late Colonial situation in which both European and local political and aesthetic values commingled.

Currie, Miles, Class of 2017, Physics & Astrophysics, Florida State University

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #5

Analyses in Support of the WFIRST Supernova Survey

The proposed Wide-Field Infrared Survey Telescope (WFIRST) supernova survey will measure precision distance continuously in redshift to 1.7 with excellent systematics control. However, the Science Definition Team report presented a idealized version of the survey, and we now work to add realism. Using Supernovae (SNe) from HST programs, we investigate the expected contamination from the host-galaxy light to estimate required exposure times. We also present estimates of purity and completeness, generated by degrading well-measured nearby SN spectra to WFIRST resolution and signal-to-noise. We conclude with a more accurate prediction of the cosmological constraints possible with WFIRST SNe.

Debra, Alyssa, Class of 2017, Biochemistry, Virginia Tech

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #7

Isolation of New Antimicrobials From Growth Inducing Soils

Our student led research entailed the use of established methods and the incorporation of new methods to cultivate and search for new antimicrobial compounds from collected soil samples. Once there was evidence of new compounds discovered, the research proceeded to identify, purify, and isolate potential organisms for further reproduction and study. New antimicrobials will lead the way in the fight against the ever increasing drug resistant strains of bacteria. A suspected soil sample that could contain new antimicrobial producers is serial diluted and plated to establish isolation of the colonies. Once isolated, a pure colony is grown from one of the colonies on a plate then grown in a broth. After, they are then collected at different points of the growth cycle, establishing which growth phase produces the product. These possible producers are plated against susceptible S. Aureus and E.coli strains with standard Gram Positive and Negative controls to establish effectiveness. After testing various soil samples, a sample collected down river of a sewage treatment plant has shown to have antibiotic properties. Further testing is underway using DNA sequencing and cloning techniques to identify and categorize the bacteria present. This evidence supports the idea that environmental conditions having a bigger role in soil bacterial diversity.

DiNapoli, Benjamin, Class of 2017, Architecture, University of Virginia

Oral Session 2 Saturday, 2:05 p.m. Room 106

Re-Centering Delhi: The Daryaganj Park Community

Re-Centering Delhi, a design research studio at the University of Virginia's School of Architecture, focuses on the relationship between the Yamuna River, a tributary of the Ganges River, and the city of Delhi, India. My studies have highlighted for me the environmental and economic concerns associated with sustainable low-income development, as well as the importance of both regional heritage and culture. The remnants of the latter two traditional elements are standing fast in the face of substantial urban growth and modernization. Now, as Delhi grows in excess of 26 million inhabitants, the once sacrosanct Yamuna River and socioecological floodplain are being reassessed critically as emergent public amenities. Even the centuries-old Mughal monuments that persistently interrupt the dense fabric of Delhi are notable for their unions of material, built form and engaging landscapes. The Re-Centering Delhi Studio illustrates how architectural design interventions can lead to impactful solutions for complicated, multifaceted problems. Specifically, the Daryaganj neighborhood has a long history, founded on the ideals of European architects seeking to construct the perfect elite villa, which has been long forgotten. This renders Daryaganj as a relic of British imperialism that lacks any defined urban character. What were once elegant art-deco homes are now shells that provide shelter to thousands of people, and stores and shops have wedged into the last available spaces on the street. Those who cannot fit between buildings and fences are pushed to the very edge of the neighborhood, in informal settlements that border a four-meter tall wall. The Daryaganj Park Development addresses these issues by constructing a new urban promenade that breaks the barrier between Daryaganj and Raj Gat. By bridging outwards from the dense city, guided by new mobility corridors and access points, both congestion and housing issues are alleviated. The overcrowded city street is brought back into daylight underneath the promenade. Affordable, easily constructed and aesthetically simple blocks of housing project from the city, set on top of a new park that retains and mitigates excess water while providing a quiet, shaded, ecological expanse. There is a pressing need to restore order and serenity in parts of Delhi's thick, congested state. The Daryaganj Park Development resolves critical issues of living within the massive metropolis, and provides Daryaganj with a concrete urban character – the new face to Raj Ghat, the cremation site of Mahatma Ghandi, and back to Old Delhi.

Doerstling, Steven, Class of 2017, Public Health (Nutrition), University of North Carolina

Oral Session 3 Sunday, 9:50 a.m. Room 011

Effects of Surgical vs. Non-Surgical Weight Loss on Mammary Tumor Burden

Obesity is a recognized risk factor for increased incidence of basal-like breast cancer (BLBC), the most lethal breast cancer subtype. Epidemiological lacks a consensus on whether moderate weight loss protects against BLBC. Typically, only interventions that result in significant sustained weight loss, such as bariatric surgery, have demonstrated cancer-preventative potential. Therefore, we sought to determine the effects of surgical versus non-surgical weight loss on inflammation, metabolic hormones, and mammary tumor burden in a mouse model of BLBC. Mice were fed a low fat control (Con) or high fat diet-induced obesity (DIO) regimen for 15 weeks modeling chronic obesity. Obese mice were then randomized to continue the DIO diet or undergo surgical or dietary weight loss, generating DIO, formerly obese (FOb)-surg, and FOb-diet experimental groups, respectively. FOb-surg mice received a sleeve gastrectomy procedure (~70% excision of stomach), and FOb-diet mice began a low fat diet. Following surgery or diet change weight normalization, all groups were orthotopically injected with E0771 mammary tumor cells, which model BLBC. At study endpoint, body fat percentage and weight of FOb-surg and FOb-diet were comparable to the Con group. Furthermore, the average tumor weight in FOb-surg mice was statistically equivalent to that of the Con group, whereas FOb-diet tumor weight was statistically equivalent to DIO mice and statistically greater than Con mice. FOb-surg mice also displayed significant reduction in serum insulin and interleukin-6 compared to FOb-diet and DIO groups, suggesting sleeve gastrectomy was more effective in reversing obesity-associated cancer risk factors than dietary weight loss alone.

Dolezal, Stephanie, Class of 2016, Art History; Classical Studies, Virginia Tech

Oral Session 3 Sunday, 9:00 a.m. Room 001

Uncovering Antiquity: Hubert Robert's The Finding of the Laocoon

This research investigates the painting, The Finding of the Laocoon, by 18th century French artist Hubert Robert, and its role in Robert's oeuvre of architectural landscapes. Anglo-American scholars have oddly remained relatively silent to date about this painting and this research sheds light onto the importance of this work. The goal of this research is to prove that The Finding of the Laocoon is not only a portrayal of St. Peter's Basilica, but also is the foundational painting in Robert's oeuvre that establishes a formula for constructing architectural landscapes. This has been done by examining Robert's professional relationship with a prominent Roman interior painter, Giovanni Panini, the inventories of Robert and influential patrons, elite collecting practices in 18th century France, and Robert's works in chronological order to document the development of his architectural landscapes. The research shows that The Finding of the Laocoon not only mimics Giovanni Panini's painting Interior View of St. Peter's Basilica, but is also indeed the foundational architectural landscape painting in Robert's oeuvre which is repeated in his later works. This research reveals how the formula established in The Finding of the Laocoon, which is based upon the art and architecture of the Vatican, stands as influential in Robert's subsequent architectural landscapes, eventually influencing Hubert Robert's design for the Grande Galerie in the Louvre.

Elsayed, Nourhan, Class of 2016, Psychology, Minor in Cultural Anthropology, Duke University

Oral Session 3 Sunday, 9:25 a.m. Room 106

The Ecology of Resilience: Predictors of Psychological Health in Disadvantaged Lebanese Youth

More than a third of Lebanese youth report facing traumatic life experience; these adverse life experiences during childhood and adolescence can have lasting negative effects on youth's psychological development and well being. Recent research on buffering the effects of adversity sheds light on the idea that individual-level characteristics (i.e., coping mechanisms) are not the sole predictor of an individual's response to adversity (Research on positive adaptation following exposure to adversity suggests that processes across multiple domains of an individual's life influences the likelihood of positive adaptations to stress following adversity. Ecological resilience indicators are attributes and resources of an individual and their environment which promote positive adjustment. Thus, the purpose of this study was to examine the role of resilience on different ecological domains that are associated with psychological well being and poor psychological health in disadvantaged Lebanese youth. This study examined the levels of indicators of resilience across three domains of a disadvantaged youth's ecology and determined how the aspects of resilience across different ecological domains predict positive psychological health and poor psychological well being. A self-report questionnaire was distributed to 187 disadvantaged Lebanese living in Lebanon between the ages of 15 and 23 (M =17.96 years, SD = 2.42 years). The self-report questionnaire assessed indicators of resilience across three different ecological domains: person, micro-system and macro-system level. The person-level domain was assessed using the Individual Capacities/Resources subscale of the Child and Youth Resilience Measure (CRYM), The General Self Efficacy scale, The Curiosity and Exploration Inventory, and the Brief Cope The micro-system level was assessed using the Relationships with Caregivers subscale of the CRYM and the Multidimensional Scale of Perceived Social Support. The macro-system level was assessed using the Contextual Factors subscale of the CRYM. Positive Psychological well being was assessed using the Flourishing Scale, and poor psychological health was assessed using the Arab Youth Health Questionnaire. Hierarchal Regression analyses supported that each of the domains of ecological resilience contribute predictive power to the youth's psychological well being and poor psychological health. These results suggest that the development of positive psychological well being and poor psychological health in disadvantaged youth are influenced by factors across the ecology of a youth's life, and that all domains of a youth's environment should be strengthened to ensure that a youth can adapt in the face of adversity.

Fox, Ryan John, Class of 2016, Chemical Engineering, NC State University

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #9

Novel Deactivation Strategies for Norovirus Using Copper-Infused Lignin Nanoparticles

The Norovirus is the leading cause of gastroenteritis in the United States, resulting in approximately 21 million illnesses and 800 deaths per year. Recent work by our group has shown that low concentrations of Cu(II) ions can bind to virus capsid proteins and cause virus aggregation. When divalent copper is reduced to Cu(I), virus capsid degradation and loss of infectivity occur, but Cu(I) ions are unstable in aqueous solution. Thus, the stabilization of Cu(I) ions must first be accomplished before its use in antiviral applications. We investigated the efficacy and stability of three reducing agents to produce Cu(I) ions, sodium ascorbate (Asc), tannic acid (TA), and lignin nanoparticles (LNPs). The Cu(I) concentration was measured over time spectrophotometrically using the chelating agent bathocuproinedsulfonic acid disodium salt (BCSA). At an equimolar ratio of Asc to Cu, near full conversion of Cu(I) was shown, but its stability was limited to several hours. Concentrations on the order of 0.01mM TA produced high Cu(I) conversion, and concentration dependent stability was observed. LNPs at 0.01 %wt produced full conversion of Cu(I) and showed stability on the order of weeks. Combinations of molecular (TA) and colloidal (LNPs) reductants were investigated to optimize Cu(I) conversion and stability. We hypothesize that surface functional groups of lignin nanoparticles stabilize Cu(I) against oxidation in aqueous solution. As a result, copper-infused EbNPs could produce stable, dilute Cu(I) solutions for antiviral applications in healthcare, food service, and waste water treatment.

Freeman, Pete, Class of 2018, Gender Studies; Peace Studies; Sociology, University of Notre Dame

Oral Session 3 Sunday, 9:50 a.m. Room 106

Training Technopreneurs: Potential Solutions for Improving Female Technopreneurs' Self-Efficacy in Switzerland

While Switzerland hosts a near equal number of male and female entrepreneurs, female-founded ventures in Switzerland are reportedly less successful than male-founded ventures as measured by output and growth. The relationships between gender, technological literacy, and motivation to internationalize businesses were examined for one sample group: male and female Swiss entrepreneurs in the tech sector. Similar effects on technological literacy and business internationalization are shown for all participants and support earlier research on the relationship between gender, technological literacy, business internationalization, and an entrepreneurial venture's output. Additionally, the motivation to internationalize a business proved stronger for more technologically literate individuals than for individuals who were not exposed or exposed very little to technology during their childhood and teenage years. Implications for educators and policy makers were discussed, and areas for future research outlined. In order to test my hypotheses, I analyzed data gathered in my study conducted between December 27th, 2014 and January 10th, 2015 with varying age groups representing different points in entrepreneurial careers within the Swiss tech industry. Twelve Swiss men and women answered questions evaluating their attitudes, skills, career perceptions, and technological literacy. A total of twelve surveys and interviews were analyzed. My main methods of research were interview and observation. I attended conferences and entrepreneurial meetups to observe how female Swiss entrepreneurs approach tech entrepreneurship. The finding that female entrepreneurs lacked technological literacy when compared to male entrepreneurs was unanticipated. The implications of my conclusions suggest that increasing the activity of female Swiss entrepreneurs starts with education. Educating Swiss girls for technological literacy to see opportunities in all industries, and particularly the technology industry, begins by increasing access to technology education before the collegiate level.

Fritz, Kaitlin, Class of 2017, Design Studies and English, NC State University

Oral Session 4 Sunday, 10:30 a.m. Room 105

Olga Rozanova: Evolution of Individuality during the Russian Avant-Garde

Artist Olga Rozanova's contribution to contemporary art can be seen by her evolution of color during the Russian avant-garde, and this metamorphosis from constraints to creative freedom alludes to her belief of individuality. In the early twentieth century, her progressive, visionary thoughts and works diametrically contrasted with Lenin's view of conservative art for the proletariat. Besides breaking Lenin's myopic view of art for the masses, Rozanova differed from her contemporaries not only by her fascination with color but also with her vocal statements defending the New Art. Through her artistic individuality and passion for color, Rozanova exceeded the ideology of Suprematist leaders and predecessors to create her own spiritual exploration in her art. Furthermore, her paintings demonstrated her philosophy of expression which surpassed Kandinsky's color theory and Malevich's utopian moral. Through her works like Flight of an Airplane (Non-Objective Composition), Non-Objective Composition of 1916, and Green Stripe, Rozanova not only strived for the purity of color but also showcased her sense of independence.

Gadsby, April, Class of 2016, Civil Engineering, Georgia Institute of Technolgy

Oral Session 4 Sunday, 10:55 a.m. Room 001

An Innovative and Sustainable Micro-milling and Thin Overlay Preservation Technology with High Impact Using 3D Technology

The Georgia Department of Transportation (GDOT) has developed and implemented a new pavement preservation method that uses micro-milling in conjunction with a thin overlay to cost-effectively replace only a deteriorated, thin open-graded surface layer (¾ - 1 ¼ in) without removing a sound underlying layer. Many innovations have been created in developing this new method including a new performance indicator and sensing device. The new method was first implemented in 2007 on a 15.3-mile section, on I-75 near Perry, Georgia and resulted in a significant saving. In considering whether to adopt the new method as standard practice, it is essential to evaluate its long-term performance. This presentation reports the long-term performance of the new method using 8-years of pavement condition data collected by GDOT and sensing data collected using the GaTech Sensing Vehicle. The pavement on I-75 is still in good condition after 8 years (with 6% of raveling in 2015). An additional service life of 2 to 4 years is expected for the I-75 project. This provides a service interval of 10 to 12 years - comparable to that of Georgia's conventional pavement rehabilitative strategy for open-graded surfaced interstate pavements, which typically ranges from 10 to 12 years. The cost analysis shows an approximate savings of 726 million dollars over 12 years if implemented on the entire Georgia interstate system. With environmental and user cost benefits, this savings will increase. This information can assist transportation agencies in making decisions about whether to apply the new pavement preservation treatment.

Gambill, Lauren, Class of 2017, Genetics, minor in Biochemistry, Clemson University

Oral Session 2 Saturday, 1:40 p.m. Room 105

Identification of a xylose transport and interconversion pathway in the oleaginous yeast Yarrowia lipolytica

Hemicellulose, one of the three main components of lignocellulosic biomass, is mostly composed of glucose and xylose sugars. While glucose is readily metabolized through fermentation by many organisms, very few metabolize pentose sugars like xylose. Research in biofuels has been aimed at taking this biomass waste and making compounds that can be used for energy and other consumer products. The lipid high lipid accumulation properties and glucose metabolism abilities of the oleaginous yeast, Yarrowia lipolytica, make it an ideal organism to use for the fermentation of hemicellulose waste because it has the potential to convert waste product into value added products that can be used for energy, consumer, and industrial applications. While Y. lipolytica does not metabolize xylose naturally, we have identified an endogenous xylose interconversion pathway. When this pathway is activated by plasmid overexpression, Y. lipolytica generates a lipid content similar to that generated from glucose fermentation. This finding makes it feasible for Y. lipolytica to be used on an industrial scale as a biomass-to-lipid conversion tool, paving the way for new forms of energy production and consumer product generation to be adopted.

George, Alex, Class of 2016, Biochemistry, Georgia Institute of Technology

Oral Session 1 Saturday, 9:30 a.m. Room 011

Using Cardiac Progenitor Cell Derived Exosomes to Improve Cardiac Function Post-Myocardial Infarction

Myocardial infarction (MI) is one of the leading causes of A1:X9 and mortality in the world. Recent clinical trials have demonstrated that cardiac progenitor cells (CPCs) exhibit regenerative effects on cardiac tissue post MI. Further studies have suggested that paracrine signaling-based mechanisms involving exosomes play a critical role in these beneficial effects. In this study, we propose to evaluate the role of exosomes derived from human CPCs, segregated by age (neonate (1-30 days), infant (1 month -1 year), and child (1 year -5 years)) and environment (hypoxia vs. normoxia), in murine model of myocardial infarction. Exosomes were generated and delivered to the left ventricle of athymic rats 30 minutes after the ligation of the left anterior descending artery in an ischemia reperfusion model. Echocardiograms were performed periodically up to 28 days post-MI when the rats were sacrificed and the hearts were harvested. Picrosirius red staining and isolectin staining were performed on the heart sections to evaluate fibrosis and angiogenesis post-MI. Our echocardiogram data indicated that the delivery of hypoxic exosomes from all age groups as well as neonatal normoxic exosomes showed a significantly improved ejection fraction (EF). The results from tissue staining showed that only the delivery of hypoxic exosomes from all age groups reduced fibrosis and increased angiogenesis. We are currently pursuing studies analyzing the exosomal transcriptome as well as investigating apoptosis following exosome delivery to provide molecular mechanisms for our observations. In short, we have demonstrated the regenerative potential of exosomes as a potential therapeutic for heart failure.

Germirli, Asli, Class of 2016, Architecture, Syracuse University

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #18

The Ottoman Han: Recovery of a Lost Typology

Developing countries around the world are struggling with rapid population growth and the negative effects of globalization. Many of these cities have unique historical heritages that are being compromised by the monoculture of globalized architecture. These cities must be willing to shape their future by recognizing the needs of historic preservation while responding intelligently to the pressures of urban growth. Change is inevitable, but doesn't require the sacrifice of history. The challenge is to find a balance between safeguarding the historical heritage while building new layers of history through modern interventions. This research draws attention to the Hans District on the Historic Peninsula of Istanbul, a designated UNESCO World Heritage Site. For the preservation of the district, it is crucial to insure the conservation of the Ottoman han typology with its unique architectural, socio-economic and commercial identity. Although the hans remain under-utilized, they have great potential for revitalization. Many are decaying and the craft traditions associated with them are also fading away with the decline of master-apprentice system. The contention of this research is that a contemporary response to a historic context must assume the role of leveraging the special character of the historic environment while contributing to the significance of the genius loci through the sensitive introduction of modern architecture. This research focuses on both the restoration of the Buyuk Valide Han and the design of a new museum and administration building. The project is shaped through the multiple lenses of Critical Regionalism, urban planning, conservation and sustainability. The aim is to add value to the Hans District by creating an interaction between the old and the new where the whole is greater than the sum of the parts. In conclusion, modern architecture must not neglect the importance and value of history, and should strive for continuity. Doing this not only enriches the modern proposals, but also revives the historical buildings, making them available and meaningful to future generations.

Gordon, Molly, Class of 2016, Biological Sciences, Florida State University

Oral Session 4 Sunday, 10:30 a.m. Room 001

The Role of DNA Sequence in Replication Timing Control

A cell must replicate its DNA once and only once during each cell cycle in a carefully choreographed process. Disruption of this process leads to genomic instability and eventual diseases. One poorly understood aspect of DNA replication control is replication timing (RT), the strict temporal manner in which segments of chromosomes replicate during the cell cycle. In all eukaryotic cells observed to date, certain regions of chromosomes replicate early while the other regions replicate late. Furthermore, RT is regulated throughout development such that about half of the genome switches RT as ESCs differentiate to defined cell types. Because many diseases, like cancer, exhibit a disrupted RT program compared to that of healthy cells, it is possible for the mechanism controlling RT to offer information about the origins of these diseases. Based on recent studies, it is expected that DNA sequence alone is sufficient to control the mechanism of changes in DNA RT. To test this hypothesis, I analyzed the propensity of DNA sequences to control RT switches in two situations: outside of chromosomal context as well as in different sub-nuclear locations. If my hypothesis is supported, proper regulation of RT will be recapitulated and manipulated, respectively, in these artificial systems. Furthermore, it will be possible to narrow down the smallest sequences necessary to regulate RT through targeted DNA sequence deletions. Having a small segment of DNA that can control RT will bring us closer to filling in gaps in the overall mechanism orchestrating proper RT, which can help us better understand misregulation events such as those observed in cancers.

Helstern, Rebecca, Class of 2016, Biological Sciences and minor in Genetics, Clemson University

Oral Session 4 Sunday, 11:20 a.m. Room 001

Does who you grow up with matter?: The role of social environment in shaping female mating preferences in sailfin mollies (Poecilia latipinna)

The influence of social experience during early development is known to affect the expression of life history traits and adult behaviors in a variety of species from fish to humans. However, far fewer studies have investigated how social experiences during development might influence female mate choice. The goal of this project was to investigate whether the social environment during juvenile development in female sailfin mollies (Poecilia latipinna) influences their mating preference for large male body size when they reach sexual maturity. Juveniles were reared in one of 3 social conditions: with 2 females and 1 large male, with 2 females and 1 small male, or with 3 females. Though our findings were not statistically significant, females trended towards showing preference for larger males upon maturation, regardless of their social treatment. Specifically, females had stronger preferences for increasing lateral projection area ratio (LPA ratio: larger: smaller male), meaning the larger the difference in sizes of the males that the females were able to choose between, the stronger preference they had toward the larger male. No effect of social rearing treatment was found to influence female mating preference. From this I can conclude that early rearing social experience does not strongly impact female preference for larger male size. Instead, female preference for large-bodied males may be learned through social experience following sexual maturation.

Herde, Zachary, Class of 2016, Chemical Engineering, University of Louisville

Oral Session 2 Saturday, 1:40 p.m. Room 106

Towards Integrated Bio-refinery: Production of Activated Carbons from Sustainable Agricultural Biomass

Non-food source biomass byproducts from agricultural processing industries such as distilleries and industrial agriculture can be a sustainable raw material source for energy storage via battery manufacturing in automotive and many other industries. Light-weight and high performing activated carbon fibers (ACF) for energy storage applications such as Li-S batteries, supercapacitors, photo-voltaic cells, and hydrogen storage can be produced from agricultural biomasses such as grains from distilleries and soy hulls from soy processing. As a part of their Integrated C5-based Bio-refinery, the Conn Center for Renewable Energy Research at the University of Louisville has developed a route to produce light-weight ACF. The biomass is first put through an acid hydrolysis that removes sugars such as xylose and arabinose, which are useful for biofuel production. The remaining fibers are then used to create ACF using a low-cost and simple activation method. As opposed to lignin based carbon fibers for composites applications, these light-weight cellulose-based carbon fibers are better suited for energy storage applications due to their unique pore structure and high surface area. This work has shown that the hydrolysis process and resulting morphology of the biomass fibers is what allows the carbons to be produced with such high surface area. This need for sugar removal allows for a holistic process that uses all of the biomass' potential for chemical products and energy applications.

Hobson, Kaitlyn, Class of 2016, English and Textual Studies; Magazine Journalism, Syracuse University

Oral Session 1 Saturday, 9:55 a.m. Room 106

"Blowing bodies to smithereens": Interpreting Hiram Sturdy's resistance to the war myth through trauma and corporeality in memoir

Among the many devastations of the Great War was an obliteration of soldiers' bodies from artillery warfare and enormous casualties, resulting in an interruption of Victorian mourning rituals that depended on and were performed around the body—the rituals that enabled the bereaved to mourn and overcome grief. The war's devastation prevented soldiers' bodies from being returned home to be interred and interrupted Victorian conventions of mourning; a situation that, I argue, provoked a response from the British government to institute the Tomb of the Unknown Warrior at Westminster Abbey, leading to the elevated status of fallen soldiers that fueled a war myth—a myth that encouraged men to consign and made their subsequent deaths seemingly "heroic" and "meaningful." This self-guided and original research draws upon the novels Jacob's Room and Mrs. Dalloway by Virginia Woolf and an unpublished hand-written manuscript by a Gunner in the Royal Artillery Regiment, named Hiram Sturdy, who fought in World War I. I discovered Sturdy's manuscript at the Imperial War Museum in London through a funded research trip. Hiram Sturdy was one of these men who enlisted and I argue through his memoir and Virginia Woolf's fiction that lost bodies in Jacob's Room and violence in Sturdy's manuscript reject the mythologization of dead soldiers and that both objects reestablish a private aspect to mourning to reprivatize the death of the soldier.

Hsain, Hanan "Alex", Class of 2018, Material Science Engineering, NC State University

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #20

Reverse Electrowetting for Energy Harvesting Devices

The overall wearable electronics and technology market is estimated to grow $11.61 billion by the end of 2020. However, over recent decades, electrical batteries have emerged as a bottleneck for portable electronic devices. Here we describe a system that converts mechanical energy into electrical by modulating the wetting effects of micro-scale water droplets arranged between two metal sheets and a dielectric coating. The water and dielectric behave similar to a capacitor by holding charge across the interface. A force pressing down on the electrode increases the water droplet's overlap with the dielectric-film-coated electrode, and excessive electrical charge then produces an instantaneous current when the droplet is released. Each cycle of pressure and release generates an alternating current that flows back into the circuit and can then be used to power a small device. We hypothesize that surface chemistry and roughness of the dielectric influences the magnitude and hysteresis of the system's current output. To evaluate our system, we measure current across the metal sheets at varying mechanical oscillation, predicting that current is also a function of oscillatory frequency. Here we conduct a parametric study of dielectric thickness, surface chemistry, and surface roughness in an effort to optimize the energy harvesting device for small-scale applications. This method of energy generation addresses crucial considerations to the wearable electronics industry by its ability to utilize a broad range of mechanical actuation, its scalability to larger devices, and its ability to be made cost effectively.

Hunt, Megan, Class of 2016, Biochemistry and Genetics, minor in Spanish, Clemson University

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #22

The Impact of Acetate-Utilizing Proteins AcuL and AcuH on Cryptococcus neoformans Virulence

Cryptococcus neoformans, a basidiomycetous fungi that is the leading cause of fungal meningitis, is mainly a threat to immune-compromised individuals, specifically those with HIV/AIDS. Annually, there are an estimated 1 million cases of Cryptococcal meningitis worldwide in HIV/AIDS patients from which 625,000 result in death. Research from the Kronstad lab and the Smith lab indicate that acetate uptake and activation play an important role in virulence. Taking advantage of the isolation and identification of acetate non-utilizing mutants in the model ascomycetes Neurospora and Aspergillus, I identified the corresponding acetate-utilizing genes in Cryptococcus. I have focused my research on AcuL, the succinate-fumarate antiporter, and AcuH, the carnitine/acyl-carnitine transporter. Gene knockout mutants of AcuL and AcuH were acquired from the Fungal Genetics Stock Center for analyses. Growth curves performed with different carbon sources showed the lowered viability of the mutants on all carbon sources other than glucose, including acetate, succinate, and lactate. Growth was qualified using spot assays onto plates of these same four carbon sources. Glucose again resulted in similar growth across WT and the mutants. While lactate and succinate did not allow sufficient growth in any of the strains, acetate presented visible differences with the mutants displaying lower viability. The mutants were subjected to stress conditions and responded with capsule formation and melanin formation, two virulence determinants of Cryptococcus, also observed in the WT. Further analysis must be done to elucidate the precise involvement of AcuL and AcuH in the utilization of acetate contributing to C. neoformans virulence.

Inglis, Andrews, Class of 2016, Cognitive Science with Neuroscience focus, University of Virginia

Oral Session 2 Saturday, 2:05 p.m. Room 011

Induction of freezing and anxiety-like behavior with C1 neuron stimulation in mice.

C1 neurons, located in the brainstem, the lowest part of the brain, regulate autonomic functions, and are activated by lack of oxygen, low blood sugar, inflammation, pain and low blood pressure (Guyenet, et al., 2013). With prior studies showing C1 neurons causing physiological and psychological responses to stress by mediating breathing and heart rate, C1 neurons in the brainstem of mice were stimulated optogenetically and induced a freezing behavior response during an Open Field Test (OFT). Using the mouse strain dopamine--hydroxylase Cre (DH-Cre) with rabies virus viral vectors selectively expressing light-activated viruses in the neurons with Cre, therefore expressing the light activated viruses only in C1 neurons, effects of stimulation causing freezing behavior were only observed in the Channelrhodopsin 2 virus (ChR2) test group versus the mCherry virus control group ($p=0.0010$). Additionally, with the use of caspase, a mediator of cell death, selectively expressed in the C1 neurons via the same Cre-dependent rabies associated construct as the light activated viruses, C1 neurons were ablated. When the animals with ablated C1 neurons were exposed to restraint stress and then placed in the OFT, no effect on behavior was observed, versus control animals with C1 neurons still intact that presented freezing behavior. Freezing behavior is a well known anxiety response, and both loss of function and gain of function experiments show C1 neuron control of this response. This finding further dissects the anxiety circuit in the brain, identifies another functional role that C1 neurons play, and contributes to the theory of physical stress responses coming before psychological stress and physical responses even causing psychological stress.

Jordhal, Alexa, Class of 2016, Biology, University of Pittsburgh

Oral Session 1 Saturday, 10:20 a.m. Room 011

The Role of the Lhs1 Molecular Chaperone in the Degradation of the Epithelial Sodium Channel

The Epithelial Sodium Channel (ENaC) is an integral membrane protein found in the mammalian kidney where it regulates salt and water balance. ENaC is a heterotrimer and contains an α, β, and γ subunit, each with cytoplasmic N and C termini, two transmembrane domains and an extracellular loop. ENaC is assembled in the Endoplasmic Reticulum (ER) and if misfolded or orphaned, ENaC subunits are subject to ER associated degradation (ERAD). Our previous work using a yeast model system determined that the conserved, ER molecular chaperone, Lhs1, selects only the α subunit for ERAD when expressed individually. Co-expression of the three subunits prevented Lhs1-targeted ERAD. We hypothesized that interactions between the three subunits in the channel block αENaC degradation. To determine which inter-subunit domain interactions prevented Lhs1-targeted ERAD, a series of βENaC constructs were created containing specific αENaC domains: exchanging termini, transmembrane domains and/or extracellular (ER lumenal) loops. The presence of the βENaC transmembrane domains was sufficient to prevent Lhs1-facilitated ERAD when co-expressed with wild-type α and γ subunits. We then hypothesized that Lhs1 recognizes a feature linked to unassembled αENaC transmembrane domains. To test whether αENaC transmembrane domains can transfer Lhs1 dependence to βENaC, a βENaC subunit with αENaC transmembrane domains was expressed alone. The results suggest that αENaC transmembrane domains are necessary but not sufficient to target ENaC subunits for Lhs1 dependent ERAD. Together, we suggest that Lhs1 distinguishes between the αENaC monomer and the assembled channel and retains this orphaned subunit in an aggregation-free state, thus preventing toxic effects in the cell.

Kaelin, Brenna, Class of 2018, Biochemistry, Minor in Psychology, University of Louisville

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #11

Mechanistic Insight Into Vinyl Chloride-Induced Liver Injury: Role of Dietary Fatty Acids

Background. Vinyl chloride (VC) is a relevant chemical toxicant and an important occupational/environmental pollutant. Most studies on the risk of VC exposure to human health have focused on the effect of VC alone (high doses) and not taken into consideration VC interactions (low doses) with risk-modifying factors. It has been shown that certain types of dietary fat such as polyunsaturated fatty acids (PUFA), linoleic acid (LA) in particular, exacerbate fatty liver diseases. Bioactive oxidized linoleic acid metabolites (OXLAMs) play a critical role in the development/progression of hepatic inflammation and injury in the context of steatosis. We hypothesize that VC exposure may synergize hepatic damage caused by NAFLD by increasing in production of OXLAMs. The purpose of the current study was to determine the role of LA metabolites in sensitizing the liver to VC via molecular, organelle, and cellular effects. Methods. Mice were administered a bolus dose of chloroethanol (or vehicle) 10 wks after being fed a linoleic acid rich high fat diet (HPUFA; 42% corn oil)-fed or low fat control diet (LPUFA; 13% corn oil). Animals were sacrificed 0-24 hours after ClEtOH exposure. Samples were harvested for determination of liver damage, inflammation, oxidative and ER stress. Results. In LFD-fed control mice, chloroethanol caused no detectable liver damage or inflammation. In HPUFA-fed mice, chloroethanol increased HPUFA-induced liver damage, steatosis, infiltrating inflammatory cells and hepatic expression of proinflammatory cytokines and genes affected in ER stress. Furthermore, chloroethanol altered protein expression of key genes involved in ER stress. Conclusions. Taken together, VC and HPUFA cause liver damage, inflammation and ER stress markers. This serves as proof-of-concept that VC hepatotoxicity may be modified by a linoleic acid rich diet. These data implicate exposure to VC as a risk factor in the development of liver disease in susceptible populations.

Kerr, Caroline, Class of 2017, Chemistry with Specialization in Biochemistry, Minor in Spanish, University of Virginia

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #24

Multicolored Luminescent Difluoroboron Beta-Diketonate - Poly(ethylene glycol) - Poly(lactic acid) Nanoparticles

Oxygen sensors have useful medical applications in the detection and response of cells, tissues and organisms to oxygen deficits. For example, tumors with low oxygen levels are often more invasive and resistant to radiation and chemotherapy treatments. Another medical condition in which it is important to measure oxygen levels is in the diagnosis and treatment of chronic wounds, where the oxygen levels of hypoxic tissues can be restored to normal in a hyperbaric oxygen chamber. Thus, the detection of oxygen levels in hypoxic tissues through oxygen sensing and imaging is important for diagnosis, treatment, and monitoring therapeutic response. The dual emissive properties of difluoroboron β-diketonate-poly(lactic acid) (BF2bdk-PLA) materials have been utilized for biological oxygen sensors. Combining poly(ethylene glycol)-poly(L-lactic acid) (PEG-PLLA) block copolymers with BF2bdk dyes generates dye-PLLA-PEG materials with passive tumor-targeting properties. These block copolymers use hydrophobic (PLLA) and hydrophilic (PEG) interactions to self-assemble into stealth nanoparticles for vivo delivery to tumors via the enhanced permeation and retention effect (EPR). The advantages of PEG-BNPs over pure PLA-BNPs are that they have longer circulation times and higher potential for tumor accumulation by the EPR effect. In this study, four structurally diverse dyes with varying pi-conjugation (phenyl, naphthyl) and donor groups (-OMe, -NMe2) are coupled to PLLA-PEG (~14 kDa) block copolymers to achieve fluorescent nanoparticles that span the visible spectrum (430 nm - 620 nm). To expand the scope of colors, these dye-PLLA-PEG conjugates were blended with PDLA-PEG to form highly stable stereocomplexes. The tacticity-induced changes in the two PLA blocks caused closer packing and stronger hydrophobic interactions to generate smaller, more water stable NPs for enhanced aqueous stability and tumor delivery. The decreased dye loading, which was a result of the blended block copolymer NPs, also blue-shifted the optical properties of the dyes to generate more fluorescent colors. The red derivative, with red-shifted emission (620 nm), is the most optimal imaging agent with a reduction in light scattering and autofluorescence noise in vivo.

Krishnappan, Sharadha, Class of 2016, Biology, Georgia Institute of Technology

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #26

Identification of Aging Genes in Rotifers using RNA Interference

Current transfection protocol in rotifers only allows for temporary transfection within rotifers and does not allow for the continuous knockdown of endogenous genes, thereby inhibiting the possibility of observing long-term biological effects in response to specific perpetual gene knockdowns. This study aims to address this particular issue by establishing a working protocol for plasmid cloning and shRNA design within an endogenous gene of B. manjavacas with known biological effects, allowing for the exploration into the optimization of a transfection protocol and demonstration of RNAi knockdown of the known gene within the rotifers as subsequent studies. Manipulation of gene expression in rotifers could occur through plasmid vector insertions, which induce silencing of a gene's expression with short hairpin RNA (shRNA), via RNAi1. This would effectively stimulate gene knockdown, allowing for the observation of biological effects such as changes in fecundity and lifespan. With the establishment of a working protocol for plasmid cloning and shRNA design, as a result of this study, the optimization of a transfection protocol for rotifers is explored. With increased efficiency in the transfection of rotifers, populations of rotifers expressing the plasmid can be amassed, allowing for experimental design that examine the varying aging mechanisms and effects that are stimulated due to permanent changes in target gene expression through RNAi. This, in turn, could give rise to the identification of evolutionarily conserved genes that regulate organismal aging, which could lead to further implications in the field of pharmacological intervention in mammalian aging and the field of biogerontology overall.

Krumdick, Melissa, Class of 2016, Applied and Computational Mathematics and Statistics, University of Notre Dame

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #13

Analysis of Volatility-based Option Trading Strategies

My research discusses the intricacies of option-based trading strategies, with a focus on volatility trading. To begin, option theory is introduced, with an emphasis on tailoring option strategies to achieve desired risk-return characteristics in a portfolio. This background is followed by a more in depth-analysis on a methodology that traders can use to identify profitable trading opportunities, take advantage of pricing discrepancies, and evaluate their trades. The volatility-based option trading strategy considered aims to identify mispriced options by comparing an option's estimates for historical and implied volatility and exploiting instances when the market view appears to be incorrectly estimating the option's volatility by trading a delta neutral portfolio of an option and its underlying. The focus of my research is the mathematical and statistical techniques that underlie this strategy, with an emphasis on the variety of ways volatility can be measured. As finding true edge involves careful and correct measurements for volatility, a significant portion of this paper explores how volatility is estimated. The Black-Scholes-Merton model is presented as a well-known and widely-used model to calculate an option's implied volatility, along with the mathematical justification behind the pricing model and a caveat about the model's underlying simplifying assumptions. The level and shape dynamics of implied volatility are discussed to highlight regularities and patterns in implied volatility. Several different historical volatility estimators, the Parkinson, Garman-Klass, Rogers-Satchell, and Yang-Zhang estimators, are then offered as alternatives to the classic estimator of volatility, the standard deviation of the asset's log returns. The performance of these estimators is compared using both simulated stock motion as well as empirical data to demonstrate the strengths and weaknesses of each estimator. My paper concludes by examining several topics that are important in derivative trading, including, hedging, money management, trade evaluation, and psychology. Dynamic delta hedging is covered in detail, with a focus on the trade-off between decreased risk and increased transaction costs. A delta hedging strategy is simulated, varying the asset price movement as well as the hedging intervals. Simulations using the money management technique of trading at fractions of the Kelly criterion are studied, quantifying the relationship between expected time to reach a certain goal and the probability the goal is reached. The discussion of trade evaluation summarizes statistics that can help a trader better evaluate his own profit and loss, monitor his trades, and evaluate the persistence of his performance. Finally, the psychological component to trading is briefly introduced, with an emphasis on advice from professional traders, to examine how psychology helps differentiate highly-skilled traders.

Kunesh, Adam, Class of 2017, Physics, Mathematics, University of North Carolina

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #28

Reducing the Angle Dependence of Light Emitted by Artificial Butterfly Wings

The Amazonian Morpho butterfly, characterized by its vibrant, iridescent coloration, is a prime example of structural color found in nature. On the scales of each wing of the blue Morpho, many microscopic structures exhibit interference and diffraction, resulting in an emission of brilliant blue color. Though this color has been reproduced by man-made nanostructures, there has been difficulty in fabricating these structures over a large area. Further, the samples produced lack a wide range of viewing angles from which synthetic "wings" are observed to emit the desired color of light. To reduce this angle-dependence, a new method which randomizes the periodicity of the structures by writing each micro-line individually was implemented. In contrast to previous methods, in which the structures were formed using perfectly-periodic light interference patterns, we made use of a laser, an Arduino microcontroller, and a microstepper to "carve" the structures at random intervals. Initial data indicates that this method does reduce the angle-dependence of the samples. This method may help to enable the production of elastic "wings," for which the emitted color could be actively manipulated based on the stress applied to the "wing."

Kyle, Mari, Class of 2016, Studio Art and Advertising, Florida State University

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #15

Building Worlds: An Analysis of the Market for Mass-Produced Virtual Reality Technology

The objective of this research is to explore the phenomena of virtual reality (VR) through the marketing of its developing technologies, its future opportunities, and its potential of mass production. I spent the first half of my research gathering information on current VR and immersive environment trends. The second half of my research, I began analyzing the current market of VR evaluating its advertising trends to explore the opportunities of VR in various fields such as education, art, psychology, entertainment, etc. This research will analyze the market of VR during the '90s "Fall of VR" and compare it to the market of the present. I interviewed the nation's most revered VR and computer graphics pioneers and gathered from their discussions a set of strengths and weaknesses of current technologies. I then combined this inside-industry perspective with an audience perspective (backed in the market research form of a survey) in order to accurately study the present day market. Ultimately, these studies have revealed a change in target demographic and societal interest for VR. Through my industry studies, I can conclude that VR applications in entertainment are the most influential and renowned in popular media, suggesting a change in current advertising strategy.

Lane, Sidney, Class of 2017, Microbiology & Immunology, University of Miami

Oral Session 1 Saturday, 9:55 a.m. Room 011

Flow Cytometric Evaluation of T cell Exhaustion in Aging HIV+ Patients and the Effect on Influenza Vaccine Response

Influenza is an important public health issue, with annual epidemics affecting 35,000 people. As such, influenza vaccination is important for at risk groups, specifically the elderly and immunocompromised. With the advancement of cART therapy, HIV infection has transitioned to a lifelong chronic infection, leading to a growing population of elderly HIV+ persons. Previous studies have shown that aging leads to immune senescence and that chronic HIV infection hastens the onset. Immune senescence is characterized by decreased expression of the costimulatory receptor CD28 on T cells, increased expression of exhaustion markers, and negatively impacts vaccine efficacy. The current study aims to determine the modulation of T cell exhaustion throughout the aging process and how this impacts the response to Influenza vaccination in an aging HIV+ cohort. We performed multi-parameter flow cytometry on PBMC from subjects prior to vaccination to evaluate multiple markers of T cell exhaustion. In total, we measured 105 parameters including T cell subset frequencies and the expression of exhaustion markers on these subsets. We performed statistical analysis to compare Old and Young vaccinees, 15 parameters were significantly different in both HIV+ and Healthy donors. 21 distinct parameters were significantly different when comparing Old and Young HIV+ donors only and 16 parameters when comparing Old and Young Healthy donors only. Overall, there was a trend of the Old HIV+ group having higher expression of exhaustion markers and lowest response to the vaccine as measured by serum antibody titers. This study highlights the need for improved vaccination of immunocompromised persons and further immunological research of the elderly HIV+ population.

Larson, Lee, Class of 2016, History and Economics, Wake Forest University

Oral Session 2 Saturday, 1:15 p.m. Room 001

The Shadow of the Nixon Pardon: The Impact of Gerald Ford's Decision on Politics and Economic Policy in the United States

Just one month into his Presidential term, Gerald Ford issued a full and unconditional pardon for his predecessor, Richard Nixon. Ford's pardon was a momentous event in his truncated tenure, and although the action initially enraged the voting public, most scholars now view the pardon as a positive, healing action. In contrast, this paper argues that the pardon increased public cynicism, demonstrated the political clout that could overpower the justice system, and accelerated partisanship in government. Additionally, the pardon prevented Ford from addressing the nation's most pressing domestic problem in an effective manner. During the 1970s, the United States faced the novel economic problem of simultaneous increasing inflation and declining output, known colloquially as "stagflation." President Ford and his advisors Alan Greenspan, William Simon, and William Seidman correctly focused on fighting inflation first, and borrowed many ideas from the newly developed economic theory on monetarism. But the pardon decision alienated the Congress, the national media, and many Americans, and this opposition prevented Ford and his administration from implementing a complete and coherent monetarist solution. Ford lost the election of 1976 to Jimmy Carter, and the nation's economic problems would persist until the early 1980s. Eventually, President Reagan and Federal Reserve Chairman Paul Volcker implemented monetarism by dramatically raising interest rates in order to rein in inflation. President Ford's term therefore represents a turning point in politics and economics: his pardon of Nixon sustained the political turmoil and disenchantment begun by the Vietnam War and Watergate, but Ford also worked to apply inventive monetarist solutions to the problem of stagflation. Unfortunately, the Congressional and popular opposition to his pardon decision precluded an exhaustive application of monetarism, and Americans suffered through five more years of economic turmoil.

Lash, Blake, Class of 2018, Biomedical Engineering, Georgia Institute of Technology

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #30

Developing novel drug-based therapies for uterine leiomyoma

Uterine leiomyomas (fibroids) are non-malignant smooth muscle tumors that develop in the myometrium of over 70% of pre-menopausal women. Approximately 30% of these cases will require treatment, accounting for an annual financial impact of almost $34 billion. Though most cases do not become malignant, fibroids can cause significant uterine bleeding, pelvic pressure, pain, and reproductive problems. Currently, symptomatic leiomyomas are treated with surgical removal, sometimes necessitating a hysterectomy. Current non-invasive treatment procedures such as gonadotropin-releasing hormone agonists have proven to have significant detrimental side effects including bone loss. The focus of my research is to investigate the link between extracellular factors secreted by leiomyoma cells and phenotypic changes in non-diseased myometrial cells. Based on previous research done with mesenchymal stem cells and tumor-conditioned media, I have hypothesized that myometrial cells treated with fibroid conditioned media will begin to exhibit a more fibroid-like phenotype than typical myometrial cells. In-vivo this mechanism could account for part of the growth of fibroid tissue. Based on the extent of fibroid-like characteristics, I plan to slow this change by inhibiting mechanosensitive pathways known to be sensitive in typical fibroid development. Studies have shown that increases in mechanical stress activate pathways like the Rho/ROCK pathway, leading to changes in cell morphology and motility. Fibroids also respond to many other pathways including PI3K and MAPK, which have a role in increasing cell proliferation. My goal is to develop a drug-based therapy to slow this phenotype change, which will hopefully translate to slower growth in-vivo.

Latif, Abdul, Class of 2016, Religion, Minor in Linguistics and Turkish, Duke University

Oral Session 4 Sunday, 10:55 a.m. Room 105

On the *Asl* of Specious Arguments: Muslim Perspectives of Evolution

The theory of evolution is instrumental in advancing much of modern science, but is simultaneously controversial due to its association with Social Darwinism and the potential challenges it presents to theistic worldviews. Pre-Darwinian Muslim commentaries on creation were often similar to the genesis account, though philosophical and mystical views displayed significant variance. Evolution entered the islamicate milieu in more and less ideologized fashions, leading different types of scholars to accept it in different regions. Discomfort with materialism and fidelity to science emerged as consistent considerations in Muslim perspectives of the theory. Current responses by "Muslim scholars" present a spectrum of complete acceptance to rejection, influenced by different notions of scriptural integrity. They demonstrate new understandings of religious authority, and employ methodological techniques which claim to be rooted in aspects of tradition.

Lee, Demetria, Class of 2016, Political Science; English, Virginia Tech

Oral Session 1 Saturday, 10:20 a.m. Room 106

"The Same Neutral Hue": Phoebe Marks's Inconspicuous Success

This paper analyzes the role of the servant, Phoebe, in Lady Audley's Secret (1862) by Mary Elizabeth Braddon. I argue that Phoebe's role is misinterpreted by scholars such as Katherine Montwieler who diminishes Phoebe's importance, and Elizabeth Lee Steere who overemphasizes it. I argue that Phoebe's role is that of the student. She learns from Lady Audley's subversive rise through the social ranks and the questionable morals that she employs to do so. My interpretation of Phoebe's role in Braddon's novel calls for a reading of Lady Audley's Secret that subverts traditional Victorian morals. My research is a synthesis of historical context, textual interpretation, and scholarly analysis. I found that Phoebe's character illustrates on the fears of Victorians of increasing social mobility and challenges to traditions. Her role in the novel is not the villain, as Steere claims, nor a canvas to display Lady Audley's character, as Montwieler argues, but the student who surpasses her teacher.

Lim, Hui Yi Grace, Class of 2016, Biology, Duke University

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #17

How Do Cells Invade? Identifying Novel Regulators of Invasion

Specialized cells invade tissues, breaking through sheets of cells during development and disease progression. Embryos breach the uterine wall to establish a fetal-maternal connection, while metastatic cancer cells invade through blood vessels to travel to distant sites of the body. In the worm Caenorhabditis elegans, invasive behavior occurs during larval development, when a specialized uterine cell known as the anchor cell breaches the basement membrane underlying it to establish a uterine-vulval connection. This process occurs in a precise, stereotyped manner, and can be easily studied using genetic analysis and live-cell imaging of genetic mutants with observable defective invasion phenotypes. Given these advantages, anchor cell invasion in C. elegans has been closely studied as an in vivo model for understanding the regulatory mechanisms behind basement membrane transmigration. Although genes involved in anchor cell invasion have previously been identified, gaps in the regulatory pathway continue to hinder our complete understanding of the mechanism behind anchor cell invasion. In this study, we identified novel regulators in C. elegans that could address some of the unknown mechanisms involved in anchor cell invasion. A pre-existing protruding vulva mutant collection, whose phenotype is indicative of altered uterine-vulval connection, was screened for a block or delay in anchor cell invasion. Two anchor cell invasion-defective mutants were identified with phenotypes that were distinct from known genetic mutants, and their associated genes were mapped onto the C. elegans genome. These mutants were then characterized for defining features of basement membrane transmigration, such as changes in actin localization, matrix metalloproteinase activity, and specification of vulval precursor cell fate, which could allude to their regulatory function in anchor cell invasion. Future work will focus more specifically on demonstrating the role of these novel regulators within known pathways. These regulators can represent future targets for therapy and help elucidate basic mechanisms behind normal human development and cancer metastasis.

Liu, Yi-Ting, Class of 2017, Neuroscience, University of Virginia

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #19

A New Protocol to Visualize Dopamine in Whole Mount Drosophila Preparation

Dopamine is a neurotransmitter critical in mediating reward pathways, locomotion, and learning and memory. Dopamine visualization is crucial for studying dopamine localization, release, and subcellular quantitation in the brain. We have developed a new immunostaining protocol to directly detect dopamine (DA) in brains of Drosophila melanogaster with high signal to noise ratio. The DA antibody stains dopamingergic neurons and terminal projections in wild-type flies while DA deficient brains lack staining, showing specificity of the antibody. The common method to infer DA in the brain utilizes immunostaining of tyrosine hydrolyase (TH), the rate limiting enzyme for DA synthesis. Here, we show the flaw in using this marker, since detectable levels of TH produced by poorly translated TH protein can produce normal amounts of dopamine. Reduced DA staining in the terminal region of a vesicular transporter mutant tell us that stained dopamine is contained in vesicles. This new immunodetection protocol will allow accurate and direct visualization of changes in subcellular localization of DA as a function of other genetic and behavioral state alterations.

Lockwood, Hannah, Class of 2017, Environmental Engineering, University of Miami

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #32

Comparison of Beach Management Practices and Bacteria Levels at 316 Florida Beaches

Through the Healthy Beaches Monitoring program, the Florida Department of Health has measured the quality of recreational beach water through measures of enterococci, a fecal indicator bacteria. When bacteria exceeds a specific threshold (104 colony forming units, CFU per 100 ml), the beaches are closed due to water contamination. One way to express the frequency of beach closures is to convert this data to percent exceedance. The causes of the exceedances are many times unknown. The objective of the study is to investigate connections between management practices and enterococci levels at the 316 monitored beaches in Florida. Beach management data was collected though a comprehensive survey completed by beach managers, which were compiled into a master excel spreadsheet and merged with the bacterial information. The merged data was analyzed statistically using t-tests. Questions chosen for preliminary testing of the collected data included whether the exceedances of enterococci differed between a) beaches that charge access fees versus those that do not, b) various seaweed density conditions, and c) the presence versus the absence of dogs. Results show that beaches requiring access fees had lower exceedances than those that did not ($p<0.02$). Beaches with reported “dense” seaweed conditions had higher exceedances than those with reported “medium,” “sparse,” and “zero” seaweed conditions ($p<0.03$). Beaches permitting dogs had higher exceedances than those that do not allow dogs ($p<0.02$). Overall results suggest that the cumulative effects of beach management practices can play a role in whether beaches comply with recreational water quality guidelines.

Lukasak, Bradley, Class of 2016, Chemistry, University of Pittsburgh

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #21

Aryl Azides as Phosphine-Activated Triggers for Small Molecules

Staudinger reactions, are commonly used in the reduction of aryl azides to amines through use of phosphines. However, in the presence of an appropriate leaving group, the reaction intermediates will undergo 1,6- and 1,4-elimination reactions, a widely utilized method in chemical biology for the release of small molecules. The mechanism and kinetics of such eliminations coupled to Staudinger reductions are not well studied. Using a fluorophore as the leaving group, the kinetics were investigated by monitoring fluorescence as the reaction proceeded. The aryl azide functions as a protecting group that cages fluorescence and treatment with phosphine results in elimination and release of the active fluorophore. Results show that the structure of the aryl azide protecting group has a significant effect on the rate of the reaction. Introduction of an electron-donating group at the benzyl position enhances the rate of the reaction by stabilizing a carbocation intermediate. Phosphine structure plays a role in both the speed and the mechanism of the reaction, as eliminations may occur from the phosphazene intermediate. These results yielded a combination of aryl azide and phosphine that yields the fastest release of fluorophore. The optimized elimination may be utilized in the fast and efficient release of small biologically active molecules.

Lukianov, Cyril, Class of 2017, Chemical & Bimolecular Engineering, Georgia Institute of Technology

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #23

Peptide-based nanoparticle as a vehicle for intracellular delivery of functional antibodies

The cell membrane remains a formidable barrier for antibody-based therapies, and efficient intracellular delivery of functional antibodies may be critical for modulating important intracellular signaling mechanisms and protein-protein interactions. This study utilizes protein engineering techniques to develop a novel nanoparticle that is capable of delivering functional antibodies to the intracellular environment. Each nanoparticle is capable of delivering up to six functional antibodies, and may bind different functional antibodies with the same affinity. The current study is focused on enhancing the specific targeting properties of the nanoparticle as well as the efficiency of intracellular antibody delivery. This novel design has great potential for many diverse applications due to its simplicity, biocompatibility, as well as modular design.

Malone, Margo, Class of 2016, Biology, Syracuse University

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #34

Evaluating the effect of arbuscular mycorrhiza fungi on crop plants

Agriculturists continually look for ways to improve the nutrient content of crops without decreasing crop yield and economic benefits. Mutualistic relationships have the potential to enhance the nutrient content of the crop without sacrificing the production needs of the farmer. Mutualisms occur when two or more species interact and both members of the association benefit. An incredibly important and often overlooked mutualism is the one formed between arbuscular mycorrhizal fungi (AMF) and plants; this interaction has been shown to be a critical component of most ecosystems, yet our understanding of these relationships is still limited. We know that in exchange for photosynthetically derived carbon, AMF help to increase plant nutrient uptake. However, the potential of AMF to improve the crop nutrient content relative to human health is relatively unstudied. Optimal levels of mutualistic activity could increase efficiency in agriculture, and these advancements would improve the economic and environmental impacts of agriculture. Arbuscular mycorrhizal fungi colonize roots and establish an external structure that enhance the uptake of nutrients and protect against pathogens and toxic stresses. AMF mobilize nutrients from the soil and transfer them to the host plants. The AMF hyphae structures maximize the explored soil space and nutrient uptake, thus making it possible to limit harm to the environment, unlike current excess fertilizer use. Crops only use a limited amount of the fertilizer inputs and the remaining fraction is lost though gas emissions and runoffs, causing severe environmental problems that contribute to global warming. If applied to agriculture, the effect of AMF would enhance sustainability by promoting nutrient cycling and reducing the need for external chemical input. The technique and knowledge of AMF application to agriculture applied to areas lacking fertile soil has the potential to increase the availability of nutrient dense crops and increase global food security. The goal of my research project is to first identify the benefit of the mutualism between arbuscular mycorrhizal fungi and crops with regard to the nutritional content. Second, to prove this method of agriculture gives farmers greater economic marginal utility while avoiding environment harm. To examine the questions, I designed a green house experiment testing 80 carrot plants in sterile, sand conditions to compare the effect of varying treatments. I utilized two two AMF species, Rhizophagus clarus and Rhizophagus intraradices. I believe the application of my research extends beyond the laboratory and science community to affect the global community.

Marrero-Rosado, José, Class of 2017, Biochemistry; Anthropology, Syracuse University

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #25

Determining the Toxicity of PTE and PXE, two Chemicals Isolated from Onondaga Lake

Onondaga Lake is part of an EPA superfund program due to over a century of chemical waste pollution. Professor Hassett from SUNY ESF has identified two poly-aromatic hydrocarbon compounds in the lake: 1-phenyl-1-(p-tolyl)-ethane (PTE), and 1-phenyl-1-(2,4'-xylyl)-ethane (PXE). These chemicals have not been studied before, but their structures are similar to DDT, a known toxic insecticide, suggesting that PXE and PTE might also be toxic. This research aims to identify if PTE and PXE are toxic to aquatic vertebrates and if so, at what concentrations, and todetermine if exposure to these chemicals also increases the risk of seizure episodes in the same way as DDT does (Tiedeken et al. 2009). So far, I have found that both PXE and PTE cause severe phenotypes and early lethality in zebrafish embryos. Some of the phenotypes seen are: massive edema, necrosis, brain growth, misshapen bodies, eye malformations, tail deformities, tail disintegration, and missing swim bladder. Exposing the embryos to PTE or PXE for 7 days post fertilization significantly increases the incidence of seizure when zebrafish are introduced to Pentylenetetrazole at 7 days. Moreover, exposing the embryos to PTE or PXE from 6 to 30 hours post fertilization (24 hour exposure) days significantly increases the incidence of seizure for larvae exposed to PTE but not for the larvae exposed to PXE. Our research is determining the toxicity of PTE and PXE. This will enable a more comprehensive lake cleanup, because alarmingly, the presence of these chemicals in the lake are being ignored and the lake is being promoted as "clean" and citizens are being encouraged to swim in it. In addition, as these chemicals may have been generated as byproducts of chemical processes elsewhere in the world, our research will hopefully contribute to more effective detoxification of other contaminated sites.

McFrazier, Maya, Class of 2017, Public Health/Pre-Dental, University of Louisville

Oral Session 2 Saturday, 1:15 p.m. Room 105

Nucleoside diphosphate Kinase-Dependent Suppression of Apoptosis in Esophageal Cancer Cells by the Oral Pathogen Porphyromonas Gingivalis

Esophageal cancer is the eighth most frequent tumor and sixth leading cause of cancer death globally. Recent evidence suggests that a Gram negative, anaerobic bacterium that is a causative agent of periodontitis, Porphyromonas gingivalis, is strongly associated with esophageal cancer. Indeed, P. gingivalis infection strongly correlates with disease stage and survival time. However, the potential mechanisms by which this important oral pathogen may predispose to the development of esophageal cancer are entirely unknown. It has previously been established that P. gingivalis produces a nucleoside diphosphate kinase (NDK) that can promote epithelial cell survival by hydrolyzing extracellular ATP and preventing apoptosis initiated by the purinergenic receptor, P2X7. Therefore, we set out to determine if P. gingivalis was able to inhibit drug-induced apoptosis in esophageal cancer (KYSE-30) cells, hypothesizing that this phenomenon may be dependent upon a functional ndk gene. Campothecin, derivatives of which are being tested for treatment of esophageal cancer, induced apoptosis in KYSE-30 cells. Infection with wild type P. gingivalis inhibited CAMP-induced esophageal cancer cell death, whereas ndk-deficient P. gingivalis mutants were less efficient in blocking apoptosis. Therefore, the epidemiological association noted between P. gingivalis and esophageal cancer may be partly explained by NDK-dependent inhibition of apoptosis.

Merkl, Jackson, Class of 2017, Aerospace Engineering, Georgia Institute of Technology

Oral Session 1 Saturday, 9:30 a.m. Room 001

Extracting Pressure and Velocimetry in Vortical Flows

The research presented (which is not solely the applicant's work) covers advancements made by the EACG lab in extracting transient flow data from complex rotorcraft flows. Two primary test cases are investigated to test current SPIV methods as well as a pressure extraction technique created by the applicant. The pressure extraction method relies on velocity vectors supplied by SPIV that are then converted into a field of frictionless pressures whose boundaries serve as the boundary conditions for a full Navier-Stokes solution capable of extracting pressures on and off the surface. The first case is a rotating rotor blade in reverse flow at various speeds and azimuth angles. The other test case, a low aspect ratio (AR: 1) cylinder in yaw, is used to validate the applicant's pressure extraction method with conventional intrusive techniques for a simple flow. The conclusions of the tests validate the lab's existing model to characterize spanwise development of trailing edge vortices. Using the applicant's pressure technique and the lab's SPIV tools, sharp-edge vortices are shown to form at highly swept conditions, convecting when perpendicular from the flow, and then detaching when fully retreating. From the cylinder test case, the effects of viscosity in off-body vortex flow pressure computation obtained by SPIV and analyzed by Couette flow analysis is observed to be very minimal, giving excellent prospects for pressure distributions generated by SPIV data. Therefore, the further work presented focuses on the development of the lab's SPIV tools and pressure extraction method.

Moseley, Maddie, Class of 2018, Communication, Minors in Writing and Entrepreneurship, Wake Forest University

Oral Session 1 Saturday, 9:30 a.m. Room 106

Personalization and Generalization in First-Year Academic Writing

The directive self-placement (DSP) is a process that helps students better understand their level of preparation for college-level writing. After the DSP essay and survey are submitted, the DSP team suggests a course for the student to help guide them, not place them, in their process of choosing a writing course best suited for their needs. Through this process, the DSP team gathers information from the essays and surveys and conducts research that is rarely found in any other university in the country. This research uses two methods, the survey and corpus analysis, to gain knowledge on how first-year writers write in regards to their audience, incorporating source texts, and their own use of various writing features and techniques. Through the corpus analysis, we were able to see how students' writing compares to expert writing by observing various features such as generalization markers, interpersonal language, narrative features, and overt persuasion across the two corpora. The findings suggest that generalization markers and interpersonal language proved more frequent in the FY student writing relative to the expert writing. The resulting conclusion is that student writers tend to broaden their claims at a much higher rate than expert writers rather than hone their argument, thus making it less credible. Therefore, we can consider what strategies students should develop as writers throughout their collegiate writing instruction in order to become more like expert writers while advancing as writers themselves.

Nassar, Layla, Class of 2017, Neuroscience, University of Miami

Oral Session 2 Saturday, 1:40 p.m. Room 011

Understanding how sex modulates the female nervous system to drive distinct reproductive behavior states

We are interested in understanding how mating and reproductive behaviors are coordinated in the female nervous system using the nematode Caenorhabditis elegans as a model. Specifically, we are identifying the neural signaling systems that drive two mutually exclusive vulval motor behaviors: mating with males or the release of progeny during egg laying. We hypothesize that (1) female vulval muscle twitching contractions facilitate male spicule insertion during mating and (2) specific mechanical and chemical signals report successful copulation and insemination. To investigate the hypotheses, we are using ratiometric calcium imaging techniques to record activity in the behavior circuit during mating with males, after successful insemination, and during the resumption of normal egg laying behavior. We have found that hermaphrodites with sperm have reduced vulval muscle twitching behaviors resulting in inefficient mating. In contrast, hermaphrodites depleted of sperm have increased vulval muscle twitching that facilitates male spicule insertion and mating. After mating is complete, hermaphrodites have sustained vulval muscle twitching that can result in release of sperm from the uterus. This behavior may act as a mechanism for competition with self-sperm. We are now examining how mating affects activity in other cells in the circuit, including the serotonergic HSN neurons and the cholinergic VC neurons. Together, these results will explain how internal and external signals modulate activity in the same neural circuit to drive distinct behavior states.

Niiro, Leslie, Class of 2016, Community Development & Social Action in Latin America, Duke University

Oral Session 2 Saturday, 1:40 p.m. Room 001

Pedagogy of remembrance: The Argentine quest to reclaim traumatic memory

How do societies teach about recent and traumatic history? From 1976 to 1983, state-sponsored terrorism reigned in Argentina. By the end of the dictatorship in 1983, the state had tortured, murdered, and disappeared more than 30,000 people in many clandestine torture centers in Argentina and abroad. Upon the completion of the transition to democracy, and after calls to action from many human rights organizations, some of these former clandestine torture centers were transformed into memory sites. These memory sites, painful reminders of the Argentine dictatorship, stand in protest against societal amnesia. Their message is clear. Never forget this history, so that it may never be repeated. Through an examination of three memory sites in Buenos Aires, I draw on critical pedagogy to analyze how Argentinians learn about the "Dirty War". Using Paulo Freire's idea of critical pedagogy, I ask how and why future generations learn about past atrocities. Because the basic principle of critical pedagogy is that education is a political act, the Argentine use of critical pedagogy demonstrates a political desire to promote certain citizenship ideals, namely, critical historical consciousness, human rights awareness, and the concept of people power. Argentinian memory sites accomplish this through promoting critical dialogue and questioning of the past. Drawing from interviews, participant observation, and analysis of educational materials from each site, I conclude that a critical reading and questioning of history, as done in Argentina, can serve as a model for other countries coping with difficult and traumatic pasts.

Nwankwo, Nneoma, Class of 2016, Political Science, Virginia Tech

Oral Session 1 Saturday, 9:30 a.m. Room 105

"I Miss School Because There Are No Latrines": Exploring the Real Cost of Poor Sanitation Facilities on Schoolgirls in Underserved parts of sub-Saharan Africa

For thousands of girls in underserved areas of sub-Saharan Africa, the onset of menstruation makes schooling very difficult. Famed researcher, Marni Sommer, refers to this clash of womanhood and education as the "body-school collision." This 'collision' often leads to menstrual-related absenteeism, mental and physical exhaustion, amongst other factors, which often end in withdrawal from school. These outcomes are not inevitable. However, due to widespread lack of access to menstrual hygiene facilities, harmful cultural attitudes toward menstruation, and the missing contextual knowledge required to manage menstruation properly, these outcomes are too often realized. / / By taking the voices of the young girls most affected into account, my research identifies measurable steps that leaders at all levels could employ to alleviate this issue. Interweaving my own experience in the field with peer-reviewed research, I recommend three key steps, termed 'I-3 approach': impart, invest and implement. My research shows that when effectively combined, these steps prove successful in promoting proper menstrual hygiene practices, eliminating negative socio-cultural norms towards menstruation and ensuring the education and long-term economic empowerment of the girl-child.

Oliver, Amber, Class of 2016, Earth & Ocean Sciences; Visual & Media Studies, Minor in Classical Civilizations, Duke University

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #36

Let's go fly a kite: generating coastal topographic maps using aerial photography

Barrier islands play an enormous role in protecting coastal habitat and the diverse assemblage of species present in these environments. Key to barrier islands' existence is their sand dunes. Coastal dunes serve to anchor and protect the island as they stave off the encroaching forces of waves and wind. Dunes form as a result of a two-way feedback between vegetation and sediment transport. Sand is transported from the beach to the dune by wind. Vegetation causes the wind to slow down, resulting in the deposition of sand and the growth of a dune. In addition, sand deposition affects plant growth. Serial observations of both topography (dune shape/size) and vegetation (percent cover) are critical to understanding coastal dune growth and correctly parameterizing models of dune growth. However, it is difficult to obtain these measurements more than once during a growing season due to the expenses involved in data obtainment. Structure-from-Motion (SfM) is an evolving economical alternative to such traditional collection methods. SfM is a method used to collect and generate topographic models using data calculated from aerially photographed images. But because the use of this approach is in its infancy, procedural guidelines ensuring the model's accuracy have yet to be established. Such guidelines are necessary to render a topographic map that mirrors a site's true elevation and georeferenced location. One such guideline is the optimal number of Ground Control Points (GCPs)—locations with known coordinates—necessary to render an accurate topographic map. To address the role of GCP quantity on SfM accuracy we prepared digital surface models of the beach and foredune on Hog Island, VA, a site that contains ~180 high precision GCPs due to its use in an ongoing field experiment. We used a 9-foot single-line delta kite attached to a consumer grade point-and-shoot camera to photograph the field site (0.25 km2) from a height of 20 m. We then processed the 200+ aerially captured photographs using Agisoft Photoscan Pro, and we compared the elevation accuracy of the topographic maps rendered using SfM to points surveyed by a total station—a GPS device used to gather coordinates. Initial results suggest diminishing returns when greater than 11 GCPs are used. The study results may be used to inform future SfM studies using unmanned aerial vehicles or kites in flat, low-sloping coastal environments. The site-specific models produced aid in understanding the coupling between vegetation and dune growth and the role of vegetation species in controlling dune shape.

Ou, Bai, Class of 2017, Finance & Accounting, University of Miami

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #27

Volatility of Volatility and its predictive capacity on S&P 500 returns

My research focused on the Volatility Index (VIX) and the Volatility of Volatility Index (VVIX). In particular, I wanted to investigate their ability to predict future S&P 500 returns. Considering the current financial markets and the volatility that exists within them, prediction of future returns allows for tremendous opportunities to arbitrage. Time series data for the VIX, VVIX, and S&P 500 indices were collected from the Chicago Board Options Exchange website. This data set covered 2,144 daily data points, spanning from January 2007 to July 2015. Two business cycle subsets were created, a recession subset (Nov 2007 – Jun 2009), and a post-recession subset (Jan 2012 – Dec 2013). These time frames separate VIX/VVIX's characteristics in each respective business cycle. In addition, forward 5 and 22 trading day returns (a trading week and month, respectively) were calculated in Excel, which considers retroactively inspecting future returns. Using Microsoft Excel's Data Analysis functionality, three single-variable linear regression analyses were completed for each time subset. Each of the volatility indices were regressed against the current day (which is a control) and the next 5 and 22 trading days. The result of each regression was a single variable model that could be used at any given time to predict the future 5 or 22 day returns. The post-recession recovery subset's models were then used in an out-of-sample pool of data, which spanned from Jan 2014 – Jul 2015, in order to test the effectiveness of the models. A correlation study between actual 5/22 trading day returns and model predicted returns concluded the effectiveness of each indices' model. The results illustrated a weak correlation (r values between .29 to .53) between the model predicted returns and actual returns. Upon analysis of a graph plotting the actual results and the model results, it was shown that the model could predict the direction of the returns (positive or negative) but could not measure the magnitude effectively.

Parks, Danielle, Class of 2017, Economics and International Affairs, Florida State University

Oral Session 3 Sunday, 9:00 a.m. Room 106

The Effect of Economic Globalization on Transnational Terrorism

This research analyzes the effect of economic globalization on the number of transnational terrorist attacks within a country. The pooled time series analysis, conducted on a sample of 160 countries from 1968 to 2014, is an updated, expanded, and revised version of Li and Schaub (2004). The analysis first replicates Li and Schaub (2004) proving the accuracy of the tests. Next, it examines the effect of a larger sample and time period. Finally, existing variables are revised and new variables are added in order to improve the test. Countries have not only become more interconnected, but also the nature of transnational terrorism has radically evolved since prior research was conducted. Following the September 11, 2001, Pentagon and Twin Tower attacks, the world has been facing a new form of terrorism. Empirically, the amount of transnational terrorist attacks globally has been decreasing after the September 11, 2001, transnational terrorist attacks. Overall, the results show that international economic integration has overtime had a greater effect on the number of transnational terrorist attacks than research had previously suggested. Specifically, foreign direct investment (FDI) and portfolio investment have a statistically significant negative effect on transnational terrorist attacks within a country. However, trade openness no longer has a direct effect on transnational terrorism. Additionally, a country's economic globalization and partners' economic globalization does not have a statistically significant effect of reducing the amount of transnational terrorist attacks that a country experiences. As a result, the analysis provides policymakers with a greater understanding on what specific economic conditions may currently promote or inhibit the transnational terrorist attacks from occurring within a country.

Patel, Terral, Class of 2016, Biochemistry, and minor in Anthropology, Clemson University

Oral Session 3 Sunday, 9:00 a.m. Room 011

The search for new drug targets in the battle against African sleeping sickness: Identification of signaling molecules involved in organelle regulation in Trypanosoma brucei.

Trypanosoma brucei is the causative agent of human African trypanosomiasis or sleeping sickness in humans and a wasting disease, nagana, in cattle. It affects more than 70,000 people annually and renders most of sub-Saharan African unsuitable for raising of livestock. The disease is fatal if untreated and current treatments are toxic and difficult to administer, making the search for new drug targets essential. T. brucei harbors specialized organelles named glycosomes that are parasite specific and essential, making them attractive drug targets. It is known that environmentally induced changes in glycosome protein composition are essential to parasite survival, however, the proteins that regulate these changes are unknown. In an attempt to identify these proteins we utilized mass spectrometry to define the glycosome proteome under different environmental conditions encountered during the parasite lifecycle, which alternates between the tsetse fly vector and the mammalian host. Analysis of these glycosome proteomes revealed the presence of a 11 kinases and phosphatases, which we hypothesize may play a role in the regulation of changing glycosome composition. To test the hypothesis we silenced these proteins using an inducible RNA interference system and measured the effect of this silencing on cell growth and glycosome morphology. We also fused the genes to enhanced yellow fluorescent protein to visualize them within the parasite via fluorescence microscopy. To date, our studies indicate that the silencing of a putative tyrosine kinase (Tb427.08.5730) and MAPK (Tb427.10.52070) did not have any effect on growth under the conditions we tested. However, silencing of a putative serine-threonine kinase (Tb972.8.490), protein kinase 6 (Tb09.211.2260), glycogen synthase kinase 3 (Tb427.10.13780), and putative kinetoplastid-specific phospho-protein phosphatase (Tb427.05.4380) slowed parasite proliferation. These studies will help in the identification of signaling proteins that may be exploited in therapeutic development.

Pogson, Kaylyn, Class of 2017, Biology, English, University of North Carolina

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #29

Fabrication and Characterization of Drug Delivery Systems for Resiquimod

There are currently three FDA-approved adjuvants for vaccine use, and there exists a need to develop more potent adjuvants to formulate more effective vaccines. Imiquimod is FDA-approved, though not as an adjuvant; however this study uses its sister drug, the 7/8 Toll-like receptor agonist resiquimod, because it causes a more potent cytokine response. Using polymeric and lipid based delivery systems, this study sought to determine the most promising drug delivery system (DDS) by which resiquimod may be delivered to the body to develop its use as a vaccine adjuvant. Resiquimod was encapsulated at 3% nominal loading by weight within the following DDS: poly (lactic-co-glycolic acid) (PLGA) microparticles (MPs) by emulsion and solvent evaporation, acetalated dextran (Ace-DEX) MPs by emulsion and solvent evaporation (with various energy inputs), Ace-DEX MPs by electrohydrodynamic spraying (electrospray), and thin-film hydration liposomes. The resiquimod loading of each vehicle was quantified and the vehicles' size, morphology, and drug release properties were investigated. Each DDS was evaluated for endotoxin content and were determined to be within the FDA's endotoxin guidelines for water for injection (< 0.25 EU/mL). The DDS had predictable morphology, encapsulation efficiency, and drug release in pH 5.0 (phagosomal pH) and pH 7.4 conditions. The cellular viability, proliferation, and lack of apoptotic cell death established high cytocompatibilities for the various DDS. Nitrous oxide and pro-inflammatory cytokine production by RAW 264.7 macrophages demonstrated the successful delivery of resiquimod to the appropriate intracellular receptors. The Ace-DEX MPs formulated by emulsion and solvent evaporation were particularly effective in maintaining cytocompatibility while effectively releasing resiquimod in a pH-sensitive manner. Overall, this study illustrates the potential for delivering a resiquimod adjuvant using Ace-DEX DDS.

Protti, Milena, Class of 2017, Art History, University of North Carolina

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #31

The Celts: Brains and Stones

The Turoe and Castlestrange stones, located in County Galway in the west of Ireland, are some of the most instantly recognizable examples of ancient art in Ireland. The dates of the stones range from 100 BCE to 100 CE. The Turoe stone is the best example, from a select few surviving examples, of a Celtic art style called La Tène. Scholars have been unable to definitively associate these stones with a specific role in the Celtic society; though the phallic shape of the Turoe stone has led scholars to suggest a fertility function. This paper compares the characteristics of the Turoe and Castlestange stones to those of a brain, in order to propose that these unique La Tène style stones in Ireland are references to a stylized human brain. Celts believed that the spirit of a human was connected directly to the head. The "Cult of the Head" comes from the Celtic practice of collecting heads and skulls during battle. It can be concluded that Celts may have had experiences with the human brain. I will also explore the possibility of these stones being related to the "Threefold Death" ritual by analyzing their location. Additionally, an examination of the usage of the Torc as protection for the head, with a written mention in the "Second Battle of Mag Tuired" by Cath Maige Tuired will connect the brain, head, and spine cord to the spirit force.

Radabaugh, Hannah, Class of 2016, Neuroscience, University of Pittsburgh

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #38

Abbreviated environmental enrichment confers robust neurobehavioral and cognitive benefits in brain-injured female rats

From wars around the world to major sports like football and hockey, recent media buzz reporting the dangers of traumatic brain injuries (TBI) has brought this once silent epidemic out of the shadows and into the eyes of the general public. Approximately 10 million TBI cases occur worldwide each year. Despite the enormity of the problem, effective treatments are scarce; hence, it is urgent that potential treatments are identified and evaluated. Environmental enrichment (EE) is a paradigm that mimics clinical neurorehabilitation at the rodent level and has been shown to confer cognitive recovery in males. However, pre-clinical studies using females are rare albeit they make up 42% of the TBI population. Therefore, the goal of this study was to test the hypothesis that an abbreviated exposure of EE would confer behavioral benefits in brain-injured female rats. Anesthetized rats received a cortical impact or sham injury and then were randomly assigned to TBI or sham groups receiving 4-hr, 6-hr, or 24-hr of EE daily. Motor and cognitive abilities were assessed on post-operative days 1-5 and 14-19, respectively. The data revealed that all EE groups exhibited improved motor function compared to the standard (STD) housed groups ($p<0.0001$), but only the 6-hr and 24-hr groups enhanced cognitive function ($p<0.0001$).These results demonstrate that abbreviated EE confers robust neurobehavioral and cognitive benefits in brain-injured female rats, which supports the hypothesis and strengthens the validity of EE as a pre-clinical model of neurorehabilitation. These findings have the potential to significantly impact, and advance, rehabilitation based research.

Rao, Vishwas, Class of 2017, Chemistry, NC State University

Oral Session 1 Saturday, 10:20 a.m. Room 001

Engineering the substrate specificity of enzymes involved in secondary metabolite biosynthesis: a route to new small molecule therapeutics

Polyketides are a class of natural products with high therapeutic value as anticancer, antifungal, and antibiotic drugs. These synthetically complex molecules are produced through mega-protein assembly lines called polyketide synthases (PKSs). Due to the synthetic complexity of these natural products, traditional chemical routes to produce new therapeutic analogs have been limited. Biosynthetic approaches to diversifying polyketides show more promise. We aim to engineer the acyltransferase (AT) domain of PKSs to allow for new chemical functionality to be inserted into polyketides. The AT domain is known as the "gate-keeper" enzyme, which control the specificity of the polyketide extender unit. Here within, we describe our efforts to engineer ATs to alter substrate specificity. We hypothesized that mutations introduced at conserved active site motifs of target AT domains could be sufficient to alter the substrate specificity of a PKS. Using saturation mutagenesis, a library of mutant ATs was constructed. Several enzyme assays were developed and used to screen members of the library for changes in substrate specificity. Several mutants with new substrate specificities were identified and characterized, supporting the original hypothesis. Mutant ATs will allow for the diversification of polyketides and the potential to discover new therapeutics.

Robertson, Nicole, Class of 2018, Biology & Public Health, University of Louisville

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #33

Selective Ring Opening Reactions Using HF-DMPU

The utility of fluorine in medicinal and manufacturing chemistry is undisputed. Despite its usefulness, the incorporation of fluorine in organic molecules is not without challenges. Regardless of their electrophilic or nucleophilic nature, most, if not all, fluorinating reagents derive from HF. Nucleophilic reagents are less expensive compared with their counterparts, and many are not commercially available. The popular Olah's reagent (pyridine-HF complex) and triethylamine-HF have been explored extensively as nucleophilic sources of fluorine in many reactions. Laurence and co-workers recently published a comprehensive library of hydrogen bond basicity for various organic and inorganic compounds. This library guided our path towards improving the reactivity of HF as well as to tame its corrosiveness and led to our initial finding that DMPU, a relatively common solvent, formed a stable complex with HF. We showcased the usefulness of the HF-DMPU complex in the fluorination of alkynes. Our success on the investigation of HF-DMPU on the hydrofluorination of alkynes, which was cited on the American Chemical Society's Chemical & Engineering News, inspired and motivated us to investigate further the synthetic utility of HF-DMPU reagent. In this poster we will show some recent studies on the selective fluorinations of aziridine, epoxides and thiiranes.

Sandoval, Sofia, Class of 2016, Studio Arts; Natural Sciences, University of Pittsburgh

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #35

The Material of Place and its Effects on a Process-Based Art Practice

The curiosity of the unknown, the exploit of a serendipitous moment, and the vigor of a momentary impulse drive my art making process. Counter to the regimented schedule that I rely on as a pre-med student, I create work by focusing on the immediate moment – through reacting and problem solving at each step, without fixation on achieving a particular end goal.

Over the summer I participated in the UHC/Studio Art's Wyoming Field Study that provided an all-encompassing and liberating immersion into my completely process-based practice, with a high emphasis on experimentation. While there, I realized how the material of place both inspire and guide the work I create. From rusted railroad spikes to prairie dog holes and colorful rocks, the resources of Wyoming provoked my experimentations; such as rust printing and plaster casting my own set of dug holes.

Now back in Pittsburgh, I continue to investigate how the resources here affect my work and the differences and similarities between this new body of work versus that of Wyoming. When considering resources, things such as sensory experience, history, material, space, knowledge, and skill-set of that particular place all become the tools I use to prompt my creative process.

Continuing this idea of contrasting places and experiences, I am also preparing to conduct a London Field Study during the summer of 2016, from which I am expecting new variances in the work I create.

Sashidar, Diya, Class of 2017, Mathematics, NC State University

Oral Session 3 Sunday, 9:25 a.m. Room 011

The role of healthcare workers in Clostridium difficile transmission in hospitals

Clostridium difficile causes severe diarrhea and affects more than half a million people a year, primarily immunodeficient people such as the elderly (CDC 2015). This costly disease is becoming increasingly common in hospitals and is estimated to cause as many as 20,000 deaths and $3.2 billion in US acute care facilities alone annually. Our objective is to evaluate the role of health care workers in the transmission of C. difficile in hospitals. For that purpose, we modeled the role of health care workers in transmitting C. difficile among patients, and evaluate the effect of handwashing rates of health care workers on the spread of the disease in a hospital setting. We modified the deterministic system from previous work that was comprised of three infectious states and 16 parameters and incorporated health care workers as vectors of the disease. In addition to creating a deterministic model, we conducted two sensitivity analyses, local and global, and compare estimated parameters values to those found in literature. Local analyses study the effect of changing one variable while keeping the rest of the parameters fixed. It was found that the behavior of the new model was similar to the behavior of the previous model. It was found that when conducting these local analyses, the model was especially sensitive to the parameters, k (discharge rate for susceptible and colonized patients per day) and (treatment rate per day). Global analysis utilized Latin Hypercube Sampling and Pearson Ranking Correlation Coefficient (PRCC) methods. The model was globally sensitive to the parameters, k (discharge rate for susceptible and colonized patients per day), kr (Discharge rate for resistant patients, per day), and (antibiotic prescription rate per day). After finding which parameters are most sensitive, we derived the basic reproduction number for the model using linear algebra and similarly tested the sensitivity of the basic reproduction number to parameters. After examining behavior and characteristics of the deterministic model, we will create a stochastic model using the Gillespie algorithm and Markov chains to examine the effect of stochasticity on the model results. Finally, we will analyze hospital data and compare these values to that of the literature.

Schramm, AJ, Class of 2016, Chemistry, Syracuse University

Oral Session 4 Sunday, 11:20 a.m. Room 105

Investigation of substrate length dependency and inhibition of ghrelin acylation

The increasing incidence of diabetes and obesity constitutes a growing threat to public health. The peptide hormone ghrelin presents a promising and largely unexploited target for therapeutic development targeting these conditions. Ghrelin is involved in a wide variety of physiological processes including hunger stimulation, glucose regulation, and multiple neurological functions. Ghrelin undergoes several chemical modifications prior to secretion, including a unique posttranslational modification which attaches an eight-carbon fatty acid to ghrelin through a serine side chain. This octanoylation, which is essential for ghrelin to bind its receptor and activate signaling, is performed by the enzyme ghrelin O-acyltransferase (GOAT). Biochemical studies indicate ghrelin is the only substrate for GOAT within the human proteome. This combination of properties marks the ghrelin-GOAT system as a drug target for potential treatments of diabetes, obesity, and appetite dysregulation. Targeting ghrelin signaling requires us to understand how GOAT recognizes and modifies ghrelin, and identifying molecules that can block either ghrelin recognition and/or modification by GOAT. Previous studies from our lab have determined the first five amino acids of ghrelin are essential for recognition by GOAT, with our current studies examining the potential for additional recognition sites. In these studies, ghrelin-mimicking peptide substrates ranging in length from eight to 20 amino acids are tested for activity with GOAT to determine which parts of ghrelin interact with GOAT. To identify potential inhibitors of GOAT-catalyzed ghrelin octanoylation, we are utilizing a previously developed fluorescent peptide substrate to screen a library of small molecules. In these substrate selectivity and inhibitor studies, we continue working towards a molecular-scale understanding of the GOAT active site. The findings of this study lay a foundation towards creating novel drug inhibitors of GOAT to combat the physiological diseases that are impacted by ghrelin signaling.

Sisman, Lara, Class of 2016, Civil and Environmental Engineering, University of Virginia

Oral Session 2 Saturday, 1:15 p.m. Room 106

The Sustainability of Algae-Derived Biofuels: Assessing Potentially Overlooked Climate Change Impacts of Algae-to-Energy Systems

Algae derived biofuels are an attractive energy source due to their flexibility in growing conditions and higher lipid yields than traditional crops. However, research indicates that algae cultivation may produce significant amounts of greenhouse gases, which has not been previously accounted for in life cycle assessments (LCAs) of algae-derived biofuels. This work performs a literature assessment of studies that quantify nitrous oxide (N2O) emissions from algae cultivation for biofuel production and creates bench-scale experiments of algae ponds in order to simulate the production of greenhouse gases during their growth. Once N2O fluxes were measured in the lab, these fluxes were incorporated into an existing life cycle assessment (LCA) framework for analyzing various fuels including algae diesel, gasoline, and standard petroleum. Modeling results reveal that "low" N2O emissions, corresponding to high DO and nitrate N source during algae cultivation, will increase overall GWP estimates by 0.2%, which is not enough to affect the certification of algae-derived fuels under Renewable Fuel Standard (RFS2), administered by the U.S. Environmental Protection Agency (EPA). In contrast, the "high" N2O emissions estimate corresponds to a 58% increase in expected GWP, which would render algae-derived biofuels not certifiable as a "renewable fuel" under RFS2. As such, in order for algae biofuels to be commercialized in the United States and remain certified under RFS2, it is imperative that large-scale algae cultivation should occur under highly oxygenic conditions with nitrate as the nitrogen source, in order to minimize N2O emissions and the overall GWP impacts of algae-derived fuels.

Spahn, Madison, Class of 2016, Music, Biology, Minor in Genome Sciences & Policy, Duke University

Oral Session 3 Sunday, 9:50 a.m. Room 001

The Evolution and Future of *Frauenliebe und -leben* (A Woman's Life and Love)

Robert Schumann's 1840 song cycle "Frauenliebe und -leben" has been performed continuously since its conception, considered a touching musical portrayal of a smattering of moments in a young woman's life: love, marriage, motherhood, and evenutally widowhood. In recent years, however, it has become a controversial topic among music scholars and performers alike due to its antiquated representation of traditional gender roles. In this project, I have attempted to compile the primary analyses and interpretations of both Adelbert von Chamisso's poetry and Schumann's musical setting, as well as a comparative study of performances of the cycle by internationally renowned artists from various generations. The project is intended for use as a resource for young singers; it can provide them both with an overview of the historical evolution of "Frauenliebe und -leben," as well as varying viewpoints that they may use to better inform their performance of a beautiful musical setting that may feel at odds with their personal values. Another facet of the project is an original composition: a collection of songs called "Woman Work," set to poetry by modern female poets, including Erica Jong and Maya Angelou. This song set, intended as a counterpart to the "Frauenliebe und -leben" cycle's representation of the female persona, provides an alternate perspective on women's life and love. It offers a depiction of the female experience of love, motherhood, hopes, and dreams from those who have lived those experiences. Most importantly, it is intended to emphasize the necessity in our time of using the creation of new music to celebrate the voices of women that have historically been misrepresented or silenced.

Spencer, Matheu, Class of 2016, Physics, Biophysics and minor in Biological Sciences, Clemson University

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #37

Using FRET to Determine Structural Dynamics and Inter-domain Interactions of Tandem PDZ1-2 Domains in PSD-95

PDZ domains are the most common protein interaction domain in the human genome and almost exclusively appear in the context of larger multi-domain proteins These domains frequently appear in tandem with up to 13 PDZ domains conjoined into a single polypeptide In some cases, tandem PDZ domains show obvious interactions or even fold into a single supramodule The structures of individual PDZ domains have been solved to high resolution numerous times by NMR and x-ray crystallography However, there are a limited number of structures for tandem PDZ domains and no high-resolution structures for anything containing more than two PDZ domains By using Förster Resonance Energy Transfer we hope to account for the dynamics which are not observed on the NMR or X-ray diffraction studies The goal of this project is to utilize structures simulated through Discrete Molecular Dynamics (DMD), use the FRET derived distances to determine the structure of the PDZ1-2 tandem, and to identify inter-PDZ domain contact formation This will allow us to determine whether there are specific inter-PDZ domain interactions that drive the dynamics of the tandem Preliminary DMD simulations have been analyzed in two ways: i) Using FRET positioning and Screening (FPS) we identified which structure of the simulated ensemble represents the best experimental FRET distances ii) By cluster analysis we identify the cluster cut off r m s that resembles the measured FRET efficiency histograms This latter method is probably a more realistic way of thinking about the problem because it includes dynamic motions.

Tavakol, Daniel, Class of 2017, Biomedical Engineering, Minor in Mathematics, University of Virginia

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #39

Pericyte Recruitment in a Diabetic Mouse Model of Corneal Neovascularization

Angiogenesis, the generation of new blood vessels from a previously existing vasculature, is reinforced by the dynamic migration and signaling of wrapping support cells, termed pericytes, covering the capillary endothelium. Understanding pericyte-endothelial cell interactions involved in angiogenesis is essential for developing therapies targeted at improving blood vessel growth and stabilization during disease, such as in diabetic wound healing. Previous work has established a connection between diminished pericyte coverage and delayed angiogenesis in diabetic wound healing models. To date, the location and identity of pericytes in healthy versus diabetic angiogenic networks has yet to be explored. Therefore, the objective of this study is to compare the extent of pericyte coverage in angiogenic networks of diabetic versus healthy mice. Adult female heterozygous Ins2(Akita) diabetic mice and wild type mice (n=6 per group) underwent a silver nitrate chemical burn on the surface of the eye to induce corneal angiogenesis. Angiogenic sprouting into the previously avascular tissue was imaged daily using bright field microscopy. Three and seven-days after injury, corneas were harvested and stained with CD31 (endothelial cell marker), NG2 (pericyte marker), and myosin heavy-chain 11 (Myh11, pericyte and smooth muscle cell marker). Using whole-mount confocal imaging, Myh11+, NG2+ perivascular coverage over CD31+ endothelial cells was quantified in the vascular areas of the mouse models. There was a negative correlation between overlapping coverage of the two pericyte markers and glucose concentration (mg/dL) at days three and seven post-stimulation (r-square= 0.888 and 0.893, respectively). Subconjuctival hemorrhages per tissue in diabetic models were increased by 3.64-fold and 4.00-fold after three and seven days between glucose level and number of hemorrhages (r-square= 0.787 and 0.831, respectively). Diabetic neovessels in this injury model have diminished pericyte coverage relative to healthy mice, which is consistent with the presence of abundant subconjuctival hemorrhages in diabetic corneas. The comparison between data collected and glucose concentration in the blood is essential to understanding the relationship between these readings with the severity of diabetic effects, with an increase in glucose concentration equating to a decrease in pericyte-supported vasculature. Together, these data suggest that reduced pericyte coverage on neovessels may contribute to the impaired angiogenesis that occurs during diabetic wound healing.

Taylor, Stephanie, Class of 2016, Studio Arts, University of Pittsburgh

Oral Session 3 Sunday, 9:25 a.m. Room 001

Researching as a Studio Artist: Perception and Printmaking

As a 2015 Summer Undergraduate Research Award (SURA) recipient, I explored the consequences of color, title, and form on artwork by creating a series of four 6"x8" screen-printed studies under the direction of Professor Lenore Thomas. I began my research by creating a stencil for my screen by layering some random marks that I had made on a scrap of paper over and over, until I had created the silhouette of a composition. Much like the infamous Rorschach “inkblot” tests, I searched for meaning in this abstracted image. In it I saw feather-like shapes, and I used color and form through reductive screen-printing techniques to create four distinct “Bird Cluster” studies: “The Fall of Icarus,” using a sunset gradient to suggest falling; “The Death of Icarus (Grayscale),” that explores death as a fade-to-black; “The Death of Icarus (Yellow),” that explores death as a fade-to-white; and “Big Bird’s Love Nest,” which uses yellow feathers against a magenta backdrop as a ridiculous contrast to the more serious “Icarus” prints. My fellow SURA researchers responded to these studies through a critique exercise, which acted as a form of data collection to gather tangible criticism. This criticism provided a starting point for the two large-scale prints of “The Fall of Icarus” and “The Death of Icarus,” based off of their respective studies. The creation of these larger prints digressed from the empirical research approach that I had initially taken; instead, “research” became an exercise in comprehending the layered screen-printing process.

Udoh, Karen, Class of 2018, Biology, minor in Spanish, University of Louisville

Poster Session 2 Saturday, 3:20-4:20 p.m. Life Science Complex, Atrium, Easel #40

Inhibiting the Anaphase Promoting Complex/Cyclosome: An Innovative Approach for Cancer Chemotherapy

The anaphase promoting complex/cyclosome (APC/C) is a large, E3 ubiquitin ligase that regulates the cell cycle, in particular the metaphase to anaphase transition in mitosis and the re-entry into G1 phase. Inhibition of the APC/C results in mitotic arrest and apoptosis in cancer cells. ANAPC2 and ANAPC11 are shown to be two vital subunits for APC/C function. in silico screening of ANAPC2 identified compounds that are predicted to prevent the association of ANAPC2 and ANAPC11. Thus, we hypothesize that the relative levels of the APC/C molecular targets, securin and cyclin B, will increase in cells treated with lead compounds. To gain better insight on the inhibition of the APC/C in cancer cells, HeLa cells were treated with lead compounds 3, 8, 10, and 11 at their respective IC50s for 24 h and then harvested to make lysates. The Bradford Protein Assay was used to determine the protein concentrations in each of the samples. To examine the relative levels of securin and cyclin B, a western blot analysis was performed. Results showed that cells treated with compounds 3, 8, 10, 11 do not have increased levels of securin and cyclin B. However, future analysis may reveal that treatment with the lead compounds causes a decrease in the levels of ubiquitinylated cyclin B and securin. This research was supported in part by University of Louisville Cancer Education Program NIH/NCI grant R25-CA134283 and a Kentucky Lung Cancer Research Program grant to JCS.

Voisin, Darby, Class of 2016, Economics and minor in Spanish, Clemson University

Poster Session 1 Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #41

The Pricing of Study Drugs on a College Campus

Although study drugs are regularly discussed in the news and on all American college campuses, the economics of the study drug market have largely been left out of the discussion. This article is written about the first known dataset, collected specifically for this project, that includes the pricing information of illegal purchases of study drugs by undergraduate students. Study drugs, commonly prescribed to sufferers of attention deficit hyperactivity disorder (ADHD), aid in focusing attention. Some common examples of study drugs are Adderall, Vyvanse, and Ritalin. Many college students acquire study drugs illegally to study for exams and complete assignments. This article analyzes the pricing of the illegal sales of these pills in light of timing of the purchase, the quantity purchased, and the type of pill. The results found that although some of the price can be explained by the number of pills involved in the transaction and the dosage of the pills, much of the price is left unexplained. Most surprisingly, prices do not seem to increase during times of high demand such as the weeks of final examinations. This phenomenon is likely caused by the nature of the study drug market on college campuses: The buyers purchase their study drugs from sellers who they have personal relationships with, and this article proposes that the intrinsic value of those relationships is taken into account when sellers price their prescription drugs.

Vuong, Hung, Class of 2017, Biochemistry, University of Louisville

Oral Session 1 Saturday, 9:55 a.m. Room 001

Development of a Next-Generation Topical Pre-Exposure Prophylactic (PrEP) Technology Using siRNA-Encapsulated, Surface-Modified Nanoparticles

Despite recent advances in our understanding of human immunodeficiency virus (HIV), HIV continues to spread at an alarming rate, with 2 million people newly infected in 2014. To manage this HIV pandemic, topical PrEP technologies – defined as active agents that prevent infection by inactivating or neutralizing pathogens – are being developed as vaccine alternatives. Current PrEP technologies are challenged with the safe delivery of active agents, specifically biologicals, for prolonged durations in the unique microenvironment of the female reproductive tract (FRT). Toward this challenge, our long-term goal is to develop short interfering RNA (siRNA) poly(lactic-co-glycolic acid) (PLGA) nanoparticles (NPs) to provide prolonged protection against HIV via multiple stages of infection. We hypothesize that delivery of siRNA NPs will inhibit the expression of the HIV-1 host cell receptor, C-C chemokine receptor type 5 (CCR5), and prevent one of the initial stages of virus infection, cell entry. Furthermore, we hypothesize that surface modifying siCCR5 NPs with Griffithsin (GRFT), a potent antiviral lectin that binds to and inactivates HIV; or MPG, a cell penetrating peptide (CPP) to enable enhanced uptake of siRNA-encapsulated NPs, will confer more temporally efficacious protection against HIV infection. The experiments conducted thus far aim to characterize and determine the efficacy of surface-modified siCCR5 PLGA NPs to achieve CCR5 knockdown (KD) and corresponding HIV inhibition in vitro. Preliminary data demonstrated that unmodified siCCR5 NPs achieved the highest CCR5 KD among the three surface modifications (37%) while CCR5 expression in cells treated with MPG siCCR5 NPs exhibited significantly lower expression (roughly 2-fold less). GRFT-modified NPs showed negligible CCR5 KD. We are currently optimizing dosage to provide more efficacious KD.

Zaki, Mark, Class of 2016, Neuroscience, University of Pittsburgh

Oral Session 2 Saturday, 1:15 p.m. Room 011

Alterations in Cortical Neuronal Pentraxins and GAD67 in Schizophrenia

Background. Excitation of parvalbumin interneurons via AMPA receptors is required for cortical gamma oscillations and cognitive function. We recently reported deficits in transcript levels of neuronal activity-regulated pentraxin (NARP, aka NPTX2) – a protein that clusters AMPA receptors in interneurons – in the dorsolateral prefrontal cortex (DLPFC) of schizophrenia subjects. Other neuronal pentraxins, NPTXR and NPTX1, are also thought to regulate AMPA receptor clustering. Consequently, we quantified mRNA expression levels of neuronal pentraxins in the DLPFC of schizophrenia subjects and determined the relationship of each transcript with levels of GAD67 mRNA, a molecular marker of cortical interneuron activity.

Methods. Levels of NPTX1, NPTX2, NPTXR and GAD67 mRNAs were quantified by PCR and/or RNA-Seq in total gray matter from DLFPC area 9 in two independent cohorts of schizophrenia and unaffected comparison subjects (total=86 matched pairs).

Results. In qPCR results from the smaller cohort (n=24 pairs), expression levels of NPTX2 and NPTXR were lower in subjects with schizophrenia and positively correlated with GAD67 levels across all subjects. In contrast, NPTX1 mRNA appears to be unaffected in schizophrenia.

Conclusion. Deficits in NPTX2-NPTXR signaling in schizophrenia could disrupt postsynaptic AMPA receptor clustering and consequently lower excitatory drive to DLPFC parvalbumin neurons. This reduction in excitatory input could lead to an activity-down regulation of GAD67 expression and GABA synthesis, providing a plausible molecular basis for altered γ-oscillations and impaired cognition in schizophrenia.

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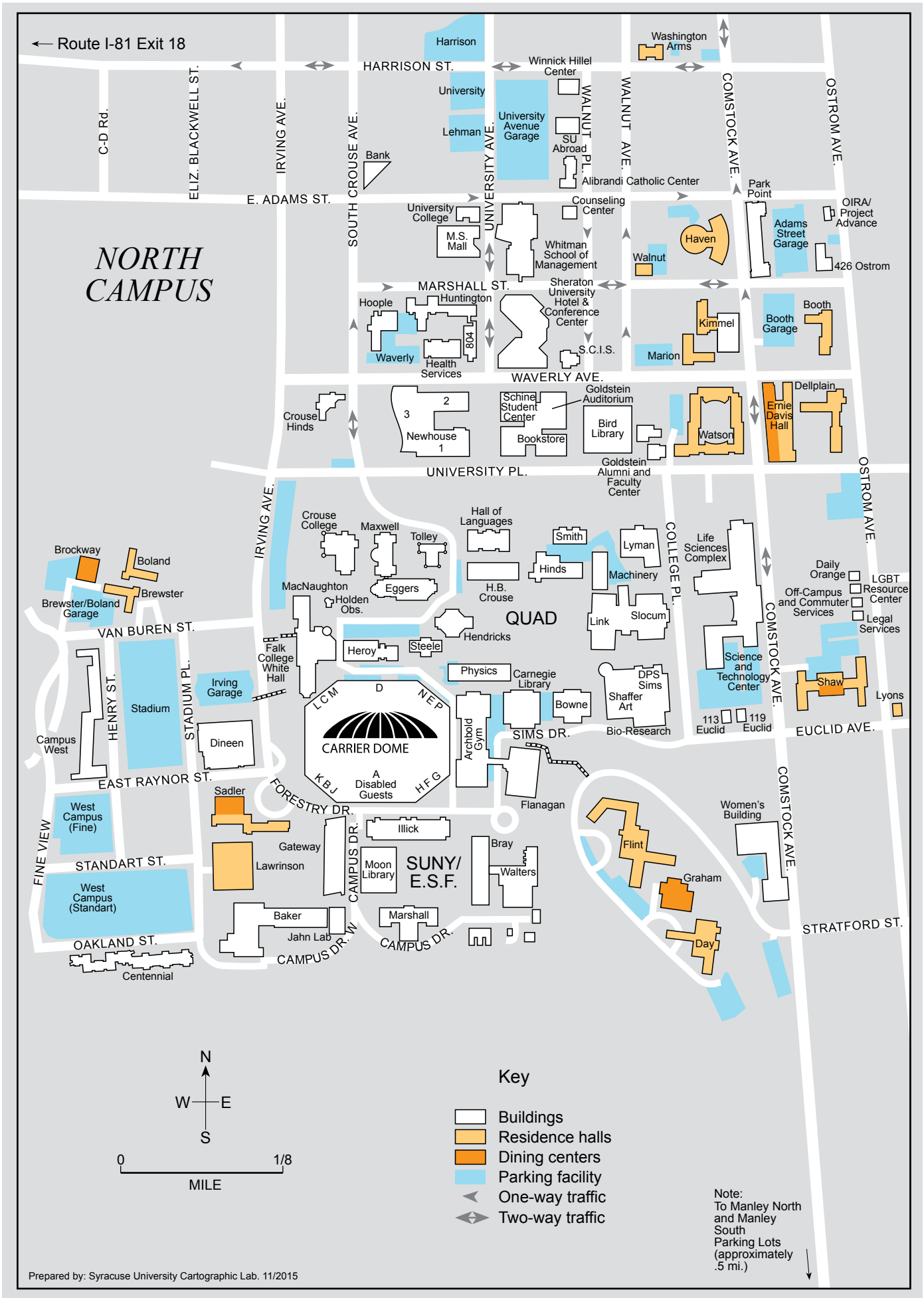
Sisman, Lara	Oral Session 2, Saturday, 1:15 p.m. Room 106	Virginia
Spahn, Madison	Oral Session 3, Sunday, 9:50 a.m. Room 001	Duke
Spencer, Matheu	Poster Session 1, Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #37	Clemson
Tavakol, Daniel	Poster Session 1, Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #39	Virginia

STUDENT PRESENTERS *continued*

Taylor, Stephanie	Oral Session 3, Sunday, 9:25 a.m. Room 001	Pittsburgh
Udoh, Karen	Poster Session 2, Saturday, 3:20 - 4:20 p.m. Life Science Complex, Atrium, Easel #40	Louisville
Voisin, Darby	Poster Session 1, Saturday, 11 a.m.-Noon Life Science Complex, Atrium, Easel #41	Clemson
Vuong, Hung	Oral Session 1, Saturday, 9:55 a.m. Room 001	Louisville
Zaki, Mark	Oral Session 2, Saturday, 1:15 p.m. Room 011	Pittsburgh

UNIVERSITY REPRESENTATIVES

ACC Academic Consortium	Dave Brown, Coordinator, ACC Academic Consortium, and Wake Forest Provost Emeritus
Clemson University	John Griffin, Dean of Undergraduate Studies
Duke University	Ron Grunwald, Associate Dean, Trinity College Director, Office of Undergraduate Research Support Brittany Kelly, Staff Assistant Karen Murphy, Assistant Dean, Trinity College
Florida State University	Latika Young, Senior Assoc. Dir., Center for Undergraduate Research and Academic Engagement
Georgia Institute of Technology	Allyson Tant, Academic Program Coordinator, Center for Academic Enrichment
University of Louisville	Dale Billingsley, Vice Provost for Undergraduate Affairs Pamela Feldhoff, Associate Professor, Biochemistry and Molecular Genetics Associate Vice President for Research and Innovation
University of Miami	Michael S. Gaines, Assistant Provost, Undergraduate Research and Community Outreach
North Carolina State University	Judy Day, Associate Director, Office of Undergraduate Research
University of North Carolina	Yesenia Merino, Graduate Assistant, Office of Undergraduate Research
University of Notre Dame	Yvonne Mikulian, Assistant Director of Undergraduate Research
University of Pittsburgh	Stephen Meriney, Professor, Department of Neuroscience
Syracuse University	Andria Costello Staniec, Associate Provost for Academic Programs Melissa Lowry, Academic Programs Judy O'Rourke, Planning & Logistics Committee
University of Virginia	Brian Cullaty, Director of Undergraduate Research Opportunities
Virginia Tech University	Aaron Burdette, Program Specialist, Office of Undergraduate Research
Wake Forest University	Wayne Pratt, Associate Professor, Psychology and Co-Director, URECA Center


← Route I-81 Exit 18
NORTH CAMPUS
HARRISON ST.
E. ADAMS ST.
MARSHALL ST.
WAVERLY AVE.
UNIVERSITY PL.
VAN BUREN ST.
EAST RAYNOR ST.
FORESTRY DR.
STANDART ST.
OAKLAND ST.
SIMS DR.
EUCLID AVE.
STRATFORD ST.
CAMPUS DR.
CAMPUS DR. W
QUAD
CARRIER DOME
SUNY/ E.S.F.
C-D Rd.
ELIZ. BLACKWELL ST.
IRVING AVE.
SOUTH CROUSE AVE.
UNIVERSITY AVE.
WALNUT PL.
WALNUT AVE.
COMSTOCK AVE.
OSTROM AVE.
COLLEGE PL.
HENRY ST.
STADIUM PL.
FINE VIEW
Harrison
Washington Arms
Winnick Hillel Center
University
University Avenue Garage
SU Abroad
Lehman
Bank
Alibrandi Catholic Center
Park Point
OIRA/ Project Advance
Adams Street Garage
426 Ostrom
University College
M.S. Mall
Counseling Center
Whitman School of Management
Haven
Walnut
Sheraton University Hotel & Conference Center
Hoople
Huntington
804
Waverly
Health Services
S.C.I.S.
Kimmel
Marion
Booth
Booth Garage
Crouse Hinds
2
3
Newhouse 1
Schine Student Center
Bookstore
Goldstein Auditorium
Bird Library
Goldstein Alumni and Faculty Center
Watson
Dellplain
Ernie Davis Hall
Crouse College
Maxwell
Tolley
Hall of Languages
H.B. Crouse
Smith
Hinds
Lyman
Machinery
Life Sciences Complex
Daily Orange
LGBT Resource Center
Off-Campus and Commuter Services
Legal Services
MacNaughton
Holden Obs.
Eggers
Hendricks
Link
Slocum
Brockway
Boland
Brewster
Brewster/Boland Garage
Falk College White Hall
Heroy
Steele
Physics
Carnegie Library
DPS Sims
Shaffer Art
Bio-Research
Science and Technology Center
Shaw
Lyons
113 Euclid
119 Euclid
Irving Garage
Stadium
Dineen
Campus West
LCM
D
NEP
KBJ
HFG
A
Disabled Guests
Archbold Gym
Bowne
Flanagan
Sadler
West Campus (Fine)
Gateway
Lawrinson
Illick
Moon Library
Bray
Walters
Flint
Graham
Women's Building
West Campus (Standart)
Baker
Jahn Lab
Marshall
Day
Centennial
N
W
E
S
0
1/8
MILE
Key
Buildings
Residence halls
Dining centers
Parking facility
One-way traffic
Two-way traffic
Note:
To Manley North and Manley South Parking Lots (approximately .5 mi.)
Prepared by: Syracuse University Cartographic Lab. 11/2015

NOTES

ACKNOWLEDGEMENTS

The 2016 M.O.M. Planning Committee would like to thank the following individuals and offices at Syracuse University who have provided support and assistance.

The Logistics and Faculty Planning Committees: Alexandria Aruck, Rick Burton, Scott Erdman, Kate Hanson, Jonathan Hoster, Heather Ketcham, Melissa Lowry, Shalabh Maroo, Judy O'Rourke, Hanna Richardson, Minet Schindehutte, Christabel Sheldon, and Jamie Winders

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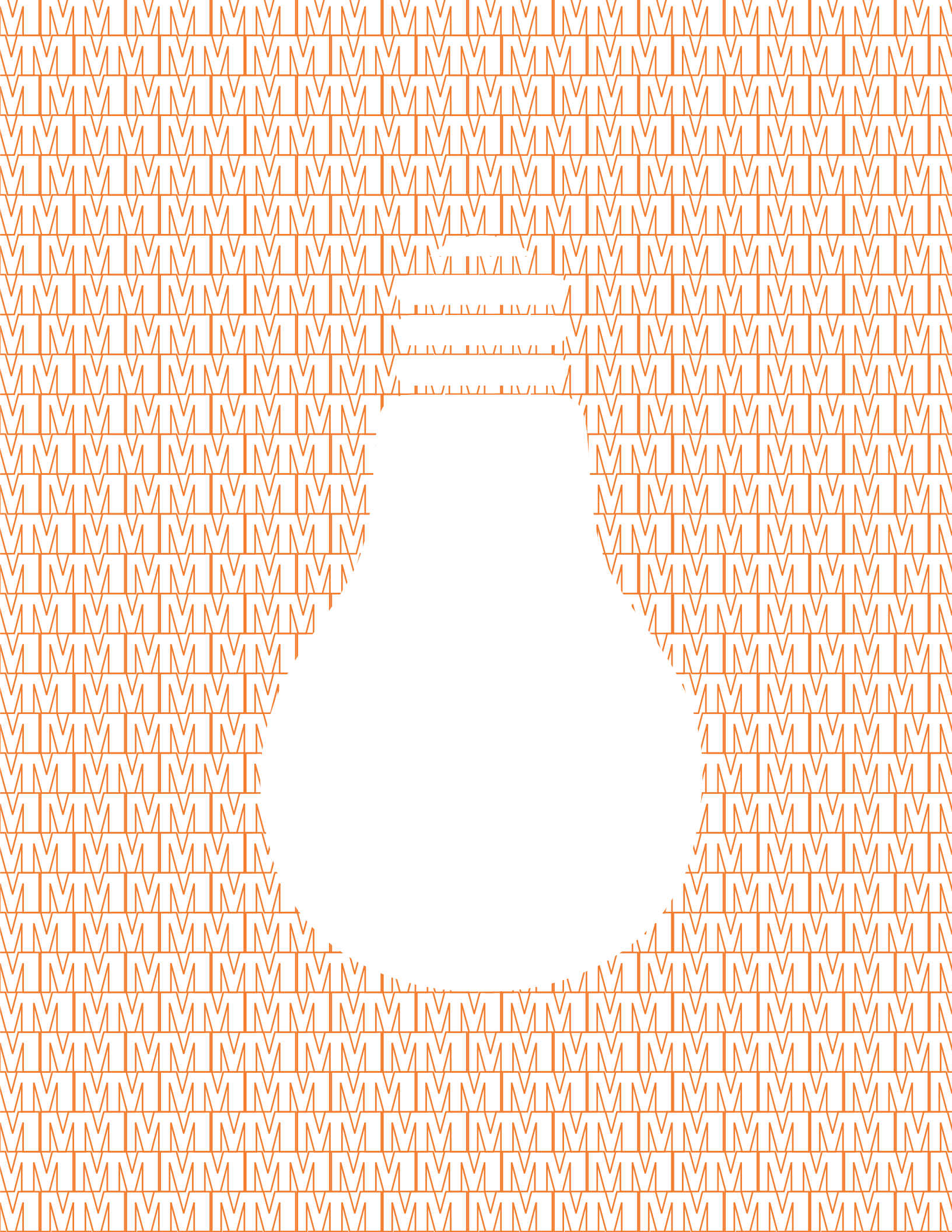
Sam Reimnitz, junior undergraduate in Communications Design
Tory Russo, senior undergraduate, Office of the Assistant Provost
And special thanks to the many, many undergraduate students who volunteered as hosts, guides, and facilitators.

















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