

2016 Meeting of the Minds (M.O.M.) Undergraduate Research Conference
April 8-10, 2016 at Syracuse University
Sponsored by the Atlantic Coast Conference (ACC)

Syracuse University's Presenters at the M.O.M. Conference

Barrett, Emily, Class of 2016, Anthropology; Geography, Syracuse University
Poster Session 1 Saturday, 11 AM-Noon Life Science Complex, Atrium

Mentor: Jonnell A. Robinson, Assistant Professor of Geography

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

Abstract: 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.

Brenner, Farrell, Class of 2017, Women's & Gender Studies; Citizenship & Civic Engagement, Syracuse University
Oral Session 3 Sunday, 9:25 am Room 105

Mentor: Juliet D. Golden, Lead Professor, SU Abroad Program on Culture and Politics of Reconciliation in Europe

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

Abstract: 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.

Germirli, Asli, Class of 2016, Architecture, Syracuse University
Poster Session 2 Saturday, 3:20 - 4:20 pm Life Science Complex, Atrium

Mentor: Randall H. Korman, Professor of Architecture

Title: The Ottoman Han: Recovery of a Lost Typology

Abstract: 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.

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

Oral Session 1 Saturday, 9:55 am Room 106

Mentor: Chris Forster, Assistant Professor of English

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

Abstract: 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.

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

Poster Session 2 Saturday, 3:20 - 4:20 pm Life Science Complex, Atrium

Mentor: Kari A. Segraves, Associate Professor of Biology

Title: Evaluating the effect of arbuscular mycorrhiza fungi on crop plants

Abstract: 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 through 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 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 AM-Noon

Life Science Complex, Atrium

Mentor: Katharine Lewis, Associate Professor of Biology

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

Abstract: 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 to determine 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 Pentylentetrazole 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.

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

Oral Session 4

Sunday, 11:20 am

Room 105

Mentor: James L. Houglund, Assistant Professor of Chemistry

Title: Investigation of substrate length dependency and inhibition of ghrelin acylation

Abstract: 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.

Syracuse University Student Finalists for the 2016 M.O.M. Conference

Adrian Eduardo Alvarez

Arts & Sciences, Biology with focus on Environmental Science, Forensic Science

Mentor: Douglas Frank, Professor of Biology

Project Title: Grazing vs. Climatic and Topographic Effects on Potential Soil Microbial Respiration in Terrestrial Ecosystems

Abstract

Soil respiration – the release of carbon dioxide from the soil surface to the atmosphere – represents respiration from roots and its associated rhizosphere in addition to respiration from soil macro and micro-organisms not associated with the rhizosphere. Soil respiration is considered to be the largest terrestrial source of carbon dioxide and thus an important contributor to the atmospheric carbon pool. Grasslands have been estimated to comprise about 31 to 43 percent of the Earth's land surface. Therefore, when considering the great extent of grasslands and the large contribution that soil respiration has on the global carbon cycle, one should expect CO₂ generated in grasslands to play an important role in the global carbon cycle. However, in order to make more comprehensive assertions at the global scale, a greater understanding is required at the ecosystem level. Attempts have been made to quantify the microbial respiration component of soil respiration in different types of grassland ecosystems and determine how abiotic (climatic and topographic) and biotic (grazing) factors affect microbial respiration. The goal of this research is to examine how grazing and abiotic factors control soil organic matter quality and microbial respiration across a range of grassland ecosystems along a precipitation gradient: from an Oregon desert steppe to a Kansas tall grass prairie. Furthermore, some non-grassland ecosystems included in this study are the forest ecosystems of Isle Royale National Park, Michigan and Acadia National Park, Maine. I consider this study unusual in that I plan to investigate the relative effects of grazing and abiotic factors in the same study and for multiple ecosystems. To investigate this, I plan to perform a yearlong laboratory incubation experiment with soils collected from the aforementioned ecosystems. Thus far, results suggest that grazing may have an effect on soils from ecosystems receiving relatively more precipitation.

Alec Angus Beaton, Jr.

Arts & Sciences, Chemistry

Mentor: Bruce S. Hudson, Professor of Chemistry

Title: Calculating the Deuterium Isotope Shift in the ¹³C NMR Spectra of Seven Peptide-Containing Molecules

Abstract:

This project seeks to develop a reliable method for calculating the deuterium isotope shift in the ¹³C NMR spectra of seven peptide-containing molecules: 2-pyrrolidone, 2-piperidinone, diketopiperazine (DKP), N-methylacetamide (NMA), caprolactam, caprylolactam, and pelargolactam. Deuteration of the N1 proton and C3 proton in the peptide structures of these molecules is carried out experimentally. The ¹H and ¹³C NMR spectra of the protonated and deuterated forms of

these molecules are obtained and analyzed for the stretching, out-of-plane bending, and in-plane bending motions of the peptide bond. ¹H and ¹³C NMR spectra are computed using Density Functional Theory (DFT) with the respective density functionals B3LYP and PBE0. B3LYP is found to be more computationally correct for C3 motion calculations whereas PBE0 is found to be more computationally correct for the N1 motion calculations. This research has found that thermal averaging affects the isotope shift observed for the low frequency out-of-plane bending modes for N; thermal averaging is therefore a factor that must be taken into account when calculating the deuterium isotope shift of peptides. Solvent effects on the peptide solutes and hydrogen bonding between neighboring peptide solute molecules (i.e., dimerization) are currently computationally being analyzed for their effects on the isotope shift. Experimental data is currently being collected and analyzed for caprylolactam and pelargolactam. Future research will concern analyzing open chain mono-peptide and di-peptide molecules experimentally and computationally as well as collecting crystallographic data on monomer and potential dimer structures of the peptides being studied.

Jessica Julie Borri
Architecture

Mentor: Yataka Sho, Associate Professor of Architecture

Title: Redefining Constraints

Abstract:

The topic of incarceration has been a widely public political debate and has only increased as we progress in 2016. As presidential candidate, Hilary Clinton mentions at the 18th Annual Dinkins Forum, "We need to come up with a solution that reduces prison population while keeping our community safe...I believe that by reducing the incarceration spending our community would be not be less safe." We need to create new ways of designing private spaces beyond concrete and changes how we see and recognize these facilities as architecture. When one knows they are being watched, they tend to exhibit positive behavior. If we make this proposition architectural, we could go beyond bolted cameras, allowing surveillance systems as part of the architectural design. The architectural risk upheld is the constant social image of a despondent object in a field containing habitants that are confined by ball and chain of which only architecture is to blame. "There can be no justification for deliberately designing unwholesome accommodation, dowdy colors, dim lighting and excessively harsh materials. This sends out the wrong message and inhabits the hopes of encouraging prisoners back into society...[this form] only brutalizes society as a whole."² By altering surveillance and observation visibility in order to accommodate all prison rehabilitation programs from Puppy Programs to agriculture, it becomes a new, innovative, rehabilitation center that changes inmate lives and the lives of those around. One of the most important aspects of life to inmates is family, or a sense of community. Currently, one in every 28 children, in our country, has a parent in prison. The penal system often transfers inmates to further federal prisons making it ever more difficult for families to visit. This thesis provides an opportunity to take outcasts in society, revamp surveillance technology into the architectural realm, and reclaim architecture can make a lasting difference psychologically in multiple ways.

Rachel M. Brown-Weinstock
Arts & Sciences, Sociology, Policy Studies, and Citizenship and Civic Engagement

Mentor: Rebecca Schewe, Assistant Professor of Sociology

Title: It's Bittersweet': Examining the Potential for Class-Unique Typologies of Community Attachment

Abstract: This research explores whether there are class-unique typologies of community attachment. The practical application of attachment research to rural issues has been limited by the literature's inconsistency in what attachment is and how it should be measured. The relationship between attachment and social class has also been highly inconsistent across studies. I hypothesize that this latter inconsistency is the result of inconsistent attachment operationalizations; implicit in this hypothesis is that some studies use indicators for attachment that are exclusive to how specific class groups define and express attachment. By testing this hypothesis, I extend the literature to consider if attachment is defined, expressed, and should be measured differently for participants of dissimilar social positions. Purposively selecting one rural community suffering from the loss of its main industry as a case study, I interviewed a sample of 22 socio-demographically diverse current and former residents who self-defined themselves as attached. This study is unique for its qualitative methodology, as almost all of the community attachment literature is quantitative in nature. Current

analysis shows that while there are some disparities in attachment definitions between class groups, the “class” or economic conditions of the community were more important in patterning attachment definitions. I also found that the intersectionality of individual social class, life course position, and the economic conditions of the community uniquely patterns attachment meanings. This research is ongoing, yet so far it indicates the potential necessity of making operational refinements to validly measure community attachment across class groups and communities with different economic conditions. As many rural communities continue to experience population loss and high poverty rates, it is crucial that studies use accurate operationalizations of attachment to accurately measure how attachment can have positive effects on rural community development.

Lisa Shin Ying Chan
Architecture

Mentor: Benjamin Farnsworth, Assistant Professor of Architecture

Title: The Gamification of Gamification: Playing with the rules of Public Space on Dataran Merdeka

Abstract: This thesis aims to recreate a public space on Dataran Merdeka, the old Padang (Independence Square), in Kuala Lumpur, capital of Malaysia. The aim of this design is to re-engage the populace with public space in the city. To the young people, public space constitutes the air-conditioned interiors of cars and shopping malls. Open air bazars are no longer in existence, and shopping streets are now being sanitized to host temporary stalls selling souvenirs to tourists. Provoked by the Malaysian Prime Ministers’ recent corruption scandal in August 2015, the waves of dissatisfaction culminated in the Bersih 4.0 demonstration rally where people took to the streets. The protestors were not given permission by the mayor to set foot on Dataran Merdeka, so they merely stayed within the barriers set up by the police. This begs the question, who does Dataran Merdeka really belong to? This thesis aims to create architecture as a phygital (physical + digital) platform to experiment participatory democracy based on the model of popular assembly. It is a space where occupants of the city may freely get together, hang out, organize activities, share ideas, address problems, and explore alternatives to the city. By such an engagement, individuals are provoked from their comfort zones to address, amplify and call for account the issues of public space inundating the city. This design calls for a simultaneous two-pronged approach: the physical space of the square, and the digital platform that allows this design to have effect beyond the confines of one particular site. This architecture aims to redefine participation beyond representative democracy, and imagine a new public space beyond race, ideology and political affiliation.

Snigdha Chatterjee
Arts & Sciences, Biotechnology and Biophysical Science

Mentor: Ramesh Raina, Professor and Chair, Biology

Title: Regulating Chromatin Remodeling

Abstract: Jumonji C (JmjC) domain containing proteins have been shown to play a critical role in regulating chromatin remodeling in a variety of organisms; however not much is known about their role in regulating pathogen defense in plants. In Arabidopsis, a model plant, JmjC protein family consists of 21 members, some of which have been shown to be involved in regulating histone demethylation. Here we show a Jmj-C protein DISEASE AND DROUGHT RESISTANT 1(DDR1) plays a critical role in negatively regulating cell death, drought, and defense against bacterial pathogen, *Pseudomonas syringae*. To this date, the role of chromatin remodeling in cell death has not been explored. *ddr1* mutants develop disease-like lesions under low humidity. In addition, lesion+ and lesion- leaves of *ddr1* accumulate elevated levels of transcript of several defense-related genes such as PR1, PR2, and PR5. DDR1 does not seem to have a role in the jasmonic acid/ethylene-mediated defense pathway, as two downstream marker genes of this pathway, PDF1.2 and VSP1, are not affected in *ddr1* mutants. Jasmonic acid/ethylene-mediated defense pathway is a major pathway of regulating defense against necrotrophic fungal pathogen (*Botrytis cinerea*) and consistent with the gene expression results, *ddr1* mutants did not show altered resistance against *Botrytis*.

Ruo Piao Chen

Architecture and Setnor School of Music, Architecture and Piano minor

Mentor: Yutaka Sho, Associate Professor of Architecture

Title: Providing Safe, Comfortable and Nourishing, Extremely Low-Income Housing Units

Abstract: The purpose of this research project is to offer 90 single units of extremely low-income housing (10% of AMI) in East New York, Brooklyn, for formerly homeless singles. The project seeks to relocate these individuals in a safe, comfortable, and nourishing environment, supplying basic amenities as well as supplementary programs. The residential portion of the building (80%, or 52,480 SF) seeks to reconnect these isolated individuals while allowing them to regain social independence. In addition to housing, 20% of the project is dedicated to community uses such as an exercise park and a career placement center, and 10% of the project is a revenue-generating FRESH grocery store that serves the surrounding food desert. The educational center provides services such as computer labs and classes to help with adult job placement, and the exercise park contributes to the physical health of the neighborhood. In addition, the design of the project as a W-shaped wall not only allows for stacked residential micro-units, but also adheres to New York City zoning laws and its policies regarding residential access to sunlight and fresh air. The project's site-specific shape also deflects some sound from the 3 Train rail above, which is operating 24/7.

All of these design and programmatic choices attempt to de-stigmatize the term "affordable housing" and its negative connotations. Drawing on initial research on the urgent lack of adequate housing for the homeless in New York, this project directly responds to the city's Request for Proposals in East New York. This research also includes a financial feasibility study of the project and its timeline within the eventual gentrification of the entire L train line. Ultimately, this project pushes the limit of architecture to affect its both its inhabitants and its external environment in a positive, social way.

Taylor LeBrea Cobb
Arts & Sciences, Economics

Mentor: William Horrace, Professor of Economics

Title: The 2008 Financial Crisis: The Relationship between Declining Housing Prices and Depression Rates

Abstract: This study examines the relationship between declining house prices during the 2008 Financial Crisis and reported depression rates of individuals in the United States in all 50 states, as well as a deeper look into those states that were hit hardest by the crisis. Using survey data from the Behavioral Risk Factor Surveillance System (BRFSS) 2003-2012, and county-level House Price Index (HPI) data, I will run a series of regression with robust controls to estimate the relationship between the likelihood that a person reports experiencing depression and the housing market conditions within their local area. Specifically, the variables of interest are experiencing depression within the past 30 days, and the change in house price index in the respondent's local county. In my regression analysis, I will control for unemployment, family income, individual characteristics, and whether or not the person is struggling to pay their monthly mortgage. Given my research on past studies and their findings, I expect to see an increase in reported depression as house prices decrease. My hypothesis is that the worsening economy due to rise in foreclosure rates and drop in home prices during the Financial Crisis lead to a rise in reported depression in the communities hit hardest by the crisis, while communities that were not affected by the crisis did not see a rise in depression. Additionally, setting aside the people who reported that they were struggling to keep up with their mortgage payments and experienced depression, I hypothesize that those who were not worried about paying their mortgage also became depressed because of their struggling surrounding local economy.

Rachel Marie Correll
Arts & Sciences, Geography and Earth Sciences

Mentor: Susan W. S. Millar, Associate Professor of Geography

Title: Major U.S. Floods: A Look at Preparation and Response

Abstract:

Floods are a problem faced by many communities around the world. Flooding has always been a part of life on Earth. It is a natural process that has occurred long before the human species evolved and will probably continue long after the humans have exited this Earth. Nature is something we must coexist with; we really on it for food, water, and materials for shelter. As much as it provides people with the means of survival, it can also wipe out human lives if we do not take care to pay attention to its force. Flooding is an increasing problem as the climate continues to change. Humans have resided on the coast and banks of major bodies of water for centuries for a variety of reasons: mercantilism, transportation, and fresh water for living. Thousands of times, homes have been destroyed and belongings lost to these bodies of water cresting over its shores and banks, yet people still choose to reside right along the weather. Living near the water is a natural instinct, but there needs to be proper preparation and response strategies in place for those who choose to take the risk with their homes and lives. In my research, I took a historical approach at two case studies: Hurricane Katrina in New Orleans, Louisiana, and The Great Mississippi Flood of 1993 in St. Louis, Missouri. Here I studies the preparation tactics and response strategies, evaluated the effectiveness of those strategies, built a comparison to the strategies presently in place, and provided recommendations for communities in future flooding situations. Ultimately, I have seen that there were some tactics that worked very well during the time of the case studies, but there is room for improvement such as increased availability of information to residents, better transportation options for those without, and a plan of action to immediately assist those affected post-disaster.

Leah Grace Garlock

Visual & Performing Arts and Newhouse School, Communications Design, minor in Communications Photography

Mentor: Jeff Glendenning, Assistant Professor of Communications Design

Title: Cross-Cultural Adoption and Identity Issues

Abstract: I am adopted from South Korea. It's a statement that, at one point in my life, was a hard idea for me to grasp. However, growing up in a diverse community and within a multi-cultural family, I had the right support and encouragement that led me to become proud of who I am. I have always been interested in other cultures and how people form their own identity. Growing up brought its roller-coaster moments, which is why I find other people's stories so fascinating. My research project focuses on cross-cultural adoption and identity issues because I wanted to further explore my own identity and deepen my understanding of adoption. The research I conducted revolves around questions like: To what extent does adapting to adoption shape identity? Is struggling with adoption issues a reflection of not being able to adapt? Or, is it a reflection of larger social issues? How do adoptees comfortably create their identity? After talking to adoptees all around the country, I chose to synthesize my research and interviews through my passions and pursuits. Working with people in different disciplines, my research led to the creation of a film, self-reflection publication, and final exhibit. My motivation was very personal. While it started from baseline curiosity, it developed into a strong desire to encourage and inspire other adoptees to find a voice of their own. The final products of my research aimed to reach out to adoptees who do not have access or connections in their communities to guide them. With this goal in mind, my research, ideation, and implementation, at times, proved challenging by my high standards and expectations. However, in doing so I walked away with a better understanding of myself, and the renewed confidence in my skills to help other people.

Richelle Ilana Gewertz

Architecture

Mentor: Elizabeth Kamell, Associate Professor of Architecture

Title: Imperfect Square: Reconsidering the Dialectical Condition between Fabric and Object in Urban Environments

Abstract: The thesis proposes to provide a new urban design approach to improve blighted areas in urban environments. It offers a strategy to patch together the fragmented physical landscape of the Shrinking City into a cohesive urban fabric. The issue at hand is the need to recapture "lost" space, the underused, deteriorated areas in the City of Syracuse. To the east of Downtown, buildings are dispersed throughout a vast wasteland of parking lots and vacant land. This collection of objects lacks a cohesive, unifying framework. The blighted area is in need of infill, an insertion of urban fabric to stitch the City back together.

In understanding the new structure of the City as an interwoven pattern of variegated levels of density and pockets of open space, the thesis accepts the reality of a less extensively built environment by reconsidering the traditional notion of urban fabric as a solid poche to something that is less dense and more open, but still adhesive. Through an interwoven pattern of solid and void, the thesis aims to show that a grouping of objects can merge into a stretch of fabric that can reunite fragmented portions of the City.

In consideration of the current realities of its post-industrial situation, the thesis asks how under-used land can become an asset, rather than an obstacle, for the future sustainability of the City. Rather than anticipate large-scale re-development to extend the size of the current Downtown core, the City should conceive a long-term strategy for repurposing the open space in its urban center.

The project that emerges is thus a master plan for a “rurban” development that acts as a new institutional campus for the research of urban agriculture. The private institution also supports a public commercial farming complex in an aim to revive the City’s struggling economy through a shift towards the food production industry.

The proposed educational research facility is conveniently located within the City’s aspiring innovation district, the so-called Connective Corridor, a collaboration between higher education institutions, the public sector and private enterprise to revitalize areas of the City as new knowledge-based industry clusters.

Sahan Jayawardena

Visual & Performing Arts, Film

Title: *I Will Be: An Introduction to the Effects of Youth Violence on a Split Community*

Abstract: *I Will Be: An Introduction to the Effects of Youth Violence on a Split Community* is a short documentary that seeks to illuminate a prevalent issue in Syracuse primarily for the Syracuse University audience. *I Will Be* introduces youth and young adults that constantly deal with violence in their lives and neighborhoods, community leaders who seek to ameliorate the issue through mentoring and working with youth, and brings to light the division between “the hill and the hood” (campus and the city). Through qualitative research, primarily interviewing youth and community leaders, the documentary provides a glimpse into the realities of life in Syracuse as a youth. It also shows the opportunities available for Syracuse University students to connect to the community and work with the youth. The process of researching and producing this documentary occurred in light of the Syracuse University lockdown on October 15th caused by a shooting involving two youths. *I Will Be* presents gathered social media reactions from Syracuse University students to the lockdown. It then introduces the perspectives on youth violence from youth, student leaders on campus and those involved in student organizations and nonprofits in the community. Those who work in the community share their experiences mentoring and trying to affect issues like youth violence, and advocate for student involvement. *I Will Be* introduces this issue from both sides of a split Syracuse, in an effort to bridge the gap between Syracuse University and the surrounding city.

Additional student participants in this project include: Executive Producers Rachel Brown-Bweinstock, Neha Rauf and Leonardo Marino; Producers Sarah Grabman and Katherine Tinder; Assistant Producers Iara Rogers Benchoam and Patty Terhune; and Director Sarah Grabman

Yvenique Lovinsky

Information Studies, Information Management & Technology

Mentor: Charisse L’Pree, Assistant Professor of Public Communications

Title: The Voice of Black Twitter: A Case Study of #BlackLivesMatter

Abstract: From its inception, the United States has devalued Black lives for political, social, and economic purposes. Centuries of oppression including slavery, Jim Crow, and separate but equal created an environment where Black people are considered worthless. Black Lives Matter (BLM) is a campaign and movement that raises awareness of the deaths of Black people due to police brutality, as well as racial profiling issues, and racial inequality in the United States criminal justice system. In 2013, the hashtag #BlackLivesMatter appeared on social media after the acquittal of George Zimmerman in the shooting death of Black teen, Trayvon Martin; since then, the campaign evolved into an organized real world movement with protests and marches nationwide. Although a decentralized network, Black Lives Matter is currently challenging politicians to address social issues pertaining to Black people. Supporters for Black Lives Matters presence in protests and heightened media coverage in the democratic presidential debate urged candidates, Hillary

Clinton and Bernie Sanders, to address the issues in the criminal justice system as well as institutional racism. The current research explores how user generated content (UGC) on social media activates individuals to rally for social change by analyzing the pattern of correlation of the hashtag, #BlackLivesMatter. After reviewing prior work regarding social media platform's role in both social and activist movements, I will document the history of Black Lives Matter and examine the influence of the movement on Twitter by reviewing the frequency and location of the tweets as well as the real world actions associated with tweets (e.g. protests, police officer suspensions). This analysis will examine the social creativity and power of these tweets to mobilize communities' offline by bypassing mainstream media in order to demonstrate how the structure of massive information can affect change.

Joseph Patrick Marion

Visual & Performing Arts, Communications Design

Mentor: Roderick Martinez, Associate Professor of Communications Design

Title: What Would a Publication by the Ghost Look Like? *The Dark Pages*

Abstract: Published by ghosts in an effort to communicate with the world of the living, this publication passes into our domain from their own, resulting in complexity and distortion. Conversations about complex topics like death and ghosts are exciting and stimulating because many people have passionate opinions on the subjects. Focusing on that interest, this publication should convey a similar wonder and atmosphere. What would a publication produced by ghosts look like? The topic of ghosts and the undead is divisive. Many believe in them, while many others deem them fictitious and imaginative. Other publications about ghosts are produced from the human perspective. This magazine is unique because that perspective is reversed. This is the spectral world's attempt to communicate with the living world. Since this magazine must pass into our world for us to read it, images and typographic elements are distorted or exaggerated to convey that rough journey from the spectral world. While death effects us all, this magazine is intended for mature audiences due to its grim topic and grisly imagery. This publication is not vulgar or lewd, instead it is an exaggerated scream from people who wish to be represented. The themes would be properly received by an adult audience. In order to stray from the classic interpretation of ghosts as bleak white apparitions, the images and text in this magazine are more fantastical and surreal. This imagery should excite the reader and further their curiosity. The need to be heard is a popular issue in social discussion, so with its application to this specific topic, there could be a new way to learn about new voices and perspectives.

Maily ann Nishiguchi

Arts & Sciences, Biology and Neuroscience

Mentor: Sarah E. Hall, Assistant Professor of Biology

Title: Gene Expression and Phenotypic Differences

Abstract: Increasing evidence has shown that environmental conditions experienced in early development can tissue-specifically 'program' changes in gene expression, resulting in phenotypic differences in adulthood. However, the molecular mechanisms regulating these processes are not well understood. Our previous work established *Caenorhabditis elegans* as a model system to investigate the molecules and pathways that contribute to environmental programming. Worms subjected to unfavorable conditions early in development and transiently passed through an alternative stress-induced dauer stage (postdaurers) retain a cellular memory of their developmental history, which is reflected in changes in gene expression, genome wide chromatin state, small endogenous RNA profiles, and life history traits when compared to worms that have bypassed this stage (controls). Previously, we have identified the OSM-9 TRPV channel as a target of environmental programming as a result of passage through the dauer stage. Using an *osm-9p::gfp* reporter, we found that *osm-9* is downregulated in the ADL neuron of postdauer adults, but remained expressed in ADL of control adults. Current (published) data suggest a model where Mutators and the ERGO-1 RNAi pathways indirectly regulate *osm-9* by mediating expression of the *daf-3* gene in response to environmental factors. Furthermore, we have characterized a cis-acting motif in the *osm-9* promoter that is necessary for its downregulation and is bound by the DAF-3 SMAD protein in the TGF- β dauer formation pathway. DAF-3 negatively regulates *osm-9* transcription after dauer formation, which is maintained by chromatin remodeling at the *osm-9* locus. This study verifies DAF-3 SMAD protein binding and identifies additional transcription factors that bind to this motif through an ongoing yeast-one-hybridization screen. Since the identified cis---

acting motif is present in the promoters of ~1000 genes in the C.elegans genome in close proximity to the same transcription factor binding sites, we hypothesize that our model of RNAi-mediated transcriptional silencing of *osm-9* may represent a more general mechanism for where gene expression is regulated in response to environmental conditions.

Kaitlin Elizabeth O'Rourke

Education and Arts & Sciences, Mathematics, Math Education, and Spanish

Mentor: Marcelle Haddix, Dean's Associate Professor and Chair, Reading and Language Arts

Title: Science, Technology, Engineering, and Mathematics Education in Chile and the United States

Abstract: The purpose of this auto-ethnography is to compare the way that Science, Technology, Engineering, and Mathematics (STEM) are taught and regarded based on literature review and on personal experience in classrooms in the United States and Chile. In the United States, STEM education is currently undergoing major reforms; politicians, school board members, teachers, and parents are working to enrich the education this country offers its students. This paper asserts that having an international perspective on STEM education will more fully enhance the current reform movement in the U.S. The Chilean education system is experiencing similar scrutiny, with students demanding that their rights be met. Therefore, it will be informative to compare this movement to that of leaders in STEM education in the United States. The work of scholars such as Diane Ravitch, Linda Darling-Hammond, Seymour Papert, José Joaquín Brunner, and Mario Weissbluth is used to support the arguments made in this study. Personal lesson plans, samples of student work, and teacher interviews are also included in this project. This multimedia, interdisciplinary study focuses on STEM education on a worldwide scale, and makes claims for the future of students of these subjects. It touches on important and topical themes such as equality in the classroom, differentiation of instruction, and project-based learning within the scope of current literature. This investigation of STEM education will inform future teaching pedagogies and paint a picture of the current landscape of education in two countries for people outside of the field.

Samuel E. Palmiere

Education, Health and Exercise Science

Mentor: Kevin Heffernan, Director, Human Performance Lab

Title: Acute Resistance Exercise

Abstract: Acute resistance exercise is known to be beneficial for overall health and slowing the aging process, however the effect of resistance exercise (e.g. weightlifting) on cognitive health is not yet established. One bout of resistance exercise may have a negative effect on arterial function as select studies note that resistance exercise increases arterial stiffness. High blood pressure and arterial stiffness have detrimental effects on systemic health such as myocardial infarctions and cerebrovascular accidents. Recent studies show that the brain is particularly impacted by these conditions. There have been studies on the effect of aerobic exercise and its impact on blood pressure, arterial stiffness and cognitive function, validating the advantageous effects of both acute and chronic aerobic training for overall health and arterial function. This study examined arterial stiffness following acute resistance exercise and its effects on overall cognitive function. The purpose of this study was to determine whether an acute bout of resistance exercise increased arterial stiffness and decreased cognitive function. Twenty participants were studied on two separate occasions with one visit serving as the control. Each visit consisted of two sets of cognitive testing separated by either an acute bout of resistance exercise or an emotionally neutral video. The cognitive testing protocol consisted of a memory task, a number matching task and an attention task. Reaction time and accuracy were collected electronically for the cognitive testing and compared between visits. Blood pressure and arterial stiffness measures were taken using a brachial oscillometric device and also compared between visits. Data analysis is ongoing, with preliminary results showing increases in arterial stiffness and no significant change in cognitive function following resistance exercise. Future implications of this study could be further investigation into the chronic effects of resistance exercise training on cognitive health.

Alexis Noelli Peña

Engineering & Computer Science, Biomedical Engineering

Mentor: James H. Henderson, Associate Professor of Biomedical and Chemical Engineering

Title: Automated Characterization of Migratory Patterns in Model Co-Culture System

Abstract: Tissue development, wound healing, and cancer all involve multiple cell types migrating at the same time either in a coordinated or dysfunctional fashion. Cells are not limited to migration; they may adhere to certain surfaces, proliferate, or differentiate while interacting with other cells. These direct cell-cell interactions, as well as the interaction between cells and the extracellular matrix, are fundamental to cell shape, integrity, and ultimately the function and development of multicellular organisms. In vitro studies generally use monocultures that do not adequately represent the natural complexity of interactions amongst many cell types. Nutrients, communication, and other vital interactions may be exchanged through direct cell-cell junctions formed between different cell types in heterogeneous systems that is not clearly simulated in monocultures. The ability to identify different cell types is critical to understanding these events and mechanisms by elucidating the roles of each cell type in a given interaction. Many approaches used to identify cell types are either invasive or cannot be applied at the individual cell level in situ (e.g. qPCR or immunohistochemistry). The goal of this project is to create a noninvasive and automated method to identify different cell types or subtypes in vitro and to characterize general cell behavior through cell motility analysis. Automation of this method is possible through a computational approach, with a series of code modifications from already existing algorithms. These include modifications of an individual cell-tracking algorithm ACTIVE (Automated Contour-based Tracking for In Vitro Environments), the addition of clustering techniques such as Principal Component Analysis (PCA) and k-medoid clustering to identify and characterize distinctive cell behaviors in heterogeneous systems. Time-lapse experiments of a direct model co-culture system of bovine aortic endothelial cells (BAECs) and bovine aortic smooth muscle cells (BASMCS) will be used to validate and explore the clustering techniques.

Matthew McShane Pietz
Arts & Sciences, Economics

Mentor: Mary E. Lovely, Chair of International Relations

Title: The Connection Between Criminal Violence and Voter Turnout

Abstract: The threat of violent crime has recently re-emerged after steadily declining for the past two decades; Prior studies, like Miguel Carreras' and Alejandro Trelles' "Bullets and Votes: Violence and Electoral Participation in Mexico" (2012), suggest that a connection may exist between criminal violence and voter turnout. With U.S. general elections occurring in the coming fall, the relevance of this proposed relationship is clearer than ever. Utilizing violent crime estimates from Uniform Crime Reporting and self-constructed voter participation estimates at the county level, this paper attempts to locate a potential causal link between criminal violence and voter turnout in the United States. Proposed theoretical connections between exposure to violence and poverty levels may help establish this causal relationship. This study attempts to answer two interrelated questions: Do county-level violent crime rates have a significant impact on county-level voter participation rates for U.S. presidential and gubernatorial elections? Might violent crime rates solely function as a clear determinant of voter turnout conditional on the level of poverty per county? The tenets of the classical Downsian model of electoral participation, coupled with prior studies detailing the significance of other voter participation determinants, aid in the formulation of theoretical answers to these questions. The construction of six unique fixed-effects econometric models will provide tangible, empirical evidence to complement the postulations described in the theory section of the paper. Controlling for demographic composition, income, poverty, and previously studied determinants of electoral participation hinders the potential development of endogeneity issues and promotes externally valid regression results. The panel data utilized for this study spans elections held in 2008, 2009, 2010, 2011, and 2012, with additional data used for certain lagged explanatory variables from 2004, 2005, 2006, and 2007.

Alberto Gabriel Rivera
Engineering & Computer Sciences, Computer Science

Mentor: Jae C. Oh, Associate Professor of Engineering

Title: Distributed Multi-Agent Foraging

Abstract: Multi-robot systems require extensive communication and collaboration in order to achieve the completion of a tasks. Instead of developing a single complex robot specifically designed for one task, we have decided to develop a

swarm of relatively small and simple robots that would be able to complete a variety of different tasks. However, the current goal of our swarm of robots is to achieve an efficient method of foraging. The robots, starting from a central location called a “nest” must work together in order to spread out to cover the environment, find “food” and bring it back to the “nest”. However, in order to achieve an efficient method of foraging we must first solve a number of simpler primitive swarm behaviors, including accurate communication between robots, efficient coverage of an area, role assignment, among others. Our swarm of robots functions as a decentralized system, meaning that there is no hierarchy between the robots and they are all actively running the same code. Because of this our robots must be able to make decisions autonomously by surveying their surroundings. To aid in this we have developed a “Neighborhood” algorithm, where a single robot can detect other robots around it within a certain distance and then make decisions based on the number of robots around it and their current state. A robot that sees other robots nearby, called a “neighbor”, will store that robot’s information in a data structure, which we call a “neighborhood”. A robot can see up to six robots, one for each sensor. The robots communicate using IR (Infrared) sensors and receivers. IR is not very reliable due to interference and noise from other light sources, so we’ve implemented an algorithm to verify signals and keep communications at a minimum. Once a certain threshold is met the robot will make the decision to switch its role in order to be more useful to the swarm as a whole.

Hannah Lois Seigel
Architecture

Title: The Architecture of Elementary Schools

Abstract: Throughout the many changes undergone in the architecture of elementary schools over the past hundred and fifty years, from the one-room schoolhouse to the open school, the learning of environments for children have transformed. However, this transformation has brought about an increasingly limited interaction with the world outside the classroom, and an increase focus on the use of technology. As the prevalence of standardized testing becomes more and more emphasized, children find themselves sitting inside the boxes we call classrooms, with minimal outside light and even less time to actually go outside. This thesis contends that this lack of interaction with nature and fresh air is detrimental to both the acquisition of knowledge in elementary school students, and the students’ ability to think creatively. It argues that architecture can be understood as the facilitating tool to bring about necessary change in this learning space. This thesis will manifest itself in the design of an educational facility that exemplifies 21st century learning goals in elementary schools. My design proposition will promote a balance between outside activity, knowledge acquisition, social interaction, and technology. Additionally, it will propose architectural solutions that adapt to the ever-evolving needs of students in their educational environment. This may include reimagining the entire standard school configuration by envisioning the outdoor space as an essential educational zone. It will also identify new types of furniture and learning layouts that may enhance the way both tactility and technologies are incorporated into this learning environment. In order to accomplish this, I have accumulated a database of historic and contemporary elementary school designs that will inform my work through the design process. Along with the feedback gleaned from my research trip, I plan to extrapolate an elementary school prototype that meets the needs of contemporary students and teachers.

Tyler Alan Smith
Arts & Sciences, Biochemistry

Mentor: Ivan V. Korendovych, Assistant Professor of Chemistry

Title: Short Peptides Self-Assemble to Produce Catalytic Amyloids

Abstract: Enzymes carry out many extremely efficient catalytic functions. Underlying this efficiency is their extraordinary complexity and ability to fold into unique three-dimensional structures. Even after decades of research, attempts to replicate this efficiency through de novo design have only shown moderate success, and it is unclear how modern-day enzymes may have evolved¹. However, short peptides that alternate hydrophobic and hydrophilic residues can self-assemble into amyloid fibrils to achieve well-defined secondary structure. These aggregates may have served as a template from which the first enzymes were derived^{2,3}. We designed self-assembling seven-residue peptides that are able to act as Zn²⁺-dependent esterases⁴ (Figure 1). Zn²⁺ acts to both help induce fibril formation and to serve as a metal cofactor to catalyze acyl ester hydrolysis.

The ability of this simple system to catalyze a chemical reaction suggests that similar peptide aggregates may have been evolutionary precursors to modern-day enzymes. Additionally, the ability to use a minimalistic design approach to generate catalytic fibrils could have implications for the development of nanostructured catalysts. By using an alternating hydrophobic/hydrophilic template, novel functionality can be introduced into simple peptide aggregates.

Robert Vincent Swanda

Falk College and Arts & Sciences, Nutrition Science and Biology

Mentor:

Title: Temperature Modification of Biological Performance

Abstract: Temperature is one of the major ways that the environment modifies biological performance, eg. biochemical processes, growth, locomotion, and metabolism. A particularly important response is the ubiquitous decline in performance with increasing temperature above some temperature optimum. Currently, the enzyme degradation hypothesis states that performance rates driven by enzyme catalysis increase exponentially until, at high temperatures, unfolding or degradation of catalytic enzymes reduce their affinity for substrate and reactions slow down. However, recent data suggest the possibility of an alternative “thermodynamic” hypothesis that as temperature increases, reactions could become limited by the diffusion/transport of substrates or products, which could explain the decline in cell performance. In order to test the thermodynamic hypothesis, this research project first measured activity and expression in a Western blot of the catalytic enzyme for lactose metabolism, beta-galactosidase, for E coli; growth was induced (higher) in lactose-rich and inhibited in glucose-rich media. Secondly, temperature response curves were measured for short-term in vivo conversion of ortho-nitrophenol pyranogalactoside (ONPG), a lactose mimic substrate, into easily assayed ortho-nitrophenol (ONP) under media-induced versus inhibited beta-galactosidase concentrations at 11 different temperatures (21 – 49°C). The temperature of maximum ONPG conversion was significantly lower under lactose media-induced higher beta-galactosidase concentrations than under glucose-inhibited lower beta-galactosidase concentrations. Finally, the effect of temperature on beta-galactosidase concentration was measured by ONPG assay and by Western blot for E coli cultured for six population doublings under each of five different temperatures (20, 24, 28, 32, and 35°C), which show beta-galactosidase enzyme increased as predicted by the thermodynamic hypothesis with increasing temperature. These results, while restricted to a single reaction, show strong support for the thermodynamic hypothesis.

Patricia Alyse Terhune

Arts & Sciences and Newhouse School, Policy Studies and Television, Radio & Film

Mentor: Charisse L’Pree, Assistant Professor of Public Communications

Title: The Power of Satire (or Political Satire’s Effect on Public Policy)

Abstract: Satire, or the use of humor, irony, exaggeration, or ridicule to expose and criticize people's stupidity or vices, has a complicated relationship with public attitudes. Many scholars have attributed shifts in political discourse and policy to major satirical outlets including television shows like All in the Family and Saturday Night Live, as well as stand-up comedy and political cartoons, which have a historical precedent in commenting on and highlighting the absurdity of culture, politics, and society in general. This paper will address the history of political satire in our current media age and describe the advantages and disadvantages of different platforms in affecting real world change. The current HBO show, Last Week Tonight with John Oliver (LWT), will serve as a case study for how the established genre of the news parody program has evolved in a new media environment; by focusing on three popular segments of the program addressing issues of net neutrality, municipal violations, and evangelical churches, this research will outline and unpack how the strategies of LWT prompted changes in FCC regulations, excessive municipal fines, and IRS leniency on for-profit churches. Oliver’s approach as a British comedian provides a unique perspective highlighting the flaws in the American system, a prerequisite for any good satirist. Furthermore, the show embraces digital platforms, posting content online within 24 hours of broadcast, integrating hashtags, and organizing campaigns that deploy other technology. LWT transcends a premium cable audience and makes Oliver’s commentary and calls to action available to the masses, thus drastically affecting his impact on political discourse and inviting a more diverse audience to participate. This research will serve both as a historical analysis of political satire and media over the past 75 years, as well as a strategy guide for affecting change through satire.

Matthew Al Trulli
Architecture

Mentor: Julia Czerniak, Associate Dean and Professor of Architecture

Title: Infrastructure between Israelis and Palestinians in the Greater Jerusalem Area

Abstract: The thesis project was separated into two parts, a research semester and a design semester. In the research semester, the project looked at how infrastructure worked amongst Israelis and Palestinians in the greater Jerusalem area. Through an exploration and research of the complicated politics of movement, I identified divisive elements within the landscape, which promoted a land that was split into two systems. I investigated how these divisive elements, such as the barrier wall and vehicular checkpoints have led to the creation of two distinct road networks and the passage of travel that each condition endures. The research portion of my project, entitled One Land, Two Systems, looked at how these two networks exist and the circumstances that lead to today's conditions. Moving forward, I am zooming into the French Hill in Jerusalem and using the Geneva Accord of 2003 as a speculative two state solution to design a major border crossing between Israel and Palestine that interconnects the two systems through the realms of vehicular and pedestrian movement and through mass transit. Entitled Two Lands, One System, I aim to reverse the current condition and allow for a design in an area of great contention and conflict in today's condition. The French Hill is at a crucial point between Israelis and Palestinians and would act as the major border crossing in a future solution. The topography here allows for the possibility of designing the crossing as an extension of the landscape and integrating it into the mountains, allowing for a more aesthetically pleasing border crossing and physical border separation than the current concrete wall. Through the design phase of this project, I aim to utilize design in a way that fosters relations and has a positive effect on the landscape and the population that would use it.

Sarah Rose Willsey
Engineering & Computer Science, Bioengineering

Mentor: Shikha Nangia, Assistant Professor of Biomedical and Chemical Engineering

Title: The Blood-Brain Barrier in Alzheimer's Disease

Abstract Today, there are over five million Americans living with Alzheimer's Disease. This complicated disorder has puzzled scientists for years and has therefore not been successfully treated. The problem stems from the blood brain barrier. This intricate structure protects the brain by allowing only a selective group of ions and materials to pass through. While seemingly important for maintaining homeostasis in the brain, this function will not allow the passage of medication to treat diseases such as Alzheimer's. Past research has indicated that the blood brain barrier consists of epithelial cells whose closely associated areas are termed tight junctions. These tight junctions are selectively permeable and the proteins of which they consist define their properties. A specialized type of protein existing in tight junctions throughout the body is called the Claudin. Twenty-seven types of Claudins exist, with Claudin-5 inhabiting the brain. The goal behind this research is to gain a larger knowledge base on all Claudins. In doing so, a better image of the brain and body will be constructed, allowing for potential cures to complex diseases. This project has specifically involved the study of Claudin-15, which is found in the small intestine and assists in glucose absorption. Gathering the amino acid sequences and creating rough models of this protein allowed for a more accurate structure to be generated through homology modeling. In order to understand how the proteins interact in a natural setting, simulations were performed using molecular dynamics. The simulation of a grid of Claudin-15 proteins resulted in four main classifications of dimers, or pairs of non-covalently bound macromolecules. The most recent simulations demonstrated that Claudin-15 most frequently dimerizes side by side, so that the position of one corresponds to that of the other. Learning the behavior of these proteins will provide insight to more of the body's complexities.

Joshua J. Woods
Engineering & Computer Science, Chemical Engineering

Mentor: Karin Ruhlandt, Dean of Arts & Sciences

Title: Synthesis of Novel Alkaline Earth Metal Heteroleptic Tetraarylborate Pyrazolates

Abstract: In recent years, simple compounds based on alkali, alkaline earth and divalent rare earth metals have been synthesized with the goal of obtaining highly coveted single source Metalorganic Chemical Vapor Deposition (MOCVD) precursors. This has afforded a number of materials with high technical relevance, such as ferroelectrics, high temperature superconductors, and semiconductors. The pyrazolate ligand system has unique properties that make it an ideal precursor for MOCVD, moreover it can be customized to exhibit a range of steric properties and solubilities via substitution on the ligand with a variety of combinations of alkyl and aryl groups. The tetraarylborate ligand system is a large, weakly coordinating ligand, which has recently been seen to participate in secondary metal- π interactions in the absence of stronger coordinating atoms such as nitrogen or oxygen. Synthesis of a heteroleptic tetraphenylborate pyrazolate ytterbium compound displaying coordination of both ligand systems to the metal center has prompted interest in synthesizing the alkaline earth analogues. Transamination in Carius tubes has yielded crystals of four novel compounds suitable for x-ray diffraction, their trends are being discussed.

YuQing Xie

Arts & Sciences and Maxwell School, Mathematics and Economics

Mentor: William Horrace, Professor of Economics

Title: Is Attitude Shaped More by Culture or Economic Events? Eastern and Western Europeans' anti-immigrant sentiment and the Great Recession

Abstract: Using survey data from European Social Survey (ESS) rounds 3, 4, 5 and 6 (year 2006, 2008, 2010, 2012) across 18 countries (6 from eastern Europe and 12 from western Europe), this paper will analyze whether the difference (if any) in Eastern and Western Europeans' anti-immigrant sentiment is more of a cultural difference or caused by the economic crisis during 08-09. The study takes the two most controversial issues in Europe – financial downturn and immigration policy and studies the correlation between these two factors. The results of this study will provide useful insights not only to European policy makers, but also to the behavioral economics field that focuses on studying the linkage between attitude and economic factors. The study is using a multilevel model that first analyzes the correlation between economic crisis and change of Europeans' anti-immigrant sentiment, controlling for individual characteristics such as age and gender. Then the study analyzes the difference in Eastern and Western Europeans' anti-immigrant sentiment regardless of GDP changes by adding an Eastern/Western Europe dummy variable to the original model. By adding an interactive term of change of GDP and the Eastern/Western dummy, the study further looks at whether Eastern and Western Europeans reacted to the economic crisis differently. Then variables that measure different dimensions of "culture" will be added to test whether this attitude difference will be successfully eliminated with the additional control variables about "culture differences between Eastern and Western Europe". Last but not least, by running the same model with interactive term year by year, the study aims at observing the general trend of changes in anti-immigrant sentiment; and by dividing the sample into two periods (pre-crisis and post crisis), running the same model would determine by how much (if any) did the crisis "sensitized" people to immigrants.

Soleil Evantash Young

Arts & Sciences, Anthropology, Biology, Women & Gender Studies

Mentor: Shannon A. Novak, Associate Professor of Anthropology

Title: The Dangerous Vector of Disease and Insanity, 1880-1894

Abstract: In 1988, during construction at the Rome Developmental Center in Rome, New York, 81 burials were discovered. These burials were associated with a graveyard in operation from 1880 to 1894 that was connected to the Oneida Insane Asylum (1860-1895). Remains from one of the 102 individuals recovered was stored at Syracuse University, where they were largely forgotten until now. These remains, a skull, belong to a female age 35-39 who was institutionalized at the Oneida Asylum for an extended period. X, the name given to her for this project, had a pronounced right occipital condyle and mastoid process, indicating that she, like other inmates at Oneida, had participated in labor therapy. As well, sinusitis, blunt force trauma to her left frontal bone, and a deviated septum all indicate that she lived a rather hazardous life at Oneida. She also had advanced tertiary syphilis, which likely was the reason she was institutionalized. Although all

“insane” bodies in the 19th century were viewed as being ruled by “nature” and not “culture,” the body of X was viewed as a dangerous vector of disease and immorality because she had syphilis. This would have translated into her being marginalized within the asylum. X’s remains offer a unique look at a group of forgotten women from the 19th century, the institutionalized “insane,” and provide a compelling narrative of a woman deemed dangerous by society during a period of rapid change and industrialization.

Mingshi Yu
Arts & Sciences and University College, Geography

Mentor: Peng Gao, Department of Geography

Title: Walkability, Sustainable Management and Urban Planning

Abstract: Walkability is a newly developed term in sustainability management and urban planning. It refers to the walk-friendly index of a local community or city blocks. This project, Using ArcGIS to Analyze Neighborhood Walkability and its Relationship with Social Factors in Local Syracuse Community, is focused on defining the relationship between walkability and city census tracts, for example, crime rate, household income and population density. The analysis of walkability will demonstrate the factors influencing walkability and their impacts on our community and the result of this project result will give out recommendations and suggestions for how to improve walkability in Syracuse, making our city a better place to walk. Walkability as a new term has becoming a hot topic nowadays for many reasons, for example, the intensified environmental issues and contradictions between human and nature as well as city citizens’ demand for a more convenient and safe community. A high-walkability neighborhood should be safe and low-carbonized, combined with mixed land use with convenient and reliable public transportation; abundant large open space and green parks for leisure and relaxation; reachable hospitals, schools and religion facilities. However, walkability is a relatively arbitrary and subjective concept. How can we define walkability? What does a walkable community look like? How do you make people feel like they can safely and comfortably walk on the street? How do you quantify this “feeling” in a reasonable and scientific way? These questions will be answered in this project, using geo-software called ArcGIS, which is designed specifically for solving spatial problems. This project will make analysis on factors influencing walkability; use spatial and statistic data to calculate index figures which quantify the walkability; demonstrate the social factors that may related to walkability as well as how we can use the walkability index figure as a reference to improve our community environment in multiple perspective ways.

Mengran Zhang
Arts & Sciences and Maxwell School, Economics and Mathematics

Project 1: Biostatistics

Mentor: Pinyuen Chen, Professor of Interdisciplinary Statistics Program

Title: Clinical Trials: Two parts or Three Parts?

Abstract: Clinical trial, which is a part of clinical research and at the heart of medical advances, is the study that tests how well the new medical methods work in people. Clinical trials are conducted in series of phases to test the drug or the treatment to see if it is effective against the disease and evaluate its safety. My research will focus on the two-stage design for phase II clinical trials and be divided into three parts. Firstly, the research will look at Simon’s classical optimal two-stage design to elaborate on how to determine the design that satisfies the error probability constraints and minimize the expected sample size. Afterwards, the research goes further to the curtailed two-stage design superior in shortening the drug development when the treatment is lack of efficacy or very effective if the safety is not a primary concern. For both of the two parts, the probability structure derived from binomial distribution and statistical model will be explained in the research Also, through comparison between the results of the optimal and the curtailed two-stage design by programming of MATLAB and R, the advantage of the curtailed design in offering savings in expected sample size and fixed stopping rules at each stage will be shown. The third part is most complicated and creative. A new model will be designed for two-stage with two treatments in the research, which is different from the previous design with only one treatment. Through this innovative design, at the end of each stage, which treatment should be used for the next patient can be decided instead of taking observations for both treatments at the same time. Based on the three parts in

the research, it can be demonstrated that how two-stage designs develop in saving time, sample size and increasing the effectiveness.

Project 2: Economics

Mentor: William Horrace, Professor of Economics

Title: Internal Migration and Wage Disparity in China

Abstract: Nowadays, most developing countries are now faced with a serious problem of over-population from the labor migration owing to the imbalances of regional economic development. Among all these developing countries, China is the representative. Since 1978 when China relaxed the restriction of internal migration, thousands of millions of labors have moved from hometowns to other places in search of better jobs and higher incomes in 30 years. This study looks at the internal migration at provincial level and estimates the casual relationship between the wage disparity and the internal migration from 1995 until 2005 in China. The theories are supported by the Todaro's migration theory and Crozet's economic geographic model. In my regression model, the dependent variable is defined as the percentage of number of migrants to one province to the total labor movement from the original province in each year. The independent variable is defined as the ratio of the average wage of the host province to the average wage of the original province. To better analyze the effects of various elements on the migration, the analysis controls for the cost of moving to the host province(distances), arable land per capita, gross output value agriculture, non-agricultural employment rate of the original province and the unemployment rate, the fixed asset investment, fiscal expenditure of local government of the host province. The dummy variables are created to control whether it is intra province movement or if the two province share the same border. Furthermore, as the inverse effect might exist as the migration can also affect the income level of one city. Therefore, IV Regression is will be done with the instrument of the average wage in the year of 1990. Most of the data are from China population census at 1995, 2000, 2005 at the provincial level.