



Summer Scholars Program

Summer 2014



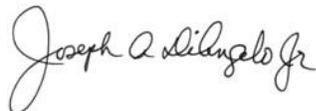
live greater.

Welcome to the fifteenth annual Summer Scholars Dinner at Saint Joseph's University. We are very pleased to have the opportunity to bring together so many different people, friends of SJU and representatives of area businesses and corporations, SJU administrators, faculty, staff, and the Summer Scholars students. This book contains brief descriptions of some of the many ongoing projects involving students here at Saint Joseph's. We hope that you will take a few minutes to talk with some of the students and let them tell you something about their work.

This year marks the tenth in which the Summer Scholars Program has been open to students and faculty in all areas of the university. We are very pleased that students engaged in creative scholarly work and independent research projects with faculty mentors from 26 different academic departments and programs. We especially wish to thank the faculty mentors who have so generously given of their time, talent and abilities to work with these scholars of tomorrow. Their generosity makes this program possible.

Thank you for taking the time to join us as we recognize the work of these young men and women. We would also like to thank the many people, funding agencies, and corporations whose support continues to make student research and creative scholarly activity at SJU a reality.

Sincerely,



Joseph DiAngelo, MBA, Ed.D.
Professor of Management
Dean, Haub School of Business



Amanda M. Thomas, Ph.D.
Professor of Psychology
Dean, College of Arts and Sciences



Rosalind Reichard, Ph.D.
Professor of Mathematics
Interim Provost, Saint Joseph's University

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Supporters of Student Research at Saint Joseph's University

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The Office of the Provost

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The McGroddy Frontiers in Science Seminar Series
IBM
The Office of the Dean, CA&S
The Office of the Provost



Deron Albright
Department of Music, Theatre & Film
Saint Joseph's University

MFA Temple University

Research Interests: Narrative Filmmaking

As a filmmaker, I believe in the transformative power of art. Working in the cinematic arts, where both subject and audience are an essential part of the equation, my central concern has always been the appropriate use of that power. I also have great faith in the power of narrative and the centrality of its position in the collaborative art of cinema. Thus my work often revolves around the question, “What story am I to tell?” – not only as a question of content, but one of construction and form. And because cinematic artists must answer to the demands of both medium and audience, the question of both what to say and how to say it is a constant struggle, because I believe the “how” is often as much about the *process* as it is about the form itself.

Although my own work has been extremely varied in approach – working across documentary, installation, agit-prop, historical drama, lyric animation, and genre narrative – my thematic concerns are unified by a quest for (re)presenting the authenticity of the human experience and the commonality of the human condition across boundaries of race, class, and nation. Furthermore, my love and practice of cinema and media arts has always revolved around my belief in its unique ability to combine the artistic, emotional, intellectual and political; while at the same time demanding a tremendous discipline of craft, technological proficiency, and the responsibility to audience.

While my earlier films often pushed the boundaries of form, I have since turned to more conventional work, attempting to create films that made a deep and genuine connection with audience. But in doing so, I am still intent on exploring the interface of form and story and meaning, and even as my films fall between the cracks of programmer and commercial categories, I have been able to find an enthusiastic and receptive audience.

I currently have three projects in development – *Invisible Son*, a partner project to my Ghanaian feature *The Destiny of Lesser Animals*; *Leave Worry Behind*, a collaboration with musician and filmmaker Richard Swift; and *Ceramic Flowers*, a *Ulysses* mash-up set on the hottest day of a Las Vegas summer.

Documenting the Past: The Story of Pennhurst

Caitlin McNamara, '15



Faculty Mentor: Deron R. Albright
Department of Music, Theatre & Film

Supported by the SJU Summer Scholars Program

The halls of Pennhurst State School and Hospital tell a harrowed tale. A landmark establishment that opened in 1908, Pennhurst originally seemed like a model institution that treated its patients with dignity and grace. However, like many of its contemporary hospitals and asylums, Pennhurst succumbed to a number of evils - overcrowding, underfunding, patient mistreatment, even medical testing on some of its residents. As the nation developed a more humane attitude towards the mentally ill and feeble minded, Pennhurst found itself in the public spotlight in the 1960s and 1970s. Suddenly, Pennhurst, and indeed the state of Pennsylvania, became the center of attention during the human rights movement. Court cases were filed, an NBC exposé depicted the harsh conditions, and the hospital was called everything from ‘the shame of Pennsylvania’ all the way up to ‘the shame of the nation.’ In 1987, Pennhurst was forced to close.

Today, the abandoned hospital tops the list of the most haunted locations, not only in Pennsylvania, but in America in general. Ghosts of patients past supposedly roam the original buildings. The partially renovated campus has been turned into the Pennhurst Haunted Asylum, a Halloween-time attraction that takes guests through the old hospital.

Looking back at its history, the events and attitudes that plagued Pennhurst seem like they took place decades ago. In reality, its past is much more recent than most people realize. While nothing can be done to reverse the wrongs that took place at Pennhurst, or in America in general, as the nation’s attitudes towards the rights of certain people definitely led to this treatment, it is important not to ignore the past today. What can we learn from this history, and where does it leave us today?

Additionally, my documentary addresses several important fallacies about the hospital. For instance, despite common misconceptions, Pennhurst is not, nor has it ever been, an ‘asylum.’ Rather, it was a hospital for the feeble-minded and epileptic; the implication that its patients were “crazy” is false and offensive. Additionally, contrary to my initial thoughts, no one is actively trying to shut down the haunted attraction. Groups like the Pennhurst Memorial and Preservation Alliance support the idea that people can be educated through entertainment; however, they are attempting to revamp the haunted house aspect so that it focuses less on the exploitation of the mentally ill and more on the history of the hospital, which is rich enough as it is.

By examining primary sources (such as newspaper articles, NBC’s expose, and the opinions of those who experienced parts of the story firsthand), as well as the views of local and contemporary historians, the story of Pennhurst can be finally be told. While it is always difficult to revisit and relive shameful parts of the past, it is also important as we move towards the future.



Susan P. Andrews

Department of Theology and
Religious Studies
Saint Josephs University (2012-2014)

Ph.D. Columbia University

Dr. Andrews is currently Assistant Professor of Eastern Religions in the Department of Religious Studies at Mount Allison University in New Brunswick, Canada.

As an expert in pre-modern Chinese religions, her research focuses on East Asian sacred place and pilgrimage traditions, interactions between cults dedicated to local deities and those devoted to bodhisattvas, and the relationship between hagiography and landscape. These subjects converge in the question: How do stories of a religious figure's life and connection to a place contribute to the sense that a site is sacred and merits devotion?

In addition to research in China, Dr. Andrews is also knowledgeable in the area of Japanese Religions, having been a Research Fellow at the Institute for Comprehensive Buddhist Studies at Taisho University in Tokyo, Japan in 2005-2006 and has taught courses in Japanese Religions.

Religion, Science and Changing Visions of the Human Body

Angelica Italiano, '15

Faculty Mentor: Susan Andrews

Department of Theology and Religious Studies

Supported by the SJU Summer Scholars Program



“Head, shoulders, knees and toes, knees and toes
Head, shoulders, knees and toes, knees and toes
And eyes and ears and mouth and nose
Head, shoulders, knees and toes, knees and toes.”

Many kids throughout the United States sing this song in preschool and kindergarten today. While singing this song, the children touch that location on their body. This song is not only a fun, playful exercise, but it also teaches the young children about their body. This is how we start learning about the body at a young age today, but what about other cultures during ancient times? What did Ancient China and Ancient Egypt know about medicine and the body? Did religion play a role in medicine like it's starting to more today? Many of these questions were answered using not only textual evidence but artwork as well.

My faculty mentor, Dr. Andrews, and I are researching the changes in medicine and science over a period of time and how religion is a key component in some of those life-threatening situations. Research has been done on Ancient China, Ancient Egypt and today. We took a look at changes in medicine or if there were changes in medicine at all using the Papyrus Ebers from Ancient Egypt. The Papyrus Ebers included examples of the ailments occurring during 1500 B.C. and the remedies for those ailments, including anything from parts of plants and animals to incantations of the gods. In Ancient China, we focused our research on the religion and burial rituals occurring in that geographical area. During that era, people really focused on how to make their deceased ancestors happy. Our research looks into how and perhaps why the dead had such a big impact on the living. Today, we have defined death in not one but three different ways. This means that cultures differently define life and death. At the same time, medicine has changed and has given physicians the ability to keep people alive whether they are declared as being brain dead or having a circulatory death. People with different religions consider one type of death as their definition of death and not the other. Religion is a big part of the culture in the United States and other areas throughout the world. Doctors need to be aware of and take into consideration a person's religion when life and death situations are occurring. A paper and scientific and artistic depictions of the human body were also developed.

The Cycle of Life and Death: A Study of the Afterlife and Family Lineage in Chinese Religion

Marissa Siu, '15

Faculty Mentor: Susan Andrews
Department of Theology & Religious Studies

Supported by SJU Summer Scholars Program



Since well before the Shang period (ca.1600 – 1050 BCE), worshipping and sacrificing to ancestors has been an important and significant Chinese practice. Rituals and ceremonies performed for the death suggests that death is merely viewed as the end of one's form of existence that leads to the rebirth in another. The Chinese believes that deceased family members continues to exist; family kinship transcend death and the relationship is sustained through funerary and mortuary practices and daily worship. Rituals, however, were also aimed at helping the deceased kin achieve greater rebirth.

The first phase of my research consisted of studying primary and secondary texts associated with life and death. I closely examined the three teachings of Buddhism, Confucianism and Daoism to understand how they contribute to Chinese understandings of the afterlife and the importance of ancestral veneration practices in particular. According to Buddhist's teachings, until final deliverance (nirvana) is achieved, each death is followed by rebirth in one of the six realms (underworld, hungry ghosts, animals, demons, humans and Gods). Chinese popular religions and miracles tales provided several alternative versions of afterlife which ranges from possibility of personal salvation through rebirth into the Western Heaven of paradise or punishment in the underworld where one faces consequences of karmic retributions for one's actions. A study of *Signs from the Unseen Realm* by Robert Campany provide a practical account of Chinese views of life, death and afterlife. The book contains miracles tales that constitute stories of people who die and return to life, narrating their experience in the underworld and the afterlife in which the souls survive the death of the body. Contact between the dead and the living was made possible on the days of observances such as The Ghost Festival, when, as Stephen Teiser's research has shown, the Gates of Hell are believed to open and the souls of the dead are freed to roam the earth. During this period, dead family members are believed to return to "earth" to visit their living kin, warning them of the horror in the underworld and requesting descendants to rescue them from the torments of hell.

The second phase of my project consisted of fieldwork. I visited several Buddhist temples to learn firsthand about the funerary practices and rituals conducted by religious practitioners and the religious symbolism behind rituals performed for the dead. To provide salvation to ancestors, descendants made offerings to monks, who are believed to have the power and spiritual merit to relieve the soul's sufferings. In addition, food offerings are made to dead ancestors and paper objects such as currency and clothes are burned as offerings to provide kins with a comfortable material life in the underworld until the soul is reincarnated. This ritual, again, reinforce the Chinese belief that the dead in the underworld were not completely cut off from the living. The importance of these ancestral rituals and practices suggests that there is a strong interdependency between the living and the dead.



Michael Angelina
Executive Director,
Academy of Risk Management & Insurance
Saint Joseph's University

BS Drexel University
Director, American Academy of Actuaries

Research Interests: Insurance

I currently lead the Casualty Practice Council of the American Academy of Actuaries as a volunteer, and as a result spend much time focusing on the public policy issues surrounding property and casualty insurance for both individual consumers and commercial enterprises. My position takes me to Washington, DC where I interact with policy makers on insurance issues such as Terrorism Coverage, Affordability of Flood Insurance, Market Conditions, and the Effects of Climate Change.

Chris's research has focused on the issues surrounding the affordability and availability of flood insurance. Flood insurance is not covered under a consumer's homeowner's policy, and most insurers do not want to sell coverage due to adverse selection which violates the law of large numbers. As a result, the Federal Government, through the National Flood Insurance Program (NFIP) provides coverage to individuals. The current financial status of the NFIP is a \$25 Billion debt as claims payments, and expenses have significantly exceeded premiums.

In 2013, Congress passed the Biggert-Waters Act, which was intended to produce "Actuarially Sound" rates (and therefore premiums) to remedy the current deficit. This caused significant problems as some policyholders saw their flood insurance premiums rise from \$1,000 per year to \$12,000 per year, thus creating a cascading effect on their mortgage payments and affordability of their residence.

Analyzing the National Flood Insurance Program: Public Policy Issues, Solvency Concerns, and the Future of the Program

Christopher Alexander, '15



Faculty Mentors: Michael E. Angelina
Department of Finance

Supported by the SJU Summer Scholars Program

The National Flood Insurance Program (NFIP) was enacted in 1968 as a federal program created to alleviate flood losses in the United States via regulation and to provide access to affordable flood insurance for property owners in high-risk flood areas. Over the past decade, however, the NFIP has accumulated \$30 billion in debt from Hurricanes Ivan, Katrina, Rita, Ike, and Sandy. The substantial accumulation of debt has been caused not only by repetitive property losses incurred in flood prone areas, but also the lack of funding from flood insurance premiums.

The recent solvency concerns prompted Congress to pass the bipartisan Biggert-Waters Flood Insurance Reform Act of 2012, which eliminated most flood insurance discount premiums that were kept artificially low. Although the Reform Act was supposed to alleviate some of the programs' accumulated debt and future loss expenses; many residents located along river banks, port cities, and coastal towns ostracized the new regulations and premium hikes. Congress revisited the Act and enacted the Homeowner Flood Insurance Affordability Act of 2014 that delayed the increase in premiums to reflect the true risk of properties in flood zones.

The delay in premium changes weakened the ability of the National Flood Insurance Program to handle its debt accumulation, especially if another major storm occurs in the next few years which could add a significant financial burden. Hence, the elimination of premium discounts and premium increases on those without discounts would have secured the future of the government sponsored program. On the other hand, the adverse effects on the finances of low and middle income households in floodplain areas were not considered when implementing the new pricing model, which helped fuel the backlash to the Biggert-Waters Flood Insurance Reform Act of 2012.

The affordability issue and solvency concerns must be reconciled in order to avoid a detested taxpayer bailout and ultimately keep the program afloat for future generations. Congress must pass legitimate, long-term legislation that discourages future development in flood zones, enforces more efficient building ordinances, provides more hazard mitigation subsidies, and allows for risk-based premiums that take into consideration financial need. A combination of these solutions can be implemented to resolve the problems facing the National Flood Insurance Program.



Paul J. Angiolillo
Department of Physics Saint
Joseph's University

Ph.D. The University of Pennsylvania

Research Interests: Organic Conductors and
Semiconductors, Materials Physics

The 21st century, in all probability, will witness a revolution in the electronics industry. Since the end of World War II, doped silicon has been the material, which virtually every electronic device is predicated. The “size” of transistors has shrunk from centimeters in 1948 to approximately 50 nm in 2012. This decreasing trend in the size of the fundamental features of electronic devices based on silicon technology cannot be sustained due to a number of quantum phenomena, which dominate the physics at nanometer length scales. The past 20 years has seen the establishment of a new area of discovery research and promising technology - that of nanoscale molecular electronics that exploit π -conjugated organic materials. Much of this development has been spurred by attempts to mimic or model the highly efficient electron and energy transfer processes typified in green plants and photosynthetic organisms.

This lab has historically used electron paramagnetic resonance (EPR) spectroscopy to probe both charged states (polarons) and neutral excited triplet states in a unique class of organic semiconducting materials. Recently, however, the lab has been utilizing EPR spectroscopy to study radiation-induced radicals in biogenic calcite from several species of extinct cephalopods. These radical systems have been found to be useful in dating the fossilized material. These spin systems may be used to further glean a more fundamental understanding of the dynamics (rotation and vibration) of polyatomic ions in crystal lattice sites.

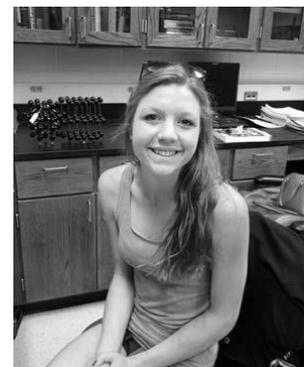
Just in the past year, the lab has been also looking at the fundamental physics of friction. Despite the common nature of friction, it remains largely unexplained especially the transition from static to kinetic friction and the evolution of stick-slip motion. It appears that the dynamics of systems exhibiting stick-slip frictional motion span many length scales, from the movement of nanometer-scale surfaces to the movement of the Earth's tectonic plates. We have developed a mesoscopic model system employing the commonplace hook-and-loop (Velcro) fastening system. When placed in shear, Velcro exhibits many of the hallmarks of stick-slip motion seen in other systems and, moreover, is accompanied by acoustic bursts that are related to the slip events. Over the past year, we have explored how the Velcro model system behaves with respect to the classical Amontons-Coulomb laws and have discovered stark contrasts with the accepted classical laws.

Robustness of Spin Relaxation Times of π -Conjugated Porphyrin Arrays

Isabella Goodenough, '16

Faculty Mentor: Paul Angiolillo
Department of Physics

Supported by the SJU Summer Scholars Program



The next generation for microelectronics may stem from the manipulation of the quantum electron spin rather than on charge manipulation.¹ This field of study is known as spintronics, or *spin transport electronics*. Recently, there has been enormous interest in organic molecules as possible architectures for spin-based devices. Experimental and theoretical work suggest that organics may open the possibility for developing devices that function on the same binary logic as their inorganic counterparts. When the electron is placed in a magnetic field the spin can take on two (2) polarizations. One when the electron's magnetic moment is parallel to the field (spin-up, low energy state), and when the electron's magnetic moment is anti-parallel to the field (spin-down, high energy state). These polarizations are able to encode the binary bits of 0 and 1. Switching between them will only require the flipping of spin, which does not require the movement of the electrons in space and thus does not produce current flow. This will allow for reduced power consumption and potentially faster processing speeds. In order for this paradigm to be a possibility, the states have to persist for relatively long times. There are two different time-scales for the electron spin, the spin lattice relaxation time (T1) and the spin-spin relaxation time (T2).

The focus of this study was to determine the spin relaxation times (T1, T2) in conjugated porphyrin arrays. When an electron is placed in an external magnetic field, the electron spins tend to align with the field. The spins can be made to undergo a transition to the higher spin state through the application of microwave electromagnetic radiation and this represents an absorption of energy. As more energy is pumped into the system, the increase in energy per unit time (power) causes the absorption of energy to plateau out and possibly decrease due to spin state population equilibration; this is a consequence of its lifetime in the higher energy state. It can also be thought of as the time it takes for an electron spin to "forget" its orientation. The longer the spin remains in one orientation, the longer the spin can communicate with other stimuli in the molecule, whether it be communication with nuclei (T1) or communication with other spins (T2), and hence the longer the spin can be used to transmit intelligence.

Our data has shown that the relaxation times of the porphyrin arrays, ranging from the monomer to the nonomer, were on the order of hundreds of nanoseconds at 298 K and represent times that are exceptionally long as compared to other organic and inorganic species.

¹ Sarma, Sankar Das. "Spintronics." *American Scientist* 89.6 (2001): 516.



Catalina Arango
Department of Biology
Saint Joseph's University

Ph.D. University of Massachusetts

Research Interests: Environmental Microbiology and Bacterial Gene Regulation

Bacteria are my passion. I am fascinated by the sophisticated mechanisms that bacteria use to control their gene expression in response to environmental conditions, and most of my research is directed towards understanding these mechanisms. For example, some bacteria are able to “choose” the most energetically favorable carbon source when there is more than one available in the environment and use it first. This behavior, called catabolite repression, is the result of an intricate interaction of proteins and other molecules, where some sense the presence of the preferred carbon source and others communicate the signal to specific genes that are turned on or off. Although the players (proteins and such) are similar in different bacteria, the role they play may be very different! I use the bacterium *Sinorhizobium meliloti* as a model organism to study catabolite repression. My students and I are trying to understand how catabolite repression works in *S. meliloti* by studying a specific group of genes, the *mela-agp* operon, which are necessary for the utilization of certain sugars. We hope that by learning more about how catabolite repression affects these genes, we can gain understanding of how it controls other genes.

I also collaborate with the Institute of Catholic Bioethics at SJU to design, test and implement an affordable water filter for people who do not have access to clean drinking water.

Which PTS Protein Is Partner to the Succinate Mediated Carbon Catabolite Repression Transcriptional Regulator in *Sinorhizobium meliloti*?

Muhammad Arif, '15

Christina Mirarchi, '16



Faculty Mentor: Catalina Arango
Department of Biology

Supported by the McNulty Scholars Program, the GeoKids Program, the Botstiber Foundation and the SJU Summer Scholars Program

Sinorhizobium meliloti is a gram-negative bacterium that is capable of carbon catabolite repression (CCR). When succinate (primary carbon source) is present in the environment in addition to raffinose (secondary carbon source), *S. meliloti* will transport and metabolize succinate first and repress the genes needed for the usage of the raffinose. Once succinate runs out, raffinose will be transported into the cell and used. This is known as succinate mediated catabolite repression (SMCR). In well studied organisms, such as *Escherichia coli* and *Bacillus subtilis*, glucose-mediated catabolite repression is regulated by the interaction of a phosphotransferase system (PTS) protein with a partner transcriptional regulator. Previous research has shown that the PTS also regulates SMCR in *Sinorhizobium*, but the mechanism is thought to be different due to differences in the PTS. The PTS found in *S. meliloti* consists of EI, HPr, HPrK, and two types of Enzyme IIA: EIIA^{nr}, and ManX. Neither the global transcriptional regulator nor the specific PTS protein that would interact with it have been identified. Our goal is to determine which PTS protein interacts directly or indirectly with the transcriptional regulator to regulate CCR in *Sinorhizobium*.

To carry out this investigation, we are using the SMCR controlled *mela-agp* operon as a model. This operon codes for genes needed for the use of raffinose. The unknown PTS protein interacts with the transcriptional regulator and activates the operon when raffinose is present and represses it when succinate is present. If this transcriptional regulator is sequestered or hidden away, then growth on raffinose will be different and the diauxic lag will change. To demonstrate this, we inserted *S. meliloti* with extra copies of the *mela* promoter region (*Pmela*) and grew it on succinate plus raffinose with and without the extra promoter copies. The diauxic growth curve of the strain with the extra promoter copies was longer than the strain without the extra copies. This indicates that the transcriptional regulators were present, active, binding to DNA, and were being sequestered. This also indicates that the transcriptional regulator is an activator and allows transcription when it binds DNA.

This method can be used to determine which PTS protein was a partner to the regulator. If a PTS protein is important and it is missing (deleted or non-functional) then the transcriptional regulators will not be active, there will be no sequestration, and the length of the diauxic lag of the strain with and without the extra promoter copies would be the same. If the protein was not important, the diauxic lag would change with extra promoter copies, as seen in the wild type. Our preliminary results indicate that unphosphorylated EIIA^{nr} and ManX may be independent partners to the unknown transcriptional regulator allowing it to bind to DNA and thus regulating SMCR.

Identification of Promoter Sequences that Interact with Regulatory Proteins in *Sinorhizobium meliloti*

Joseph Johnson, '16

Faculty Mentor: Catalina Arango
Department of Biology

Supported by a Gift From Nick Nicolaides, '87



Sinorhizobium meliloti is a gram-negative bacterium that exists free-living in soil or forms nodules in the roots of legumes. In the presence of multiple sources of carbon, *S. meliloti* preferentially selects succinate over other carbon sources. After depleting the supply of succinate, the bacterium uses secondary sources. This phenomenon is known as succinate-mediated catabolite repression (SMCR). *E. coli* and *B. subtilis* also exhibit catabolite repression, but in these organisms it is mediated by glucose rather than succinate. The mechanisms behind glucose-mediated catabolite repression in *E. coli* and *B. subtilis* have been studied and are well understood, but the mechanisms behind SMCR in *S. meliloti* have not yet been fully understood. The focus of our research is to identify the mechanisms behind SMCR in *S. meliloti*.

Regulatory proteins bind to a sequences of DNA in the promoter in order to regulate the expression of genes; in particular, some of these regulatory proteins mediate catabolite repression control of genes. Our research this summer attempts to identify those promoter sequences that are critical for gene regulation. Using error-prone PCR, we constructed a library of randomly mutated promoters that are fused to a gene encoding green fluorescent protein (*gfp*). The fluorescent product of *gfp* is visible under a microscope and may be quantified so as to report the amount of promoter activity. To ensure that our method of constructing mutants worked, we sequenced 18 potential mutants from our library of randomly mutated promoters. Using Geneious software I aligned the forward and reverse sequences of the potential mutants with the wild type sequence containing no mutations (Figure 1). I then aligned the forward and reverse sequences for each potential mutant to find changes in a nucleotide between the mutant and the wild type and also to show an agreement between the forward and reverse sequences of the mutant, confirming the presence of a mutation. Chromatogram data of the sequence helps evaluate the quality of the sequence. I found that 4 out of the 18 potential mutants sequenced this summer contain point mutations (Figure 2). We will next insert these mutants into *S. meliloti*, grow them in various carbon sources, and look for changes in the amount of fluorescence. Such a change may suggest that the mutated sequence is critical for gene regulation through catabolite repression.

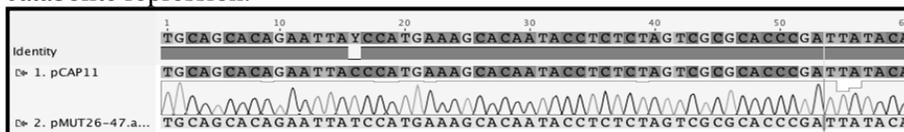


Figure 1. Position 16 shows a C to T mutation. The defined peak shows high confidence in the mutation.

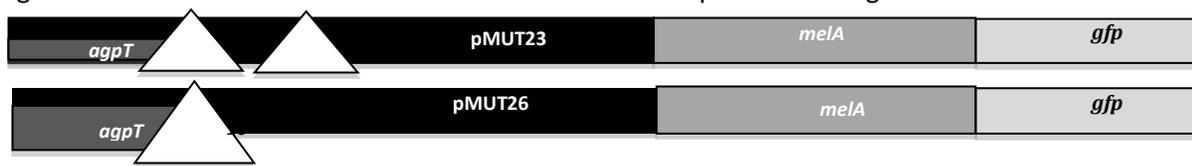


Figure 2. Two of the randomly mutated promoters. Triangles show the positions of point mutations.



Lisa A. Baglione
Department of Political Science
Saint Joseph's University

Ph.D. Cornell University

Research Interests: Negotiation Among Adversaries,
Russian Domestic and Foreign
Policy, Authoritarianism, Democracy/ Democratization,
and Conflict Transformation

My list of stated interests might seem unrelated and too broad-ranging at first glance, but there is a common thread that unites them. As I came to the study of Political Science and International Relations, the world was experiencing the last extremely icy winds of the Cold War, and I was fascinated with why, how, and when the US and the USSR would agree to reduce and eliminate what was seen then as the most essential elements of their security, their nuclear arsenals. My study of superpower nuclear arms negotiations brought me to think theoretically about the conditions under which adversaries cooperate as well as to consider what these bargains between enemies were really about. Did they signify compromises? Were they related enhancements in the relationship? Well, sometimes yes, and sometimes no, and that conditionality of the meaning of these agreements often led to greater problems in the superpower relationship, as one party might feel underappreciated for its sacrifices or another might believe its good faith had been abused.

As I was studying superpower arms control, the USSR was undergoing an enormous transformation and, ultimately, it collapsed. Russia emerged out of the ashes of the Soviet empire, and its nature as well as its relationship with the US and the rest of the world transformed. I had much to learn (and earned great enjoyment) from trying to puzzle out the course of post-communist change and the conditions under which former communist states might successfully transform their economies, societies, and polities into successful market and democratic systems. Russia is one of these states that has struggled with leaving behind the old and creating a new system that included economic dynamism and opportunity for a large proportion of its citizens as well as political freedom, civil rights, and effective arrangements for holding elites accountable and subjecting them to the laws of the land. Understanding Russia's domestic politics has been an interest of mine, in particular with respect to the development of early political and civil society organizations and later, bringing back my fascination with negotiation among adversaries, I became interested in understanding how enemies agree to stop fighting and actually live together productively in the same polity. While developments in Chechnya -- a region that tried to break away from Russia in the early 1990s -- spawned my early interests in conflict transformation, my enthusiasm was (unfortunately) further ignited by the developments of the post-Cold War world. Since 1990, violent conflict within states has been all too prevalent and political scientists have sought to understand how to (re)create successful polities post-conflict and post-authoritarianism. My research interests were particularly well suited to these inquiries as I understand the complexity of interactions among adversaries as well as the post-communist/authoritarian transformation process.

To this day, I continue my interest in Russia affairs and seek to explain its politics and foreign policy to my students and others who will listen. In addition, I investigate post-conflict transformation, particularly in war-torn and post-communist states. My general approach to world politics is that domestic and foreign policies tend to be closely intertwined and that leaders respond to constituent pressures and their assessments of national identity in pursuing their policy options. Thus, working with Megan Duffy this past summer (2014) was a pleasure, as she was investigating Russian foreign policy toward former Soviet territories. Although Russian-Ukrainian relations were in the news throughout 2013-2014, students of Russian foreign policy know that the Russian Federation has had assertive relations with the former Soviet republics for some time and has in the post-communist era generally perceived these regions to be its special purview. Thus, Megan's work investigates the extent to which Putin's recent actions are a significant change in Russian behavior or a continuation of past practices.

Examining the “Russian Idea:” How Identity Informs Russian Foreign Policy in the Post-Soviet Space

Megan Duffy, ‘15

Faculty Mentor: Lisa Baglione
Department of Political Science



Supported by SJU Summer Scholars Program

In recent months, policymakers and political observers the world over have been analyzing Russia’s incursion into Crimea and eastern Ukraine. This action fits a pattern of Russian foreign policy, dating from the first days after the fall of the Soviet Union, in which Russia uses intimidation, and often force, to maintain the loyalty of post-Soviet states. Using the three major paradigms of International Relations thought – Realism, Liberalism, and Constructivism – I assessed Russia’s motives for its aggressive foreign policy. In the Realist tradition, Russia uses its antagonistic behavior to assert its dominance in the post-Soviet region. Its’ security is predicated on maintaining a sphere of influence. In the Liberal school of thought, Russia’s foreign policy can be attributed to domestic appeasement. The invasion of Crimea and support for the separatists in eastern Ukraine play very well in Russia; President Vladimir Putin’s approval ratings have risen to 72%. Finally, in the Constructivist paradigm, Russia’s foreign policy is created out of ideology and identity. The Kremlin leadership subscribes to the notion that Russia has always been and must continue to be a Great Power, that is, a state that helps shape world politics and the world order. Moreover, Russian identity is intertwined with that of the United States. As was the case during the Cold War, Russia sees the U.S. as its adversary, and demands that Russia be accepted as a legitimate force in world politics. For example, when the colored revolutions broke out in Ukraine, Georgia, and Kyrgyzstan in the mid-2000s, Russia perceived them to be democratization efforts undertaken by the U.S. Russia responded to this potential subversion of its influence by increasing its own involvement in the region. As articulated below, I found that the Constructivist school provided the most complete and valid explanation of Russia’s continued interference in many of its neighbors’ affairs.

I used four cases to better understand how these paradigms explain Russia’s policy of meddling in its sovereign neighbors’ affairs: Crimea (Ukraine), South Ossetia and Abkhazia (Georgia), Transnistria (Moldova), and Kazakhstan. The first three have a history of Russian separatist activity and direct Russian involvement in such activity; the fourth has a sizable Russian minority, but no signs of ethnic dissent. From the Constructivist perspective, Russia has maintained a level of involvement in the first three states, but not the fourth, because they are ideologically threatening. They have begun to orient themselves to the West – Ukraine was on the verge of signing an Association Agreement with the European Union, Georgia has expressed interest in joining NATO, and Moldova has already signed its own Association Agreement. The governments in each of the three are liberal democracies. Kazakhstan, however, is firmly authoritarian, posing no threat to the Kremlin. Moreover, Kazakhstan has recently joined Russia’s Eurasian Economic Union, cementing a partnership between the two states.



Elizabeth Ann Becker
Department of Psychology
Saint Joseph's University

Ph.D. University of Wisconsin

Research Interests:
Behavioral Neuroendocrinology

As a behavioral neuroendocrinologist, I am interested in examining the neural and hormonal mechanisms underlying animal social behavior. In particular, I focus on non-genetic parental contributions to the development of offspring brain and behavior (e.g. how parental care influences offspring biology). In my lab we examine the development of a range of behaviors including aggression, animal communication and parental behavior.

For many species, the postnatal period, which consists primarily of feeding and thermoregulation, is a critical phase in development. In female offspring, it has been well-documented that care from mothers influences the development of maternal behavior and anxiety through epigenetic mechanisms. Although the majority of research has focused on maternal care, the early social environment is not limited to interactions with mothers alone, and may include fathers, siblings and even alloparents. In the bi-parental California mouse, for example, increased care from fathers leads to increased paternal behavior and aggression in adult male offspring. Paternal care is rare among mammals and therefore, has been largely understudied. In the Becker Lab, we work with the monogamous, territorial and highly aggressive California mouse (*Peromyscus californicus*), which is a model system for exploration of paternal investment on offspring development and the development of aggression.

Summer Research Highlights. This summer I was fortunate to work with two talented summer scholars on two very different projects. In one, we explored the role of dopamine in the formation of the winner effect, which is an increased probability of being victorious subsequent to multiple winning experiences (see Sammartino). In the second study, we compared the consequences of maternal and paternal care on male offspring aggressive and parental behavior (see Stephenson). Both of these studies provide unique insights into the development of social behavior across the lifespan.

Dopamine's Role in the Home Field Advantage

Nicole Sammartino, '15

Faculty Mentor: Elizabeth A. Becker
Department of Psychology

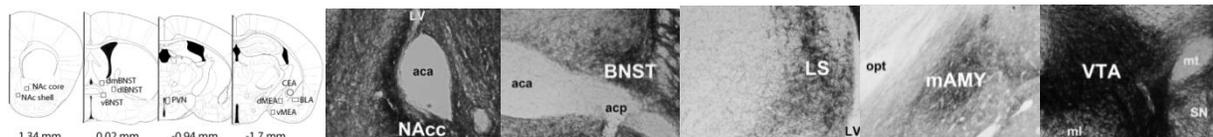


Supported by the SJU Summer Scholars Program

The winner effect, which has been demonstrated in a variety of species including humans, describes the phenomenon of increased winning ability following previous victories. The winner effect is thought to be connected with the challenge hypothesis which indicates an increase in testosterone (T) levels after an aggressive experience. When an aggressive encounter is won in a familiar location, androgen (AR) receptor density increases in brain regions associated with control of aggressive behavior, such as the mesolimbic pathway. Dopamine (DA) levels have also been seen to increase after an aggressive encounter as measured by the DA precursor tyrosine hydroxylase (TH). It has been found that an increase in T following a social encounter can trigger the release of DA to reinforce that social behavior. Based on this connection, it is possible that increased T following the win of an aggressive encounter at home may trigger a release of DA which may reinforce the aggressive behavior and initiate the formation of the winner effect.

Adult male California mice (*Peromyscus californicus*) were conditioned with either winning experience or no winning experience before being tested in either a familiar or unfamiliar cage using a 10 minute resident-intruder aggression paradigm. 45 minutes after completion of the aggression test, trunk blood and brains were collected from the experimental male. Males with both prior victories and residency (home advantage) demonstrated a full winner effect in the test encounter as compared to those who did not have prior victories or residency. For males without prior victories, an increase in T following an aggressive encounter may be important in assisting future winning ability.

Since DA has been linked to aggressive behavior, and because T is important for winning and influences DA production, we hypothesized that individuals with both prior victories and residency will demonstrate a higher DA concentration in mesolimbic regions as compared to those who do not have prior victories or a home cage advantage due to the potential reinforcing effects of winning an aggressive encounter. Brains were then stained for a precursor indicating active phosphorylated tyrosine hydroxylase (pTH) by immunocytochemistry. Sections were then analyzed using an OLYMPUS BX51 microscope to determine which sections demonstrated the heaviest staining for the regions of interest: nucleus accumbens, lateral septum, bed nucleus of the stria terminalis, amygdala, and ventral tegmental area. Once the location of the most concentrated pTH stain was determined, photomicrographs of that region were taken so that cell counts could be taken electronically using NIH image software to determine how much pTH is being expressed in each given region. This data will be further analyzed to determine the importance of DA in reinforcing the formation of the winner effect through aggressive encounters in a home location.



Differential Impacts of Paternal and Maternal Care in *P. Californicus*

Michael R. Stephenson, '15

Faculty Mentor: Elizabeth A. Becker
Department of Psychology

Supported by the SJU Summer Scholars Program



Recent evidence in the aggressive and biparental species, *Peromyscus californicus*, indicates the importance of paternal care in the development of offspring behavior. Specifically, retrieval by a parent (removal of a pup from a potentially dangerous situation outside of the nest) influences the expression of aggressive, and parental behaviors in male offspring. Although the overwhelming majority of research examining parental effects on offspring development has focused on maternal impacts, to our knowledge, comparisons between maternal and paternal influences have yet to be fully explored.

To directly test for differences between maternal and paternal care in the current study, we experimentally increased maternal or paternal retrievals, and examined adult offspring aggressive and parental behavior. Randomly selected male offspring were subjected to one of four treatment manipulations during the early postnatal development: maternal retrieval, maternal sham retrieval, paternal retrieval, and paternal sham retrieval. At five months of age, focal males were then allowed to sire a first litter so that the presence of their offspring could be assessed as a modulator of paternal aggression in a traditional resident-intruder paradigm. Following the birth of a second litter, the paternal care of focal males was observed so that comparisons between groups of fathers could be ascertained.

Based on previous literature, we hypothesize that fathers who received high levels of retrievals from their fathers will be most aggressive, and fathers who received low level of retrievals from their mothers to be least aggressive. In addition, we hypothesize that fathers who received a high level of retrieval from either parent will exhibit higher retrieval behavior than those fathers who received a low level of retrieval from either parent. Together, these hypotheses will yield a greater understanding of the role parents, particularly fathers, play in regulating the future behavior of their young. The first test will illustrate how parental care influences a male offspring's aggression, while the second test will examine how a father or mother alter their son's ability to provide parental care itself.

Our predictions of the expression of certain levels of aggression, and paternal care, arise from the potential for fathers to transmit behavior across generations, both gnominically and non-gnominically, particularly to sons. Thus, we expect that males exposed to high levels of paternal care during development (i.e. paternal retrieval condition) will similarly express high levels of paternal care as adults, and associated high levels of territorial aggression. Moreover, these inquiries provide further insight into the impact parents have on the development of offspring behavior.



Henry V. Bender

Department of Ancient Studies and Classics
Saint Joseph's University

Ph.D. Rutgers University

Research Interests: Latin and Greek Epic,
Lyric Poetry; Topography and Archaeology of
Ancient Greece and Italy; Classical Mythology;
Classical Influence on Renaissance Florence and
Rome

My teaching is very student focused and flows from a lifelong commitment to the need for knowledge to inform understanding. While the primary work of a Classicist is the Greek and Latin languages themselves, it is imperative that the relevance of Classical studies be continually reasserted and rediscovered by succeeding ages. In this sense the material culture of the Graeco-Roman world consists of artifacts, structures, sculptures and the “stuff” with which the ancients cultivated, lead and perpetuated their ideas and values. Reading the literature of ancient Greece and Roman invites reflection on profound topics such as the continuity of humankind, the irrepressible need for each person to find meaning in both individuality and in the shared experience of living and struggling with fellow man. The material informs the textual; literature and archaeology are arms on the same torso. My research and publications have been the product of this view.

Classical myths embody the awakening of the human mind to ask and answer—if imperfectly—the deep questions about the origin of life, love, hostility, the defeating sense of life as terminal, the promise of a new day and the life of man as an embryo in the womb of mother earth. Through the gods, goddesses, heroes and warriors of myth and epic, young people today can see emblematic representations of character types, Jungian archetypes, and struggling societal personifications of the antitheses of human nature. Through Greek and Roman art and sculptures we have windows into the values of their worlds; the Roman counterpart is informed by what the Greeks sought abstractly but utilizes decoration for extrinsic purposes. In one sense we see the written and artistic media of the Roman Empire espousing values to inform, direct and cajole more than to edify, dignify and assert the essence of *humanitas*.

My 47 year career of teaching on various secondary and university levels has found me teaching what I have termed the *connective tissue* of being human. The challenge is to awaken my students to think and to express in nonlinear ways the nexus between thinking and feeling. The mysterious dialog between the heart and the mind is always troubling, but it always results in a better understanding of who we are and where we are going. Our values inform our deeds which are the ultimate and undeniable expression of what we value and how we value.

The subject of the power of iconography particularly prominent in the cuirassed statures of Roman emperors is an engrossing topic. Miss Charles as a young artist brings a sensitivity to the comprehension of a statue of any era. Her ability to take cognizance of decoration and image as a visual almost textual link with the person and time of its making gives this project great promise.

The Iconography on Cuirassed Statues of Augustus, Domitian, and Trajan

Kayla Charles, '15

Faculty Mentor: Henry V. Bender
Department of Ancient Studies
and Classics



Supported by SJU Summer Scholars Program

Including sculptures and paintings, imperial artwork has served as a significant marker of presence for an emperor in ancient Rome. Specifically, triumphant cuirassed sculptures display glorified representations of these figureheads. They exemplify a deliberate mixture of mythological and historical imagery to lend increased prominence to an event under their authority. Such statues tended to elevate an emperor to a divine status. They would grasp the attention both of Rome's population, and when sent to other provinces, that of all who were able to observe them.

Traditionally, the statue was carved from one piece of marble except for the head and arms. Torsos could sport new heads and arms as emperors changed. There were two types of cuirassed statues: Classical and Hellenistic. The former was introduced during the reign of Augustus and derived its style from sculptures of Alexander the Great. The imagery on the breastplate (cuirass) of these statues reflected the interests of the reigning emperor. The victories that were attributed to him would be considered worthy of representation. My research has shown that in various periods popular motifs such as griffins, gorgons, victories and barbarians constantly appear. The interplay between their symbology and recognition enhances the image of the emperor depicted.

The first Roman emperor, Augustus, established the use of cuirassed sculptures because he effectively combined images of barbarian opponents with those of mythological figures to produce a message of peace and prosperity after years of civil war. The Prima Porta statue of Augustus, a most complex sculpture, commemorates his victory over the Parthians in 20/19 BCE. No statue of any succeeding emperor displays such an intricate narrative on its breastplate. Augustus' use of iconography signals the dawning of the *saeculum aureum* or golden age of Rome and projects the favor he won from the gods. While stressing descent from Augustus, the iconographical imagery of succeeding Julio-Claudian emperors (14-68CE) became less complex and favored a less refined, simpler style.

During the Flavian period (69-96CE), as sculptors tried to reach a large audience, iconographical imagery became more clearly associated with specific events or moments. The Flavians focused on the celebration of military victories with increasingly less abstract iconography. This shift in the imagery on the breastplates reflected the different imperial values. From Augustus (31BCE-14CE) through Trajan (98-117CE), the cuirassed statue continued to document important military victories and the addition of new territories through select mythological figures and allegorical symbols defining an emperor and his rule.



Raquel Kennedy Bergen
Department of Sociology
Saint Joseph's University

Ph.D. University of Pennsylvania

Raquel Kennedy Bergen is a Professor of Sociology. She is a fellow in the Institute for Violence Research and Prevention at Saint Joseph's University. A graduate of Saint Joseph's, she received her Master's Degree and Ph.D. from the University of Pennsylvania. She joined the faculty of Saint Joseph's in 1993.

She is the author or co-author of numerous scholarly publications and five books on violence against women including, *Wife Rape: Understanding the Response of Survivors and Service Providers*; and *Issues in Intimate Violence* (Sage Publications). With Claire Renzetti and Jeff Edleson she edited, *Sourcebook on Violence Against Women* (Sage Publications) and the recently published anthology, *Violence Against Women: Classic Statement* (Allyn and Bacon); and *Violence Against Women: Readings from Social Problems* (Rowman Littlefield). Her area of expertise is intimate partner sexual violence and her current research explores women's experiences of sexual and physical violence during pregnancy.

In 2004 she was appointed by the Honorable Governor Edward Rendell to the Pennsylvania State Ethics Commission. She is currently the only woman to serve on this Commission. Raquel Kennedy Bergen has worked with battered women and sexual assault survivors for the past 18 years. She routinely travels the country to educate advocates for battered women and sexual assault survivors on intimate partner sexual violence. She is also the faculty moderator of REPP — the Rape Education Prevention Program at Saint Joseph's University.

Violence Against Women

Caitlin Lavorgna, '15

Faculty Mentor: Raquel Kennedy Bergen
Department of Sociology

Supported by SJU Summer Scholars Program



This summer I was fortunate to be given the time to focus research on violence against women, specifically rape. My interest in this topic stemmed from a semester I spent in South Africa where I was able to work in a shelter with abused women in children. My time there allowed me to take a closer look at the violence that was happening in South Africa, and I wanted to see how it compared to the violence here in the United States. As I did more research the focus molded into taking a closer look at rape on college campuses, a location I am most familiar with.

Rape has become an epidemic in the United States and especially on college campus. The change of being a victim is four times greater while a person is a student in college. Rape and sexual assault has become commonplace on college campuses, which has led to beliefs that in some cases rape is deserved. Due to this I focused on who may believe rape myths, beliefs such as if a woman is wearing a revealing top she deserves to be raped. The research showed that men, members of fraternities or sororities, members of athletic teams, and those without previous rape education were more likely to accept rape myths and therefore more likely to perpetuate the ongoing cycle of rape on college campuses.

I used a previously collected data set in order to analyze the information the researchers had collected. The researchers also focused on who accepts rape myths. This allowed me to create my own survey, which will be conducted in the Fall 2014 semester. The data analyzed will be used together with the survey data to provide the information for my senior thesis.



Frank Bernt

Department of Teacher Education
Saint Joseph's University

Ph.D. Temple University

Research Interests: Service-Learning
Moral Development Tests &
Measurements

I have a longstanding interest—both personal and academic—in service to others: what motivates it, how it can impact (both positively and negatively) its recipients, and its potentially transformative effect upon the one who serves. The Gospel claim that “it is more blessed to give than to receive” is not only attested to by those who serve; it is at least partially confirmed in empirical studies linking service to any number of positive psychological benefits.

Of course, the connections supported by the research are neither direct nor simple. Certain conditions must be in place; certain frames of mind on the part of both giving and receiving parties will either enhance or detract from benefits.

There have been recent steps to capitalize upon the positive benefits of service—and more particularly, of service learning—in the field of teacher education. In our own Teacher Education Department, the value placed on character education, reflective inquiry in teaching, and culturally responsive teaching makes service-learning an ideal tool for teacher preparation.

Colleen Carmody’s research steps away from the usual focus upon service-learning outcomes and focuses instead upon issues and concerns relating to “setting the stage” to assure maximum likelihood that the above-promised personal transformation will occur. Her study is a two-part invention involving, first, a series of interviews of education faculty and service-learning faculty, as well as of community partners; and second, the developing of a “model service-learning course syllabus” for an education course that intentionally incorporates principles of service-learning effectiveness (distilled both from the literature and from her interviews) into the field experience component of a teacher education course.

The hope is that her syllabus, framed by her account of interviews and review of the literature, might serve to further spark conversations within the Teacher Education Department concerning how existing field experiences might integrate service-learning concepts in a way that contributes substantively to the department’s effort to prepare teachers who are committed to being “persons for and with others.”

Thinking Beyond Four Walls: Cultural Relevance in Education

Colleen Carmody, '16

Faculty Mentor: Frank Bernt
Department of Teacher Education



Supported by the SJU Summer Scholars Program

Culture is one of the most diverse and complex words in the English dictionary yet most definitions include the word “understanding.” As Grant Wiggins states, “We have to understand our own understanding before anything else.” The reason I have such a passion for education, culture, and service learning is that you need a form of understanding to authentically live out all three. The understanding of pedagogy is vital to educating students of different cultures, and I believe that service learning is one of the most practical means for accomplishing that challenging task.

I created an undergraduate service-learning course for education majors that is entitled *Thinking Beyond Four Walls: Cultural Relevance in Education*. It encompasses the ideas of the fearless educators such as Gloria Ladson-Billings, who defined the term “culturally relevant teaching” in 1992 as a means for working with underserved children in America’s public schools (Ladson-Billings, 1992). The syllabus includes a variety of teaching strategies, including examples of both formative and summative assessments, for future teachers and their students. It gives tangible examples of how teachers must be culturally responsive both in and out of their classrooms in order for their students to learn to the best of their abilities in a way that they can most efficiently understand and relate to other students.

This course is a service-learning course, which means there are discussions about social justice-related topics throughout the semester that accompany three hours of service a week in an education environment in the city of Philadelphia. Providence Center’s after school program, St. Rose of Lima Elementary School, and St. Martin de Porres Independent Catholic Elementary School are three of the service sites at which the students will be placed. I visited each of these educational settings and spoke with the supervisors/principals about their organization. We discussed ways we can enrich the relationships among Saint Joseph’s students, the students/faculty at the organization, and our Saint Joseph’s education professors. After talking with each supervisor, I discovered that the most beneficial way to achieve this would be to create relationships through authentic conversations among all parties while being practical, yet not forgetting we all have schedules.

The goal of this service-learning course is for education majors to leave Saint Joseph’s University with an open mind and with confidence in themselves that they have the ability to understand their students. They will be able to talk about race, gender, sexuality, etc. when appropriate in and out of their classroom. As teachers, if we are not comfortable with our own cultures, we won’t be able to be comfortable with others’ cultures. Self-reflection is a huge component that once again gets lost in translation. The most important element as a teacher is to have an open mind in the classroom. The only way your students will learn something from you and grow will be by giving them a chance to tell you their story and for you to tell them yours. Teachers must control and manage the classroom by being consistent, yet there is always room for improvement. The one important aspect that I learned throughout this research is that when utilizing culturally responsive strategies with your students, it carries out into everyday life forcing you to not only fully understand your surroundings, but yourself as well.



Shantanu Bhatt
Department of Biology
Saint Joseph's University

Ph.D. Emory University

Research Interests:
Gene regulation in pathogenic *Escherichia*

Enteropathogenic *Escherichia coli* (EPEC) is a significant cause of morbidity and mortality amongst infants in developing countries. EPEC belongs to the attaching and effacing (A/E) family of pathogens that are so called because they attach intimately to intestinal cells and destroy cellular microvilli – organelles that play critical roles in the absorption of fluids and nutrients. The destruction of these appendages contributes to the observed diarrhea. The ability of EPEC to attach, efface, and cause diarrhea resides within the pathogenicity island locus of enterocyte effacement (LEE). The LEE of EPEC is necessary and sufficient for pedestal formation. Because of its indispensable role in virulence, the regulation of the LEE has been extensively characterized over the past two decades. Over 50 regulators of the LEE have been identified that affect the LEE at every imaginable level of gene regulation. Surprisingly, though, almost all the known regulators are proteins and very little information is available on the role of regulatory small RNAs (sRNAs) in EPEC pathogenicity. sRNAs are a heterogeneous group of molecules that range in size from 50-500 nucleotides in *E. coli* and are usually not translated. The majority of sRNAs elicit their effect by directly base pairing to their target mRNAs to affect stability and/or translation. My lab is interested in identifying sRNAs that directly or indirectly regulate the LEE and contribute to the virulence of EPEC.

A second project, that I have recently initiated, explores the pathogenicity of the emerging enteric pathogen *Escherichia albertii*. Several recent outbreaks of diarrhea have been attributed to this bacterium. *E. albertii*, like EPEC, possesses an intact LEE. However, the pathological and evolutionary significance of the pathogenicity island remains undocumented in *E. albertii*. We have begun to investigate the environmental and regulatory control of the LEE of *E. albertii* and compare and contrast it to that of other related LEE-possessing pathogens.

Our research will provide insight into the repertoire of regulatory mechanisms used by LEE-possessing pathogens to cause disease, which will aid in the rational design of therapies to combat these bacteria.

Identification of sRNAs that Modulate Enteropathogenic *Escherichia coli* Pathogenesis in *Caenorhabditis elegans*

Elisabeth Mason, '15



Faculty Mentor: Shantanu Bhatt
Department of Biology

Supported by a Gift From Nick Nicolaides, '87

Enteropathogenic *Escherichia coli* (EPEC) is a bacterial pathogen that infects the intestinal cells of infants and destroys cellular microvilli, which prevents the absorption of water and nutrients that leads to diarrhea. The locus of enterocyte effacement (LEE) is a cluster of genes required by EPEC to cause diarrhea and disease. The LEE is responsive to regulation by numerous environmental and cell generated molecular cues, including the signaling molecule indole, which is synthesized by the gene products of the *tnaCAB* operon. The central gene *tnaA* encodes for the enzyme called tryptophanase, which breaks down tryptophan into indole. Interestingly, indole is also toxic to the worm species *Caenorhabditis elegans* and causes its death. This species is often used as a model organism to identify virulence factors and their targets because of the high degree of similarity between its genome and that of humans. Thus, regulators that affect the expression of the *tnaCAB* operon would also be expected to affect the LEE.

Whereas protein-based regulation of the LEE has been widely studied, the roles of regulatory small RNAs (sRNAs) in regulation of the LEE remain elusive. sRNAs are a diverse group of molecules that typically do not encode a proteinaceous product and most of them elicit their regulatory effect by base pairing to their target mRNAs.

We examined the role of the regulatory sRNA Spot42 in indole production. It was observed that sRNA overexpression inhibited the production of indole. To determine the region of binding between Spot42 and *tnaA*, we used the program IntaRNA, which predicts regions of complementary base pairing between a sRNA and its target mRNA. For Spot42, this region was predicted to be located in the intergenic region between *tnaC* and *tnaA*. To verify the direct binding to this region, we fused the *tnaC-tnaA* intergenic region to the reporter gene *lacZ*. The *lacZ* gene encodes the enzyme β -galactosidase. β -galactosidase breaks down the colorless substrate ONPG to a yellow colored product ONP. The amount of color produced directly correlates to the expression of the enzyme. After intentionally overexpressing Spot42, we observed that there was a substantial decrease in the yellow color production compared to a strain that does not overexpress Spot42. This suggests that the computationally predicted region is indeed the site to which Spot42 base pairs and represses *tnaA*.

We are currently evaluating whether the protein Hfq, which facilitates the base pairing of Spot42 to its target genes, is also involved. Moreover, we are also evaluating whether Spot42 affects the ability of EPEC to kill *C.elegans* as well as contribute to disease in mammalian cells. Collectively, these results will contribute invaluable information on the roles for sRNAs in EPEC virulence.

The Small RNA MgrR Regulates the Locus of Enterocyte Effacement of Enteropathogenic *E. coli* by Targeting its Regulator *grlR*

Elizabeth Storm, '17

Jamie Palmer, '17

Faculty Mentor: Shantanu Bhatt

Department of Biology



Supported by the SJU Summer Scholars Program

Enteropathogenic *Escherichia coli* (EPEC) is a bacterium that infects the small intestine, primarily in infants in developing countries. EPEC infections cause diarrhea and often lead to death. This pathogen is able to exert its effect by directly binding to intestinal cells and destroying the microvilli—hair-like appendages that absorb water and nutrients. This capability originates from a region of its genome known as the locus of enterocyte effacement (LEE).

Whereas a large number of protein regulators of the LEE have been identified, the roles of regulatory small RNAs (sRNAs) remain unexplored. sRNAs are a lesser known type of RNA that do not code for protein products like messenger RNAs (mRNAs) do. They have been found to typically regulate mRNA transcripts by direct base pairing and affecting the stability and/or translation of that region.

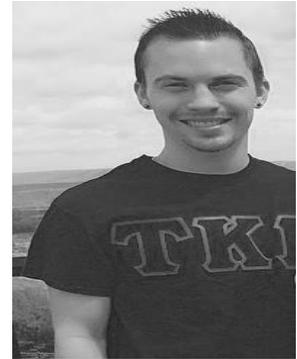
Our project this summer has been focused specifically on identifying the mechanisms and effects of a sRNA called MgrR (magnesium-responsive RNA) on its target gene *grlR*, an important regulator of the LEE. Through the use of the online program IntaRNA, we predicted that MgrR is capable of directly base pairing to and repressing *grlR*. This prediction was confirmed as overexpression of MgrR resulted in reduced expression of *grlR*. Interestingly, the region of *grlR* to which MgrR base pairs appears to overlap the binding site for a protein called CsrA that is known to activate the expression of *grlR*. Further experimentation has led us to postulate that the sRNA MgrR works as a repressor by competing for the same binding site as CsrA and preventing stimulation. We are currently expanding upon these observations.

In summary, by continually researching more about the mechanisms involved in regulation of the LEE, the hope is that this information can be used to develop drugs against deadly EPEC infections.

Exploring the Role of the Small RNA RyhB in Virulence of Enteropathogenic *Escherichia coli*

Christian Xander, '15

Faculty Mentor: Shantanu Bhatt
Department of Biology



Supported by a Gift From Nick Nicolaides, '87

Enteropathogenic *Escherichia coli* (EPEC) is a major cause of infantile diarrhea in developing countries. EPEC possesses the locus of enterocyte effacement (LEE) pathogenicity island that allows for the ability of bacterium to attach and degrade the microvilli in the small intestines. Three major transcription factors that are encoded within the LEE are GrlR, GrlA, and Ler which act to coregulate the LEE and modulate EPEC virulence. One topic of interest that remains unexplored is the role of regulatory small RNAs (sRNAs) in regulation of the LEE.

Specifically, we are studying the role of RyhB, an Hfq-dependent iron-responsive sRNA, in the regulation of the LEE. Preliminary results have shown that RyhB directly base pairs the 5' untranslated leader region (5'-UTR) of *grlRA* as well as *ler* mRNAs to repress gene expression. To test these results we conducted two types of experiments to examine the effects of RyhB on these transcriptional factors. One experiment was a β -galactosidase assay, a colorimetric assay due to the activity of β -galactosidase acting on a substrate (in our case ONPG). This assay was conducted using the *grlR'*-*lacZ* translational fusion. The second experiment was a western blot which was used to look at the effects of RyhB on the steady-state levels of GrlA, Ler, and EspB proteins. Our results from the β -galactosidase assays showed that the *fur* mutant repressed the β -galactosidase activity of the *grlR'*-*lacZ* translational fusion (Figure 1). Our results from the western blotting showed that Ler and GrlA proteins were both repressed by the RyhB overexpressor (Figure 2). These results lead us to believe that RyhB represses *grlR*, *grlA*, and *ler*.

Our future goals include studying the effects of RyhB in an EPEC background (previous work was done in an *E. coli* background) and to examine the *grlR'*-*lacZ* and *ler'*-*lacZ* activity under different iron concentrations.

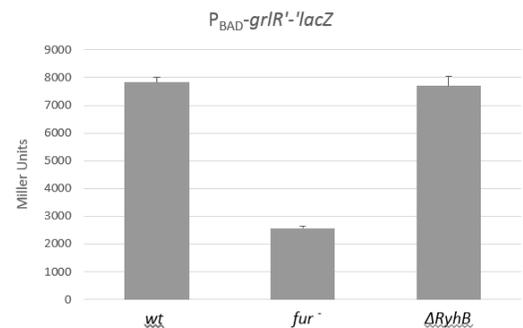


Figure 1: Overproduction of RyhB in the *fur* mutant repressed activity 3-fold. The Δ RyhB mutant showed comparable activity to the wild type.

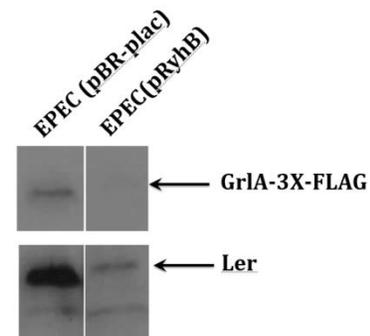


Figure 2: RyhB represses the synthesis of GrlA and Ler proteins in a RyhB overexpressor in EPEC.



John M. Braverman, S.J.

Department of Biology
Saint Joseph's University

Ph.D. University of California, Davis

Research Interests: Evolutionary Genetics in
Flies and Plants

Two different individual organisms from the same species often differ in their DNA. I want to know why. So the basic scientific question unifying my research on diverse organisms is: “What explains their genetic variation?”

The answer may be different in different organisms. For example, organisms which fly tend to spread genetic variants across geographical regions, reducing the “structure” of the populations. Organisms which live in very small populations and limited ranges, like plants specialized to live on certain kinds of soils, are expected to show a very high level of genetic differences among geographic populations. Several other variables come into play, such as, the gene or genetic region in question.

With that in mind, my Summer Scholars investigated genetic variation in a plant called the lyre-leaved rock cress (*Arabidopsis lyrata*). We surveyed several local nature preserves with interesting soil types. The results revealed a number of important genetic variants, some of which may be involved in local adaptation.

In addition to our scientific findings, I appreciated the intellectual and personal development in a group of students working on different but interrelated projects. We exchanged insights about the genetics, lab techniques, computer software, and field collection. The Summer Scholars Program again proved extremely valuable to three SJU students and me.

Genetic Basis for Local Adaptation in Populations of *Arabidopsis lyrata*

Katherine Molloy, '15

Faculty Mentor: Fr. John Braverman, S.J.
Department of Biology

Supported by the SJU Summer Scholars Program



The goal of this project is to identify the genetic basis of plant adaptation to soil type. The subject of this study is the plant lyre-leaved rock cress; the scientific name of this species is *Arabidopsis lyrata*. It is a close relative of the model organism *Arabidopsis thaliana*. It is found in Central and North America in low-competition habitats where other plants are unable to grow such as serpentine soil. Serpentine soil was deposited from volcanic activity when North America and Africa split. Serpentine is nutrient poor with low calcium to magnesium ratio and high in heavy metals making it a difficult environment for plants to survive. *A. lyrata* has the ability to grow in harsh environments such as serpentine, granitic and sandy soils. By studying *A. lyrata*, we hope to learn more about how plants evolve to survive in harsh environments.

Individual plants are collected from five populations in Pennsylvania and Maryland, with permission from Nottingham County Park, The Nature Conservancy, Natural Lands Trust, and PPL public electric utility at Holtwood damn. Four populations are serpentine, and one is granitic. DNA is extracted from the individuals and used to sequence genes that have been identified as candidates for soil type adaptation. We also sequence a universal, non-coding chloroplast DNA loci found in all plants as a baseline of genetic variation.

Genes and the non-coding sequence are amplified using polymerase chain reaction (PCR) to make many copies of the DNA. Once the genes of individuals are sequenced they are aligned. The DNA alignments are analyzed to identify which genes and which alleles at those genes contribute to soil adaptation. The alignments are analyzed using software called Geneious Pro. Software called DnaSP is used to identify and quantify genetic variation.

ANNATI is a gene originally identified in other publications as a candidate for soil type adaptation. We compared the DNA sequences of this gene among nine individuals. So far, there are 70 polymorphic sites across serpentine, granitic, and sandy soil populations. Many of the polymorphisms have alleles, or variants, which are unique to one soil type. For example, there is a glutamate/aspartate polymorphism, at which the glutamate allele is only present in the serpentine soil populations.

Future work includes extracting DNA from the leaves of 24 plants collected this summer. We also have about 100 samples of previously extracted DNA to study. Through this study of different populations of *A. lyrata*, we hope to gain more information about how plant populations are affected by natural selection.

Local Adaptation in Plants

Lauren Young, '15

Faculty Mentor: Fr. John Braverman, S.J.

Department of Biology

Supported by a Gift From Nick Nicolaides, '87



The plant, *Arabidopsis lyrata*, is a member of the Brassicaceae, a family which contains economically important vegetables such as broccoli, cauliflower, and mustard. *A. lyrata* is a close relative of the model organism *Arabidopsis thaliana*. It is adapted to challenging habitats such as serpentine soil. Serpentine is an ultramafic rock, so it contains high concentrations of metals that are toxic to most plants such as chromium, nickel, magnesium and iron, and is low in nutrients that support most plants such as calcium and potassium. The soil also has a low calcium to magnesium ratio. Over the summer, I had the opportunity to investigate the genetic basis of adaptation of *A. lyrata*. The objective of my research was to find polymorphisms, or differences in the DNA sequences between individuals of the same species, that may have functional and adaptive consequences, such as adaptation to serpentine soil. The two genes I studied to do this were *MGT7*, which is a magnesium transporter, and *IRT2*, which is an iron ion transport protein.

In this research, six steps are followed to find polymorphisms: bioinformatics study, plant and leaf collection from natural populations, DNA extraction, PCR amplification, DNA sequencing, and sequence alignment. In the bioinformatics study, I infer the gene structure in *A. lyrata* from the known gene structure of *A. thaliana*. This is done so that I can design oligonucleotide primers for the laboratory work. In the collection step, I go out to different field sites and collect samples. I really enjoyed sampling, as I had the opportunity to visit and learn about four different exceptional wildlife locations: Lock 12 Recreation Area, Nottingham County Park, Willisbrook Preserve, and ChesLen Preserve. After collecting samples, DNA extractions are performed. Next, PCR amplifications are done to make many copies of the DNA. The purified PCR products are sent out for commercial sequencing. Sequences are evaluated for quality and aligned using the software Geneious Pro. These alignments reveal DNA polymorphisms.

Another important goal is to make a very basic description of the life cycle of *A. lyrata* in nature and in the lab. Thus, I collected seeds from Nottingham and Willisbrook, which I am growing in a growth chamber. Photos are taken often to document the rates of germination and growth of the stem and different types of leaves. Once the plants reach their leafy stage, we plan to extract their DNA for future studies. I am very grateful for my Summer Scholars experience because I learned many of the wet lab techniques that complement the dry computational research I do. This was significant to me because it gave me a holistic view of the research, enabling me to see the project steps unfold to the end goal of data collection and interpretation.



Kristin L. Burr

Department of Modern and Classical Languages
Saint Joseph's University

Ph.D. Washington University in St. Louis

Research Interests: Medieval French Literature;
French-Speaking Regions of North America

My main research interests lie in two areas that initially appear to diverge strongly. First, my work focuses on thirteenth-century Old French verse romance, with an emphasis on tales involving King Arthur's court. I study issues related to gender, examining for instance the changing role of the female body and the ways in which the definition of chivalry shifts. My current project is an in-depth investigation of the literary function of love tokens. In Old French romance, lovers regularly exchange concrete objects that serve as signs of their affection. These tokens bind the pair together, offering proof of fidelity, identity, and true love. The items that immediately come to mind play a key role in celebrated twelfth-century tales.

Many thirteenth-century verse tales, however, are far from traditional. Trusting their audiences' knowledge of romance conventions, composers toy with expectations concerning characters, customs, and topics. Not surprisingly, the portrayal of love tokens in these narratives becomes more complicated, as well: authors start to transform the theme with amusing—and sometimes shocking—results. My project analyzes how composers build upon traditions established in earlier works to transform the significance of tokens and create a different image of chivalry and love, simultaneously forging a new model of the relationship between the hero and the heroine.

Second, I am interested in traditionally French-speaking regions of North America, including Québec, Acadie, Louisiana, and New England. In studying these areas and their history, I ask what it means to be in a linguistic minority—particularly in the United States—and look at the challenges faced by French-speaking groups as well as the ways in which they seek to preserve their unique cultural heritage. It is in the context of this area of research that I served as a Summer Scholars mentor in 2014.

Despite the linguistic and geographical differences in my areas of interest, a common thread ties them together: in both cases, my work centers on how identities are formed and evolve over time. Whether in tales written in Europe centuries ago or in twenty-first century Francophone communities in North America, identities continually change and display levels of complexity that become increasingly apparent as one examines them more closely.

Exploring Cultural Differences and Limitations in Philadelphia's French-Speaking Population

Lindsay Hueston, '16

Faculty Mentor: Kristin Burr
Department of Modern and Classical Languages
Supported by the SJU Barbelin Scholars



The Philadelphia French-speaking population comprises mainly Haitian and West African immigrants. Since the population is not very large, their difficulties in coming to the United States have historically been hard to trace and study. Because the contrast between the culture of one's home country and the culture of the United States may be drastically different, those coming from cultures other than the United States may find it difficult to adapt and succeed when immigrating, resulting in questions of identity and cultural differences. This project, in turn, sought to discover the relevance of culture and identity in the lives of Philadelphia's French-speaking population, specifically, after having immigrated to the US.

I interviewed a total of 19 French-speaking immigrants from Morocco, Haiti, Cote D'Ivoire, Cameroon, Guinea, and Chad in attempts to further understand the adjustment process of immigrants from countries that do not make up a significant portion of U.S. immigration statistics—and more specifically, how Francophone cultures and values influence this transition and consequent integration into American society. Participants were asked the following questions (in French, English, or both) about their transition to the United States:

- Why did you come to Philadelphia? Has coming to the United States been difficult for you? Do you feel welcomed?
- Do you find it easy to maintain your culture and identity in America?
- Have you ever felt excluded because of your status as an immigrant, or because of differences in culture? Have you felt discrimination? What is your perception of Americans/what do you think theirs is of you as an immigrant?
- What main differences have you noticed between your home country and the United States?
- What is one thing you wish would change about the immigration process—coming here or afterwards?

The participants were between the ages of 15-65, both male and female, of various occupations, and all were born in their home country and immigrated to the U.S. The interviews were conducted with the help of the Welcome Center of the Sisters of Saint Joseph; Father Patrick Samway, S.J., and the Haitian community at St. Barnabas Catholic Church; and visiting and current Francophone students at SJU.

More specifically, these immigrants discussed differences between the U.S. and their home countries—the organization of the government and its effectiveness, police involvement and response time, traffic rules, family life and values, the education system, gastronomic differences, treatment of strangers, job availability, and the role of religion in everyday life, among other smaller differences. Though many have come from less-developed countries and admire the United States for its level of development, the majority of these immigrants are extremely proud of their heritage and culture even after witnessing these contrasts.

Above all other factors, the language barrier was the most difficult thing to adapt to. Additionally, the immigrants interviewed reported feeling like some Americans saw them as “poor Africans” or “poor Haitians” because of their background or accent, automatically projecting a stereotype without knowing anything about the immigrants or their culture. This perception resulted in some cases of workplace and public discrimination, but for the most part, these immigrants said Americans were welcoming and understanding of their situations. Many also expressed frustration with the American immigration process and obtaining green cards, citing the process as long, dehumanizing, and unnecessarily stressful. It can be difficult for French-speaking immigrants to adapt to American culture, as many immigrant resources cater to Spanish-speaking populations; though there are places that serve French-speaking immigrants, the smaller number of French speakers in Philadelphia proves one more obstacle to overcome in immigrating to the U.S.

My interviews this summer have allowed me to gain a greater perspective of the life of an immigrant, and have furthered my interest in the intersections of culture, language, and identity—particularly in the Francophone world. Additionally, speaking with these 19 people has made me realize the need for greater empathy and solidarity in American society with those who immigrate—in terms of job opportunities, opportunities to learn English, to have a better education, and to have a better life all-around. Government processes can be improved as well, in terms of efficiency as well as consideration for the immigrants as fellow human beings. Though there may be drastic differences in terms of our cultures, we are all ultimately human—a statement that many expressed in my interviews, and one that has become even more present to me through working on this project.

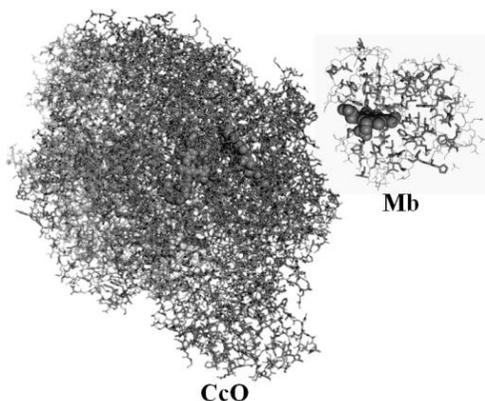


Jose F. Cerda

Department of Chemistry
Saint Joseph's University

Ph.D. Michigan State University

Research Interest: Spectroscopic and Electrochemical Studies of Redox Proteins and Heme Model Compounds



My research objective is the study of the electrochemical properties of redox proteins and redox cofactors to understand how proteins utilize these groups to achieve a specific function. For example, cytochrome *c* oxidase (CcO) and myoglobin (Mb) (X-ray crystallographic structures shown on the left side) have very different biological roles despite containing similar redox cofactors. The main cofactors in these heme proteins are heme *a* and heme *b*, highlighted in magenta. CcO is an enzyme that utilizes the reduction of oxygen to water to pump protons across the mitochondrial membrane for the eventual production of ATP, the energy currency in cells.

It is an electron transfer (ET) protein that contains multiple redox centers, whose main redox centers are two heme *a* cofactors. A topic of much interest is the elucidation of how the two hemes *a* are involved in the proton pumping mechanism of CcO. Heme *b* (found in Mb, hemoglobin, and heme peroxidases) can serve in roles such as oxygen storage and transport, electron transfer, oxygenase, catalase, peroxidase, and gas sensing. Although numerous studies have been performed on heme proteins, quantification of a protein-heme interaction is typically difficult because specific heme-protein interactions are hard to isolate within the protein. One way of studying specific interactions to the heme is by using heme model compounds dissolved in aprotic solvents. In this regard, during this summer, my group investigated the electrochemical properties of iron-, and copper-porphyrins in aprotic solvents.

Another approach in understanding protein-cofactor interactions is to use fluoride binding in heme proteins. Research studies performed in other labs have used fluoride ion as a probe of the heme cavity of proteins. During the last couple of years, we used this approach to study the heme cavity structures of Mb and horseradish peroxidase. This summer, our group investigated the electrochemical properties of heme-bound fluoride complexes of hemoglobin to understand how the quaternary conformational changes affect the redox properties of this oxygen transporter.

Utilizing Electrochemical Methods to Study the Properties of Hemoglobin

Joshua Middlecamp, '15

Daniel Walz, '15

Kyle Smith, '15

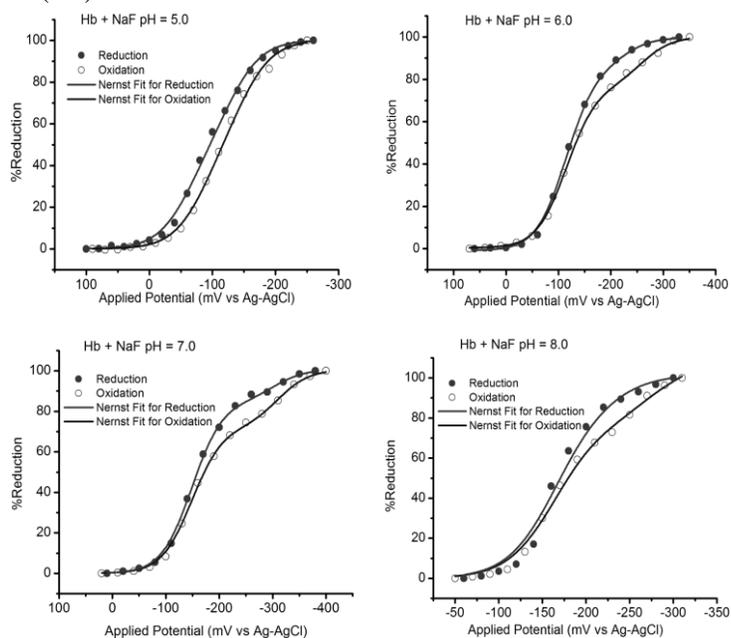


Faculty Mentor: Jose F. Cerda
Department of Chemistry

Supported by the a Gift From Anne Marie and Jay Borneman, '80 and the SJU Summer Scholars Program

Heme proteins play a vital role in a variety of important biological functions, all via an identical mechanism: utilization of the same redox cofactor. This demonstrates the importance of the effect of heme cavity structure on the chemistry of the heme, paving the way to understanding the definite task of the heme protein. There are many different types of hemes that exist in biology; however, it is heme *b* that we were most interested in, due to its presence in hemoglobin (Hb).

In Dr. Cerda's lab this summer, hemoglobin was the main focus of study: specifically, the fluoride-binding behavior of its hemes. Hemoglobin is the protein found in red blood cells, responsible for transporting oxygen throughout the bodies of all vertebrates. To study this protein, UV-vis spectroelectrochemistry was utilized via a UV-vis cell equipped with three electrodes: a working, a counter, and a reference electrode. UV-vis spectroelectrochemistry provides researchers with the reduction potential (E_m) of the sample, in addition to the number of electrons involved in the oxidation-reduction (redox) reaction. Instead of using chemical oxidation/reduction agents as is typical in UV/vis spectroscopy, in these experiments, an electrical potential was applied to the sample.



Our goal was to measure the reduction potential of Hb, with and without fluoride bound to its hemes, as well as to compare its various pH profiles with one another. With the data, we were able to construct a side-by-side comparison of the pH profiles of the Hb-fluoride complexes. As seen on the right, the results show that as the pH increased, the paths of the oxidation/reduction became increasingly different. Furthermore, the oxidation/reduction paths are affected by the presence of CO_2 and 2,3-bisphosphoglycerate (BPG), which regulate oxygen binding in Hb. Our results suggest that oxygen binding in Hb may be controlled by the redox properties of Hb.

Heme Peripheral Group Interactions in Extremely Low Dielectric Media and Their Contributions to the Heme Reduction Potential

Alaina Stockhausen, '15

Nicolette Wilkes, '15



Faculty Mentor: Jose F. Cerda
Department of Chemistry

Supported by a Gift From Anne Marie and Jay Borneman, '80 and the SJU Summer Scholars Program

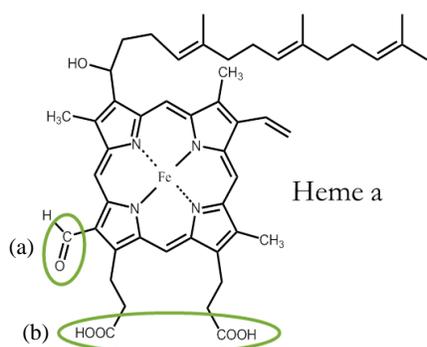


Figure 1. Heme Peripheral Groups
(a) formyl group (b) two propionate groups

Heme *a*, a naturally occurring cofactor in the protein cytochrome *c* oxidase, is a critical component in creating a proton gradient in our cells to produce ATP—the body's main source of energy. Our research this summer focused on the effects of the heme *a*'s peripheral groups interactions on the heme reduction potential. Heme *a* contains various peripheral groups, but the two propionates and the formyl group are of particular interest to our research (Figure 1). Various type of porphyrins (the aromatic ring surrounding the metal) derivatives were used to test the propionate and the formyl groups interactions.

What sets our data apart from previous research is that we were able to quantify the interactions to the peripheral groups by using cyclic voltammetry (CV) in low dielectric constant, non-polar, solvents. The low polarity medium matches the conditions of the naturally-occurring environment of heme *a*, which is surrounded by various non-polar amino acid residues.

The heme *a* reduction potential change was about -100 mV for the deprotonation of the propionate group after addition of a strong base DBU (1,8-Diazabicyclo[5.4.0]undec-7-ene). We then moved on to quantify the redox potential shift due to hydrogen bonding to the formyl group. We added a strong acid, TFA (trifluoroacetic acid), to the copper porphyrin derivatives. The redox potential shift for the porphyrin derivatives bearing one and two acetyls in its structure was about +200 mV. In conclusion, the study of the heme and porphyrin derivatives in low dielectric constant solvents demonstrates how interactions of the heme *a* peripheral groups are important in regulating the redox properties of the heme. These properties are important in understanding how cytochrome *c* oxidase translocates protons through the mitochondrial membrane to produce ATP.



Susan Clampet-Lundquist
Department of Sociology
Saint Joseph's University

Ph.D. University of Pennsylvania

Research Interests: Cities, Families,
Social Policy

Over the past decade, I have talked to adults and teenagers who live in low-income neighborhoods about neighborhoods, housing, jobs, risk behavior, and school. My ultimate goal in this research is to inform social policy so as to improve the wellbeing of families struggling to make ends meet. Throughout this research, I have heard many stories from teenagers about the violence they witness, and their entanglements with law enforcement – whether or not they are involved in illicit activities. From their narratives and from my experience teaching a class in prison, I have become more interested in non-incarceration solutions for crime.

Two important components of the mission of Saint Joseph's University are to prepare students for engaged citizenship and to pursue social justice. Connecting the research resources of universities and the on-the-ground knowledge of community-based agencies is a key part of engaged scholarship. In his call for higher standards at Jesuit universities in 2006, Father Dean Brackley argued that “universities should speak to the wider world.” This summer, I worked with a summer scholar whose research does just that. Michaela McGlynn worked with a social service agency, Good Shepherd Mediation Project (GSMP), which works with teenagers who have been arrested. Over the last three decades, the United States has become more punitive in terms of how society deals with teenagers who break the law, and as a result, we have higher incarceration rates for teens than other countries like us. GSMP provides an alternative path for teenagers who get into trouble, by using restorative justice programs to deal with the roots of the problem and to heal the harm that has been done. GSMP wanted to learn more about the teenagers who are exposed to their program, and whether they were re-arrested in the year following their program. In the spirit of engaged scholarship, Michaela worked with the agency to figure out relevant research questions, and she has kept in conversation with them as to her findings along the way. Providing GSMP with information about how the teens are doing assist them in their endeavors.

Restorative Justice Programs for Juvenile Delinquents in Philadelphia

Michaela McGlynn, '15



Faculty Mentor: Susan Clampet-Lundquist
Department of Sociology

Supported by the SJU Summer Scholars Program

The Chinese word for crisis is a composition of the symbols for “danger” and “opportunity” showing that there is the possibility for either outcome from any crisis situation. Through engaged citizenship, communities as a whole must work together to promote and encourage opportunity for individuals in crisis.

One of the fastest growing groups of criminal offenders in the United States, accounting for over 29% of offenses each year, is juvenile delinquents. Though the high percentage incites an urgency to address this issue, not all juveniles will recidivate. Therefore, it is not only important to understand the risk factors that influence a juvenile to become involved in deviant acts, but also to discover the reasons for delinquents to continue deviant behavior after a first conviction. Juveniles have the opportunity to change for the better and succeed as productive members of society, but many are unable to do so when they are released into the same environment that initially caused them to perform these deviant acts. Focusing on the roots of a juvenile’s delinquency and providing proper services will allow juveniles to return from the justice system with a new outlook, which will help make society safer, keep crime rates down, and restore a broken community.

Restorative Justice practices have become more widespread and serve as an alternative to traditional retributive processing. Pennsylvania’s juvenile justice system currently employs these ideals. Focusing more on rehabilitation rather than retribution, these programs work with the goals of increasing community and victim involvement, increased offender compliance, reduced recidivism rates, and increased perceptions of fairness for the offender and affected community.

The first neighborhood justice center in Philadelphia, Good Shepherd Mediation Program (GSMP), provides daylong diversion classes for juvenile delinquents that explain constructive ways to manage conflict, control anger, and make better life decisions. In order to promote success for juveniles in the community, this Juvenile Offenders Diversion Program (JODP) uses restorative dialogues to collectively identify and address the harms, needs and obligations of the juveniles in addition to his or her community.

In a secondary data analysis of GSMP’s 2010, 2011, and 2012 records, the current project found that the JODP has a 84% success rate for juveniles to refrain from reoffending within a year of attending the program. Analyzing the impact of the juvenile’s seriousness of first offense, age, sex, and ethnicity on recidivism showed varying results across waves. The first wave’s results show a strong positive relationship between the seriousness of a juvenile’s first offense and success, in that juveniles who committed more serious offenses were less likely to recidivate. Age and sex were also found to have a strong relationship with success in both the first and second waves. The likelihood of success increases with participants’ age and females were more likely to succeed than males. Interestingly, though no relationship is evident between ethnicity and likelihood of success in the first and third waves, the second wave shows a very strong relationship in that non-whites are less likely to succeed after participation in the program. These results suggest that delinquency and recidivism are not simply a product of individual characteristics, but rather a compilation of experiences from the juvenile’s social environment. The information found as a result of this project offers insight into the success of restorative programs in addition to whom and under what circumstances these programs are most beneficial.



Peter A. Clark, S.J., Ph.D.
Departments of Theology & Religious
Studies & Health Administration
Departments
Director-Institute for Catholic
Bioethics
Saint Joseph's University

Ph.D. Loyola University of Chicago

Research Interests: My research this summer focused on implementing the Mercy Health Promoter Model designed by the fellows and staff of the Institute of Catholic Bioethics for the Hispanic community in Norristown. As of March 2010, 11.2 million undocumented immigrants were living in the United States, virtually unchanged from a year earlier according to the new estimates from the Pew Research Center. Estimates show that there are at least 40,000 undocumented Hispanic immigrants living in the Philadelphia area, constituting eight percent of the total immigrant population. The increase in foreign-born peoples and their need for health care is a complicated issue facing many cities, health systems and hospitals. Over the course of the past few years Mercy Suburban Hospital has treated increasing numbers of foreign-born Hispanic patients. The majority have been presenting in the late stages of disease, which has made treatment more complex and costly.

To meet the needs of this growing immigrant population, the Mercy Health System Task Force on Immigration designed a program that centers on the Third World concept of “Health Promoters” This program is intended to serve as one possible proactive solution for hospitals to cost-effectively manage the care of this growing percentage of foreign-born individuals in the population. This notion of a “Health Promoter” program in Philadelphia is unique as one of those rare occasions when a Third World concept is being utilized in a first world environment. It is also unique in that it could serve as a paradigm for other hospitals in the United States to meet the growing need of health care for the undocumented population.

The implementation of the Mercy Health Promoter Model is a joint venture between the Institute of Catholic Bioethics, the designer of this model, and the Mercy Health System of Philadelphia. This pilot program began in January 2013 and targeted the Nigerian community of Philadelphia. In September 2013 we were approached by the French West African community and began serving this community. In May 2014 we were approached by the Pastor of St. Patrick's Church in Norristown to implement the Health Promoter Model in Norristown for the Hispanic community. We spent the summer educating five new health promoters for the Hispanic Community. This new initiative will be located at St. Patrick's Parish in Norristown and begin in October 2014. This new initiative will be a joint venture with Mercy Suburban Hospital and the Institute of Catholic Bioethics. The hope is that this model could serve as a paradigm for other Catholic hospitals nationally in the care for the most vulnerable members of our society—the undocumented. This pilot program has been endorsed by the Catholic Health Association of the United States and they are very interested in monitoring the implementation, success and evaluation of this model.

Health Promoters Norristown: Implementing the Mercy Health Promoter Model in an Urban, Resource-Poor Hispanic Community.

Gabriel Solórzano, '15



Faculty Mentor: Peter Clark, SJ
Department of Theology & Religious Studies

Supported by the Institute for Catholic Bioethics

This summer I investigated the process of conjointly implementing the Health Promoter Model program in an urban Latino population with Mercy Suburban Hospital and community leaders. Over the past decade the Norristown region has experienced a Hispanic population increase. A large portion of the Norristown Hispanic community works in jobs that do not provide health insurance and pay low salaries. Undocumented foreign-born Latinos in this growing community are frightened to seek medical care or have restricted access to health care because of their legality status. Some members of the foreign-born population also come up against language barriers since they speak Spanish primarily and do not speak English very well, limiting their access to health care. An increase in a Hispanic community that contains documented and undocumented immigrants concerns hospitals that are committed to provide health care to those who have limited access to health care. While Mercy Suburban Hospital asserts their devotion to treating the disadvantaged in their service area, the hospital confronts an influx of Latino patients with advanced stages of a disease or chronic condition, putting a financial burden on hospital system. An initiative was made from members of the St. Joseph's University Catholic Bioethics Institute to collaborate with Mercy Suburban Hospital and Latino community leaders to implement the Mercy Health Promoter Model program in the Hispanic population.

The goal of this program is two fold: to meet the needs of resource-poor Hispanics in the hospital's adjacent communities and to provide a cost-effective way the hospital can treat resource-poor Hispanics. The Mercy Health Promoter program works efficiently when established in a safe community center where the Hispanic, urban population congregate. St. Joseph's University Catholic Bioethics Institute and Mercy Suburban Hospital together chose to implement the Mercy Health Promoter model at St. Patrick's Church. St. Patrick's Church is the only church that has a large urban, resource-poor Hispanic population in the Mercy Suburban Hospital service area. To accomplish the goals of the Mercy Health Promoter program five parishioners were selected from the community to be Health Promoters. Health Promoters function as health educators in their community about health issues. Along with members of St. Joseph's University Catholic Bioethics Institute, Health Promoters also conduct monthly screenings for common health risks factors such as hypertension, diabetes, high cholesterol levels, and obesity.

Through the connection with a hospital, hospital residents teach the Health Promoters and Bioethics Institute members how to screen for risk factors. Health professionals who work for the hospital attend the monthly screenings and refer parishioners who present risk factors to the hospital. St. Joseph's University Catholic Bioethics Institute and the Mercy hospital system donate screening supplies. The Mercy Health Promoter Model thus allows Mercy Suburban Hospital to treat risk factors, preventing more advanced stage disease from developing in patients. This reduces the financial burden on the hospital system, permitting Mercy Suburban Hospital to continue treating resource-poor Hispanics in their service area.

**Ethics Teaching Rounds:
A Paradigm for All Teaching Hospitals**
DJ Temme, '16

Faculty Mentor: Peter A. Clark, S.J.
Institute of Catholic Bioethics

Supported by the SJU Summer Scholars Program



Teaching hospitals use medical teaching rounds as a means to facilitate young physicians to learn from experienced hospital staff. These medical teaching rounds focus on the physical disorders of the patient to familiarize medical students with the necessary conditions and treatments. This form of teaching, while valuable, falls short in some regards because it does not address the fact that these medical problems are often affected by other problems, whether they be physical, mental, social, religious, etc. This gap between the education medical students are receiving and the expectations placed on physicians to provide excellent care calls for a change to the way medical students are taught.

To solve this problem, the Trinity/Mercy Health System has designed and implemented a new type of teaching rounds, known as ethics teaching rounds. Three different models of ethics teaching rounds are in use by the Trinity/Mercy Health System; each is slightly different from one another, but all can be described as weekly case presentations followed by discussion. These three models are in use at the following hospitals in the Trinity/Mercy Health System: Nazareth Hospital, Mercy Fitzgerald Hospital, Mercy Suburban Hospital, and Mercy Hospital of Philadelphia. The goal of this new form of teaching rounds is to teach physicians to view the patient holistically and consider each unique aspect of the patient in order to provide he or she with excellent care. In doing this, medical students learn the importance of medical ethics, while reducing the need for ethics consultations.

This summer, I have worked alongside Peter A. Clark, S.J., two resident physicians from the Trinity/Mercy Health System, and Vice Presidents of Mission from the Trinity/Mercy Health System to evaluate the use of ethics teaching rounds. To do this, we designed two surveys to evaluate these rounds; one for the resident physicians who have attended ethics teaching rounds and one for the hospital staff who facilitate ethics rounds. We are now working towards publishing our findings to create a paradigm for all teaching hospitals to use.



Clare Conry-Murray
Department of Psychology
Saint Joseph's University

Ph.D. University of California, Berkeley

Research Interests: Social and Moral
Development, Gender Development

I am currently focused on researching how children from preschool ages through middle school coordinate concerns with fitting in to gender norms and concerns with being treated fairly. My research shows that children are concerned with both gender norms and fairness and at times, these issues conflict.

In general, children state that people should be able follow their own interests or preferences when it comes to gender roles, but they also consider the situation. For example, children state that hypothetical children should follow unconventional interests (like a boy who likes pink bikes) in private, but not in public, where they might be teased (Conry-Murray, 2013). This is an important indication that children follow gender norms to fit in and not only as an expression of their real interests.

There are some important developmental differences in children's endorsement of personal choice and fairness. Younger children around the ages of 4-7 tend to overestimate the likelihood that preferences will be in line with traditional gender roles, and they are more likely than older children to be inflexible about gender norms. In one study, I found that young children accepted a teacher treating boys and girls differently and unequally if it was consistent with gender roles. For example, young children approved of a teacher giving boys each a robotics kit and girls each an old maid card game, while older children were less likely to approve of this. Young children seemed to see these unequal gifts as a response to the interests of boys and girls and therefore, as justified. However, both younger and older children disapproved of a teacher who gave unequal, but gender neutral gifts, to boys and girls (e.g. M&Ms to girls and bananas to boys). This is concerning because it means that young children may not be aware of the diversity of preferences that exist and they may not challenge unfair treatment based on gender norms.

I have examined reasoning about gender and fairness in several age groups from preschool through adulthood and in several countries (Turkey, Benin, West Africa and South Korea). Currently, Emily Hachey and I are developing a research program to examine how children with autism understand gender norms and fairness, given that theory of mind (understanding of other people's minds and perspectives) develops later for children who have autism.

Theory of Mind Understanding in Autism

Emily Hachey, '15

Faculty Mentor: Clare Conry-Murray

Department of Psychology

Supported by the SJU Summer Scholars Program



The Center for Disease Control currently estimates that 1 in 68 children is diagnosed with Autism Spectrum Disorder, indicating a 30% increase in Autism diagnoses since 2012 (“Press Release,” 2014). With the astronomically increasing identification of Autism Spectrum Disorders (ASD), an understanding and acceptance of people with autism deserves the psychological community’s utmost attention.

Autism has been associated with a delay in theory of mind development, the understanding of other people’s mental states. However, theory of mind tests have traditionally consisted of verbal tasks and demanded verbal responses from participants. As autism spectrum diagnoses necessarily include deficits in communication (“Autism Spectrum Disorder (ASD),” 2014), the traditional mode of testing theory of mind might cause an innate disadvantage for people on the autism spectrum. With a more accurate assessment of theory of mind, we intend to assess the relationship between ToM and empathy, reasoning about social situations. Previous research has shown that even in children with autism who scored lower than normally developing children on theory of mind tests, moral judgment was still substantially intact (Leslie, Mallon, & DiCorcia, 2006). Additionally, previous research has found no difference in empathic concern between children with and without autism.

Research included an extensive literature review on the topics of autism, ToM, empathy, and social reasoning, hypotheses supported by the literature review, and submission of a research proposal to the university ethics committee, to begin collecting data in a future master’s thesis project. Empathy and reasoning about social situations also will be tested. This master’s thesis aims to investigate interactions between theory of mind, social reasoning, and empathy in the autism community, highlighting these strong psychological abilities through more accurate assessment.



Steve Cope
Department of Art
Saint Joseph's University

MFA Boston University

Research Interests: Painting

Inside the process of painting I am looking to assimilate and contribute to my heritage, stand on the foundation laid by painters of recent account and proceed in the development of the visual language.

I search my physical world for a potent or mysterious image that I can lock into paint. In 1990 while on the top floor of a Boston skyscraper, I saw at a great distance, a blimp, hovering silently over the harbor. It was an image I took to immediately- the blimp, as a slow and stealthy observer with a unique vantage point became a metaphor for my work as a painter. Soon wandering blimps themselves began appearing in my work, and I found I was painting them quite obsessively, flying into different landscapes. Ultimately, the blimp itself disappeared, transformed into a simple sphere. To me the spheres are a kind of universal subject matter. With their many different connotations, these forms are open in meaning and do not imply anything too specific. Some people see molecules: other people see beach balls. I'm interested in the relationships inside the painting and between the painting and viewer. These circles and spheres are ripe for interpretation, allowing the viewer to bring his or her associations to the experience with the painting.

What I do is look around and find the images that seem pertinent to us, images that we personally connect to. If I am lucky and follow these images, and though they remain for me a personal discovery, imbued with content special to me alone, they will sometimes transform into larger ideas that can be understood as part of common human experience, accessible beyond the particular. The blimp was an image I connected to, among it's other qualities it was solitary, a lonely image. Perhaps people could connect with that, as if we all experience being alone in the universe. To me that is interesting, to make images that touch people, that contribute to our understanding of the experience of life in our times.

Vanity: A Study of Today's Definition of Beauty Through Paint

Ashley Alden, '15

Faculty Mentor: Steve Cope
Department of Art

Supported by the SJU Summer Scholars Program



A prominent issue in today's society is body image, especially for females. Skinny corresponds to sexy; it is implemented in the media as we see every day. I was able to address this issue in art form in my collection, which I titled "Vanity: A Study of Today's Definition of Beauty Through Paint". My images explore the emotional distress body image causes for women, desirable body parts, and public figures associated with beauty whether they are in a positive or negative light.

A constant throughout all my pieces is irony. I depicted attractive women emotionally distraught due to the inability to realize their true beauty. On the other hand, we have gorgeous women that are well aware of their assets. A personal favorite subject to work with is Marilyn Monroe- an American icon beloved by many people. Although she was an advocate for being true to your own beauty and comfortable in your own skin, she still was wrapped up in the upkeep of vanity. So, I would add an undesirable variable to exploit there is no true "perfect" woman. All of my pieces have some aspect of beauty as well as a dig at American standards. By doing this I hope to engage the viewers with the subject and have them reflect on the issue. The problem is relatable for so many women, and even men. I want the viewer to be able to recount his or her own experiences, and then realize how ridiculous and miniscule it is through the humor and irony of the painting.

The actual application of paint differs from one painting to the next. In some pieces I applied thick layers of paint, and in others the paint was scarce. I experimented with different forms of layering, surface texture, and color usage. I found the most success by putting a black and white image on top of metallic spray paint, book pages, and patterned paint backgrounds to be the most interesting. I used the negative space to create the image, allowing the background to come through as the base for the subject. The overall project has been extremely beneficial to my growth as a painter. I was able to travel to NYC and view some of the Chelsea Galleries and learn from some of the best contemporary artists. From this I was able to come into my own style and find the type of paint application is the most fitting for me.



Tom Coyne
Department of English
Saint Joseph's University

MFA University of Notre Dame

Research Interests: Creative Writing

I am interested in stories and storytelling. My writing ranges from fiction to nonfiction, from travel writing to screenwriting to sports writing (as part of my life's goal of making golf tax-deductible, I write a great deal about this particular pastime). But the common motivation behind all my work is a curiosity about the ways we process our experience of the world and share that experience with others.

For me, it's all about narrative. Life is a great story, something with a beginning, middle, and end, and the more richness and thoughtfulness that we can bring to that story makes not only our lives better, but as writers, can deepen the experience of those around us. It's in our DNA to need stories—we require them as human beings. Comedy, tragedy—we learn how to walk through our day via the experience of others. Ever since humankind started scratching scenes on cave walls, we have looked and listened and learned: This is how I got the bear. Or this is how the bear got me.

We all have stories and experiences to share, if we look at our lives closely enough. The challenge in the noise of our culture is to make those stories stand out and capture an audience. This is where the craft of creative writing enters our work. We work at organizing our thoughts in a way that reaches out and engages and reveals something genuine. The beauty and wonder of writing—of all art, really—is that it gives us the chance to create and convey something that has never quite been captured before, at least not as it comes through our unique and individual consciousness. This is a great gift. And one worth our most sincere efforts.

Telling it Like it Is: An Exploration in Portraying Complex and Diverse Women in Today's Television

Dara Driscoll, '15

Faculty Mentor: Robert T. Coyne
Department of English



Supported by the SJU Summer Scholars Program

In the most recent years the progress of women in television has become far more visible. Many more television shows feature lead female actresses, and often these actresses are Women of Color.

Television as a media reflects what society considers the norm, and consistently casts of actors have been primarily, if not completely, white. It was also the case that the cast of characters would be male, with some small female roles. This format does not fit the society we live in today. Women are not only housewives who tend the household, and they have not been for quite some time.

Several television shows today feature women in different occupations, relationships, sexualities, and financial situations; this is the reality of the modern American woman: variety.

During my time as a Summer Scholar I sought to create a television drama that featured young women in as many different races, ethnicities, sexualities and gender identifications as possible. I used *American Horror Story: Coven* and *Orange is the New Black* as inspiration. Both of these shows have five or less male characters, all of whom are not major or completely necessary to the plot. The point in my television show was to give women the screen time they were deprived of for so long.

My television show, *Severed*, is about a girl, Audrey Jensen, and her ghost twin sister, Melissa Jensen:

Audrey Jensen has a dead sister who won't stay dead. Melissa Jensen spends her days and nights harmlessly haunting Audrey until one day she discovers Chris Rodriguez and accidentally possesses Audrey in an attempt to speak to Chris herself. With the help of Audrey's best friends, Jessica and Alexandra, Audrey must find a way to stop Melissa from taking her body, and her life.

The Screenwriter's Bible by David Trottier assisted me with the traditional screenplay format, and it also helped me polish out the gritty details that are involved with television screenplays. During my time as a Summer Scholars I spent my days outlining, writing and breaking through the wall that is writer's block.

This project revealed to me the purpose of writer's rooms for television shows. It is very difficult to write subplots and create every aspect of a television show alone. I set out to write five episodes, and I succeeded, but it was a challenge, for sure. This project also made me aware of the nuances in television shows that do not occur in movies. Television shows involve a few acts, depending on the length of the time slot, and a tag at the beginning (typically before the title card) and a tag at the end (before the credits roll).

Just as when I learned to write a movie screenplay, writing a television screenplay deconstructed television shows for me for the rest of my life, though I see this as an advantage and not a distraction.

***My Name is Janie* Novel Manuscript**

Christina McCabe, '15

Faculty Mentor: Robert T. Coyne

Department of English

Supported by the SJU Summer Scholars Program.



In recent years there has been an increase in popularity of the Young Adult novel, particularly those that address problems and issues that today's young adults may be dealing with. A few of the most popular titles that fall into this category include *The Fault in Our Stars* by John Green, *The Perks of Being a Wallflower* by Stephen Chbosky, *Thirteen Reasons Why* by Jay Asher, and *Speak* by Laurie Halse Anderson. This summer, I was able to write the manuscript of my own young adult novel centered around addiction and recovery.

The novel follows the story of eighteen-year-old Janie when her fight with addiction leads her to a month long stay at a treatment facility. While the reader is mostly learning about Janie's present life through twenty-eight chapters, there are windows to her past and glimpses of the events that led her to treatment.

The entire process of writing a novel has been both difficult and rewarding. During my time at SJU, I've written mostly short stories and poetry in my creative writing classes. Writing a 231 page manuscript was basically a strenuous test of how well I can transfer the skills learned in class to a larger piece. Having the time and mentorship to take on this project was a gift, and a wonderful foundation on which to build my novel and further my education.



Laura M. Crispin
Department of Economics
Saint Joseph's University

Ph.D. The Ohio State University

Research Interests: Labor Economics,
Economics of Education, Economics of
Poverty and Income Inequality, Applied
Econometrics

My primary research interests are extracurricular participation and the effects on educational and labor market outcomes. Extracurriculars help students to gain both cognitive skills such as math and reading, and non-cognitive skills such as interpersonal, leadership, and teamwork skills, all of which increase human capital and ultimately wages. Furthermore, there is an opportunity cost associated with participation: time spent in extracurriculars must take time away from other activities, which tends to reduce risky behaviors such as smoking and drinking. Thus, it is likely that participants will be more successful than non-participants in terms of educational attainment and wages.

The causal effect of extracurricular participation on educational and labor market outcomes are often difficult to ascertain due to selection issues: students who choose to participate may also be those who choose to continue their education, which is difficult to account for empirically. Using econometric techniques and rich, nationally representative data from the Department of Education, I am able to estimate the causal effects of extracurricular participation in high school on students' high school dropout decision and college attendance and completion decisions. As an example of my findings, I find substantial effects of participation on dropout rates, reducing the likelihood of dropping out by 14 to 20 percentage points.

I am particularly interested in "at-risk" students—those from disadvantaged backgrounds—because dropout rates for this group are more than twice as high as the dropout rates of their peers, and without policy intervention, the outcomes for at-risk students will be substantially worse than their peers. I find that for at-risk students, extracurricular participation is especially important for reducing the dropout rate, indicating that policies to provide and promote extracurricular activities in areas with high concentrations of at-risk students will be particularly effective at increasing educational attainment and wages for students.

A related project that I've recently begun is to estimate the effect of time allocated to extracurriculars and work on college students' time spent on homework and sleeping. I focus on these time use categories because organizations such as NCAA have increased funding for scholarships, which requires recipients to increase time spend on extracurriculars. Additionally, due to the rising cost of college, students may feel an increased pressure to work during college to reduce their need for loans. These two trends may lead to the final trend: an increase in the time to graduation, with many students in four year colleges taking significantly longer than four years to complete their degree. If time spent in extracurriculars and work reduce time spent on studying and sleep, then policies that promote extracurriculars and work during the school year may have unintended consequences for current college students.

Do Teacher Salaries Positively Affect Graduation Rates in Low Income New Jersey Schools?

Nicholas Hopkins, '16

Faculty Mentor: Laura Crispin
Department of Economics



Supported by the SJU Barbelin Scholars

Economists agree that investment in human capital is perhaps the most important element driving economic growth. In August, 2013, the Economic Policy Institute, a think tank based in Washington, DC, released a report entitled “A Well- Educated Workforce is Key to State Prosperity,” in which they identified “a clear and strong correlation” between the educational attainment of a state’s workforce and median wages in the state and added that providing expanded access to high quality education will “likely do more to strengthen the overall state economy than anything else a state government can do.” In an economy in which the demand for highly skilled workers is rapidly increasing, while the demand for their less skilled counterparts is decreasing, the importance of education for our nation’s overall well- being has never been higher. It seems clear that ensuring that every child receives at least a high school education should be a top priority to ensure our nation’s long term economic competitiveness.

One of the most important factors influencing this academic success or lack thereof is the teacher instructing the students in the classroom. In my project, I estimate the impact of teacher compensation on graduation rates, focusing specifically on New Jersey. I formed my own dataset from data I collected pertaining to school funding and graduation rates from the New Jersey Department of Education website and the National Center for Education Statistics’ Common Core of Data. Using the data analysis software STATA, I used this data to analyze to what degree highly paid teachers have a positive impact on high school graduation rates. By comparing the success rates of very poor and very rich schools in New Jersey, I hope to gain insight as to whether elevated expenditures on teacher salaries benefit students or if educational success is determined by factors that are not influenced by highly paid teachers.

The disparity in income in New Jersey is vast, which has important implications for their educational system. New Jersey is home to three of the twenty richest counties in America, as well as six counties where the poverty rate is over 30%. It is also home to Camden, where 65% of citizens live below the poverty line, including 80% of children. This disparity in income ultimately leads to a disparity in educational inputs; it is likely that students attending underfunded schools have inferior educational outcomes, which could potentially be remedied through increased spending on teachers.



Carmen Faccini

Department of Modern and
Classical Languages
Saint Joseph's University

Ph.D. University of Illinois at Urbana-
Champaign

Research Interests: Literary and film (re)construction and response to social and political issues in modern Latin America and the Caribbean, such as dictatorships, exile and political imprisonment. I am also interested in educational development and cultural production in Latin American modern revolutions.

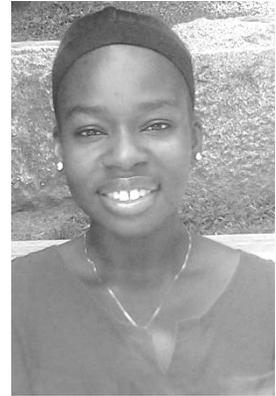
In relation with the previously mentioned research interests I teach courses in a cultural studies framework or postcolonial theory--such as Narratives of Slavery in the Hispanic Caribbean, Dictatorships in the Southern Cone, Culture in Revolution, among others--, which explore the historical, political and social subtexts of the works analyzed.

Edith Adjei-Danquah approached me last semester with the idea of conducting a research project on children's literature and producing a creative piece in this field as well. I felt enthusiastic since I myself am a writer, and I am also interested in Hispanic Literature of the Fantastic, including fairy tales and other children genres. Edith conducted research on the theoretical work in this field (Louis Vax's, among others) and applied those theories in the study and analysis of Horacio Quiroga's children's short stories, *Cuentos de la selva*—an Uruguayan author whom she had a chance of reading in her Introduction to Hispanic Literatures class. Edith did a fine job producing a research paper on “La tortuga gigante”, “La gama ciega” and “Las medias de los flamencos.” Furthermore, this research and analytical experience led her to producing creative writing in the Spanish language--a promising piece entitled “La canción de la selva”, which I expect to be the first of a future collection of short- stories.

***Lo fantástico* in the Children's
Short Stories of Horacio Quiroga**
Edith Adjei-Danquah, '15

Faculty Mentor: Carmen Faccini
Department of Modern and Classical Languages

Supported by the SJU Summer Scholars Program



Two important literary genres in Latin American writing are *realismo mágico* and *lo fantástico*. *Realismo mágico*, or magical realism, is more about the manner in which one sees reality. It is connected to a theory that pertains specifically to Latin America, *lo real maravilloso*, proposed by Alejo Carpentier-Cuba. Likewise, *realismo mágico* also is specific to Latin America. It is characterized by the tone of normality with which the narrator relates fantastic facts. In this genre, the narrator relates the “magical” facts (like levitation, miracles, imagined illnesses, unusually long life spans, or people with animal-like traits) as if they occur naturally without explanation or surprise. An example of this is given in Gabriel García Márquez’s short story “*Un hombre con alas enormes*”, or “A Man with Very Large Wings.”

The second genre, *lo fantástico*, or the fantastic, more is fairytale like. In this genre of Latin American literature, the fantastic penetrates reality. In *lo fantástico*, there is no specific limit between reality and the fantastic. A continuum exists between the most fantastic to the most real. An environment is created that is so real, it takes one out of his or her comfort zone. In Spanish, the description of this kind of feeling, this seismic impression, can be said as *se mueve el piso*. This feeling is one of fear and being threatened. The final effect is the world of the fantastic invading the real world almost like a mirror effect. Some famous authors in this genre are Luis Vax, Horacio Quiroga, Julio Cortázar, and Jorge Luis Borges.

Using the background information provided above about *lo fantástico* as a guide, I conducted my research in Spanish, concentrating on this literary genre and focused on a specific author. I looked closely at the genre *lo fantástico* and studied it in the works of Horacio Quiroga, a Uruguayan short story writer, and analyzed the effect of his work on Uruguay. My preliminary research started with the above information about *lo fantástico* continued further with an investigation of fundamental theories in this genre. Even further, my research will narrow as I study one or two specific works of Horacio Quiroja. From my research, I developed an annotated bibliography to gain an understanding of the genre *lo fantástico*. In addition to this, I also developed a creative pieced, a short story written for kids, using the style of *lo fantástico*.



Dr. Jonathan Fingerut
Departments of Biology,
Environmental Science

Ph.D. University of California

Research Interests: Dispersal
Ecology of Fruit Flies and
Ecophysiology of Diatoms.

Research in my laboratory normally centers on the larvae of black flies, the ubiquitous bane of campers and outdoors enthusiasts throughout most of North America. In particular, we focus on their dispersal (one-way movement in the environment) and how flowing water interacts with their behavior to determine their distribution.

Last summer, however, we decided to answer a similar question using a different model organism. Fruit flies are an equally ubiquitous group of flies whose genetics, behavior and sensory abilities have been well characterized. Building on past work to develop a non-toxic marking technique that could be used to track flies in the natural environment without influencing their behavior, we are developing baits to specifically attract (and hopefully control) an invasive species, *Drosophila suzukii*, which preferentially damages fruits such as blueberries and raspberries on the vine.

In a second project, we are also working on a group of photosynthetic single-celled organisms called diatoms. Just as ubiquitous as fruit flies, diatoms are the basis of many aquatic food chains and an difficult group to organize taxonomically. Focusing on one cosmopolitan species, *Achnantheidium minutissimum*, we are trying to determine if this is indeed one species or rather a group of closely related species. Our approach is multi-disciplinary using both genetics, morphological analysis and physiological experimentation to determine how closely related are strains from different locations and ecosystem types (stream vs. lake). This project is in collaboration with the Academy of Natural Sciences of Drexel University. My lab is leading the efforts to investigate the diatoms' physiology, specifically how flow (presence, absence and magnitude) influences their growth rates.

Our findings will help us understand not only the phylogenetics of this important species, but also help to identify the types (or combinations) of information that can, or cannot be useful in these types of studies.

Overwintering and the Effect of Low Temperatures on *Drosophila suzukii*

Marissa Diorio, '16

Faculty Mentor: Jonathan T. Fingerut
Department of Biology

Supported by SJU Summer Scholars Program



Drosophila suzukii is a sub-tropical species of fruit fly that has origins in Southeast Asia. Global trade allowed this species of fruit fly to make its way to the United States, first arriving in Hawaii and California, and then eventually appearing here on the East coast. *Suzukii* are notably different than other species of fruit fly, not only for the males' spotted wings but for the females' sharp ovipositor which allows them, unlike almost all other fruit flies which lay their eggs in dead or decaying fruit, to lay their eggs in soft skinned fruit that is still on the vine. This invasive pest is a particular problem for economically important soft skinned fruit such as peaches, strawberries, cherries, pears, raspberries, nectarines and blueberries. Two of these, peaches and blueberries, are locally important crops. As *suzukii* are a sub-tropical species of fruit fly and we wanted to determine if they are able to survive our winters and if so, how they are doing it. Not much is known about the overwintering of fruit flies but what is known is that most species appear in large numbers in early spring while *suzukii* appear in late summer. . We are testing two hypothesis to explain this pattern: 1) that they survive the winter but in very small numbers (either in the field or in man-made structures) and need time to rebuild their numbers and 2) that they do not survive and must reinvade each year. Our research, therefore has focused on the effect of low temperatures on *suzukii* reproduction. To determine this we decided to expose them to temperatures similar to early fall and observe the effect on their reproductive physiology. Our initial results show that compared to room temperature (21C) flies which complete their lifecycle from adult to adult in 2 weeks, a decrease of just 5C increased the generation time by 50%, mostly by increasing the time till egg laying and larvae appeared. Studies are continuing using colder temperatures all the way down to freezing. Although the results of these trials will reveal a lot of information, and should provide us with information on their *ability* to survive the harsh Philadelphia winter, they will not tell us if the flies actually do survive. To determine that we have set up and will be monitoring a series of population boxes of both *suzukii* and another species (*D. simulans*) that is known to overwinter in the area, to determine survivorship and reproduction both indoors and under natural temperature conditions for the entire winter season. By determining survivorship overwinter, we can utilize the aspect of winter that knocks down their population to hopefully, keep them from invading fruit fields in the future.



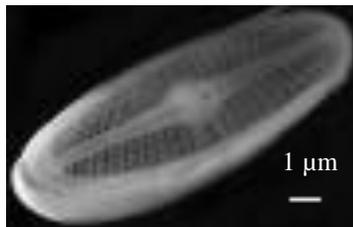
The Effect of Environmental Factors on the Mobility of *Achnantheidium minutissimum*

Merissa Misiura, '15

Faculty Mentor: Jonathan T. Fingerut

Department of Biology

Supported by the McNulty Scholars Program



Diatoms are ecologically important photosynthetic, single-celled algae easily recognized by their beautiful, ornate outer shell, called a frustule, made of silica. Though a frequently studied group, particularly as indicators of environmental-health due to the species-specific set of conditions in which they can live, there are many interesting aspects of their morphology and physiology that are still unknown. For example, we are still working to understand their ability to move, and why they do this. The species we use, *Achnantheidium minutissimum*, is found in various aquatic environments, is tolerant of acidic pollution and a range of flow conditions from still to fast-running waters. In an effort to better understand why these simple single-celled organisms move, we are investigating if the environment has an effect on both where they move, as well as the rate at which they move. These factors include temperature, light, pH, density, and nutrients; all important factors in determining stream-health and the types of organisms found in an aquatic environment.

Thus far we have studied the effects of light and nutrients. To do this we grow diatoms under controlled environments matching their habitat (temperature, light and nutrients) and then divide them into different treatments one order of magnitude greater or lesser for a given parameter. Microphotography and videography of the diatoms allows us to track their movement and determine their spatial distribution, (how clumped or evenly distributed they are), both among treatments as well as over time within a treatment.

Our preliminary results indicate that nutrients have a significant effect on the rate of diatom movement. Surprisingly, when given double amount of nutrients, the diatoms stop moving as much as a complete lack of nutrients does. Neither light levels, nor nutrient levels, however, appear to effect spatial distribution. Work is continuing to investigate other environmental parameters, as well as further understanding the effects we have already seen.



Mark Forman
Department of Chemistry
Saint Joseph's University

Ph.D. University of Pennsylvania

Research Interests: Strained and
Theoretically Interesting Organic Molecules

The focus of my research program involves the synthesis and study of non-natural products that possess unique properties and enhanced reactivity as a result of forced deviations from their ideal geometries. In particular, my research group has been interested in studying the effects of bond angle distortion on the structures and properties of alkenes.

The carbon-carbon double bond of an alkene is made up of a sigma (σ) bond and a pi (π) bond as shown in Figures 1a-d. Maximum overlap between the p-orbitals of the π bond occurs when the axes of the p-orbitals are exactly parallel, as shown in Figures 1c and 1d. Any deviations from this ideal geometry are manifested in the form of enhanced reactivity and unique properties of the alkene. One type of distortion in alkenes is referred to as pyramidalization and results from a *syn*-folding of the R group substituents (Figure 1e). The degree of folding may be conveniently measured via the pyramidalization angle, ϕ , which is defined as the angle between the plane containing one of the doubly bonded carbons and the 2 substituents (R) attached to it and the extension of the double bond. Representative alkenes possessing pyramidalized double bonds include cubene (**1**) and pentacyclo[4.3.0.0^{2,4}.0^{3,8}.0^{5,7}]non-4-ene (**2**) (Figure 1f).

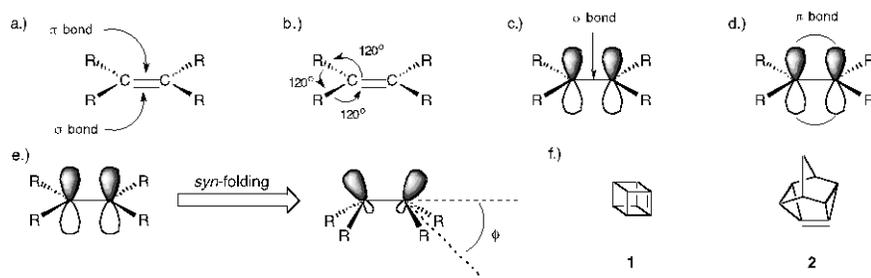
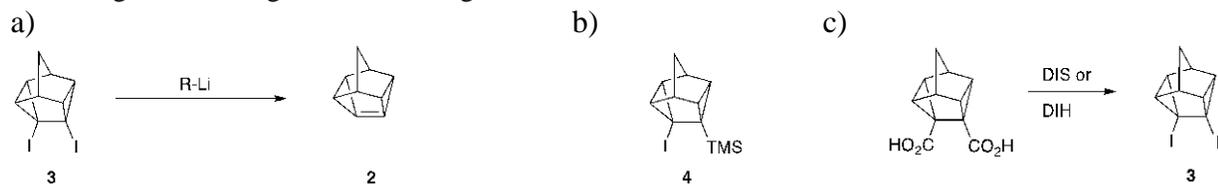


Figure 1

During the summer of 2014, my research group continued the investigation of the synthesis and study of pentacyclo[4.3.0.0^{2,4}.0^{3,8}.0^{5,7}]non-4-ene (**2**) and direct synthetic precursors. We have previously shown that alkyllithium induced dehalogenation of 4,5- diiodopentacyclo[4.3.0.0^{2,4}.0^{3,8}.0^{5,7}]nonane (**3**) leads to pyramidalized alkene **2**. This summer we investigated new synthetic routes to the precursor diiodide **3** and related polycyclic alkylidides using 1,3-diiodo-5,5-dimethylhydantoin (DIH). We also began to investigate new methods for dehalogenation of **3** using different organometallic reagents.



The Synthesis of Pentacyclo[4.3.0.0^{2,4}.0^{3,8}.0^{5,7}]non-4-ene

Casey Adams, '15
April Savarese, '15

Faculty Mentor: Mark A. Forman
Department of Chemistry

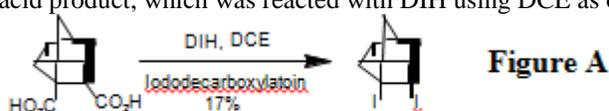
Supported by SJU Summer Scholars Program



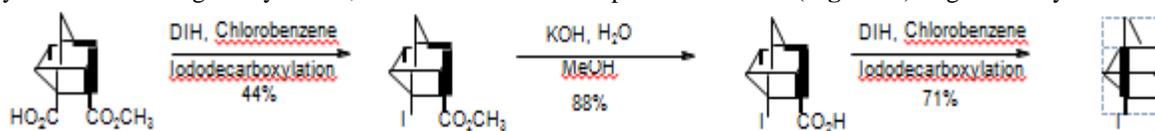
This past summer the Forman research group conducted research on the synthesis and study of the effects on bond angle distortion on the structures and properties of alkenes, specifically pentacyclo[4.3.0.0^{2,4}.0^{3,8}.0^{5,7}]non-4-ene.

Alkenes are a class of organic molecules that contain carbon-carbon double bonds. The carbon-carbon double bond of an alkene ideally has bond angles of 120°, and any deviations from this ideal angle cause enhanced reactivity and unique properties of the alkene. One of the main types of distortions in alkenes is referred to as pyramidalization. This results from a syn- folding of the substituent groups.

This past summer we worked towards modifying the synthesis of pentacyclo[4.3.0.0^{2,4}.0^{3,8}.0^{5,7}]non-4-ene. We focused our efforts on iododecarboxylation chemistry. The first reaction we tried to improve involved creating the diiodide product from closed diacid (**Figure A**). This would shorten our synthesis by four reactions. We started with our closed diacid product, which was reacted with DIH using DCE as our solvent.



This reaction was reacted for twenty four hours with light. This reaction unfortunately did not result in better yields than the original synthesis, so we went back to the previous method (**Figure B**) to get better yields.



Using nuclear magnetic resonance (NMR) and gas chromatography/mass spectroscopy (GCMS) we have evidence that the diiodide product was formed, which is the main precursor to our target molecule (**Figure C**). We are going to continue working on improving these reactions to optimize yields and reduce the time needed to form our target molecule.



The Synthesis of Pentacyclo[4.3.0.0^{2,4}.0^{3,8}.0^{5,7}]non-4-ene

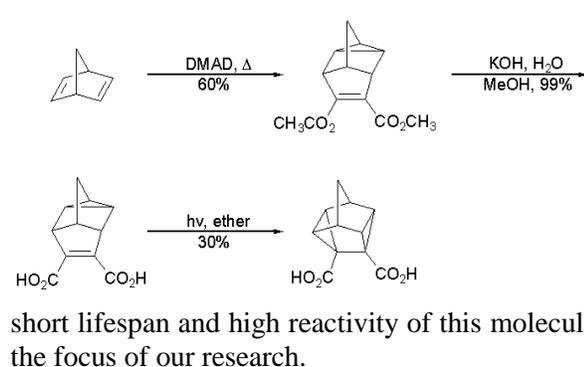
Stephanie Schallenger, '16,
Rachel Troxell, '16

Faculty Mentor: Mark A. Forman
Department of Chemistry

Supported by a Gift From Anne Marie and Jay
Borneman, '80 and the SJU Summer Scholars
Program



The Forman research group focuses on the synthesis and study of non-natural products, which possess distinctive properties and enhanced reactivity because of their forced deviations from their ideal geometries. For this synthesis, we strive to synthesize pentacyclo[4.3.0.0^{2,4}.0^{3,8}.0^{5,7}]non-4-ene, which is comprised of a unique bond strain on the carbon-carbon double bond. These carbon-carbon double bonds align to form bond angles of 120°, yet some alkenes deviate from this ideal geometry because of their increased reactivity and high energy. These highly reactive alkenes that possess bond angles greater or less than the ideal 120° are typically strained along their carbon-carbon double bonds.



While alkenes can be affected by various sources of strain, pentacyclo[4.3.0.0^{2,4}.0^{3,8}.0^{5,7}]non-4-ene experiences a type of syn-folding, or pyramidalization. This source of strain affects the molecule by causing the substituent groups to bend towards one another. This creates a tetrahedral geometry rather than the ideal trigonal planar geometry. The strain on the compound renders pentacyclo[4.3.0.0^{2,4}.0^{3,8}.0^{5,7}]non-4-ene highly reactive, with a lifespan in the order of seconds. Both the short lifespan and high reactivity of this molecule causes difficulty in the synthesis of this compound and is the focus of our research.

One of the main goals during our summer research was to synthesize significant quantities of the precursors to pentacyclo[4.3.0.0^{2,4}.0^{3,8}.0^{5,7}]non-4-ene that are needed for our research efforts. First, a Diels-Alder reaction was performed to synthesize a diester. This diester product was then hydrolyzed in a hydrolysis reaction, yielding open diacid. The open diacid was then subjected to ultraviolet light, which caused a photochemical cycloaddition to occur and produced closed diacid. The photochemical reaction is a challenging step in the synthesis of precursors to pentacyclo[4.3.0.0^{2,4}.0^{3,8}.0^{5,7}]non-4-ene because it is time consuming and produces low yields. Each of the reactions was repeated numerous times with careful attention to detail so that we could synthesize as much closed diacid as possible.

By the end of the summer, we were able to synthesize enough closed diacid to further our research goals for the upcoming school year. We will be using the closed diacid that we synthesized to aid us in our efforts to synthesize and isolate our target molecule.



Richard Gioioso
Department of Political Science
Saint Joseph's University

Ph.D. Florida International University

Research Interests: Latin American Immigration to the U.S., Youth and Political and Economic Reform (“the new economy”) in Cuba

The disintegration of the Soviet Union in the early 1990s had dramatic effects on the Cuban economy and in the everyday lives of Cubans living on the island. A “Special Period” began in Cuba that was marked by extreme scarcity of consumer goods, a significant increase in poverty, and a lack of opportunities. Since then, the Cuban government has implemented many political and economic reforms intended to improve the economic conditions of its citizens. Although circumstances have improved for many, primarily due to the creation of a robust tourism sector, society is increasingly characterized by socio-economic inequalities. Meanwhile the political leadership continues to be concentrated in the hands of an aging political elite, while much of the population (almost 40%) is under the age of 30 years old. This summer I investigated what Cuban youth, ages 18-30, think about “the new economy” and how they are navigating its complexities to survive.

I am particularly interested in understanding the role that higher education, universally accessible and one of the main successes of socialist Cuba, plays in the lives of members of the youth generation. I interviewed various youth about the connection between their studies, jobs, and career goals. In many cases, interviewees greatly benefitted from their college education and career choice, but the salaries they earn in their official jobs, which are controlled by the central Cuban government, are not enough to survive. They therefore choose a number of paths not related to their studies or career paths (and often related to the tourism sector), to augment their income, thus making them question the value of obtaining a higher education at all. As my analysis continues, I strive to analyze the lived experiences of Cuban youth to evaluate the political and economic reforms implemented by the government.

In the case of Tatiana, the Summer Scholars Program has been an excellent opportunity to work together on the topic of Cuban youth. Not only did she take my course, “Contemporary Cuban Politics and Society,” in Spring 2014, which included a study abroad component, but we conducted research together while in Cuba and are currently working together on the organization and analysis of the data, and will write up the findings in an article.

The New Cuban Politics Consist of Economics

Tatiana J. Pulido, '16

Faculty Mentor: Richard N. Gioioso
Department of Political Science



Supported by the SJU Summer Scholars Program and the Department of International Relations

After learning about contemporary Cuban politics and society in class during the spring semester of 2014, my classmates and I had the opportunity to travel to Cuba and experience firsthand the ajiaco (stew) that embodies Cuban culture. During our time in Cuba, we had the opportunity to see the role of socialism in daily life in the form of propaganda, health care, and (inadequate) government-subsidized food rations.



Left: Billboard "The changes in Cuba are for MORE SOCIALISM"

Center: A menu at a restaurant with prices listed in both currencies: the Cuban Convertible Peso (CUC: available to foreigners) and the Cuban National Peso (CUP: government wages are paid in this. Worth approximately 1/20th of the CUC).

Right: Billboard "[the US] Embargo: the longest genocide in history"

After the popular socialist revolution in 1959, the Castro regime took power from the US-backed Batista presidency. Upon the collapse of the USSR in 1991, Cuba was plunged into an economic crisis which is now called the Special Period. Today's youth grew up during that complex time under a socially stratifying dual-currency system, in the presence of anti-US propaganda, and with a large emphasis on their heritage, which is also socialist and uniquely Cuban. It is on these youth that Cuba must rely for its future success with an aging governing population.

Despite the large role of the state in everyday life, and the emphasis placed on the socialist government, economics determine the ways of life for Cuban youth. While in Cuba, in addition to conversing with those I met about international relations, I performed formal social science research by conducting interviews with Cubans between the ages of 18 and 30. They differed in their careers and goals but they shared a desire for economic opportunity. Every Cuban has to perform social service, but they are not paid a living wage, because the government cannot afford it in the absence of Soviet aid, so personal economic pressures determine leisure time and future goals. The most efficient path to economic advantage (aside from money sent from family abroad) is working in the tourist industry, which booms despite the US travel ban and embargo, while any hardship is blamed on said embargo.

Cubans are culturally similar to Americans, and are friendly to us despite the demonized embargo, which they see as being between the two governments and not the people. They are well-educated and know that their country has problems. However, they also know that other countries, including the US, have problems of similar weight and that Cuba has excellent qualities as well, notably the government-provided education and health care. Economic openness is increasing, which, while desirable, does not change their high opinion of these government services. To them, these two factors are not mutually exclusive. Openness begets inequality, yes, but the Cuban culture is not prideful in that neighbors are not ashamed of giving and taking help from each other when possible. Also ingrained is that access to free health care and education are rights, and no amount of poverty or inequality should affect that. Although equalizing factors are important, irrevocable individualism arose in the hardships of the Special Period and this is beginning to be viewed positively in the diverse (and still fundamentally socialist) Cuban culture.



Peter Graham
Department of Chemistry
Saint Joseph's University

Ph.D. University of Virginia

Research Interests: CO₂ Activation

As part of nature's carbon cycle, photosynthesis converts atmospheric carbon dioxide into carbohydrates which provide cells with energy and the chemical building blocks needed to synthesize other compounds. Since the industrial revolution, humans have relied on fossil fuels to provide energy and the chemical building blocks needed for the manufacture of everything from plastics to pharmaceuticals. This reliance on fossil fuels has broken the balance of the global carbon cycle by concentrating carbon in the atmosphere. The development of alternative chemical processes that use carbon dioxide as a chemical building block would ease this imbalance. Not only would such processes decrease the reliance on petroleum raw materials, but they would also consume excess carbon dioxide by converting it to useful chemicals. This would provide an economically viable way to mitigate carbon dioxide emission by chemical industry, and could become an important facet of ultimately restoring balance to the global carbon cycle.

Carbon dioxide is an attractive alternative carbon starting material for a number of additional reasons. Unlike petroleum or natural gas, carbon dioxide does not have to be extracted from the ground, and does not require transportation across the globe in order to be used. It is also nonflammable and nontoxic. However, carbon dioxide's innate stability presents a major challenge, and only a handful of known chemical processes can make use of carbon dioxide as a starting material. Therefore, in order to effectively use carbon dioxide in chemical reactions, its chemical stability must be overcome.

In my laboratory we are investigating transition metal complexes of tungsten, molybdenum, and rhenium that can overcome the stability of carbon dioxide. These metals strongly coordinate carbon dioxide and in doing so bend the normally linear molecule. This activates carbon dioxide towards otherwise impossible reactions. Gaining a better understanding of how such metal complexes interact with carbon dioxide is critical to developing new catalysts for carbon dioxide activation. Such catalysts could convert carbon dioxide into carbon monoxide, formic acid, acrylic acid, or dialkyl carbonates, all useful chemical building blocks.

The Synthesis of New Molybdenum Carbon Dioxide Complexes

Xuyao Duan, '16

Faculty Mentor: Peter M. Graham
Department of Chemistry



Supported by a Grant From the American Chemical Society Petroleum Research Fund

In nature's carbon cycle, carbon dioxide is produced by respiration and is converted into carbohydrates which provide energy to cells. However, the balance of the global carbon cycle has become broken since the industrial revolution because excess carbon has been released into the atmosphere from the overuse of fossil fuels. The development of chemical processes where carbon dioxide is used as a chemical building block will not only decrease the reliance on petroleum, but also consume excess carbon dioxide produced by industry. Carbon dioxide is nonflammable, nontoxic, and easy to obtain, which makes it an ideal starting material. However, the innate stability of carbon dioxide dictates that few chemical processes can make use of it as a starting material. The purpose of our group's research is to synthesize new molybdenum carbon dioxide complexes which might enable carbon dioxide to be better utilized by chemical industry and reduce the impact of carbon dioxide emissions.

During this summer, my project has been to synthesize new molybdenum carbon dioxide complexes featuring new ligands attached to the molybdenum metal center. I start with $\text{TpMo}(\text{NO})(\text{CO})_2$, and the compounds which can provide ligands such as an N-heterocyclic carbene or 3-chloropyridine. This reaction requires a high temperature reflux to give ligand substitution and form a new molybdenum carbonyl complex. I then use oxidants like cumene hydroperoxide and *t*-butyl hydroperoxide to oxidize and synthesize a carbon dioxide complex. Next I use standard spectroscopic techniques to detect the characteristics of the complex. For example, infrared and nuclear magnetic resonance spectroscopy can help determine whether the substitution or oxidation have occurred successfully. One of the carbon dioxide complexes that I have isolated featuring the ligand NHC is depicted in Figure 1.

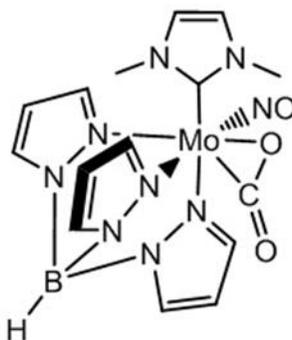


Figure 1. $\text{TpMo}(\text{NO})(\text{NHC})(\eta^2\text{-CO}_2)$
(NHC = 1,3-dimethylimidazolidene)

Synthesis and Reduction of Molybdenum Carbon Dioxide Complexes

Gregory Lorzing, '16

Faculty Mentor: Peter M. Graham
Department of Chemistry

Supported by the SJU Summer Scholars Program



Since the beginning of the industrial revolution, people have used coal and subsequently petroleum as primary energy sources. This reliance on fossil fuels has created an imbalance in the atmosphere due to high levels of carbon dioxide. On the other hand, plants use photosynthesis to utilize the carbon dioxide in the air as a starting material to create carbohydrates. My research over the summer was to explore new ways of using carbon dioxide as a starting material in chemical synthesis which would both remove it from the environment and reduce the current reliance on fossil fuels. Since carbon dioxide is extremely stable, our research uses a metal center to activate the carbon dioxide. This means the carbon dioxide is bent rather than linear which can allow it to react more easily with other molecules.

Over the summer I have worked on the syntheses of new carbon dioxide complexes. The carbon dioxide complexes can be made by simply oxidizing a carbon monoxide complex. Each of the carbon dioxide complexes feature different supporting ligands attached to the metal centers, which change the properties of the compound. Thus, a variety of different reagents have been tested under various conditions to successfully oxidize each metal complex to form a carbon dioxide complex. Once the carbon dioxide complex is made a variety of reactions have been attempted to determine its fundamental properties.

The Reactivity of Molybdenum Carbon Dioxide Complexes

Mike Pogash, '15

Faculty Mentor: Peter M. Graham
Department of Chemistry

Supported by a Gift From Anne Marie and
Jay Borneman, '80



In the modern era, earth's carbon cycle has been disturbed by the increasing amounts of carbon dioxide in the atmosphere largely due to the combustion of fossil fuels. Finding a way to reduce this abundance of atmospheric carbon dioxide is a major concern. One of the more economically appealing routes to this goal is to make use of the molecule as a reagent. Unfortunately, carbon dioxide's kinetic and thermodynamic stability prevents most reactions from occurring. However, the chemical nature of the molecule can be altered by coordination to a metal, which can occur through the use of specific metal complexes. If such coordination could allow useful products, such as plastics, to be made from carbon dioxide, the chemical industry could reduce their carbon dioxide emissions in a profitable manner.

Over the summer I have explored the reactivity of two molybdenum-carbon dioxide complexes, one of which is depicted in **Figure 1**. I have reacted these complexes with a number of small molecules including alkenes, alkynes, and halides, in hope of converting the coordinated carbon dioxide into a different carbon-containing molecule.

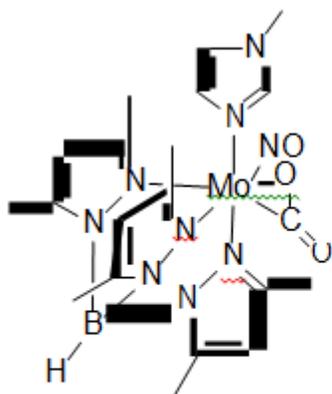


Figure 1. $\text{Tp}^*(\text{Mo})(\text{NO})(\text{MeIm})(\eta^2\text{-CO}_2)$

Synthesis of Metal Centered Carbon Dioxide Complexes

Joe Vasta, '16

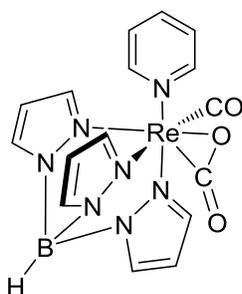
Faculty Mentor: Peter M. Graham
Department of Chemistry



Supported by a Grant From the American Chemical Society Petroleum Research Fund

In order to address the problem of excess carbon dioxide in the atmosphere due to the abundance of fossil fuels being burned for energy, carbon dioxide could be used in chemical reactions to serve as an alternative carbon starting material. Utilizing carbon dioxide in large scale chemical reactions has the advantage of sequestering some carbon dioxide by synthesizing a useful product that would otherwise have been made from petroleum or natural gas sourced starting material. Since carbon dioxide is naturally extremely stable and does not normally react with other molecules, the carbon dioxide must be attached to a metal to increase its reactivity. This activation can allow for various reactions to be performed with carbon dioxide.

Past work in our laboratory has shown that metal complexes based on the transition metal molybdenum are capable of coordinating a molecule of carbon dioxide very effectively. During this summer, I have been working towards the synthesis of an analogous rhenium carbon dioxide complex. Our preliminary results indicate that carbon dioxide has been successfully coordinated by the rhenium metal center, as shown below. Our future plans are to pursue simple reactions of the new rhenium complex with other small molecules such as ethylene.





Ann E. Green

Department of English

Ph.D. State University of New York, Albany

Research Interests: Race, Class, Gender, Writing, Service-Learning and Social Justice. Of Late, Medical and Environmental Writing.

I write. I teach writing, and I write about the teaching of writing. Most of my work centers on the role that the subject position of the writer takes in any piece of narrative. I often question: How do race, class, gender, sexuality, and disability change the way a writer presents a self in language? How does language determine what we can and can't say? How can we use writing as a tool for social change? What happens in the teaching of writing when we consider the subject position of the writer?

In the last fifteen years, my scholarship has focused largely on the service-learning classroom. If we're engaged in the "faith that does justice," what does it mean to send predominantly white middle class students into communities of predominantly people of color to "serve"? How can service learning work as a force for social justice and social change if it replicates societal hierarchies and inequities? What happens in a writing classroom where race, class, gender, and sexuality are addressed and how can they be addressed effectively?

More recently, this scholarship has turned toward issues of environmental racism and classism, particularly surrounding social class and fracking in Pennsylvania, and the implications of medical writing for the humanities. In addition, I have been exploring writing for more general audiences, including *The Huffington Post* and *The Chronicle of Higher Education*, in order to reach broader audiences and engage more deeply in social change work.

I see Ms. Johnson and Ms. Tucci's summer scholars projects as "advanced service-learning projects." Ms. Johnson's project developed after taking "Writing and Environmental Justice" in the spring of 2013. Drawing from her interest in environmental justice, Ms. Johnson pursued intensive service-learning experiences at an urban farm and an environmental awareness project. Ms. Johnson was able to connect these Philadelphia experiences with a recent immersion experience she had with the Bri Bri people in Costa Rica. Ms. Tucci's summer scholar's project extended the work she began in "Hospital Stories" considering the role of empathy and medicine. By engaging with the residents of Sacred Heart Home, a hospice for the poor, Ms. Tucci reflected on the role that empathy plays in our own experiences of medicine and the need for human connection, particularly when we are at our most vulnerable.

Environmental Justice: Past Conceptions and Present Applications

Molly Johnson, '15

Faculty Mentor: Ann Green
Department of English

Supported by the SJU Summer Scholar's Program



For my summer scholar's project, I explored Environmental Justice through reading fiction and nonfiction, and engaging in two service-learning projects in Philadelphia. The concept of environmental justice considers how environmental hazards affect people of color and/or people in poverty. People of color or below the poverty line disproportionately face more environmental threats including pollution of their air, water, and land. The environmental justice movement, which has been recognized in the U.S., beginning in the 1960's, works to correct this disparity.

For my project, I read various literary works ranging from historical accounts to novels. including *Silent Spring* by Rachel Carson, *Farm City* by Novella Carpenter, *From the Ground Up: Environmental Racism and the Rise of the Environmental Justice Movement* by Luke W. Cole and Sheila R. Foster and *World Made by Hand* by James Howard Kunstler. Reflecting on these texts, I wrote creative non-fiction pieces in order to explain environmental justice issues in an interesting way. I incorporated my previous study abroad experiences by writing about justice issues facing indigenous populations in Costa Rica and Panama. At the same time, I volunteered at two Philadelphia organizations (Urban Tree Connection and Overbrook Education Center) which have a focus on environmental justice issues in order to see modern applications of the term in the city.

At Urban Tree Connection, an organization that engages community members in greening projects, particularly through urban agriculture, I worked an urban farm on N 53rd St which grows a wide range of produce that is sold at farmer's markets throughout the city. Urban agriculture provides healthy food access while creating jobs and combating blight in affected communities. I also worked with the Overbrook Education Center, a product of JASTECH Development Services. This organization contributes to a variety of projects for the Overbrook Community that relate to art, health and the environment. My project at the OEC was to help with an EPA funded campaign called the *Did You Know* campaign that promotes a better environment and better public health in environmental justice communities. OEC focuses on zip codes 19131, 19151, and 19139 which are primarily African American community that faces a large poverty rate, a food desert and consequently related health problems. The *Did You Know* campaign will be launched September 13th, 2014.

As I was able to write about my experiences and various environmental justice themes, my summer scholars project allowed me to polish my own ideas on the subject as well as raise awareness about this broad inequality which exists in our world. To continue with my summer scholar's research I will be writing a departmental honor's thesis focused on urban agriculture models and their feasibility in Philadelphia.

To Feel or Not to Feel: Empathy in Medicine

Maria Tucci, '11

Faculty Mentor: Ann E. Green
Department of English

Supported by the SJU Summer Scholars Program



The need for human interaction is inherent in all of us and to try and deny it leads to problems. Every day, doctors must find the balance between feel too little and feeling too much. Doctors who do not allow themselves to feel empathy for a patient lose the ability to communicate with them on a human level, while doctors who feel too much lose objectivity when making difficult decisions. Last year, in one of my English classes called Hospital Stories, Dr. Ann Green presented a study to the class that measured the empathy of training doctors through their years of practice. I was shocked to learn that between the first and third year of training, there is a significant drop in empathy. Having an interest in medicine, I decided to research underlying problems in the medical system that can lead to a lack of empathy and how doctors can combat this issue. I wanted to present my findings in the style of the writing I had done for Hospital Stories: a creative non-fiction narrative.

There are many components that can lead to doctors becoming unfeeling towards patients. Three of the many problems include exhaustion, administration, and balance between work and home. While there are now regulations for the amount of hours a resident can work, with more for how many hours they can work in a row, the world of medical education tries to prevent the exhaustion from getting in the way of the medical practice. However, working for twenty-four hours straight still leaves doctors feeling tired and doing multiple days of this kind of work, even if not in a row, is exhausting. Along with the long hours, doctors must also worry about pressure from administration. In order to make more money, hospitals want as many new patients coming in as possible. To do this, doctors are forced to see more patients. This push causes doctors to spend less time with each individual, leading to less time in the examination room and less time to spend listening to the patient. Finally, because of these long and busy days, doctors often come home to their families exhausted. Doctors may also miss parts of their family's lives due to the long work hours. These effects can lead to familial tension.

As part of my research, I spent two days a week at Sacred Heart Home, a hospice in North Philadelphia where patients may stay until they pass away and are treated with the utmost care and compassion. The hospice relies completely on donations instead of federal funding and it provides peace for many people's final days. During the weeks I was there, I witnessed how the sisters cared for every person. They did their best to make the patients comfortable and happy by getting them moving about and showering them with love and support. I connected with many of the patients at Sacred Heart and experienced the struggle one faces when trying to feel but not too much.

Different people suggest different remedies when dealing with the problems caused by exhaustion, administration, and balance between work and home. However, there is one thing all doctors agree on: the best way to fight off a loss of empathy is to remember that they are there for the patient and to help them get healthy again. Reminding themselves of why they went into medicine can help stay the effects of their difficult profession.



Yu Gu
Department of Physics
Saint Joseph's University

Ph. D. Massachusetts Institute of Technology

Research Interests: Laser Materials Processing,
Integrated Devices, Lab-On-Chip

Wouldn't it be great if medical diagnostics can be done with a portable device the size of your flash memory drive instead of in a clinic? The work in my lab focuses mainly on the fabrication of novel features for optofluidics and Lab-On-Chip. Optofluidics is the combination of small liquid elements and small optical elements. It is a novel and rapidly developing technology. Lab-On-Chip is the miniaturization of the standard chemical and biochemical functionalities of a laboratory, making it portable, efficient and easily automated.

This summer, my student and I worked together on laser fabrication of microfluidic channels. Tightly focused, pulsed lasers have a high amount of peak energy and this can be used to ablate different kinds of material. We achieved ablation of different sized open channels in both glass and a polymer called PDMS. The average width of ablated features was fifty microns, or half the width of a human hair. Working with pulsed lasers frees us from needing to use a cleanroom and expensive lithography equipment for fabrication of microfluidic devices. Lasers are also capable of producing devices in three-dimensions, unlike traditional methods. Future work includes making smoother channels, sealing open channels, and making lightguides.

Another interesting project we worked on was the use of ferrofluids for optofluidics. Ferrofluids are suspensions of nanoliter sized magnetic particles that respond to external magnetic fields. We used these fluids for their opacity to make an optofluidic switch. Because ferrofluids are actuated by magnetic fields, they can be moved without the use of mechanical parts. Figure 1 shows an image of Karl's (my summer scholar) name written with a laser. It is photographed next to a quarter to show its size scale. Figure 2 shows an image of a ferrofluid.

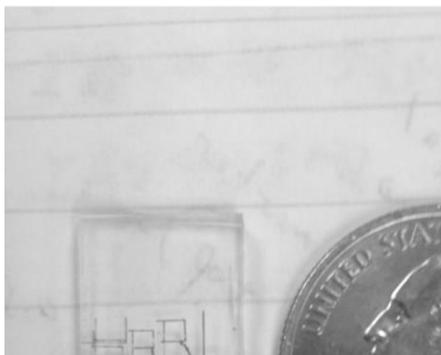


Figure 1. Student's name written with a pulsed laser



Figure 2. An oil-based ferrofluid

Femtosecond Laser Materials Processing

Karl Morris, '16

Faculty Mentor: Yu Gu
Department of Physics



Supported by SJU's Summer Scholar Program

We are interested in creating two extremely small structures: integrated waveguides and microchannels. Integrated waveguides are areas of increased refractive index to guide light. Microchannels are used in Lab-on-Chip devices to control small amounts of fluid. These two structures have been combined for use in our optofluidic switch research. Femtosecond laser materials processing, sometimes called “micromachining,” allows these structures to be created via ablation. Ablation is the process that occurs when the high energy of the laser breaks the bonds in the material.

At the beginning of the summer, we were supplied with a chip by collaborators in Italy that contained multiple waveguides and a microchannel for the optofluidic switch; however, we wanted to be able to create our own. During the summer, we completed purchase of a 780 nm femtosecond laser (Menlo Systems). Before conducting formal research, I tried to get an understanding for how the laser actually worked. As my knowledge for the laser increased, I began to build our current setup for our research. Figure 1 shows our current setup, which is composed of two Velmex stages to move the sample along the X- and Y-axes, three mirrors (Thorlabs) that are coated and specially reflective at 780 nm. A 40X microscope objective (Olympus) was used to focus the laser beam, and a micrometer (Thorlabs) was used to adjust the focus of the laser beam. Currently, all of the mirrors that we are using are mounted on posts; however, we hope to use a vertical optical breadboard for improved stability.

After creating this setup, I focused on trying to find the best writing speed for micromachining microchannels in a polymer called PDMS and glass. Figure 2 shows the width of channels for different speeds, the slowest shown is 2 mm/s, which is 72 μm thick, and the fastest is 30 mm/s, which is 31 μm thick. This data will give us insight on how to create our own chip in the future.

While trying to micromachine, we ran into many challenges that we are still hoping to overcome. One of the challenges was that with only one stepper motor controller, we could only move one axis at a time, which made it difficult to create intricate designs. Also, we ran into a difficulty with using glass, which is why I turned to using PDMS. We hope to be able to work with glass in the near future when we acquire more pieces of equipment. Last, because of the stepper motor on the stage, the ablation process looks rough at very low speeds so we hope to get a stage with no friction in the future.

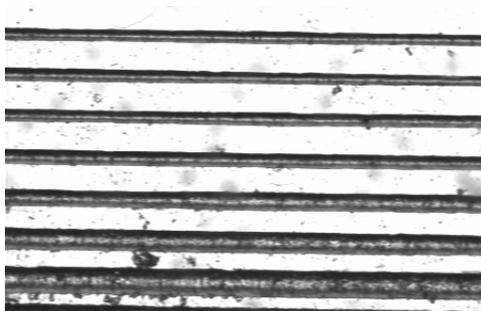


Figure 1

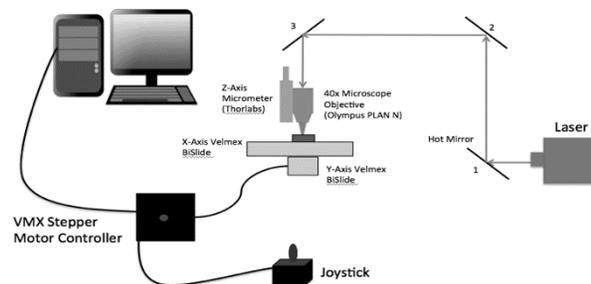


Figure 2



Piotr Habdas
Department of Physics
Saint Joseph's University

Ph.D. University of Silesia

Research Interests: Glass
Transition, Soft Condensed Matter,
Rheology of Non-Newtonian Liquids

During summer of 2014 two students worked in my laboratory, and two students volunteered for a part of the summer. Zachery Brown'17 and Gregory Hogan'17 studied dynamics of colloidal particles in dense suspensions with various strengths of inter-particle attraction. Ryan Stull'15 and Sebastian Hurtado-Parra'15, who in the second part of the summer was part of REU program at University of Pennsylvania, worked on extracting properties of complex liquids by tracking motion of magnetic beads suspended in dilute colloidal suspensions.

Colloidal suspensions of spherical particles have been used successfully as a system that models the behavior of a regular glass. Zachery and Gregory made samples with various attractive strengths between colloidal particles, thus making them more sticky, to see how particle dynamics change as the particle stickiness increases. Using confocal microscopy we collected data over several hours and then tracked the centers of the colloidal particles. We were able to study how colloidal particles interact with each other and study their collaborative motion. Now, we plan to continue analysis of data to extract more information about cooperative particle motion and how it changes with the concentration of colloidal suspensions and with inter-particle attraction.

Ryan and Sebastian made samples with dilute colloidal suspensions and a small number of magnetic beads. Next, they constructed a motorized system next to a microscope in order to move a magnet near the sample and therefore exert a range of forces on the magnetic beads. From the motion of the magnetic beads one can extract properties of dilute colloidal suspensions. We have obtained preliminary results of how a magnetic bead moves through a dilute colloidal suspension. Next, we plan to conduct systematic studies of magnetic beads moving with various speeds through colloidal suspensions of various concentrations.

Spatially Heterogeneous Dynamics in Dense Colloidal Suspensions with Short Ranged Attractive Potential

Zachery Brown, '17

Gregory Hogan, '16



Faculty Mentor: Piotr Habdas
Department of Physics

Supported by a Grant From the National Science Foundation

Despite our use of glass in everyday life, the glass transition is still poorly understood by physicists. This does not just refer to the molecular glass that light bulbs and windows are made out of. The glass transition is when a liquid material's viscosity increases to the point where its particles stop diffusing. Only then does it become a glass. This glass may appear as a solid on a macroscopic scale. However, the system does not exhibit any long range order. Figure 1a shows what a conventional solid might look like on the microscopic scale. Figure 1b shows what glassy materials look like. Unlike the ordered packing in the conventional solid, the particles in the glass are randomly packed together.

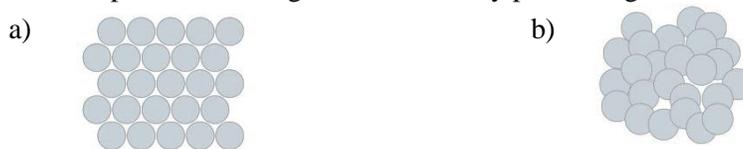


Figure 1. a) Difference between a conventional solid with long-range order and b) a glass where particles are randomly packed.

For our studies, we did not use molecular glass. The particles are far too small and move too fast for us to accurately quantify their dynamics using microscopy techniques. Instead we used dense hard sphere and attractive colloidal suspensions. They exhibit a glass transition and are easier to work with due to their size and diffusion time. In these colloidal systems the particles move around due to Brownian motion. This refers to the random motion of the particles caused by the molecules of the liquid slamming into them due to their thermal energy. In colloidal suspensions with hard-sphere particle potential particles only interact with each other on contact and bounce off of one another the way billiard balls would. These are called hard sphere systems. But, in some of our samples we induced a depletion attraction by adding a second, smaller species of colloidal particles. Figure 2 shows how the addition of these smaller particles causes the larger ones to attract to each other at short ranges.

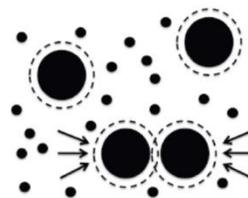


Figure 2: A drawing of the depletion force. Small particles induce attraction in big colloidal particles.

Using a confocal microscope and image analysis, we have been able to track the motion of these particles and quantify their dynamics. We hope that these dynamics will provide valuable insight into both the hard sphere and reentrant glass transitions.

Driving a Magnetized Particle Through a Colloidal Suspension

Sebastián Hurtado Parra, '15

Ryan Stull, '15

Faculty Mentor: Piotr Habdas
Department of Physics



Supported by a Grant From the National Science Foundation

Research in our group has been focused on studying materials when they are in the glass state. While matter in the glass state is commonly encountered, there is still a great deal about it which is not understood. The mystery of this particular phase has evaded researchers due to the small molecular size, and subsequent limited ways in which it can be observed.

More indirect methods of investigation have thus sprung. What perhaps has seen the greatest success is the colloidal suspension model. In this model, solid particles- called colloids- which are of more testable proportions are submerged within some liquid, thereby imitating the structure of a material in the glass phase (Figure 1). The volume fraction (percentage volume of colloids in the colloidal suspension), and intermolecular attraction have been some of the relevant factors studied in past years.

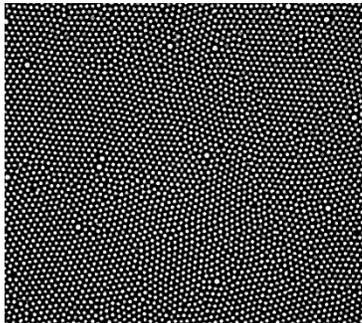


Figure 1: Sample image of a colloidal suspension. The white dots represent colloids. With the aid of computer algorithms we can track the motion of these particles over time-lapsed images.

During this Summer Scholars Program, the focus of the project was an experimental study of recent theory that encompasses some important physical properties of colloidal suspensions, such as viscosity and diffusivity [1]. The experiment consists of a traceable probe which is driven through a colloidal suspension of varying concentration. Of chief interest is the study of the motion of a magnetic probe, for some of the proposed theory predicts behavior of such a particle and no research of the sort has been conducted yet. There were several experimental problems faced: the most persistent was a continuous flow in the sample. It was found that the flow was due to a mechanism called natural convection, which can be minimized by decreasing the size of our system. Once this problem was solved, we were able to successfully set up and run the experiment systematically. We are currently collecting systematic data in suspensions with specific volume fractions and range of forces acting on the magnetic bead.

[1] Zia, R.N., Brady, J.F., *J. Fluid Mech.* **658**, 188 - 210 (2010).



Virginia Goulding Johnson
The Faith-Justice Institute
Saint Joseph's University

Ph. D, University of Delaware

Research Interests: Teacher
Development, Non-Violent Conflict
Resolution, Inclusive Schools

Societal problems like violence become school problems when students imitate the aggressive and violent characteristics of the adult world. Part of my scholarly interest in schools and positive climates has focused my work on the benefits of teaching children strategic nonviolent responses to conflict. Since 1998 I have been involved with a SJU created initiative entitled *The Peacemaker Curriculum*. *The Peacemaker Curriculum* is a set of lessons using wide-ranging children's literature and activities to help children recognize and manage their feelings, as well as respect others' similarities and differences, in order to resolve conflicts through problem-solving alternatives. Undergraduate students in my Education courses, particularly those designated as Service-Learning, have been invited to Philadelphia public and parochial schools to teach elementary school children these basic tenets of nonviolent conflict resolution.

More recently greater media attention has focused on the serious problem of bullying. Again, my interest in healthy, positive schools and classroom climates has led me to search for non-violent solutions to bullying. Relying on research and well known established anti-bullying programs (see, for example, the Olweus program); Summer Scholar Kaitlyn Martin and I have conducted an examination of multiple definitions and strategies for bullying prevention through an interdisciplinary approach. The survey she created to assess undergraduate teacher candidates' knowledge of anti-bullying measures will indicate levels of awareness and need for further training in this area. Her handbook, *The bully, the victim and the bystander: A bullying prevention handbook for today's teachers* will be used to educate future teachers and their students on positive solutions for bullying.

An Examination of Bullying Prevention Programs in Schools and Supporting Future Teachers for Today’s Classrooms

Kaitlyn Martin, ‘16



Faculty Mentor: Virginia Goulding Johnson
Faith Justice Institute

Supported by the SJU Summer Scholars Program

In recent years, bullying has become a “hot topic” in education due to its prevalence in schools and the media attention that focuses on the problem. Teachers have been called upon to handle bullying situations as they arise in their classrooms, but many veteran teachers feel unprepared to tackle this potentially volatile issue. Since I am an Elementary Education (PreK-4) and Special Education (K-8) major and future teacher, I considered what I would do if I noticed bullying behaviors in my classroom; it occurred to me that I was unaware of any research-based practices that reduce bullying in the classroom. Therefore, I decided that I would examine current bullying prevention programs and study whether or not teacher candidates were prepared to institute these interventions in their classroom. When I first began my research, I ran a pilot survey and found that most teacher candidates received little, if any, explicit training on how to intervene in bullying situations. I believe that teachers fail to adequately address bullying due to ignorance, rather than indifference. Since my research indicated that as much as twenty to thirty percent of students experience bullying as a bully, victim, or both, I hoped that my research could be used as a resource for teachers to help them solve bullying in their classrooms and schools.

Throughout the ten weeks that I have been working on my project, I have been researching the literature and composing a handbook that addresses bullying intervention; I have entitled it *The Bully, The Victim, And The Bystander: A Bullying Prevention Handbook for Today’s Teachers*. My handbook is based on an interdisciplinary model, which I created, that defines and states the causes and solutions of bullying from medical, psychological, educational, sociological, and legal lenses. Throughout my handbook I assert that the best way to intervene in a bullying situation in the classroom is to identify what types of bullying behaviors are evident in the classroom and what changes should occur within the classroom dynamic. The steps should be: Check certain aspects of your classroom environment in order to foster positive student interaction. Consider what motivates the child to bully the victim. If the bullying persists, utilize the *Martin-Johnson Model for Bullying Intervention* (as seen below). Inspired by Response To Intervention (RTI), it follows a whole group, small group, and individual intervention sequence. First, implement whole group interventions (i.e. review rules, empower bystanders, use literature, draw on examples of bullying in the media, provide social skills training, and teach whole-class anti-bullying lessons), then move on to small group interventions (i.e. assign peer mentors, assign peer partners, use classroom mediation, use The No Blame Approach, and use social stories for bystanders), and then implement individual interventions for both the child who is being bullied (i.e. start the conversation, develop a safety plan, provide positive teacher-student interactions, and talk to his or her parents) and the child who is bullying others (i.e. use a behavioral contract, provide social skills training, and use social stories). Then, reflect on the classroom dynamic to determine if positive change has taken place and the intended goals have been met. I believe that this model and the handbook can help teachers prevent bullying and keep students safe in their classrooms and schools.



James Kelley
Department of Marketing
Saint Joseph's University

Ph.D. The University of Western Australia

Research Interests: Global Branding

My research focuses on global brands. In an ever-changing world, it is imperative that organizations track and assess how a consumer perceives their brand, however, how a consumer interacts with the brand plays an equally important role. Consequently, there are two primary research streams that I explore: consumer behavior towards global brands, and global brand communities.

How a consumer behaves toward a global brand has multiple facets that are influenced by country of origin, consumers past experience, education, income, and personality traits. For example, when investigating Eastern cultures attitudes and perceptions towards global brands, Chinese and South Korean consumers are more influenced by their peers and will choose brands based on what others believe are important regardless of their personal preference. Western orientated consumers (U.S.) are more likely to choose brands based on their own personal experience with the brand regardless of what others think. Regardless of cultural orientation, when a consumer is highly materialistic they have stronger attitudes and perceptions towards global brands, and in turn are more likely to consume global brands.

The second stream of literature focuses on online brand community research. Prior research has focused on consumers' general motivations of community engagement, however research related to the power of branding is limited. To explain consumers' general motives for participating in an online brand community, I use various motivation theories to explain why consumers identify, internalize and interact with online brand communities. Through this research we find that an individuals self-concept and motivation to get and give information are found to serve as central mediators between individual differences and brand website interactivity.

Design Characteristics of Logotypes and How They Cue Brand Personalities

Kati Polaski, '15

Faculty Mentor: James B. Kelley
Department of Marketing

Supported by the SJU Summer Scholars Program



Recognition of design's value in creating a viable competitive advantage is growing. By investing in meaningful design, it is possible for companies to trigger select emotional responses in consumers, enhancing brand awareness and shaping brand image. Specific attributes of design like shape, symbol, color and typography warrant greater attention as they help consumers associate human personality traits with brands. Focusing specifically on typography, which has been at the periphery of marketing-consumer research since the advent of the digital age, scholars acknowledge that styles of lettering connote different meanings, which brands can adopt simply by selecting a certain font. Further, logotypes, which feature a uniquely styled font as opposed to using an icon or symbol, have the difficult task of conveying meaning solely through the nuances of typography.

Inspired by the work of Dr. Grohmann, who postulates that weight and flourish, two design characteristics of typeface, are indicators of ruggedness, we set out to determine if those features could effectively cue a rugged brand personality. For this research we established three primary objectives: 1) Examine how companies portray their brand personality through logotype 2) Determine if the public's interpretation of the logotype matches the intended brand image 3) Explore how masculine versus feminine fonts surrounding each logotype influences consumer perception. To accomplish these goals I conducted a literature review around the areas of typography, psychology, and branding and then designed a questionnaire that was released to 500 participants. 250 respondents received instructions and questions written in a masculine font (**impact**) and the remaining 250 in a more feminine font (Times). From there we asked participants to rate four different coffee brand logos (two of which satisfied the requirements to be considered rugged) using 26 design characteristics and 16 different personality traits. Respondents were also asked questions regarding their own personality and attitude towards each coffee brand.

Harnessing the power of SPSS to perform means tests, correlations, and regressions, we discovered that we were right to question the role that flourish plays in determining brand personality. Compared to weight, which showed significant correlation to rugged brand personality and brand attitude, flourish did not register any correlations worth further exploration. We also found that weight was more identifiable to rugged individuals, who we measured by looking for high levels of endurance, dominance, understanding, and autonomy and low levels of harm avoidance. Lastly, we found that when a masculine font surrounded the logotypes, respondents perceived the brand as less rugged in comparison. This finding proves especially important in a packaging or retail environment where fonts surrounding a logotype might either diminish or enhance a brand's image. Overall, our research validates claims that fonts play a substantial role in determining brand personality. More specifically, brands wishing to be seen as rugged should develop logos that are heavy in weight.



Christopher Kelly
Department of Sociology & Criminal Justice
Saint Joseph's University

Ph.D. Temple University

Research Interests: Interrogation

Shortly after his inauguration in January 2009, President Obama signed Executive Order 13491 that created a Special Task Force on Interrogations and Transfer Policies to reevaluate the interrogation practices authorized by the previous administration. In August that same year, the Task Force recommended that a new interagency collaboration be formed, called the High Value Detainee Interrogation Group (HIG), and specifically recommended that in addition to its operational duties, the HIG also create a program of research to evaluate the best practices in lawful interrogation. I have been fortunate enough to be funded by the HIG for three studies.

To begin our work with the HIG, my colleagues and I developed a "taxonomy of interrogation methods," identifying three conceptual levels of increasing specificity: first, the broad macro-level categories historically used to describe the dichotomous approaches to interrogation, such as rapport versus control, information-gathering versus accusatorial, friendly versus harsh, or minimization versus maximization; second, a meso- or intermediate level consisting of six domains –rapport and relationship building, emotion provocation, context manipulation, confrontation/competition, collaboration, and presentation of evidence– that we believe encompasses and parsimoniously describes all interrogation methods (with the exception of torture); and third, the specific micro-level techniques that have been empirically evaluated or appear in well-known documents like the Army Field Manual and those of the "Reid Technique."

Since the publication of the taxonomy, we have focused on examining interrogation using the six domains we developed in a survey of interrogators from 10 countries and a content analysis of interrogation recordings provided by the Los Angeles Police Department. We found that the domains were reportedly used at significantly different rates, with rapport and relationship building being the most used domain and confrontation/competition the least. We found significant, positive associations between confrontation/competition, emotion provocation, and presentation of evidence in both sources of data, and these three domains were also significantly more likely to be used where the suspect denied involvement. Additionally, with respect to confrontation/competition, we found that use of these harsher methods significantly suppressed suspect cooperation for 15 minutes regardless of the other methods used in the intervening time period.

In addition to an on-going relationship with the LAPD, I am currently developing studies with the Philadelphia Police Department and the Las Vegas Metropolitan Police Department to examine various aspects of interrogation, including the effects the physical space of the interrogation room has on cooperation and effective methods at eliciting information (as opposed to those designed to produce a confession).

“Do the Right Thing:” Interrogation Method and How Techniques of Emotion Provocation Influence Suspect Responses

Jessica Falkenstein, ‘15

Faculty Mentor: Christopher E. Kelly
Department of Sociology & Criminal Justice



Supported by the SJU Summer Scholars Program

Techniques of emotion provocation are commonly used in interrogations, in which the interrogator asks questions that specifically target the suspect’s emotion in order to elicit useful information or a confession from the suspect. This summer I researched how suspects respond to different techniques of emotion provocation through a qualitative content analysis of audio and video recordings of interrogations provided by the Los Angeles Police Department. I analyzed 15 interrogations that ranged from 14 minutes to five and a half hours, with the average being approximately an hour and a half. Among the interrogations 14 of the suspects were male, most were in their thirties and of different races, the most common being Hispanic. Suspects who were interrogated had committed murder, rape, or robbery. While most of the interrogations resulted in denial, more than half of the interrogators were successful in reaching their goal of acquiring useful information. A qualitative analysis of recorded interrogations has never been done before, and this research is important because it can shed new light on what techniques are most successful in interrogations, whether the goal be to acquire a confession, information or even a strong denial.

The research I have conducted this summer focused specifically on how suspects respond to the techniques of appealing to the suspect's self-interest, appealing to his/her conscience, and offering moral rationalizations. Although the three techniques all part of the domain of emotion provocation, they produced different responses from the suspects. When the interrogator tries to appeal to the suspect’s self-interest by reminding the suspect that by not telling the truth there will be consequences and that the suspect will be better off by complying, the suspect responds defensively and explains to the interrogator that there is more to it than just providing information. At this point the suspect will demonstrate the fear they have of providing information because they may come off as being a snitch, and in doing so demonstrate how the fear of being sought out by one of their peers is greater than the fear of being convicted for the crime. When the interrogator targets the suspect’s conscience, trying to play on their guilt, the suspect rarely expresses sorrow for the victim, but instead for the effect their actions will have on their family. The suspect will plead with the interrogator to allow them to speak to their family and explain the situation first and will rant about how they feel ashamed for putting their family through pain. Finally, when the interrogator attempts to provide a rationalization or justification for the suspect’s actions so that the suspect does not appear to be completely at fault. For example if the crime committed was robbery the interrogator might say that the suspect probably had to commit the crime in order to support their family. At this time the suspect picks up on the interrogator’s terms and will agree with the rationalization. The suspect will openly discuss their actions but explain how they had no other choice or how it was ultimately the victim’s fault. When rationalizations are provided by the interrogator the suspect appears to be more comfortable to talk about the crime and admit to involvement, but will provide justification for it. These are a few examples of how suspects respond to techniques of emotion provocation, and there is much more to be learned from analyzing interrogations. By continuing the study of suspect’s responses, we can identify what methods work best and apply them to become more successful in future interrogations.



Christina King Smith
Department of Biology
Saint Joseph's University

Ph.D. University of Maryland,
Baltimore County

Research Interests: The Cytoskeleton and
Cell Motility

Research in my laboratory centers on questions concerning cell motility. Our current areas of investigation focus mainly on understanding mechanisms of actin- dependent organelle motility and how motility is regulated. As a model system, we use retinal pigment epithelial (RPE) cells from fish. These cells are found at the back of vertebrate eyes, and contain numerous pigment granules that in fish, undergo mass migrations in response to light. RPE cells can be isolated from the eyes of fish, dissociated, and cultured as single cells. Aggregation and dispersion of pigment granules within RPE is dependent on the actin cytoskeleton, and can be chemically triggered in isolated cells, allowing investigation of the mechanisms involved in motility.

Questions we are addressing include:

- Do actin dynamics, including actin retrograde flow, play a role in pigment granule motility?
- The signaling molecule, cAMP, stimulates pigment granule aggregation in vitro. What are the targets of PKA?
- What type of myosin motors are in RPE that could effect pigment granule motility, and what is their distribution?

A new area of investigation involves an enzyme found in RPE cells that is essential for vision. This enzyme, RPE65, is an isomerase that regenerates the prosthetic group called retinal. Retinal associates with the protein opsin, found in photoreceptors, and when in the *cis*-form, allows the photoreceptors to detect light. After light hits the retinal it is converted to the *trans* form, dissociates from opsin, enters the RPE cells, and in a series of enzymatic steps undergoes isomerization to regenerate the *cis* form, which then re-associates with opsin in photoreceptors. Recent studies have shown that an actin- dependent myosin motor, myosin VIIa, is responsible for the redistribution of this enzyme in mammalian RPE cells in light-and dark-adapted eyes. Myosin VIIa has also been shown to play a role in light-dependent motility of pigment granules. We are investigating whether this enzyme similarly undergoes light-dependent translocation in fish RPE and the mechanisms of its redistribution. RPE65 has been identified in smooth endoplasmic reticulum in mammalian cells. We are also studying whether smooth ER containing RPE65 undergoes light- and dark dependent redistribution in fish RPE.

Phagocytosis in Choanoflagellates

Eric Adjei-Danquah, '17

Faculty Mentor: Christina King Smith

Department of Biology

Supported by a Gift From Nick Nicolaides '87

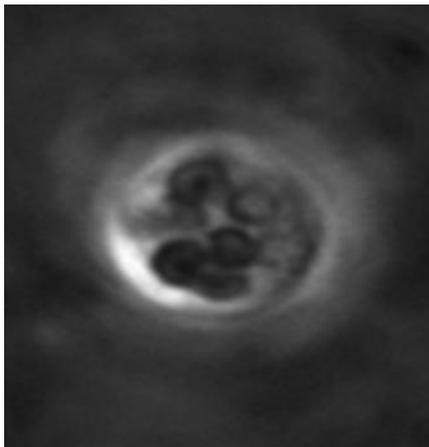


Choanoflagellates are unicellular eukaryotes and are members of the Protista kingdom found in both marine and freshwater environments. They have an ovoid or spherical cell body three to ten micrometers in length, a collar of thirty to forty actin-filled microvilli, and a single apical flagellum that varies in length. Choanoflagellates feed through a filter-feeding process in which their single apical flagellum moves, generating a current that facilitates the flow of water through their microvilli collar. The microvilli subsequently filter bacteria and other food sources that will be phagocytosed, or engulfed.

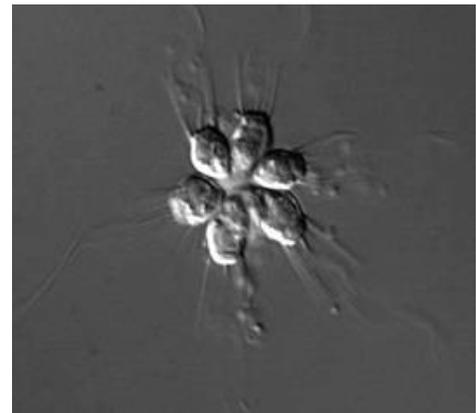
These organisms have piqued interest for a variety of reasons. Choanoflagellates bear striking functional and physical similarities with the choanocyte cells of aquatic sponges, the cells that allow the sponge to feed. Moreover, choanoflagellates have the ability to change morphology between solitary cells, both motile and attached to a surface (thecate cells) and colony types (rosette and chain colonies).

Using the choanoflagellate *Salpingoeca rosetta*, we are investigating whether these cell types demonstrate differences in the kinetics of phagocytosis. Choanoflagellate cultures were maintained by passaging every four days. Preliminary phagocytosis studies were conducted using BioParticles, fluorescently-labeled heat killed bacteria, as a food source. Bioparticles were prepared from stock solution, sonicated, and visualized in suspension. Experiments are ongoing to observe phagocytosis.

To determine if differences in feeding kinetics exist among the different cell types, colonies need to be produced. Other research has shown that the sulfonolipid RIF-1 in the bacteria *Algoriphagus machipongonensis* induces colonial formation. Broth and plate cultures of *Algoriphagus machipongonensis* were established; this bacterial strain will be used to induce colonies in choanoflagellates and study phagocytosis in rosette colonies.



Left: Choanoflagellate with visible phagosomes;
Image taken at 100x using
Immersion oil by [Nathan L'Etoile](#)



Right: Rosette colony in *S. rosetta*
Dayel et al. 2011. [Dev Biol.](#) **357**:
73-82

Localization and Redistribution of Enzyme RPE65 in Teleost Retinal Pigment Epithelial (RPE) Cells

Megan O'Donnell, '15

Faculty Mentor: Christina King Smith
Department of Biology



Supported by the McNulty Scholars Program

The retinal pigment epithelium (RPE) is a layer of cells located at the back of the vertebrate eye, directly behind the retina, and is densely packed with pigment granules. Because fish do not have dilatable pupils, light flux is regulated by pigment granules that disperse throughout the RPE cell's elongated apical projections in the light and aggregate back toward the cell body in the dark (moving up to 100µm). The RPE and retina layer are closely interrelated regarding this redistribution. Cryosections of the two tissue layers can exhibit the aggregation and dispersion of pigment granules in dark and light adapted environments, respectively.

In addition to controlling light flux, the RPE and retina play a role in the visual cycle, necessary for proper vision. The RPE contains an isomerase, RPE65 that regenerates the all-trans retinal, associated with rhodopsin, back to its cis-form crucial for photoreceptors to absorb light. A recent study shows that in mammalian eyes, RPE65 localizes at the apical side of the retinal pigment epithelium in the dark and redistributes to the basal side in the light, which requires an actin-dependent myosin motor, myosin VIIa, MyoVIIa has also been implicated in pigment granule movement. Because pigment granule motility and RPE65 distribution both rely on similar actin-dependent mechanisms, and because pigment granule motility is much more dramatic in fish RPE, we are addressing the following question:

Does redistribution of RPE65 in dark adapted and light adapted fish RPE occur as in mammalian eyes?

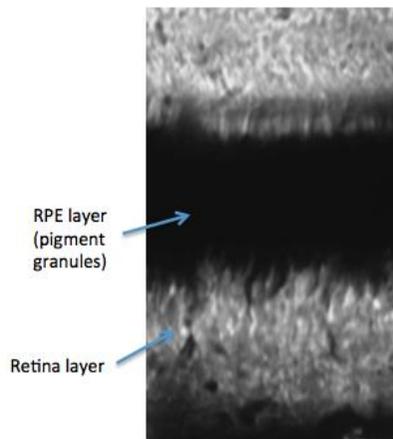


Figure 1. Cryosection of the RPE (seen in black) and retina layer in a light adapted environment

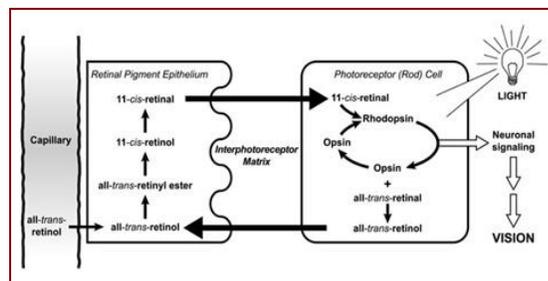


Figure 2. The visual cycle in RPE and retina layer



Paul Klingsberg
Department of Mathematics
Saint Joseph's University

Ph.D. University of Pennsylvania

Research Interests: Combinatorics;
Graph Theory; Computational
Complexity

My fields of research are *combinatorics* and *graph theory*. In very general terms, combinatorics deals with enumeration of the number of ways to perform a mathematical task (such as choosing a delegation of three people to represent a group of 15 people), and graph theory is concerned with diagrams you make by connecting dots with lines. Since these areas are relatively accessible to undergraduates, they are often sources of undergrad-level research problems, but not all the projects I have directed have been purely combinatorial, because the choice of topic is in large part driven by the student's needs and interests. I have directed projects each of the last five summers. In '06, I directed two summer scholar projects: *The role of invariance in mathematics* (which, among other things, investigated the use of an invariant in a number of combinatorial problems) and *Generalized Möbius Inversion* (which is abstract combinatorics). In Summer '07, I directed a project in another area of combinatorics, *Pólya-de Bruijn Theory*, which deals with enumeration questions in which not all the ways of performing a task count as different. (For example, consider painting the faces of a cube using k colors. Rotating the cube will make some colorings coincide with others.) I directed a project centered on probability theory '08, on stochastic processes and the Black-Scholes formula in '09, on problem solving in '10, on coding theory and public-key encryption in '12, on Financial Mathematics in '13, and on computability theory in '14. For more details on these projects, please see the one-page summaries prepared by the students.

Topics in Computability Theory

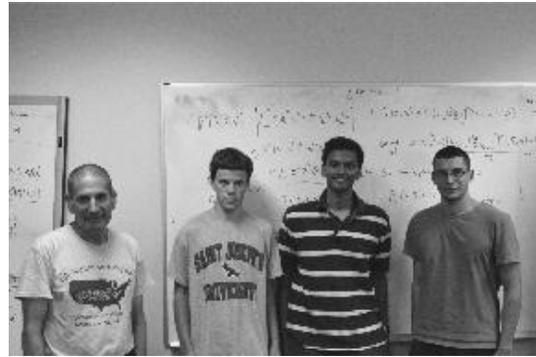
Matthew Gliatto, '16

Jimson Mathew, '16

Joseph Suleiman, '16

Faculty Mentor: Paul Klingsberg

Department of Mathematics



Supported by the SJU Summer Scholars Program

In the 1930's, questions in formal logic and the foundations of mathematics led pioneers, including Church, Gödel, Post, Kleene, and Turing, to the development of the theory of formal computation, which investigates questions of what can and what cannot be algorithmically computed. The pioneers and their successors have made surprising discoveries, and the subject has influenced the lines of development, both theoretical and practical, of the field of computer science.

Over the summer, we studied some of these discoveries. Following Martin Davis, we took as the central notion computations performed by programs constructed in a simple programming language (which we called "Davis programs"), so that a computable function was for us one that can be computed by Davis program. The development of the theory of (Davis) computability relies on the properties of the so-called primitive recursive functions, and we also studied these extensively and extended them to the class of μ -recursive functions. We proved that a function is Davis computable if and only if it is μ -recursive. (This is but one of many equivalences. All of the proposed definitions of "computable function" turn out to be equivalent, so that if a function is not Davis computable, it is assumed to be absolutely uncomputable, regardless of method.)

We constructed a numerical encoding of all Davis programs, upon which many highlights depend. Some of the highlights include:

- the construction of a "universal" program that can simulate every Davis program; the proof that there is no Davis program to compute the predicate $\text{HALT}(x,y)$ which is true if and only if the program with code-number y halts when run on input x
- the theory of recursively enumerable sets and predicates
- the Parameter Theorem
- The Recursion Theorem (which for example shows how to find a program whose output is its own program number)
- Rice's Theorem (and its generalization, the Rice-Shapiro Theorem). Rice's Theorem says, roughly, that there is no way to know, for any given function or set of functions, exactly which programs produce these functions.

The last topic we studied was the unsolvability of the general Diophantine equation, (the solution to Hilbert's Tenth Problem). Through the several ingenious constructions (discovered by a number of mathematicians), it turns out that if you could determine whether every Diophantine equation has a solution, you could also determine exactly when the predicate $\text{HALT}(x,y)$ is true, and, as mentioned above, there is no way to tell in every case whether $\text{HALT}(x,y)$ is true.

This project enabled us to improve our understanding of the fundamentals of Computer Science. It also allowed us to see how mathematical functions and a computer language coalesce in developing a computer program.



Mark F. Lang
Department of Food Marketing
Saint Joseph's University

Ph.D. Temple University

Research Interests: Marketing Strategy and
Consumer Behavior

My research focuses on learning that supports marketing strategy and decision-making in the field of food products marketing and retailing. Specific topics include consumer and market research; brand and marketing strategy; consumer behavior; retailing, merchandising, and private label; and innovation and product development.

The research methodologies I use are typically based on consumer surveys that examine shopper behaviors in reaction to alternative branding, merchandising, and promotional strategies. This approach combines theories from the marketing disciplines of consumer behavior and strategy. Much of my research studies topics and ideas that are current issues in food industry.

All of my work is targeted to academic peer reviewed journals in marketing and food and most, if not all, of my work is also published in trade magazines. Some work is cited through interviews in the popular press such as the New York Times, Bloomberg News, and Fast Company.

I often include undergraduate and graduate students in my research studies as well as managers from well-known companies. I also like to use research results in the classroom.

This restaurant study being completed with Joey Robinson is a vehicle for me to expand my work from the realm of supermarkets and consumer packaged goods into the very dynamic restaurant sector. This study is interesting because it employs advanced methodologies as well as some innovative fielding techniques. It has a good chance of appearing in a leading academic peer reviewed hospitality journal.

The X-Factor: The Effect of Excitement on Consumer Restaurant Behaviors

Joseph Robinson, '15

Faculty Mentor: Mark F. Lang
Department of Food Marketing



Supported by the SJU Summer Scholars Program

There has been much interest and investment in new restaurant concepts in the U.S. market. New concepts have become an established excitement factor in the industry. The food-service industry now receives \$.51 of the food dollar, trumping retail and consumer product goods. Some new concepts catch on with consumers and succeed well others struggle to catch on. What is it that makes some new restaurant concepts successful and others fail? Are there attributes that stimulate repatronage and positive word of mouth, or online reviews for restaurants?

Phil Romano created a restaurant incubator in Dallas Texas. It is a place for restaurateurs to test out their new concepts. Dr. Lang and I saw this idea as an opportunity to explore positive factors within the industry. We did exploratory research, and interviewed Phil Romano. The research lead us to believe that there are excitement or experiential factors that correlate with a guest's positive response after dining at a restaurant. We studied secondary research and topic-focused academic journal articles to collect known and accepted attributes of positive post-dining responses, and we interviewed industry experts on the topic to identify new attributes. We fielded interviews with the following; Phil Romano, *founder of Romano's Macaroni Grill and Fuddruckers*, Dave Manuchia, *restaurateur and original member of the Olive Garden team*, Blaine Sweatt, *creator of Seasons 52, Smokey Bones, and Olive Garden*. Sarah Lockyer, *Editor and Chief of Nation's Restaurant News*, Josh Levine, *Director of Operations for Starr Restaurants*, and John Buchanan, *President of Lettuce Entertain You Consulting*. The interviews yielded fascinating results, and a series of attributes not found in the accepted concepts from our secondary research. We have created a survey to test the attributes we uncovered and analyze and identify the correlation between discovered excitement factors and behavioral outcomes; returning to a restaurant, recommending restaurant, paying a higher price for the restaurant, and positively sharing your experience digitally.



George Latella
Department of Food Marketing
Saint Joseph's University

MBA Saint Joseph's University

Research Interests: Food Marketing
Strategy, Brand Strategy, Consumer
Behavior

We have a great opportunity as Food Marketers to influence consumers. From where & how they shop to what, where, & how they eat, and finally, to how they dispose of their food/packaging. The Hispanic population is growing in the U.S. and we need to do a better job of understanding them.

Prior to teaching, I spent 22 years as a Sales and Marketing Executive with Tastykake. Hispanic consumers were a focus for us, especially as we expanded our distribution across the United States with Wal-Mart.

In addition to teaching, I also consult for food companies and help with target marketing segmentation, strategic/marketing planning, market sizing, consumer research, direct marketing & E-commerce.

All of the Food Marketing classes I teach use marketing theory as a base, but are heavily focused on the practical application. This research will be a big part of my classes in the coming year as Hispanic consumers continue to grow in importance to Retailers and Manufacturers in the United States.

Food Trucks

Tyler Hill, '15

Faculty Mentor: George J. Latella
Department of Food Marketing

Supported by the SJU Summer Scholars Program



In recent times, a food truck boom is occurring throughout America. More trucks roam the streets in cities than ever before in history. The trucks are no longer the simple hot and cold sandwiches; with some trucks offering gourmet entrees. The quality is much higher as trucks specialize in categories, which in turn, has raised the price of eating at a food truck. The food truck has evolved into something that has the ability to sustain itself well into the future and become a mainstay in the American culture.

I did most of my work and research in Buffalo, New York. In this city there are over twenty individual food trucks operating throughout the area. These trucks vary from Lloyd's Taco Truck, to Pizza Amore, to the Knight Slider. These are three trucks in the area that showcase the individuality and flexibility that food trucks can offer. Lloyd's Taco Truck sells all sorts of made-to-order Mexican cuisines. Pizza Amore has a huge brick oven inside it where it cooks pizzas for up to ten minutes for customers. The Knight Slider is a truck that offers small burger sliders of varying styles, from Southwest burgers to burgers with eggs on top. These three trucks show how specialized the trucks are and how quality is of the utmost importance in the food truck industry.

Food trucks are quickly becoming a force in the food industry. As the economy rights itself and consumers' disposable income rises, the food truck business booms. People see food trucks as a luxury, and when money is tight, they are cut out of the budget. One of the biggest reasons motivating consumers to visit food trucks is the experience had while eating there. It is one of kind dining, and the food is usually something quite different than what is normally found in restaurants.

Right now though, it is crunch time for food trucks. They must work hard to become a part of the spending of not only the Millennials, but any group they can reach. The economy is trending upward, and the food trucks will work hard to have a strong presence in the country. The way the market fluctuates, the next bear market is not that far off, and if food trucks do not assimilate themselves fully to the culture and become a part of a consumers spending, then they will be the first thing cut when money gets tight again.

Research of Current Food Marketing Shortcomings Within the USA's Growing Hispanic Communities

Kristen Rupp, '15

Faculty Mentor: George J. Latella
Department of Food Marketing

Supported by the SJU Summer Scholars Program



For my summer research, I investigated the current patterns food marketers exhibit when advertising to Hispanics in the United States. My original hypothesis emphasized advertisers' shortcomings, with my prediction being that strong connections were not being made with the Hispanic population because of how messages were being advertised. Examples of this would be mistranslations, unawareness of literacy rates, commercials airing at times where Hispanics are not the primary audience, or ignorance of Hispanic consumers' brand or store loyalty to local small-brand or neighborhood stores instead of mass producers. Through my research, I discovered that the advertisers' shortcomings did not concern marketers' habits so much as they concerned unfamiliarity with the habits of the Hispanic communities. With my focus being the Greater Philadelphia area, I closely studied the dominant Puerto Rican population in the Northeast. I found several behavioral patterns that may prove advantageous to food advertisers, especially concerning an overwhelming Hispanic dependence on social media and other online media for commerce. If a food product can resonate with the Hispanic community online, it is much more likely to succeed in stores. Additionally, with larger household sizes, Hispanics generally spend more money weekly on groceries, and subsequently depend more on online coupons and discounts. Notably, the Hispanic male population typically feels underrepresented and overgeneralized, so a focus on the men might prove beneficial, especially because roughly 50% of Hispanic men are buying groceries for the household. I was captivated by the results of my research, and am so grateful for the opportunity to work through the Summer Scholars Program at SJU.

EatCommerce: The Ecommerce Evolution

Albert Wunsch, '17

Faculty Mentor: George J. Latella

Department of Food Marketing

Supported by the SJU Barbelin Scholars



Americans are obsessed with convenience and hungrily feed upon technology which promotes their addiction. This infatuation extends seamlessly to how we eat. Food, it can be argued, has always been the harbinger of convenience. From markets to malls, fast food to drive through windows, America wants its food quick and easy and will stop at nothing to achieve this goal, even at the expense of human interaction.

Computers and smartphones are the next phase in promoting the technological revolution of the food industry. The finite confines of the customary brick and mortar marketplace are expanding. The internet, with its infinite reach and limitless boundaries, has revolutionized the food industry. The consumer no longer needs to physically visit the market. Our food, whether it is a single meal or the weekly groceries, is accessible from the household computer, the laptop, and/or the smartphone.

The marketplaces of the internet have no lines. There are no difficult check-out people to deal with. The shopping cart is imaginary. It accepts coupons and even provides same. Its open 24 hours, 365 days a year, and is easy to get to. Clothing is optional and, remarkably, it delivers.

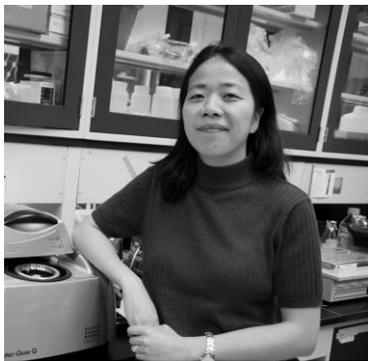
Ecommerce, the business of sales over the internet, encompasses not only the marketplace but also restaurants and specialty food items. One can read reviews of local restaurants and make a reservation on the same site. In the mood for lobsters from Maine? An internet connection enables you to order it from the comfort of your own home. A simple key stroke from a smartphone, and a pizza is on its way to one's apartment.

Retail food establishments are expending large sums of money into the development of high end websites and "apps", or applications, for the smartphone. These sites cater to every food interest. It could be said that where there's an appetite, there's probably an app for that.

My research focused on the extension of ecommerce into the food industry. I examined the technological advancements of the internet which permit consumers easy access to food websites via computers and mobile apps found on smartphones. Analysis of the ease of ordering food, finding restaurants, on-line shopping and innovative ways of advertising, were achieved through hands-on experience of dominant apps and websites.

Included in my research was a survey I conducted, directed to persons between the ages of 14 and up. Innovation is only good if it is used and popular. It seems obvious that the younger generations would find this new type of marketplace more attractive. Does it, however, peak the interest of older consumers? If not, is it just a fad? My survey served as my tool to answer these types of questions.

Finally, I was able to forecast the direction and scope of the retail food market effort into, what I call, EatCommerce.



Julia Y. Lee-Soety
Department of Biology
Saint Joseph's University

Ph.D. University of Pennsylvania

Research Interest: Telomere Biology, Phage Genomics

Bacteriophages are viruses that infect bacteria. There are estimated 10^{31} particles of bacteriophages (or simply phages) in the biosphere. The diversity of phages is vast. Through the SEA-PHAGES Program, thousands of mycobacteriophages that infect *Mycobacterium smegmatis* have been discovered with several hundred thoroughly analyzed at the DNA level. Studying these mycobacteriophages has led to finding that they are indeed diverse. Some phages only differ by one nucleotide in their DNA sequences, most have very little similarities among each other, and many show mosaic genomes having swapped segments of sequences as they infect their hosts.

After infection, the goal of some phages is to generate many, many copies of themselves before killing the host. Because *M. smegmatis* is a relative of *M. tuberculosis*, the bacteria that causes tuberculosis, studying how mycobacteriophages kill may lead to developing therapeutics. In the sixth year of participating in the SEA-PHAGES Program as the Phage Safari laboratory experience for first-year Biology students, we have ventured to explore phages of another bacterial host, *Arthrobacter*, a distant relative of *Mycobacterium*.

This summer, we have optimized the protocol to isolate phages from the soil-dwelling *Arthrobacter*. We have successfully isolated six phages from soil collected around Delaware County and named them Brent, Atree, Jacks, Jesse, JeremyWyn, and Pool. After purifying single clones of each phage, we extracted DNA and have begun to compare these phages by various methods. By electron microscopy, we found all six phages to have very similar morphology; all are in the siphoviridae family characterized by round polyhedron capsid heads and long non-contractile tails. Except Brent, the genome sizes of all the phages were approximately 55-60kb long as visualized by pulsed-field gel electrophoresis; Brent's genome size was relatively shorter at approximately 45-50kb. Interestingly, the restriction enzyme digest patterns of all six phages were very similar, suggesting comparable DNA blueprints despite being isolated from 5 – 10 miles apart geographically. How similar the phages are to one another is only confirmed through complete genome sequencing.

We are grateful to Dr. David Dunbar and Trevor Cross (Cabrini College) for help on the protocol, to Dr. Karen Snetselaar for help with the electron microscopy, and to Anna Kesaris, Eric Adjei-Danquah and Dr. Christina King Smith for technical assistance.

Isolation of Bacteriophages Using Arthrobacter as a Host

Shawn London, '16

Faculty Mentor: Julia Lee-Soety
Department of Biology



Supported by the SJU Summer Scholars Program

Bacteriophages are viruses that infect bacteria. They are very diverse and are estimated to be the most numerous organisms on earth today. Phages can be isolated from soil, sand, water, and many terrains in between. A phage is rather hardy and can survive in a variety of climates. Their diversity and survivability as well as their small genome make them an excellent model organism for undergraduate research. The Phage Genomics Labs at Saint Joseph's University allow incoming freshman the opportunity to be immersed in research and learn about how authentic research is conducted.

Recently, there has been a push to attempt isolation using various hosts such as *Bacillus*, *Streptomyces*, and *Arthrobacter*. For my summer scholars project I chose to continue work on isolation using *Arthrobacter* and optimize the protocol. Part of my project was to isolate novel phages using this new host, but a second goal was to write up a protocol for use by incoming freshman in the fall 2014 semester. With help from Dr. Dunbar and Trevor Cross at Cabrini University, calcium chloride dependence was identified for increased efficiency. Modifying the Phage Lab protocol with this new information 6 phages were successfully isolated and analyzed.

Three *Arthrobacter* phages were isolated at different locations within a 10 mile radius and at different times but have some remarkable similarity based on restriction endonuclease digest patterns. In a restriction digest, the phage's DNA is cut up by enzymes that target specific sequences. The fragments of DNA are resolved by agarose gel electrophoresis and separate by size with smaller pieces running faster and farther down the gel while larger and slower fragments remaining near the top. The genomic DNA isolated from the three phages (named Pool, ATree, and JeremyWyn) were digested by 5 different endonucleases and showed very similar patterns (Figure 1). This suggests very similar DNA sequence.

Even though phages are expected to be diverse and differ dramatically, my hypothesis is that because the *Arthrobacter* phage's genomes are typically very short there may be a high level of conservation in the genome. If many of the genes are conserved then it is probable that the restriction digest would be very similar. It is unlikely that these phages are 100% identical due to various locations and conditions of collection as well as the high diversity of phages in general. Future goals are to test the new protocol with the incoming phage class as well as to analyze any phage isolated in the class to see if restriction digests continue to show high levels of similarity.

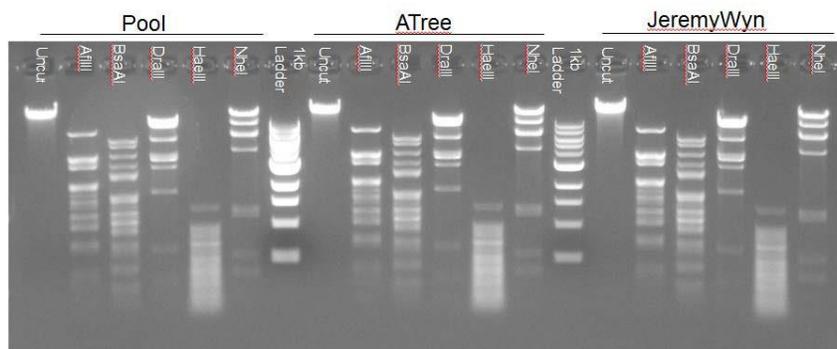


Figure 1: The restriction digest patterns of phages Pool, ATree, and JeremyWyn. In order to cut the DNA 5 different enzymes were used: AflIII, BsaAI, DraIII, HaeIII, and NheI.



Edwin Li
Department of Biology
Saint Joseph's University

Ph.D. University of Rhode Island

Research Interests: Membrane Protein
Structure and Assembly

My research area focuses on understanding the physical and chemical principles governing the interaction of membrane proteins. The interaction that brings two proteins together is referred as dimerization. Membrane proteins typically dimerize to set signaling cascades inside the cell that regulate vital cellular process such as growth, differentiation and motility. Of particular interest in my lab is the interaction between the membrane-spanning regions (transmembrane domains) of membrane proteins during the process of dimerization.

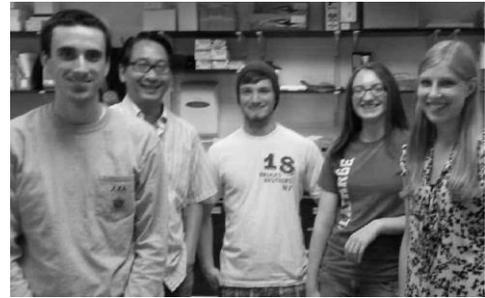
My lab uses different assays to study the interaction between transmembrane domains. In these assays, chimeric proteins containing the transmembrane domain (TMD) of interest are used. Interaction between two TMDs, from two chimeric proteins, leads to the expression of a reporter gene. In one assay, the ToxR assay, the gene encoding the enzyme beta-galactosidase is used. In another assay, the AraTM assay, the green fluorescent protein (GFP) gene is used. In these assays, enzymatic activity and fluorescence are used as a reporter of the propensity of the transmembrane domains to dimerize. Using the ToxR and AraTM assays my lab is elucidating the mechanism by which several membrane proteins dimerize, with emphasis on the role of the TMD. These proteins include: fibroblast growth factor receptor 3 (FGFR3), FMS-like tyrosine kinase 3 (FLT3), and mucin 1 (MUC1). These proteins have been associated with skeletal abnormalities (e.g., dwarfism, Crouzon syndrome, etc.) and several types of cancer (e.g., breast, bladder, etc.).

Measurements of Transmembrane Domain Dimerization Using the AraTM Assay

Tim Stachowski, '15

Joseph Collins, '16

Christina Freeman, '16



Faculty Mentor: Edwin Li
Department of Biology

Supported by the SJU Summer Scholars Program, the McNulty Scholars Program and the Department of Biology

Transmembrane proteins are vital for many processes in cells, such as communication, adhesion, and proliferation. These proteins usually have an extracellular domain that binds to an extracellular signal, a transmembrane region of about 20 amino acids spanning the length of the lipid bilayer, and a cytosolic domain. Monomers of these proteins interact with each other to form dimers, activating them to transmit the message of the extracellular signal across the lipid bilayer into the cell. Dimerization is possible partly because of the interactions between amino acid residues in the two transmembrane domains (TMDs) and other neighboring regions. It is believed that these interactions have a strong influence on the dimerization of the whole proteins. Furthermore, mutations in TMDs have been linked with detrimental physiological effects. This summer, preliminary work was done for the bacterial AraTM assay, which will eventually be used to measure dimerization in the TMDs of three transmembrane proteins: FLT3, FGFR3, and MUC1. Unregulated activity of these proteins has been associated with several forms of skeletal abnormalities and cancer.

In the assay, *E. coli* is transformed with two plasmids, pAraTM and pAraGFP, which code for a chimeric protein and the green fluorescent protein (GFP), respectively. The AraTM chimeric protein contains a maltose binding protein, the desired TMD and the araC transcription factor. When the chimeric proteins dimerize, the araC transcription factors interact with each other and bind to the araBAD promoter on pAraGFP. This promoter regulates the *gfp* gene, which allows for the expression and subsequent fluorescence of the protein. Fluorescence is then measured as a reporter of TMD dimerization. High fluorescence denotes that the TMD has a high propensity to dimerize, low fluorescence indicates a low propensity.

Prior to performing the AraTM assay, it was necessary to clone pAraTM plasmids containing the specific TMDs. Polymerase chain reaction (PCR) was used to make additional copies, or amplify, the DNA sequence encoding the TMDs from FLT3, FGFR3, and MUC1. This amplified segment was inserted in the pAraTM plasmid, linking the DNA sequences encoding the maltose binding protein with that of the AraC protein.

In addition to creating plasmids for the AraTM assay, another portion of the project focused on developing a modification of the assay using a newly engineered strain of *E. coli*. In the original assay, pAraGFP acts as a reporter of homodimerization, but it must be co-transformed into bacteria along with the plasmids encoding the chimeric protein. To simplify this process, the reporter gene (*gfp*) can instead be inserted into the chromosome of a bacterial strain using a technique known as recombineering. By utilizing viral proteins that mediate the recombination of foreign DNA into host cells, a copy of *gfp* and the ampicillin resistance gene are placed into the *lacZ* locus of *E. coli*. Using this strain will have benefits in future studies of TMD homodimerization and heterodimerization because the expression levels of GFP can be more accurately controlled.



April Lindner
Department of English
Saint Joseph's University

Ph.D. University of Cincinnati

Research Interests: Creative Writing

Although I spent the first part of my career writing and publishing poetry, a few years ago I decided to try my hand at writing a novel. The result was *Jane*, a young adult contemporary retelling of *Jane Eyre*, published in 2010, by Poppy/Little, Brown Young Reader. In writing *Jane*, I drew upon my obsessions: the Victorian novel, live music, and the visual arts. An art major forced to drop out of Sarah Lawrence when her parents die in a car crash, Jane reluctantly takes a job as nanny to the young daughter of a rock star on the brink of a comeback. I tried to remain true to the spirit of Charlotte Brontë's masterpiece while making something new, and found the challenge invigorating. I was especially excited to discover the world of YA readers and bloggers—the most enthusiastic audience a writer could encounter.

In fact, writing *Jane* was so satisfying that I immediately went on to write a second YA novel, *Catherine*, a retelling of *Wuthering Heights*, also set in the world of live music and musicians. I worked to give my novel a multi-generational sweep like its source material; *Catherine* intersperses narration by Chelsea, a suburban teen who runs away from home to search for the mother who went missing when she was a toddler, and Catherine, Chelsea's mother, the seventeen-year-old daughter of a nightclub owner on the Bowery who falls into impetuous love with a mysterious aspiring punk rocker.

When the time came to write a third young adult novel, I drew from yet another of my enthusiasms: travel in general and Italy in particular. In the summer after I graduated from college, I backpacked solo across Europe, and I've always wanted to write an extended project inspired by my misadventures on the road. Inspired by E. M. Forster's *A Room With a View* and the luminous 1985 Merchant-Ivory film adaptation of that novel, I wrote *Love, Lucy*, a novel set partly in Italy and partly on a fictional university campus in Philadelphia. The novel will be released in January 2015.

Writing *Love, Lucy* also has brought me back to where I started—poetry. A generous SJU summer research grant enabled me to travel to Florence and Rome to collect material, only some of which made it into the novel. Lately I've been using those leftover sensory impressions—along with notes from two SJU study tours in Greece—to write poems about travel.

My 21st Century Grand Tour

Dana Mingione, '15

Faculty Mentor: April Lindner
Department of English

Supported by the SJU Summer Scholars Program



During the 17th and 18th centuries, a young aristocratic gentleman would not have been considered educated without having taken an extended tour of Europe known as the Grand Tour. The trip was an intellectual requirement, and Grand Tourists didn't travel for the "practical" reasons that religious pilgrims or merchants had. British aristocrats in their 20's would travel with their tutors and immerse themselves in classical art and culture. Italy was seen as the highlight of this journey; cities like Venice, Rome, and Naples were simply not to be missed. Grand Tourists would travel for months, perhaps years, and the journey was difficult, uncomfortable, and often dangerous. The advent of railroads in the 19th century made travel faster, more comfortable, and more accessible to more people. Women and people of the middle class joined the aristocrats and contributed to the growing mass tourism. Renaissance culture was rediscovered, and destinations like Florence became essential.

While trips of such scale and magnitude as the Grand Tour are no longer commonplace, the spirit of the Grand Tour lives on. The average American college student cannot afford – in more ways than one – to dedicate years to the exploration of foreign countries. However, study abroad programs offer the perfect opportunity for a new generation of Grand Tourists to enrich their education through travel. And these new tourists use their journal entries and blog posts to continue the tradition of travel literature initiated by the likes of Byron, Shelley, and Goethe.

For my Summer Scholars project, I wrote a piece of travel literature of my own about my experience abroad. I was fortunate enough to spend the spring semester of 2014 in Florence, Italy where I lived with a host family, completed an ESL internship, and took four courses. One of my courses was Literature of the Grand Tour of Italy, in which I analyzed the works of various Grand Tour authors. My absolute favorite work and the one that most informed my writing was *Italian Pleasures* by David Leavitt and Mark Mitchell. Their essays are simple, funny, honest snapshots of their time spent in Italy, and they served as a springboard for my own writing. I wrote about things like all the ridiculous mistakes I made riding the national train line, the rush that comes from climbing tall European buildings, and the perpetual, and the acute embarrassment I felt being an American in Italy.



Timothy A. Lockridge

Department of Communication Studies
Saint Joseph's University (2012-2014)

Ph.D. Virginia Tech

Dr. Lockridge is currently Assistant Professor in the Department of English at Miami University (Oxford, Ohio). He teaches, researches, and writes about digital publics, digital writing practices and born-digital scholarship. He received his Ph.D. in Rhetoric & Writing from Virginia Tech in 2012.

Dr. Lockridge also has an MFA in Creative Writing and his poetry has appeared in many literary journals. He is currently working on a larger fiction piece and several smaller new media/hypertext projects. He is also a Senior Editor at Computers and Composition Digital Press and has served as an Assistant Editor for Kairos.

Systems of Fan Fiction Classification Through Additional Tags

Emily Miller, '15

Faculty Mentor: Timothy Lockridge
Department of Communications Studies



Supported by the SJU Summer Scholars Program

During the fall of my junior year abroad in Edinburgh, Scotland, I took a class about storytelling, folklore, and oral cultures in the Scottish context. Perhaps the most interesting part of the course was how various types of folklore were categorized. For example, fairytales can be categorized by their functions through Vladimir Propp's Thirty-One common functions in his *Morphology of Folklore*; or through a Type-Index like Aarne-Thompson's, which identifies a group of stories that are configurable into a set and identifiable in a common way because they share a common plot. Through studying various classification systems of folklore, I began to correlate the tagging system on the Fan Fiction sharing website www.archiveofourown.org to both Propp's Morphology and Aarne-Thompson's Type Index. This correlation inspired my research on how tags are used to classify Fan Fiction.

Fan Fiction is a type of fan activity where fans of a specific show, movie, book, or other popular media write their own original stories about the characters or settings. Though the concept of Fan Fiction has roots back to the 15th Century, it became popularized in its most basic form in the mid-1960s alongside the TV series *Star Trek*. With the invention of the internet and the movement of fan cultures from a physical to an online space, Fan Fiction and the ability to post it on various platforms (like LiveJournal, FanFiction.net, Dreamwidth, Tumblr, etc.) has flourished. Since 2008, Archive of Our Own has grown in popularity as one of the most popular Fan Fiction hosting sites. It is run by the Organization for Transformative Works and only hosts written Fan Works. It's extensive tagging system (through which works of Fan Fiction are categorized) is innovative not only for Fan Fiction, but to all online posting sites, allowing fans to include not only system tags, but also their own free-form tags. Using my own experiences in fandom as a basis, I decided to look at Fan Fiction within the *Teen Wolf* (2011 MTV remake) fandom to see how their tags functioned.

Looking at three different data sets (Top 50 Fics of all time by Hits, Top 50 Fics of all time by Kudos, and 30 Most Recent Fics with more than 1000 Kudos), I listed all their additional tags and categorized them into specific tag types. The additional tags are tags that are written by the author to include whatever they may feel needs tagging but are not included in the Archive's pre-existing tags. I classified them into 18 different tag types: genre, emotion, trigger warnings, content warnings, metacommentary, supernatural elements, character types, sex acts, relationship/character dynamics, writing style, tropes, actions (non-sexual), holidays, objects, places, time, relationships, and collection. While most fics had between three and ten tags, some fics had none and one had upwards of 100 tags. Tags can also fit into more than one category; for example, many metacommentary tags are also character types or relationship and character dynamics. The most consistent tags that appeared were genre tags, trigger warnings, sex acts, character types, and relationship/character dynamics.

The fully analyzed results of the study will appear on a Tumblr blog made specifically for the study, allowing fans, fic writers, and fic readers to access it regardless of their academic knowledge.



Kim A. Logio
Department of Sociology
Saint Joseph's University

Ph.D. University of Delaware

Research Interests: Race, Class, Gender, and Health

My classes include the Research Methods and Data Analysis courses in which students develop their senior thesis. Teaching this course over the years allows me to interact one-on-one with most of our majors as they work toward an original analysis of data consistent with professional sociologists and criminologists. The teaching-scholarship connection is strong; as I guide students through the research process, I become a better researcher myself. While my own scholarship focuses on women's and children's health, I conduct all scholarship through the lens of race, class, and gender intersections. This summer, I have the pleasure of working with Catherine Jones on a project that examines how men and women develop their views of the world through immersion and study abroad programs. She describes the experiences as transformative and the interviews reveal great life lessons for these students. Working with students as they develop as researchers is a true pleasure. This project, like so many others, developed from a simple idea to a sophisticated analysis of original data that contributes new knowledge to the field of sociology.

The Impact of Weeklong International Service Immersion Experience on the Student

Cat Jones, '15

Faculty Member: Kim Logio

Department of Sociology

Supported by Summer Scholars Program



The summer after my freshman year at Saint Joseph's University, I embarked on the Summer Immersion Program (SIP) to Guatemala. The weeklong international immersion experience of painting two schools, building a classroom, and developing relationships with my fellow SIP participants, as well as the students and community members of T cpan, Guatemala, proved to be life changing. The ripple effects were immense, as I changed my major, friend group, collegiate and professional goals, and perspective on life. I decided to conduct research to see if my experience was unique or if the impact of weeklong international service immersion experiences on students was impactful and if so, in what way.

Institutions of higher education have recently put an increased emphasis to teach beyond the classroom and have their students explore the world outside the campus community. Study abroad is highly encouraged, however weeklong 'alternative breaks' are growing quickly in popularity. Weeklong service learning based programs are a form of transformative learning through immersion in a different culture. The programs create educational experiences that challenge, and therefore change students 'filter' or 'lense' through which they view the world. These transformative learning programs enable students to put a face and name to social issues and injustices as they begin to know and care for people that differ from them in a multitude of ways: every-day lifestyle, living conditions, education, opportunities, obstacles, etc. Students are exposed to intricacies between nations and cultures, and see situations first hand that cannot be taught in a classroom. Studies conducted have discovered that students who participate in an immersion trip have had an increase in levels of compassion, empathy, vocational identity and faith, personal understanding of themselves, and greater understanding of cross-cultural issues than those who did not participate.

Saint Joseph University undergraduate students, 15 total, who participated in a Winter or Summer Immersion Program (WIP or SIP), within the last two years are interviewed to measure the impact of their experience, the relationships formed, understanding of social injustices, perspective on cultures, and personal growth.

My research corroborates studies that demonstrate students who have participated in a weeklong, international service immersion based program have broadened their worldview and become more tolerant and appreciative of cultural differences. The statement, "human relationships are the vehicle for change" takes on a real, intentional and significant meaning for students who have participated in a weeklong international service-immersion experience. It has been meaningful and comforting to learn that my experience in Guatemala was not unique in its impact.



Scott P. McRobert
Department of Biology
Saint Joseph's University Ph.D.

Ph.D. Temple University

Research Interests: Animal
Behavior, Evolution, Ecology

Research in my laboratory involves the examination of animal behavior through studies on rare, exotic and, in many cases, endangered species of fish, reptiles, amphibians, and insects.

Our work with fish involves analysis of shoaling, or grouping behavior. My students and I examine the factors that fish utilize when choosing shoalmates, including coloration, pattern, size, shape and shoal composition. In almost all cases, fish shoal with individuals that have features similar to their own. This may benefit them through the 'Confusion Effect' in which predators have difficulty identifying and attacking an individual within a group of phenotypically similar fish. We have examined shoaling in a number of different species and are now looking at the effect of experience and learning on shoaling behavior.

Our amphibian work focuses on environmental factors such as temperature, pH, density and pollution that influence metamorphosis. We are currently looking at metamorphosis across a wide variety of poison frogs and we run a yearly project in which elementary school children study metamorphosis in American toads.

Our reptile work involves the study of life history traits in rare turtle species. Working with the Turtle Survival Alliance we currently house a number of assurance colonies containing some of the world's most endangered species.

Finally, our work with *Drosophila* involves analysis of the genetic and evolutionary bases of sexual behavior. Current projects include an examination of interspecific interactions in local *Drosophila* communities and a project to understand the effects of sleep deprivation on sexual behavior in *Drosophila*.

Analyzing the Life History Traits of *Drosophila suzukii*:

An Invasive, Agricultural Pest

Elizabeth Krohn, '15

Tommy Smith, '15

Stephanie Tittaferante, '15



Faculty Mentor: Scott P. McRobert

Department of Biology

Supported by the McNulty Scholars Program, the GeoKids Program, the Botstiber Foundation, the SJU Summer Scholars Program and the Department of Biology

Drosophila suzukii, a native fruit fly species of Southeast Asia, has over the last 80 years spread and become an invasive species to much of Europe and America. As of 2011, *Drosophila suzukii*, or Spotted Wing Drosophila (SWD) for the black spots on the males' wings, became prevalent through much of Northeast America and have been threatening agricultural production, particularly blueberries in NJ. What differentiates SWD from other fruit flies and makes it a formidable pest is that the females lay their eggs in soft skin fruit that are still on the vine, as opposed to fallen, decaying fruit. With their ovipositor, a saw-like organ in the abdomen, the females are able to cut into the skin of fruit to deposit their eggs, sometimes a hundred at a time. When the eggs hatch, the larva consume the fruit from the inside, rendering the fruit unsuitable for consumption as it softens and is vulnerable to bacterial infection. Since SWD have a short life cycle and are able to mate just a few hours after eclosion (emergence from the pupal casings), they are able to multiply rapidly and cause widespread damage. In order to address this environmental problem, our lab analyzed SWD's behavior to understand what makes SWD successful as an invasive species and to find a mechanism by which SWD can be controlled.

We found that adding blueberries to our culture medium is necessary to maintain SWD in the laboratory. Therefore, we conducted an experiment to determine the effect of blueberries on reproductive behavior and offspring production. Virgin *D. suzukii* males and female flies were collected and housed individually in vials containing Instant Drosophila Medium (4-24) plus yeast. For approximately one-half of the females, the vial also contained a single, whole blueberry. When 3-5 days old, single females were placed into a vial containing a single male, and the flies were observed for 60 min during which copulation frequency (CF), copulation latency (CL) and copulation duration (CD) times were recorded. Females that mated were maintained in a vial (either with or without a blueberry) for 7 days, and offspring from that vial were counted.

The results show that there was no significant difference between females maintained with a blueberry (BB) and females maintained without a blueberry (no BB) with respect to reproductive behaviors. CF for BB females was 0.716 and CF for No BB females was 0.642 ($p = 0.313$; $X^2 = 1.0196$). CL for BB females was $1331.55 \pm 166.42s$ and CL for No BB females was $1479.33 \pm 233.31s$. CD for BB females was $1323.93 \pm 80.16s$ and CD for No BB females was $1257.39 \pm 51.78s$. There was no significant difference between CL for BB and No BB females ($p = 0.6017$). There was also no significant difference between CD for BB and No BB females ($p = 0.4979$).

With respect to housing conditions prior to mating, BB females produced significantly more offspring (41 ± 4 offspring) than females housed without a blueberry (23 ± 3 offspring) ($p = 0.0004$). With respect to housing conditions before and after mating, "BB/BB" females produced significantly more offspring (47 ± 5 offspring) than the "No BB/BB" females (21 ± 4 offspring; $p = 0.001$) and "No BB/No BB" females (26 ± 4 offspring; $p = 0.011$). These results suggest that exposure to blueberries prior to mating leads to higher offspring production in *D. suzukii* females. Future studies will determine whether other food sources have similar effects.



Randall M. Miller
Department of History
Saint Joseph's University

Ph.D. Ohio State University

Research Interests: American Social, Political, and Regional History, With Special Interests in the Eighteenth and Nineteenth Centuries

My work has largely concerned issues of forging identity and community, the ways people organize and respond to social change (e.g., civil rights), people at war, and media images and interests. Such work has led to books on such varied subjects as slavery and freedom in the Old South, the northern homefront(s) during the American Civil War, Reconstruction after the American Civil War, religion and society, ethnic and racial images in American film and television, immigration and forming ethnic communities, interactions among different religious, racial, and ethnic groups, urban development (especially in the South and the Sunbelt), and American politics, among others. Of special interest is discovering how people express their own selves in word and material culture. Probably my best-known work in that regard remains my book, *“Dear Master”*: *Letters of a Slave Family* (Cornell University Press; rev. and enlarged pbk. ed., University of Georgia Press), which related the story of an African-American family, as revealed in their letters that spanned over two generations in bondage (in Virginia and Alabama) and, for some, in freedom (in Liberia). In my teaching, I have emphasized similar interest in finding and interpreting new materials, most particularly in crafting writing assignments that ask students to discover and engage primary sources such as diaries, letters, and autobiographies of “ordinary” people (e.g., people heading west on the overland trails, soldiers and civilians in wartime, workers in factories and fields), as well as using the built environment and material culture to “find” people’s values, interests, and identities by what they made and used. Most recently, I have been exploring several topics related to homefronts in wartime, politics and religion, and political leadership.

Jillian Gardner’s work on discovering and describing patterns of political “revolution” through the study of various revolutions across the globe, in order to develop a “model” of predictability as to the likelihood, timing, and direction a “revolution” might take, fits with my own interest in comparative social and political change. Her signal contribution will be charting the “echoes” of revolutionary ideas as they worked within a revolution and across revolutions to translate ideas into interests and then into actions. Her work this past summer also has focused on the revolutionary experience in Pennsylvania, as part of a close-in examination of a revolutionary process. This is the first step to a comparative investigation of “the Revolution” in America and, from that, a step toward a working model to apply elsewhere.

The Revolutionary Hypothesis

Jillian Gardner, '16

Faculty Advisor: Randall M. Miller

Department of History



Supported by a Gift From Randall Miller and the SJU Summer Scholars Program

Revolutions have been studied, questioned, and admired. In order to understand if a revolution will occur, I find it to be necessary to look at previous revolutions and study the choices made. The “Revolutionary Hypothesis” project aims to understand, determine and track patterns in terms of historical revolutions and rebellions. By discovering patterns, variables and evidence, the hypothesis will work to create a concrete formula to (1) determine if a possible revolution or rebellions is probable (2) work to gain knowledge of similarities and differences of past revolutions and (3) predict the victor of revolutions or rebellions. In order to explore these stages, it was beneficial to narrow my focus on the individual man and his revolutionary choices.

Throughout my research on individual revolutions I have come to the conclusion that there are “echoes.” Specifically, in researching the American Revolution, several echoes from man to man, and place to place, show that the people of a revolution use each other to spark revolutionary rhetoric and even resistance. Crane Brinton, a close student of revolutionary patterns and historian in the American Revolution, argues that, “Revolutions grow from seeds sown by men who *want*.” Brinton made this argument by looking at several revolutions on a micro-scale. Following his lead, I have investigated the American Revolution as the first step in understanding and comparing patterns; here the “echo” effect was relevant. The revolutionary men, the literal beating hearts of the American Revolution were crucial actors in determining the outcome of the revolution because of their influence on others.

A key actor in the American Revolution I studied was Benjamin Franklin. The life and trials of Benjamin Franklin place him in the center of American Revolutionary rhetoric and political discourse. Such is the case because he constantly contemplated what America could be. Like that of his scientific endeavors, Franklin treated the independence of America as an experiment in independence and democracy. He stated in his work title “The Progress of Government and Prosperity in the United States” published in 1786, “We are, I think, in the right road of improvement, for we are making Experiments.” The inclusion of the word “we” in the quote suggests that Franklin is not alone in his ideals, and alludes to other men who took his lead and made experiments of their own. Through my study, I found that many men echo Franklin’s belief that America was capable of making their own government and becoming prosperous, willing to experiment with independence and republicanism. As Thomas Paine, in his pamphlet *Common Sense* (1776), wrote, “Can America is happy under a government of her own? As happy as she please under a government of her own; she hath a blank sheet to write upon.” This is only one instance of “echoing,” but the emphasis on experimentation is a strong theme driving the Revolution.

Revolutions do not just happen; particular people translated thought into action. Studying the people that make up revolutions is significant to the “Revolutionary Hypothesis” because significant actors were crucial to the unfolding of the American Revolution—history cannot write itself.



João (John) Neiva de Figueiredo
Department of Management
Saint Joseph's University

Ph.D. Harvard University

Research Interests: Sustainability, Business
International Strategy, Organizational Efficiency

My research is interdisciplinary in nature, occupying the intersection between international business, strategic management, and economics. The two overarching and interrelated objectives in my research are to advance the understanding of organizational sustainability in the global context and to use the models of management science and the tools of strategic management to improve organizational efficiency while contributing to a more sustainable world. My desire is to address specific needs on a case-by-case basis and offer practical contributions to the betterment of individuals and society, in other words, mostly applied research. I believe research not only should contribute to the academic literature and the practitioner community, but also should be a means towards the improvement of our collective lives on the planet.

Specifically in the area of sustainability, my motivation is to contribute to the long-term prospects of mankind's survival on the planet by following two basic premises, namely that more efficient use of natural resources and greater equality in human well-being are necessary conditions to achieve that goal. For this reason my research on sustainability focuses on two broad areas. First, the research seeks points of synergy in which actions contribute simultaneously to the three components of the triple bottom line: people (social aspects); planet (environmental aspects); and long-term financial health (economic aspects). Second, when complete synergies among the three components are not present and tradeoffs are necessary, the research seeks to find resolution of these tradeoffs in ways which guarantee preservation of the environment and enhancement of equality and human dignity. Two summer scholar projects pursue this objective in different ways.

One project examines the sustainability of kibbutzim in Israel from a managerial point of view. These are egalitarian communities that focus either on agriculture or light manufacturing and have a history of almost one hundred years. The kibbutz is an interesting laboratory to examine sustainability of communities because their egalitarian nature became less rigid in the late seventies and mid-eighties, as main economic activity drifted towards manufacturing. Beginning roughly forty years ago certain external pressures led to gradually increasing inequality, leading to the desirability of research describing why this was the case, and what motivated kibbutz members over time.

The other project is focused on bee-keeping in the United States. In light of the recent phenomenon of increased hive mortality, the project examines the practice of migratory beekeeping in an attempt to identify actions that can increase its sustainability. This practice consists of the transportation of beehives over large distances over land so bees can help the pollination of plant cultures in another part of the country. Migratory beekeeping is especially important in the case of certain crops, such as almonds in California, the pollination of which depends almost exclusively on bees. The objective of the project is to search for organizational solutions to help enhance the sustainability of migratory beekeeping.

The Evolution of the Organizational Structure of Kibbutzim: An Inquiry Into Motivation Theories as Applied to the Sustainability of Communal Organizations

Rosanna J. DeFilippo, '15

Faculty Mentor: Joao Neiva de Figueiredo
Department of Management

Supported by the SJU Summer Scholars Program



A kibbutz is a collective community typically found in Israel where members voluntarily choose to play an active role in the success and the sustainability of the kibbutz. Historically, kibbutzim (plural of kibbutz) have been agriculturally based, but in more recent decades many have shifted to an industrialized production base. With this shift, scholars have argued that the core values of these communities have also shifted, thus “redefining” the modern-day definition of a kibbutz.

This assessment has implications for social sustainability as it relates to motivation of workers in kibbutzim. Understanding what motivates these workers to do tasks well in the workplace is important because the success of these workers also affects the each aspect of the triple-bottom line (people, planet, and profits).

To understand the motivation of kibbutzim workers to do their jobs well, the values of the agricultural-based and production-based kibbutz were analyzed, compared and evaluated against four more-credible present day motivation theories: expectancy theory, equity theory, self-determination theory, and goal-setting theory. Each comparison evaluated what the theory would predict and whether or not this prediction matched the actual outcome of the kibbutz situation.

Preliminary analyses suggests that self-determination theory, which states motivation has nothing to do with rewards or outcomes, but on whether or not work is meaningful, there is a sense of freedom and autonomy, and work allows for meaningful relationships with others, best fits the model to which the agriculture-based kibbutzim ascribes. Yet equity theory, which states whether or not people's motivations are based on the rewards and efforts of others, may best ascribes to why workers are motivated in the production-based model.

**Institutional Apiaries:
Searching for Sustainable Solutions**
Elizabeth Wardach, '16

Faculty Mentor: John Neiva de Figueiredo
Department of Management

Supported by the SJU Summer Scholars Program



This past summer I researched the sustainability of migratory beekeeping in the United States. I looked at the observed consequences of this beekeeping practice and offered a prediction and suggestions to resolve the tradeoffs found between farmers and apiarists.

The almond crop in California is one of the largest pollination efforts in the United States. The almond crop in California's Central Valley is responsible for 50-80% of almonds harvested worldwide, and in 2013 the estimated yield was 1.85 billion pounds of almonds. An estimated 1,600 apiarists have their hives transported from all over the US to California's Central Valley whereby more than 31 billion honeybees are taken to pollinate the almond crop each February.

Migratory beekeeping is an apiarian practice in which a beekeeper moves colonies directly to fields of nectar-producing crops to aid in pollination. Some plants are self-incompatible which means that they rely on pollinators to reproduce. One example of a self-incompatible plant would be almond trees. This crop relies on pollinators in order to produce a yield each year. Local Californian honeybees cannot pollinate the entire crop alone, so beekeepers from all over the United States ship their hives each year to help with this massive pollination effort. Due to recent honeybee population decline, native pollinator species cannot sustain the amount of pollination needed for such large-scale monoculture farming operations. Migratory beekeeping ensures that bees are pollinating throughout the year and constantly making honey. Migratory beekeeping is beneficial to the apiarists who keep the bees because it ensures a bountiful honey yield, and also benefits the variety of farmers who get their crops pollinated. Modern migratory beekeeping practices have become the main source of crop pollination in the United States.

In my research I found that there are various consequences of migratory beekeeping. Large-scale migratory beekeeping has been linked to hybridization of non-native and native honeybee species. Hybridization is defined as the formation of hybrids, or crossbreeding between parents of two different species. This can be dangerous in the case of the honeybee because it narrows genetic diversity. There are also stressors placed on honeybees during transit, while pollinating, and after pollination. Transporting bees via tractor-trailer across the country has an estimated ten to fifteen percent hive loss. Bees perish during transit from sepsis and exiting the hive. Once delivered, two to three hives per acre are placed throughout orchards to pollinate. Such a high density of beehives in one area aids the spread of disease, mites, and fungi. Bees have nothing to forage for once the almond crop's bloom is over because they are surrounded with miles of almond trees. These boomerangs of food availability cause major stress on bee colonies, often leading to hive loss.

Several outcomes are predictable from the observed state of affairs in migratory beekeeping. If the current apiarian model were upheld, honeybee populations would be expected to continue to drop. Migratory beekeeping is not sustainable in terms of overall honeybee health. The timing of shipment, placement, and removal of beehives could become more efficient to decrease overall hive loss. Many times early placement or late removal from fields where pollination is needed can be detrimental to hive health.

Konstantinos P. Nikoloutsos

Department of Modern and
Classical Languages
Saint Joseph's University



Ph.D. University of Birmingham (U.K.)

Research Interests: Classical Reception

My research focuses on an area of classical studies called “reception” and investigates the ways in which the texts, ideas, images, and material culture of ancient Greek and Roman civilizations have been “received,” that is, understood, used, and abused in modern times. In particular, I am interested in two different areas of classical reception: the afterlife of ancient drama in Latin American theater (with an emphasis on Argentina and Cuba) and the portrayal of the classical world on the big screen (with an emphasis on representations of events and figures from Greek history in post-World War II Hollywood films).

My research seeks to identify the reasons why classical antiquity is still important for contemporary artists and how it changes from the page on the stage and on the screen to suit the expression of modern concerns and ideas. More specifically, I am interested in the “revisionist” approaches that the mediums of theater and cinema follow vis-à-vis the ancient world, that is, the ways in which antiquity is revised, distorted, compressed, and contested, and why the past is subjected to such an eclectic mode of representation.

Currently, I am working on a monograph tentatively titled *Ancient Greek History on Film: Reality and Representation*. The book focuses on films from two different eras in the history of Hollywood cinema: the so-called Age of Epics (1951-1964) and the post-*Gladiator* revival of the epic genre (2000-present). The goal of my research is to explore the transition from the linguistic to the optical in filmic recreations of Greek history, that is, the economic, technological, ideological, and industrial mechanisms through which the words of ancient literature (“written” text) change into images (“visual” text) that are made available for public consumption in mainstream cinema.

Power and Perception: Classics and the American Revolution

Carlos Cardozo, '15

Faculty Mentor: Konstantinos P. Nikoloutsos
Department of Modern and Classical Languages

Supported by the Summer Scholars Program

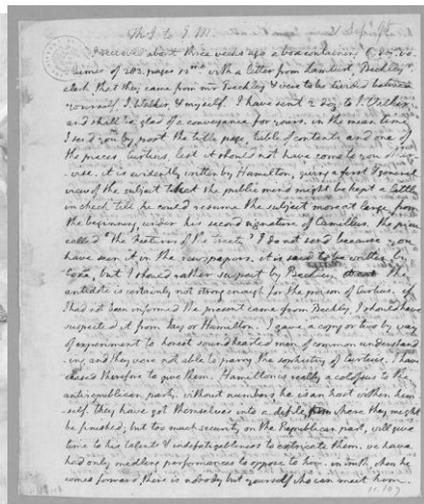


My project this summer involved investigating the impact of Greco-Roman world, especially its mythology, history, and drama, on the American Revolution. The bulk of my research explored literary and visual mediums. I focused the aesthetic portions of my research on the post-Revolution mythologizing of the founders and their actions, particularly in the depiction of George Washington.

For example, I analyzed *The Apotheosis of George Washington*, a painting found on the inside ring of the Capitol Dome in the city of Washington, DC. The painting, depicting the Washington as being assumed into heaven on a cloud and joining the Olympian gods as a new Zeus, combines ancient mythology with contemporary American ideals, portraying ancient deities engaged in the propagation of the ideals of the Early Republic.

I also examined the literary reception of the ancient world among the Founding Fathers, in particular the journals of Alexander Hamilton, in which he uses the biographical writings *Parallel Lives* of the ancient author Plutarch to formulate views on contemporary political philosophy, and the play *Cato: A Tragedy*, which was performed at Valley Forge in 1778. *Cato* in fact may have been the source for the famous rallying cry of the Revolution, “Give me Liberty or give me Death!”

My research has largely pointed to a powerful trend in colonial America - a trend of use and abuse of Classical Antiquity to promote political ideologies and create a sense of historical continuity. Colonial Americans saw themselves as the heirs to the Roman Republic - as the last vestige of ancient virtue contrasted with a thoroughly decadent Europe, where ancient liberty had given way to tyranny. It was this unique reception of antiquity that defined the ideologies of the founding fathers, and helped to forge the new American nation's identity.





Peter Norberg
Department of English
Saint Joseph's University

Ph.D. Rice University

Research Interests: Herman Melville's
Reading

In addition to my other projects, I am Associate General Editor of *Melville's Marginalia Online* (<http://melvillemarginalia.org/front.php>) an electronic archive of Herman Melville's reading that includes critical editions of surviving books from Melville's personal library. The marginalia Melville left in his personal library are essential to the manuscript archive for his fiction and poetry because many of these volumes served as primary source material for his published works. The working manuscripts for most of Melville's major works are either unlocated or destroyed, but one can find valuable clues to his compositional processes in the margins and on the endpapers of the books he had before him while he wrote. In writing such masterworks as *Moby-Dick* and *Billy Budd, Sailor*, Melville drew heavily from other books for factual details, stylistic techniques, and aesthetic form. Using digital photographic enhancement processes, we have also recovered significant new evidence that reveals previously erased marginalia in multiple volumes, including, most recently, Melville's personal copy of *The Poetical Works of John Milton* (Boston: Hilliard, Gray, 1836). This recovery work has uncovered new evidence of Melville's creative processes and his aesthetic, religious, and political concerns. To date, we have published 26 titles, including Melville's 7-volume set of *The Works of William Shakespeare*, his copy of the *New Testament and Psalms*, and his copy of Thomas Beale's *The Natural History of the Sperm Whale*, a significant source for *Moby-Dick*. There are also an additional 21 titles in production, representing one sixth of the 285 extant titles from Melville's library.

During the summer of 2014, Katie Daubert and I prepared for digital publication two significant volumes from Melville's library: a history of the Shaker religion titled *A Summary View of the Millennial Church* (Albany: Van Benthysen, 1848) and a two-volume edition of Mme. de Stäel Holstein's *Germany*, a critical survey of German literature, drama, and theology that Melville considered to be one of the most erudite works of cultural criticism he ever encountered. In addition to processing the 1277 photographic images associated with these volumes, Ms. Daubert also contributed to bibliographic research on their relation to Melville's published work and to other volumes in his personal library. Ms. Daubert also explored how digital access to primary sources and historical artifacts can enrich and extend research in the Humanities.

An Analysis of Melville's Marginalia Online and Additional Digital Archives

Katie Daubert, '15

Faculty Mentor: Peter Norberg
Department of English

Supported by the SJU Summer Scholars Program



The Digital Humanities has attracted momentous attention as today's technology progresses and becomes familiarized in modern day routines. The incorporation of technology into the humanities is an ever-growing field of possibility, and this summer I was able to partake in this field as I worked closely with Melville's Marginalia Online's digital archives. My studies and work led me through the extensive process of acquiring, editing, uploading, and researching some of the surviving books of Herman Melville's library. These volumes provide markings and annotations from Melville himself, and act as primary source material for his own works. My tasks included searching University of Pennsylvania's *Rare Book & Manuscript Library* to locate copies of Madame de Stael's *De l'Allemagne* as well as running Matthew Arnold's *Mixed Essays, Irish Essays, and Others* and *Culture & Anarchy; and Friendship's Garlands* through an sRGB process and formatting them for the web. I also took on the task of contributing to the commentary of de Stael's *De l'Allemagne* by taking on thorough research as to how Melville's possession of *De l'Allemagne* may have influenced his own work.

My work this summer has given me an in-depth view of the progression of technology as universities and other sources of academia transition the humanities into the digital world. By transitioning important, physical works of literature into digital archives on the web, users will be able to access and view otherwise inaccessible work and apply firsthand study and analysis. Not only can I appreciate the tedious and careful work done to make these materials available for the web, but also the accessibility of such materials for scholars and students alike are now easier and more in-depth for future research. Melville's Marginalia Online is also interactive, providing pop up text box commentary that gives insight as to why these markings from Melville may have influenced his published works. This type of interactive research allows mentors and students to find a way to focus on documents and text that go beyond papers and books. Users can now interact with text on a multimedia platform and broaden their thought processes and interpretations of a certain topic. This accessibility and connectivity of knowledge will allow future research to blossom and grow as new ideas and analyses develop and intermingle. This allows work in the humanities to take on a more extensive and interpretive direction as we find ways to use this progressive technology to broaden and benefit our studies in academia.



Cristian Pardo
Department of Economics

Ph.D. University of Maryland at College Park

Research Interests: Macroeconomics,
International Finance, Dynamic
Microeconomic Modeling

My main area of research focuses on the causes of business cycles. In particular, I have investigated the link between entrepreneurial risk aversion, financial imperfections and business cycles. Private entrepreneurs, who are more common in emerging markets, tend to invest large fractions of their wealth in a single, small company, thus highly vulnerable to risk. Consequently, risk aversion among private entrepreneurs can impose costs to society as unfavorable shocks that reduce entrepreneurs' wealth increase this cost and thus reduce private entrepreneurs' willingness to invest. Therefore, the said behavior towards risk may result in a mechanism that magnifies the effects of shocks thus producing stronger output fluctuations.

In a related area, given that most emerging economies tend to borrow mainly in foreign currency, changes in the value of their currency affect the value of foreign debt and thus entrepreneur's wealth. In my research I show that domestic depreciations, an economy's natural response to adverse shocks, are stronger under fixed than under flexible exchange rate regimes. Therefore, fixed exchange rates may further magnify the effects of shocks due to the resulting stronger depreciation. I show that flexible exchange rates could be preferable under conditions less restrictive than those found in the past.

I also do research on Dynamic Microeconomic Modeling, both in the area of health and labor economics. My research deals with the question of what factors people base their choices of major decisions, such as to whether or not have family, have kids, work, study, what type of work, what kind of health insurance, etc. In particular, I have a paper that examines the determinants of the choice of health insurance type in a stochastic, dynamic environment. Developing an structural model and using panel data from Chile, I estimate the importance of certain variables that individuals take into account in choosing health insurance types (private or public), such as premiums, expected out-of pocket costs, and individual preferences in choosing. Another paper in this field relates to the choice of the type of job individuals choose: to be a wage-employee and receive a paycheck every period, or to be self-employed and potentially earn more, but face more risks. I here again develop a dynamic stochastic structural model, which together with the use of data, allows me to estimate the parameters that best reflect the actual choice made by people.

While structural models face trade-offs between complexity and computational tractability, structural analysis allow researchers to model the actual processes that lead to changes in individual behavior. With them, we can predict the evolution of such choices into the future, given some demographic assumptions, such as on population aging and growth. In the health insurance paper, I examine the impact of eliminating restrictions due to pre-existing conditions. In the labor economics paper, I analyze the effect of mandating self-employed workers to pay for unemployment insurance.

An Investigation of the Change in Prices of Baseball Tickets

Jonathan Jenkins, '15

Faculty Mentor: Cristian R. Pardo
Department of Economics



Supported by the SJU Summer Scholars Program

Millions of tickets are being sold every year in each sport in the U.S. In particular, millions of tickets are being re-sold in secondary market sites such as Stubhub.com. One can expect there is an economic equation behind the price of these tickets, with both supply and demand considerations. My summer scholar's project has been to take this initial premise, and shed some light on how the price fluctuations of re-selling tickets occurred. To do this, I took daily reading on three teams with different average price levels: the Boston Red Sox (expensive), the Philadelphia Phillies (mid-priced), and the Pittsburgh Pirates (inexpensive). I recorded ticket prices for each team's next home game up to 7 days in advance. In total, I recorded over 1800 readings.

One can anticipate many factors affecting the price of a baseball ticket than just the section of the seat. The ones we looked at in this research were time of game, days until the game, the team's ranking, the opponent team's ranking, the starting pitcher, the weather, precipitation expectations, etc. We took the team ranking information and starting pitchers from ESPN and weather information from weather.com.

After running an econometric analysis for the determinants of the prices, we reached many interesting findings. First, only the Pirates seem to have a slight but statistically significant preference of more highly-ranked pitchers. In addition, as expected Friday, Saturday and Sunday games seem to have a significant preference over weekday games for all teams, as the prices of tickets shows a strong statistical correlation. Also, the early afternoon games and mid-afternoon games (games between 12-4) also have higher tickets prices and thus seem to also be preferred on average. The number of tickets available consistently showed a negative correlation with ticket prices in all cases, signaling the importance of supply considerations. For the analysis of temperature, we use a base line of 72 degrees as the "perfect" temperature and calculated the absolute value of how ever many degrees above or below. Except for the Red Sox, these values showed no significant effect on the price of a ticket. The other meteorological condition we looked at was precipitation, specifically the percent chance for it to rain. Unlike for temperature, it seems that only Pennsylvanians are worried about not getting wet, while there was no significant statistically correlation for Bostonians or Pittsburghians.

In conclusion, the results show that the best time to buy a ticket for each team is as far in advance as possible and, as expected, weekday games tend to have cheaper prices. All other factors are team based. While in Boston, no other factors present statistical significance, if looking for a ticket in Philadelphia, to get the cheapest ticket one should also look at the weather forecast. If looking for a ticket in Pittsburgh, one should also take into account the starting pitcher.



Diane M. Phillips
Department of Marketing
Saint Joseph's University

Ph.D. Penn State University

Research Interests: Consumer Psychology &
Environmental Sustainability

I'm a consumer psychologist trying to make an impact on the world. My goal is to leave a livable planet for future generations. I realize that this is a "tall order" for just one person and I am not unrealistic in the challenge that is ahead of us. However, by connecting with groups of other talented and motivated individuals, especially business leaders, together we can impact the changes we need.

I have used a variety of techniques, from in-depth interviews to laboratory experiments, to online surveys to develop a better understanding of how individuals make pro-environmental decisions. One recent publication found that innovative consumers - those who are most flexible in their thinking and are willing to consider new things - are the most likely to enact a variety of pro-environmental behaviors. Another recent study attempted to find out why consumers don't purchase green products, even when they say they want them. The results showed that when consumers are given information about a green product that differentiates it from other products (such as "it has not been sprayed with pesticides"), consumers are not only willing to purchase the product, but they are willing to spend more money for it.

The project this Summer focused on a group of local entrepreneurs who started sustainable businesses. We conducted in-depth interviews with these entrepreneurs to help us understand what motivates them to initially start their business. Two themes that have initially come out of the interviews are that: (1) entrepreneurs see that they are inextricably connected to other individuals and value that connection and (2) entrepreneurs feel a sense of responsibility to do what they can to improve the lives of others.

The Triple Bottom Line: Where People, the Planet, and Profit Intersect

Rich Viebrock, '15

Faculty Mentor: Diane Phillips
Department of Marketing

Supported by SJU Summer Scholars Program



In nearly all of today's business models success is measured in profit alone. This limited method of measuring success neglects the hidden costs associated with the way a business interacts with the environment and its stakeholders. As a result of this model, large-scale business has led, and continues to lead America on a path that is environmentally damaging and socially unjust. It is due to this inadequate measure of success that the consumer has become a dollar, a factory worker has become a burden, and the planet has become a never-ending pot of gold; only the truth is we're nearly out of gold. In order to adequately address the social inequalities and environmental degradation that plagues our world, I believe it is imperative that we take a fresh look at what business has to offer. It is time to throw away the old business handbooks and adopt a new type of business, one that is socially just, environmentally friendly, and of course, profit earning.

With these ideas in mind, I set out this summer in an effort to identify and study businesses in the greater Philadelphia area that support the triple bottom line business mentality. This model, contrary to traditional business, equally values people, planet, and profit. Using the business directories of several organizations who promote the triple bottom line business model I was able to locate a vast number of businesses who fit my criteria. Little did I know Philadelphia's "responsible business" sector is on the rise! After identifying over fifty "triple bottom line" businesses I contacted each one individually, requesting an interview with founder/owner. Following an extensive process of studying interviewing techniques I began interviewing each business owner.

The main criteria of each interview revolved around one question, "Why do you do what you do?" What seems to be such a simple question did not yield such simple answers for these socially conscious and environmentally savvy entrepreneurs. Nearly all of the research participants expressed a deep concern for what they believe to be the world's leading issues; and it is through their daily business operations that they strive to make a difference. It is interesting to note that in many of the interviews it was revealed that the participant's efforts to be more environmentally friendly and promote social equality stem from strong emotional connections with both humanity and the planet. In such instances, it was evident that the triple bottom line was truly in effect; the business is simply the means by which they fulfill their innermost desires to make the world more inhabitable for all.

Although this marks the end of the summer, my research in this field continues. I have been lucky enough to schedule an interview in early September with local responsible business hero, Judy Wicks. My hope for the continuation of this project is not only to learn more about the unique sustainability initiatives currently used by local businesses, but also to capture those ideas in a short documentary film. For this reason I have video-recorded each interview. I plan on using the footage that I have gathered to compile a short film that will be used by faculty and staff at Saint Joseph's University as a means to educate their students on the importance of responsible business practices. If there is one thing that I have learned from the women and men that I spoke with this summer, it is that we need to spread the message; business can be a force for good, let's start using it that way!



Tia Noelle Pratt

Department of Sociology and Criminal Justice
Saint Joseph's University

Ph.D. Fordham University

Research Interests: Sociology of Religion, American Catholicism, Race and Ethnicity, Identity Studies

The core areas explored in my early work – the sociology of religion, American, Catholicism, race/ethnicity, and identity studies – encapsulate my overall research interests. Currently, I am working on two projects that examine these core research interests. Through my current research, I am continuing to explore the intersection of religious and racial/ethnic identities while moving beyond the original scope of study to include other forms of identity work among Roman Catholics.

The first project is related to data I collected during the fall 2013 semester that examines Roman Catholic young adults' knowledge of and attitudes towards the Church's pro-life teachings and how their attitudes can serve as a bellwether for the Church's political strategy. At this time, I am working on an article that discusses five issues that resonate with the Millennial generation that can also serve to broaden the umbrella of conversation on pro-life issues.

The second project I am researching examines immigration and migration, access to the priesthood and religious life and experiences of racism within the Church that mirror those of the larger society as areas where commonalities of experience exist between African Americans, Latinos, Asian Americans, and Native Americans. The work of a number of scholars has tackled the U.S. Catholic Church's encounter with race and racism. This body of extant scholarship does not offer a comparative analysis of the experiences of multiple racial and ethnic minority groups within the Roman Catholic Church in the United States. The article I am researching could not be timelier as racial and ethnic minority groups are poised to comprise more than 50% of Catholics in the United States by mid-century.

My early work established a trajectory of research in the sociology of religion with a focus on racial, ethnic, and identity studies. The continued exploration of these themes will help push forward sociological knowledge in these areas and expand our understanding of the intersection of religion, race, and identity in daily life.

An Analysis of the Clery Act Across Three Universities

Kevin Curtis, '16

Faculty Mentor: Tia Pratt
Department of Sociology

Supported by the SJU Summer Scholars Program



The Clery Act is a law passed by Congress which requires universities that receive federal funding to make their crime statistics publicly available. Under federal law, colleges and universities nationwide are required to collect statistics under the Clery Act related to the reporting of eight crimes: Criminal homicide (murder/non-negligent manslaughter and negligent manslaughter), Sexual offences (forcible and non-forcible), robbery, aggravated assault, burglary, motor vehicle theft, arson, and arrest or disciplinary referral for liquor law violations, drug law violations, and illegal weapons possession. There are seven main goals of the Clery Act as outlined by Dennis E. Gregory and Steven M. Janosik; they are (1) improve communication and crime reporting between campus departments, (2) make crime statistics available to incoming students and parents, (3) improve campus safety programs, (4) improve policies and procedures of campus security, (5) change student safety behavior by raising awareness, (6) create transparency of crime reporting by the institution, and (7) reduce crime on campus. Scholars have researched the effectiveness of the Clery Act in achieving these seven goals. For my project I am analyzing the Clery Act crime statistics of three universities of similar size and location to see if their affiliation, specifically private religious, private non-religious, or public, can account for differences in crime statistics.

I looked at crime statistics from Saint Joseph's University (SJU), Johns Hopkins University (JHU), and Morgan State University (MSU). SJU is religiously affiliated and private, JHU is not religiously affiliated and private, and MSU is a public university. The data are from the years 2010, 2011, and 2012 because that is what was made readily available by the universities. I accessed this data on each university's website. I hypothesize that SJU will have the lowest amount of crime, JHU will be in the middle, and MSU will have the highest amount of crime as outlined in the Clery Act crime statistics, because a religiously affiliated university like SJU is expected to attract the kinds of students who are less likely to violate the law. To analyze the statistics I put them in an excel spreadsheet and made crosstab tables of the statistics for analysis.

After preliminary analysis of the data the result show that my hypothesis is not supported by the data. MSU and SJU have very similar crime statistics unlike JHU which is much different. JHU has very little crime reported whereas MSU and SJU have high amounts of crime in comparison.



Daniel Reimold
Department of English
Saint Joseph's University

Ph.D. Ohio University

Research Interests: College Media

As the brush fire both destroying and renewing journalism burns brighter, students are more empowered than ever to make a difference while still in school. It is one of the many reasons I have focused my professional and scholarly work largely on college media.

From a research and reporting perspective, in recent semesters, I have documented the rise of a new breed of student journalist/entrepreneur I call the “college media mini-mogul.” I have explored the influences shaping and censoring student media – including campus newspapers, magazines, radio stations and yearbooks – as they seek to survive and thrive in the post-print age. I have delved into the explosion of student-initiated online-only outlets and viral phenomena increasingly competing for students’ attention and stealing eyeballs from the traditional campus press.

I have also featured superstar student journalists who have confidently and compassionately covered major events such as the Ferguson riots, Occupy Wall Street, presidential elections and campus shootings. And I have written about the founding of international student media in areas formerly heavily censored – including in the northern Kurdistan region of Iraq after the fall of Saddam Hussein and in Egypt after the 2011 uprisings and protests.

College Media in the Digital Age

Christopher James DeMille, '16

Faculty Mentor: Daniel R. Reimold
Department of English



Supported by the SJU Summer Scholars Program

Working with The Hawk, the student newspaper at Saint Joseph's University, I became familiar with the unique challenges facing The Hawk and wanted to gain a better understanding of these challenges at other universities. I examined the challenges several universities were facing and found that rising print costs and a decline in advertisers are only two of the many problems facing university newspapers.

I began by reading the print and online content published by Jesuit and several Philadelphia universities (Drexel, Temple, and The University of Pennsylvania) to review the topics of stories they published and how they presented these stories to readers. I wanted to gain an understanding of why they wrote about the topics they did, why they covered these topics the way they did.

I examined the focus of articles, how much the reporting focused on hard and soft news, campus centered and locality focused news reporting, and also the length, and medium through which the newspaper reported on the topic. I wanted an understanding of what types of stories, both the subject and form, attracted readers and thus would allow for an increase in advertising.

After this, I spoke with top editors at these papers to get an understanding of their reasoning behind the content and types of stories and their focus on digital media.

I found that these newspapers were synthesizing traditional reporting with digital media in long-form feature stories. They feature lengthy articles, with scrolling images, short videos, interviews, and sound bites packaged on design focused web pages.

The focus on online and digital media was often attributed to its cost-effectiveness. These news sources can bring in advertising revenue with no overhead costs on a website.



Eileen Dugan Sabbatino
Department of Special Education
Saint Joseph's University

Ed.D. Wilmington University

Research Interests: Transition
From High School to Work or
Postsecondary School for Students
With Disabilities

My recent studies combines two of the areas in which I have spent much of my research in higher education: the study of transition from high school to work or school for students with disabilities and the study of autism spectrum disorders.

The trend has been for students with disabilities to be placed in the least restrictive environments appropriate throughout their K to 12 schooling. Consequently, students with Asperger's Syndrome (AS) are looking to attend colleges and universities upon high school graduation. Currently, most post-secondary institutions are not prepared to support the 'tsunami' of students with AS who are heading their way. Disability service providers at colleges typically offer learning supports such as extra time on tasks, distraction-free test-taking environments, etc.

Those supports are appropriate for students with learning differences, but may not meet the unique needs of students with AS. Their difficulties are more social in nature. Students with AS may exhibit deficits in communication, socialization, peer interaction, and flexibility. Additionally, at adolescence, students with AS tend to develop social anxiety, which can lead to behavior issues.

My research is focused on the best practices for supporting students with AS as they transition to college from high school and then the transition from college into the world of work. To that end, I am investigating ways in which high school personnel can best prepare their students with AS for the transition to college, the supports that are being offered to students with AS at college, the challenges that have been encountered along the way, the strategies used which have overcome those challenges, and the process by which colleges and universities are preparing their students to transition to adult lives after college.

Post-Secondary Opportunities for Individuals With Intellectual & Developmental Disabilities

Samantha Slonim, '15



Faculty Mentor: Eileen Sabbatino
Department of Special Education
Supported by the SJU Summer Scholars Program

Access to post-secondary education opportunities for individuals with intellectual and developmental disabilities has dramatically expanded in the past 10 years. These programs are located across the country in both community colleges and larger colleges and universities. My research focused solely on post-secondary programs in Pennsylvania, New Jersey, and New York, and excluded community colleges. Although there are online resources to investigate these programs, there is limited information provided online to thoroughly understand each program. Therefore, the product of my research is a college guide that profiles each college program through a series of questions and answers. The purpose of this approach was to create a standardized method of comparison for individuals who are seeking enrollment for themselves or their children.

There are four main types of post-secondary education programs available for individuals with intellectual and developmental disabilities: vocational programs, transition programs, partially inclusive certificate programs, and fully inclusive bachelor's programs. Vocational programs help to prepare students for specific jobs. While many vocational programs and schools are self-contained and unaffiliated with colleges, the OASIS program for culinary arts is housed at Mercyhurst University, which allows for the OASIS students to experience some inclusion with typical peers. Transition programs are typically funded through school districts and are for students between the ages of 18 and 21 who are still enrolled in high school and thus continue to be educated under IDEA. The transition programs included in my research were housed at colleges and ranged from two to five days a week.

Partially inclusive certificate programs are for students that have exited high school and seek an experience in higher education. These programs include vocational experience, social experience with typical peers, life skills courses, and enrollment in typical college classes with accommodations. In most of these programs, the students do not earn grades in the inclusive courses, and simply earn the certificate by completing agreed upon course requirements. Finally, the fully inclusive bachelor's programs target high-functioning individuals with Autism Spectrum Disorder. In these programs, students are admitted and treated based on expectations of typical college students; however, they often receive social and time accommodations, along with additional classes and support to enhance their social skills. Therefore, the program is fully inclusive, yet the individuals continue to receive appropriate supports to foster success.

Although each program is unique, there are many trends and commonalities among the 30 programs that I investigated. Most of the programs began between 2002 and 2014. Additionally, they typically start as commuter programs and transition to residential programs. To date, many of the programs are currently in the transition stage in which they are brainstorming ideas for a residential component or piloting their residential component. The expansion of the use of residential communities integrated into post-secondary programs will increase the opportunities for individuals with intellectual and developmental disabilities to pursue higher education.

According to The Arc (2014), there are approximately 4.6 million individuals with intellectual or developmental disabilities living in the United States. Most post-secondary programs are limited in the number of students they can accept and accommodate each year due to the intensive, individualized plans that are created for each participant. Often times, programs have to refuse admission to students due to the programs' limited capacity or capability to meet the functional needs of the students. If programs begin to offer residential options, students can apply to programs across the country, which would increase the likelihood of acceptance into a program. With increased support and options, we can expect individuals with intellectual and developmental disabilities to have more opportunities to succeed in higher education.

The Arc. (2014). *Resources*. Retrieved from: <http://www.thearc.org/page.aspx?pid=2448>



Philip Schatz

Department of Psychology
Saint Joseph's University

Ph.D. Drexel University

Research Interests: Concussion

I am interested in the assessment and management mild traumatic brain injury, commonly referred to as “sports-related concussion”, in collegiate, high school, and youth athletes. This is a topic that has seen increased attention over the past several years, in the media, in the research literature, and even in state legislation. However, definitive diagnosis and effective treatment of concussion remains in its infancy. My research program focuses on the reliability and validity of commonly used concussion assessment measures, as well as factors effecting the assessment and recovery from concussion.

Prior to participating in contact or at-risk sports, athletes complete a “baseline” or pre-season cognitive assessment, consisting of a series of computer-based tasks measuring their reaction time, working memory, and attention and concentration. In the event an athlete sustains a concussion, their post-concussion test scores can be compared to their own baseline, or healthy level of performance. It is common practice to update pre-season baseline scores before each athletic season, and one aspect of my research is to evaluate and document the stability, or reliability, of annual test scores. In other words, how much do test scores fluctuate from year-to-year.

Another interesting question relates to the utility of updated baseline scores, for comparison to post-concussion data. While annual evaluations are recommended, there are no data documenting the utility or need for updated test scores. For example, if an athlete sustains a concussion, and their test scores drop considerably (from baseline levels), is the small variation between annual baseline evaluations relevant in the context of such a large decrease in performance?

This past summer, we analyzed both the stability/reliability of annual baseline test scores, in a sample of high school student athletes, and also evaluated the utility of these updated annual baselines in the context of comparison to post-concussion data. These two research studies are part of my ongoing research to better understand the manner in which we assess neurocognitive in healthy individuals, as well as those who have experienced a neurological insult, in the form of a concussion.

Assessing the Test/Retest Reliability of the Baseline Concussion Test (ImPACT) in High School Athletes

Kathleen Logan, '14

Faculty Mentor: Philip Schatz
Department of Psychology

Supported by SJU Summer Scholars Program
and the McNulty Scholars Program



The widely-used and validated method of concussion assessment is the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT). Current practice involves athletes undergoing a baseline examination before the start of each season. After suffering a concussion, the injured athlete completes the ImPACT test again. The individual results of the baseline and post-concussion performances are compared in order to diagnose the presence and severity of a concussion. Thus, the ImPACT test allows for an objective comparison of the individual before and after the injury.

This summer, I worked with Dr. Schatz to investigate the reliability of the ImPACT test across three administrations and the utility of updated baselines when compared to post concussion test data. Research included the preparing and organizing of a large data set from Louisiana high schools athletes for statistical analyses.

Preliminary results show that for athletes taking the test three times across three administrations, there is high test/retest reliability in all five neurocognitive composite scores of the ImPACT test. In a sub-sample of 71 athletes who completed two annual baselines, following by a concussion, only 4% (3/71) would have been diagnosed as “concussed” based on comparison to the second baseline instead of the first.

In the midst of this research, an offshoot project was initiated. This study examined the correlation between high school data (state test proficiency scores and mean ACT scores) with two ImPACT composite scores (verbal memory and visual memory). Preliminary results indicate a low correlation between high school academic data and ImPACT composite scores. However, results show a significant difference between public and private high school athletes’ composite scores on both verbal memory and visual motor speed.

This Summer Scholars research will culminate in publications documenting the utility of updated baseline assessments, as well as the relationship between concussion testing and high school proficiency scores.



Becki Scola

Department of Political Science
Saint Joseph's University

Ph.D. University of California, Irvine

Research Interests: American Politics and
Institutions

My research interests include American institutions, gender politics, race/ethnic politics, inequality, and social welfare policy. In my book, *Gender, Race, and Office Holding in the United States: Representation at the Intersections* (Routledge), I investigate the effect of institutions on women's legislative representation across the fifty United States, specifically analyzing the variation in the level of representation among white women and women of color state legislators. I find that differential state institutional structures and political culture predict where we will see higher levels of white women and women of color serving in state legislatures.

The idea that gender and race/ethnicity inform political service and behavior is a common theme within my research and teaching. For example, I recently co-authored a study that analyzed the relationship between women's descriptive representation in state legislatures and voter turnout across the states. My co-author and I determined that having more women present in state legislatures does indeed impact voter turnout in Presidential elections.

Another current project that I am working on looks at anti-hunger advocacy in Philadelphia. I ask why the rate of food insecurity within Pennsylvania continues to increase despite the presence of several advocacy organizations within the state that attempt to alleviate hunger. This ongoing project will study how anti-hunger organizations impact social policy within the larger and interrelated realm of local, state, and federal agencies and political operatives.

Political Polarization in the Contemporary United States

Matthew Atwell, '15

Faculty Mentor: Becki Scola
Department of Political Science

Supported by the SJU Summer Scholars Program



The United States of America is currently entrenched in the most divisive period since The Civil War. Hindered by their inability to compromise, the 112th Congress, 2011-2013, earned itself the nickname the 'Do-Nothing Congress' by being the least productive in history, even sinking their approval rating into the single digits. This ultra-partisanship peaked in October 2013 when the United States government, unable to agree upon a budget, shutdown. My research seeks to answer two pivotal questions rising from this gridlocked political climate: 1) Does the polarization in Congress permeate the American people, or is the hyper-partisanship confined to an incongruous political class? and, 2) what has caused the current polarization in the United States? My research seeks to answer these questions.

While it is clear that U.S. politics have become increasingly partisan, it appears the polarization is limited to the political class, comprised of office holders, candidates, party activists, and interest group leaders. Some evidence paints the American public as too widely ambivalent towards most political issues to be too divided. Other bodies of evidence suggest that rather than polarizing with Washington, voter attitudes remain unchanged since the 1950s. Voter polarization would suggest that the mass public move away from the center, towards each party. However, Gallup reported that in 2013, a record high 45% of Americans identified as independent. Moreover, in a poll conducted by the American National Election Survey at every election since 1952, voters are asked questions in order to be placed on a 7-point party identification scale. In 2008, independent identification matched its all-time high since the survey began. This indicates that the average American voter remains far more moderate than the extremely polarized political class.

As for the roots of polarization, scholars and pundits have offered a myriad of answers from political redistricting and geographic partisan sorting to the extremism of party and ideological activists. However, the answer appears to lie in institutional changes that allowed ideological issues that had previously been kept off the two party's agendas to take center stage, while material incentives for political participation dissipated, giving rise to ideological and programmatic incentives. This caused today's political elites to embrace deeper policy commitments on ideological issues more divisive than those that previously characterized the political landscape. These changes, combined with growing extremism of party activists and conflict extension have led to increasingly bitter disputes over a wider range of issues.



Fulvia Serra

Department of Modern and Classical
Languages
Saint Joseph's University

M.A. Università degli Studi di Siena

Research Interests: Feminism and
Revolution: At the Intersection Between
Identity and Class Struggle From a
Marxist/Autonomist Point of View

I have always been interested in the intersection between feminism and class struggle. In Italy I studied Carla Lonzi who, among other things, focused on the alliance between women and other revolutionary movements. Once here in the States, I focused primarily on Black feminism and studied Audre Lorde's theory of intersection, as well as Bell Hooks who re-defines feminism in a direction that allows for the encompassment of all sectors of political struggle.

At the same time, while in Italy, I was exposed to the political theory of Autonomia and Workerism, primarily through Mario Tronti, with whom I graduated in Italy. Here in the States I read and then translated for the prominent Italian feminist journal DWF essays by Silvia Federici. I became increasingly interested in her writing, as well as those of the Midnight notes.

I am interested in exploring the opening/shifting of new commons and the continuous movement/constant creation of the existing ones as well as in the phenomenon of commodification of always wider sectors of reproduction. In Marxist terms, production coincides, more or less, with economical activity and reproduction with all the work necessary to create and re-create the conditions that make production possible. This definition is limited and insufficient and does not reflect the variety of activities included.

In more feminist terms reproduction is all that is necessary to create and maintain life. More precisely, and in order to exclude from this sphere those sectors that have been already enclosed and commodified, we could argue that reproduction is all the work we do that doesn't constitute an economic activity and does not produce profit (and that's why it is usually not considered 'real' work or, to be more specific, not validated as labour and it's not exchanged for wages). If we use the metaphor of the work on the village garden (reproduction), as opposed to the work on the lord's garden (production), it becomes clear that the same set of activities can be considered 'production' when included in a relationship of exchange/value and 'reproduction' when it is not. In this way, we are arguably able to conceive the entire sphere of reproduction as constituting commons.

At this moment, I'm writing an article on the enclosure of the sphere of intimacy, which allows the capitalist system to proceed with the commodification of care, keeping in mind that enclosures are projects that aim not only at the constant accumulation and extraction of resources but, maybe more importantly, at creating political paralysis and dependence.

Standing For Welcome; Stories of Migration in Italy and the United States

Graziella Ioele, '15

Faculty Mentor: Fulvia Serra
Department of Modern & Classic Languages

Supported by a Gift From an Anonymous Donor



Today humanitarian crisis and violence define our world and this has resulted in many people being displaced from their homes. The reasons for being displaced may vary but the result is always the same, a poverty of the spirit that leaves one truly vulnerable. During my time at Saint Joseph's I was able to gain an insight to what this type of vulnerability looks like all around the world. I taught ESL in South Philadelphia, Went on a border immersion in El Paso, TX and I got the chance to work with political asylum seekers in Bologna, Italy. This past semester and summer I've been working with newly arrived refugees in North East Philadelphia. All of these experiences have given me an insight to how person in a new country feels. The vulnerability they experience heeds a deep strength that causes these migrants and refugees to succeed against all odds. My goal with this paper is to explore that strength in the plights of refugees and migrants in the United States and Europe with a focus on Italy. I feel called to focus this paper on Italy because the crisis there is especially troubling, with thousands come to Italy's shores everyday and hundreds dying at sea. In my paper I spoke about the statistics, but statistics are cold and however shocking they don't do the crisis justice.

I chose to include personal stories in this paper from migrants in the US and Italy because I think that is what will ultimately change their perception around the world and show the true strength and resilience of migrants and refugees. If everyone in Italy knew the struggle and pain a refugee went through in their home country and the battle they fought to get to Italy then maybe there would be less racism. Perhaps if everyone knew what the refugees and migrants coming to the United States were running from then maybe no one would say they weren't welcome. Racism and bad policies that hurt migrants and refugees are only created because people dehumanize them and view them only as problems and not people. The single story of migrants that is being spread around the world today is toxic and misguided. In this paper I seek to go away from the single story and move to a place where the individual story is spread and cherished because only from seeing migrants as humans and not problems will we truly welcome them.



Reecha Sharma

Department of Interdisciplinary Health Services
Saint Joseph's University

M.D. Maharashtra University of Health Sciences

Research Interests: Reproductive Medicine,
Autism Spectrum Disorders

I am interested in the identification of physician's perceptions and knowledge of psychotropic medication use and side effects in children and adolescents with autism. Physicians routinely prescribe Psychotropics to children with ASDs, but their side effects are poorly monitored and are a major source of concern for parents. Among children with a comorbid diagnosis of ADHD, bipolar disorder, OCD, depression or anxiety, around 80% were prescribed at least one psychotropic medication including antidepressants, antipsychotics and stimulants. Many physicians use medications on a trial-and-error basis. My students and I are currently investigating these perceptions by surveying physicians who treat children and adolescents diagnosed with autism spectrum disorders. The survey consisted of questions from four categories: drug indications, metabolic drug effects, drug safety updates, and patients most at risk. So far the survey data predicts that the use of psychotropic medications in children diagnosed with ASDs is perceived to be highly effective by physicians. Some physicians consider that the side effects of these medications can be easily managed. Our study once completed can be utilized to develop practice standards for prescription of psychotropics, gaining detailed information about medication use, providing adequate, timely information to parents, and improving outcomes for children and families by modifying the patients' risk.

Physician's Perceptions and Knowledge of Psychotropic Medication Use and Side Effects in Children and Adolescents With Autism

Olivia Correll, '16

Emily Moore, '16

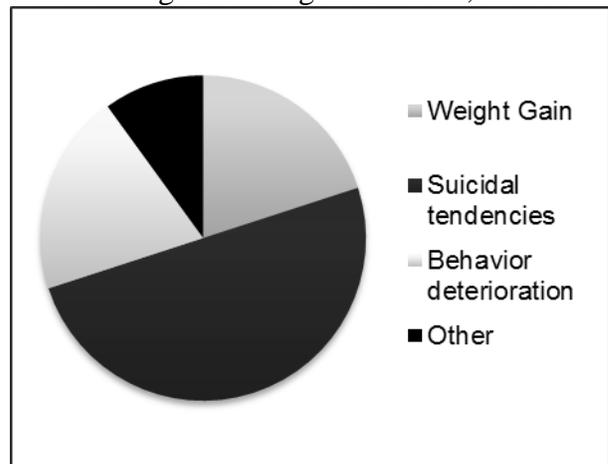


Faculty Mentor: Reecha Sharma

Department of Interdisciplinary Health Services

Supported by the SJU Summer Scholars Program

We are rising juniors who have been working with the autism population for the past three years. Our professional experience and academic studies with the autism population has been the foundation of our interest for our current research. Our present study, supported by Dr. Reecha Sharma, aims to gain advanced knowledge on psychotropic medication use and side effects in children and adolescents with autism that are prescribed these medications. The method used for this ongoing study is an online survey through the accredited tool, Survey Monkey. The survey was distributed to a variety of physicians nationwide who treat children and adolescents with autism. The specifics of the survey included questions from four categories: drug indications, metabolic drug effects, drug safety updates, and patients most at risk. Data thus far indicates that the use of psychotropic medications in children and adolescents diagnosed with ASDs is perceived to be highly effective by physicians. However, physicians still recognize the serious side effects of these medications (pie chart). The goal of this study aspires to develop practice standards for prescription of psychotropic medication, as well as gain detailed information of medication use to insure the provision of adequate and timely information to parents. This in turn can work towards improving outcomes for children and families by modifying the patients' risks. With medication being one of the most common stressors for families living with the diagnosis of ASD, we intend for our research to aide in alleviating some of the misconceptions and misperceptions between physicians and parents. We, as undergraduate researchers advancing towards a professional career in the field of autism, are privileged to participate in research that can touch the lives of the families that we work with.





Elaine Shenk

Department of Modern &
Classical Languages
Saint Joseph's University

Ph.D. University of Iowa

Research Interests: Linguistics

As a sociolinguist, I am interested in both the linguistic phenomena that appear in settings of language contact, such as phonetic, morphological, syntactic, or pragmatic features, as well as in the broader social phenomena that accompany such contact, such as symbolic values, ideologies, language policy and planning). Puerto Rico and the United States are two contexts which provide a rich source of data for analysis in this area. In the former, Spanish and English have coexisted officially for over one hundred years, and although Spanish is the clear language of choice for most islanders, English can also be present to varying degrees in oral and visual language practices in the public sphere. In the United States, the two languages come into frequent contact in heritage language populations who are part of a bilingual continuum as well as in immigrant communities as we observe rapidly changing demographics beyond the traditionally studied contact settings such as Miami, New York, Chicago, and the Southwest.

My current research focuses on the ideologies articulated by speakers about language officialization and their daily decisions about language use and practices. To explore these areas, I collect data through personal interviews, public speeches, legislative debates, metaphors used in the media, and participant observation. This data is examined within the framework of Critical Discourse Analysis, which prioritizes the mapping of various analytical forms onto one another, asking how spoken and written texts (e.g., the texts of a radio campaign about language) are produced and distributed; analyzing the discourse about those texts (e.g., interviewees' ideologies about the content of those texts); and situating these realities within a sociopolitical framework (e.g., Puerto Rico's historically colonial relationship to Spain and current commonwealth status in relationship to the United States is a crucial element to understanding the context of language contact). Critical Discourse Analysis thus moves the researcher between a micro- and macroanalysis of text and context.

Language contact varieties readily demonstrate features such as codeswitching and loanwords from one language to the other. Thus, ideologies sometimes point to the ordinary character of these features and sometimes decry them as less 'pure' varieties of language. This determination is based more on socially- or politically-determined values than on linguistic ones. Thus, these language contact settings provide rich sources of data that enable us as scholars to incorporate linguistic, historical, political, and social realities into our research objectives and analysis.

The World is Yours: A Critical Lens for Adult ESL Learners in the U.S.

Kathryn Smith, '15

Faculty Mentor: Elaine M. Shenk

Department of Modern and Classical Languages

Supported by the SJU Summer Scholars Program



Critical pedagogy is an educational philosophy through which students are able to critically examine the systems and structures around them, that is, students are guided to understand and critique the historical and sociopolitical context of schooling and subsequently, change the nature of the larger society (Crookes and Lehner, 1998). Freire (2000) distinguishes “banking education,” in which teachers transfer the content of their minds to their students from “transformative education,” which develops when education takes place as a dialogue between the teacher and students, concerning real-world issues that are meaningful to the class (p. 58).

Recent immigrants are among some of the most vulnerable members of U.S. society, especially if they lack a command of English. These marginalized populations benefit most from a critical classroom, in which they are given a voice and a chance to effect change in the larger community (Pennycook, 1994). However, given the lack of well-funded ESL programs, most of the teachers these students encounter are working as volunteers—without much formal training, let alone exposure to theories of transformative education.

My study focused on the presence of critical practices in adult ESL classrooms, observing classes at two organizations across the Philadelphia area. Spread across one or two advanced- or conversation-level classrooms in each organization, as well as one citizenship class, my observations lasted between eight and ten hours per school, totaling 20 hours over two months. After my observations were complete, I interviewed each instructor about their awareness and implementation of critical practices.

I found that most adult ESL classes demonstrated a number of characteristics of an ideal critical pedagogy classroom, whether the instructor had knowledge of the theory or not, due to his or her willingness to treat his or her students with dignity and respect. That is, teachers would ask about issues in the students’ personal lives, such as a recent illness and ability to receive proper medical treatment in their L1, if only out of care and concern for their students. It seems that adult classrooms by their very nature require a certain level of critical engagement in that way, as the issues they care about and bring to class are different from child learners.

My analysis compared roughly 30 staple characteristics of a critical pedagogy classroom with the classrooms I observed and found that this space for critical thinking was most often created by teachers’ immersion in the community, inclusivity of students’ cultures and first languages, explicit discussion of curriculum design and classroom goals, community building, addressing personal problems in students’ lives, creating a space for students to tell their stories, having immigrants and language-learners as teachers, erasing teacher-student dichotomy, and connecting class material to students’ lives. While most of these characteristics connect with previous research in critical theory, a few, such as the inclusion of recent immigrants as instructors, were unique to these classrooms.

These real-life classrooms did not emphasize praxis (the connection between theory and practice), as is often prescribed by critical theorists and educators. Additionally, little emphasis was placed on civic engagement and actively changing the community that students are struggling in, which is a huge tenet of critical pedagogy. I concluded that this disengagement came from the instructors’ focus on survival skills (i.e., the most essential language skills), rather than any larger project.



George P. Sillup

Department of Pharmaceutical &
Healthcare Marketing
Pedro Arrupe Center for Business Ethics

Ph.D. The Fielding Institute

Prior to joining the full-time faculty at Saint Joseph's University in 2004, Dr. Sillup worked in the diagnostic, pharmaceutical and medical device industry for 28 years and held positions from salesman to COO. He worked in major corporations, such as Johnson & Johnson, as well as in start-up businesses, where he sold products, conducted research and launched several new medical/pharmaceutical businesses into global markets. Dr. Sillup has attained favorable reimbursement coverage and coding for pharmaceuticals, medical devices and drug-device combination products with international regulatory authorities and with the U.S. FDA and CMS (Medicare). He has been a member of several boards of directors, e.g., American Heart Association. In 2014, he has published research with College of Arts & Sciences colleague, Dr. Eileen Sullivan, and Haub School of Business professor, Dr. Ronald Klimberg, "Timeslips – Comparing Agitation and Anxiety Rating Scales to Evaluate the Benefit of Non- Pharmacologic Creative Sessions in Nursing Home Patients with Dementia" in the *Online Journal of Nursing*.

Additionally he and Steve Porth have published their 10th consecutive audit of the newspaper coverage of ethical issue affecting pharmaceutical industry in *Pharmaceutical Executive* entitled "Pharma in the News", and are working on the 11th with the Summer Scholars, Dante Gleason and Caitlin Smith.



Stephen J. Porth

Associate Dean and Executive Director of
Graduate Programs
Department of Management
Saint Joseph's University

Ph.D. Temple University

Dr. Stephen Porth is Associate Dean and Professor of Management of the Haub School of Business at Saint Joseph's University, Philadelphia, PA, USA. He is the Executive Director of graduate business programs in the Haub School, which includes nine degree programs and over 1200 students. Dr. Porth is Senior Editor of the *Journal of Jesuit Business Education*. His research and teaching interests are in the areas of strategic management, leadership, management consulting, and business ethics. Dr. Porth is also a management consultant, specializing in leadership development and strategic management programs. He has written two books, one which is now in its third edition and has been translated into Chinese, and he has published extensively in management journals, including the *Journal of Operations Management*, *Journal of Management Education*, *Management Decision*, *Journal of Organizational Change Management*, *International Journal of Production Research*, and *International Journal of Operations and Production Management*.

Dr. Porth serves on the Board of Directors of *Nutritional Development Services* and the Board of Trustees of *Country Day School of the Sacred Heart*. He is past president and a current board member of the *Colleagues in Jesuit Business Education*.

Portrayal of the Pharmaceutical Industry in the Newspaper Media

Dante Gleason, '16

Faculty Mentors: George P. Sillup
Stephen J. Porth

Department of Pharmaceutical & Healthcare Marketing
Department of Management

Sponsored by the SJU Summer Scholars Program



This summer, my partner and I researched how articles in major newspapers portrayed pharmaceutical companies and/or their products. We read multiple articles, starting in the fourth business quarter of 2013 and ending with the third business quarter of 2014, which covered articles from the top five most popular newspapers in the country based on circulation, specifically *The New York Times*, *The Los Angeles Times*, *USA Today*, *Wall Street Journal* and *Washington Post*.

To find these articles, SJU's Business Reference Librarian, Cynthia Slater, ran a search through databases using certain keywords (e.g., pharmaceutical). These articles were then sent to Dr. Sillup to send to Lauren Lang, '16, who is the administratrix for the EthicsTrak[®] database. Lauren distributes the articles into two batches, one for my partner and one for me.

I read these articles searching for certain issues commonly reported in the media. After I'm done reading each article, I analyze them to see if the content of the article presents a positive, negative or neutral image for "Big Pharma," or the large pharmaceutical companies across the country. I organize all my assessments into an Excel spreadsheet, and, then I send it back to Lauren for the data to be compiled in the EthicsTrak[®] database.

This summer has had a completely different set of ethical issues than I noticed during the previous summer. For example, last summer was mostly about drug safety but this summer seems to be more about research and development (R&D). There was a wide variety of articles covering the R&D issue in the pharmaceutical world, including Johnson & Johnson's attempt to follow through on their "no tears" campaign for their baby shampoo by removing dangerous chemicals from this product. There were also studies being done to see if some drugs could have different uses than previously imagined. Ecstasy may very well be a successful medication for those who suffer from post-traumatic stress disorder (PTSD). Drug safety was a prevalent ethical issue again this summer (seen through addiction to opioids) but it was not covered as much as it was last summer or as large as the R&D issue this summer. Another big issue was healthcare reform, but this was expected due to the plethora of sign-ups for health insurance that occurred at the beginning of this year. The one positive trend that I am noticing between last summer's research and this summer's research is that many more articles are providing both sides of the issue instead of just hammering in on one side.

Throughout this entire summer, I gained an even larger perspective about what is happening in the pharmaceutical industry and have built upon what I learned during last summer. It was inspiring to read about how many great ideas are on the forefront and should be making a huge difference in this world very soon.

Portrayal of the Pharmaceutical Industry by Newspaper Coverage

Caitlin Smith, '17



Faculty Mentors: George Sillup
Stephen Porth

Department of Pharmaceutical & Healthcare Marketing
Department of Management

Sponsored by the SJU Summer Scholars Program

The pharmaceutical industry is nothing short of controversial, considering its always-changing environment. I spent my summer doing research, along with my Summer Scholar partner Dante Gleason. Under the direction of Drs. Sillup and Porth, I examined various ethical issues portrayed in newspapers involving the pharmaceutical industry. To do so, we used five of the most circulated newspapers in the United States including the *Wall Street Journal*, *USA Today*, *The New York Times*, *The Washington Post*, and *The Los Angeles Times*. So far, we have read and sorted through approximately 300 articles, but still have many to go.

We are investigating the most frequent ethical issues reported about the pharmaceutical industry today, as well as what major pharma companies are mentioned most frequently. So far, we have found that Healthcare Reform and Drug Safety are two of the most reported ethical issues. The Affordable Care Act is having an impact on pharmaceutical companies because they want to be covered by the new insurance many Americans are now using. This way, pharma companies' drugs can be used widely throughout the population. The FDA has played a large part in drug safety; for example, there has been a rise in the abuse of prescription pain-killers because many people want more restrictions placed on them. Marijuana has also played a large role in these articles because some pharmaceutical companies are against legalizing its use, largely because it can replace drugs they currently sell.

Our process is as follows: first, Cynthia Slater, SJU's Business Reference Librarian, searches for articles through two different databases by using keywords that may lead to articles involving pharmaceutical companies. Next, Dr. Sillup organizes them by month and formats these articles to make them easily readable and sends them to Lauren Lang, the EthicsTrak® Database Administratrix, who evenly distributes them to Dante and me. Then, I read each article and decide if they contain relevant ethical issues related to the pharma industry. If they do, I enter into the Pharma or Healthcare Excel spreadsheet. Then I classify the articles by newspaper, front page or editorial, the ethical issue involved, whether both sides are represented, whether the articles' headlines and the articles themselves are neutral, negative, or positive toward the pharmaceutical industry, and, finally, list the companies and drugs mentioned. The perspective I take while conducting my research is that of "Big Pharma" in making my assessments of the articles. Once the batch is completed, I send the spreadsheets for inclusion in the database.

As a Pharmaceutical & Healthcare Marketing major, this research has helped me gain a better insight into the field that where I will working. It also gave me a preview of some of the challenges I may be facing in the future as a part of the pharmaceutical industry. Dr. Sillup and Dr. Porth will use our findings, combined with their insight, to make conclusions in an article which will be published in the *Pharmaceutical Executive*.



Glenn B Siniscalchi
Department of Theology
and Religious Studies
St. Joseph's University

Ph.D. Duquesne University

Research Interests: Fundamental Theology, Jesus' Resurrection, Theology of Religions

My research is driven ultimately by the common religious questions that many individuals ask themselves about God and his relationship to humanity. Some of these questions include the following: where have we come from? (questions related to origins); what makes life worth living, and why do human beings suffer? (questions related to meaning and purpose); what is good and evil, and what is morally right and wrong? (questions about morality); what does it mean to be human? (questions related to identity); what awaits human beings at death (destiny)? These kinds of questions stem from our natural inclinations. To the extent that we seek answers to these kinds of questions, human beings can become the persons they were meant to be. There is a causal relationship between theology and everyday life.

Part of my research centers around the origins of the Christian movement. I want to know if Jesus existed, and whether he was/is the person he claimed to be. More specifically, my research and published work is heavily centered around the credibility of Jesus' resurrection from the dead. My work with Greg Ferroni is dedicated to the historicity of the post-mortem appearances of Jesus, and how two recent scholarly trends have tried to account for these unique occurrences: bereavement apparitions and supernatural disclosures of Jesus "from the other side." In the project we demonstrate conclusively that there are too many differences between what is known about bereavement experiences and the New Testament data (cf. 1 Corinthians 15:3-8, and the Resurrection narratives) to maintain responsibly that the earliest percipients fell victim to the former.

My other project is with Dennis Corpora, who will be concentrating on understanding the differences between the implications of standard big bang cosmology and Stephen Hawking's quantum cosmology. In the project we conclude that, although the Hawking/Hartle model of the universe does not include a singularity (as in the case of the standard model), their model still predicts an ultimate beginning. Such a conclusion is consistent with the Catholic Church's teaching on the doctrine of "creation out of nothing."

**Quantum Cosmologies,
Creatio ex Nihilo and the Existence of God**
Dennis Corpora, Jr., '15

Faculty Mentor: Glenn B. Siniscalchi
Department of Theology and Religious Studies

Supported by the SJU Summer Scholars Program



The Catholic doctrine of creation out of nothing expresses the Church's belief that the universe was created out of nothing. The doctrine also entails that an extramundane cause must be responsible for "why there is anything instead of just nothing." Although there are many theological reasons to believe in *creatio ex nihilo*, the doctrine is remarkably consistent with modern discoveries in astronomy and astrophysics (apropos the origin of the universe). Unfortunately, the scientific evidence for an absolute creation and Catholic theology are often seen as contradictory. For reasons such as this, many people who are misinformed about the Catholic faith continue to question their religion and depict a so-called "warfare between science and religion."

The first aim of my essay was to explain the doctrine of creation *ex nihilo* and standard big bang cosmology. The second aim of my essay focused on contemporary versions of quantum cosmology (Hawking, Hartle, etc.), and it discusses whether these models entail an absolute beginning or not. By restricting the meaning of "nothing," quantum cosmologists provide depictions that might satisfy the academic community of scientists, but in the end these models do not preclude an ultimate beginning. My paper bridges the gap between contemporary science and Christian belief in a creator God. I submit that my paper helps enlighten those who are misinformed about the notion that "science militates against religion."

Examining the Post-Mortem Appearances of Christ

Gregory Ferroni, '16

Faculty Mentor: Glenn B. Siniscalchi
Department of Theology and Religious Studies



Supported by the SJU Summer Scholars Program

My research this summer focused on the post-mortem phenomena that occurred after the death of Jesus of Nazareth. My work was dedicated to the historicity of these events and to recent scholarly opinions and explanations for them, specifically bereavement apparitions.

When determining and evaluating the historicity of the post-mortem appearances of Christ, I researched the Gospel writings and the Epistles of St. Paul (specifically the Resurrection narratives and 1 Corinthians 15:3-8). These are the stories claiming a resurrected Jesus. Those who interacted with Jesus claimed to have seen Him inside and outside, in multiple geographic areas, and to many people at once over a period of forty days. They also held that His tomb was empty. St. Paul, a converted Christian who never met Christ, also claimed to meet the resurrected Christ during his dramatic conversion from Judaism to Christianity.

Bereavement apparitions are common phenomena amongst those mourning the death of a loved one. They most commonly occur to widows and widowers, although they are known to occur to anyone who knew the deceased person. The types of appearances are vast: physical, auditory, a mere presence, or a combination of these. The apparitions have also been known to pass on otherwise unknown information to the alive person.

Overall, my research concluded that bereavement apparitions are not a viable explanation for the post-mortem appearances of Christ. Primarily, bereavement apparitions occur solely to those grieving the death of the deceased. This would not account for Saint Paul's conversion. Thus, it is unlikely that Christ would appear to people through multiple means. Hence, bereavement apparitions, since they cannot account for Paul's experiences, are not an explanation for the post-mortem appearances of Jesus of Nazareth.



Alexander J. Skolnick
Department of Psychology
Saint Joseph's University

Ph.D. University of Georgia

Research Interests: Emotion, Disgust, Contamination, Gender Differences in Emotion, Emotions Involved in Health, Stress and Ways to Buffer it and Olfaction

I am an assistant professor in the psychology department and have been here at Saint Joseph's for 7 years. I began my scientific career as a biopsychologist interested in social relationships in primates. I studied orangutans in zoos, capuchins in group colonies, and rhesus monkeys on an island. Over the years, research twists and turns have led me away from nonhuman primates to focus my research on understanding emotions in humans. My scientific path has led me to the specific study of the emotion of disgust in all its icky glory. This destination was possibly inevitable as there are interesting questions about the biological nature of disgust, in terms of how as an emotion disgust may function to keep people safe from contagious agents. One area I focus on is whether the gender differences generally seen in disgust (men lower than women) are due to biological differences or social influences. I am also fascinated by the ways that disgust influences people's lives, for example, affecting food choices, occupations, or even moral decisions. Disgust is a particularly interesting emotion because disgust feelings can produce very strong behavioral and facial responses to things that are physically disgusting (e.g., mucus, slime, blood) as well as to behaviors of others or even moral issues (e.g., cruelty, ambulance chasers, slave labor, abusive relationships).

One of the two students carrying out Summer Scholar projects with me this year, Esteban Valencia, is conducting research related to this latter aspect of disgust: how the words people use to describe morally offensive interpersonal behaviors affects emotional reactions. Esteban, with interests in legal studies, emotions, and language, has managed to combine these areas into one project that addresses whether people respond differently depending on the words used to describe a socially deviant behavior, such as *rape* or *sexual assault*. Kathleen McGee, my other Summer Scholars student, is conducting research on another interest of mine, namely, how hook-up experiences and relationships are judged by college students. Hooking-up (casual sex without traditional dating) is a ubiquitous social pattern among younger people, such as college students, but little is known about how these relationships are viewed by the interactants themselves. Kathleen similarly wanted to examine how hooking-up might influence the participants. Her research compares college students to an older nonstudent sample and is finding interesting differences in the perceptions people have of the expectations men and women have of hook-up experiences.

Gender and Views of Hook-up Culture

Kathy McGee, '16

Faculty Mentor: Alexander Skolnick

Department of Psychology

Supported by the SJU Barbelin Scholars



After two years of being integrated in a fairly typical college scene, I have observed many differing successful and failed romantic interactions. I have observed that for college students today, “dating relationships,” relationships in which the two partners have ongoing emotional and sexual ties, are less common and it seems that “hooking up,” interactions in which two partners have a purely physical relationship that may or may not include intercourse and may occur only once or are routine, has come to dominate the way that students interact sexually. This shift from more serious relationships to more causal types has affected modern day co-ed interactions on and off campuses across the United States. But on an individual level, it also has effects on the young men and women submerged in this culture. Many young individuals feel as though they are living an ideal life, benefiting from the positive aspects of being in a relationship (sexual pleasure) without any of the responsibility or long-term commitments. But for others, this “carefree” lifestyle is not carefree at all and can take a large emotional toll.

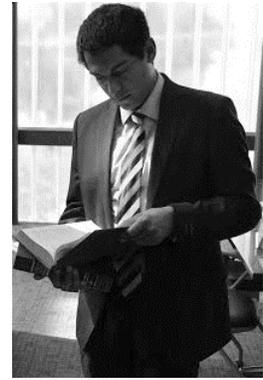
As different studies have reported, negative outcomes tend to be more prevalent among women, who often are more emotionally invested in hook-up relationships. As results from a survey taken by 137 women and 45 men distributed during my research, women generally do tend to have a more critical and negative view of hook-up culture. But a bit unexpectedly, women and men did have very similar rates of hooking up and also very similar expectations during as well as after a hook-up itself. When presented with hookup scenarios, there were also some inconsistencies between the opinions of men and women. Men tended to think that a hook-up situation is an appropriate way to meet a partner, but women disagreed. Women also thought that relationships have a higher likelihood of forming if two people do not hook up immediately, but men disagreed. These differences were backed up by statistically significant differences in women’s and men’s responses. Further data collection and analyses will be conducted in fall 2014.

Investigating Emotional Responses to the Language of Sexual Deviance and Sexual Transgression

Esteban Valencia, '16

Faculty Mentor: Alexander Skolnick
Department of Psychology

Supported by the SJU Summer Scholars Program



May 2014 saw the beginning of a federal investigation into 55 United States colleges for the systematic mishandling of sexual violence complaints made under collegiate jurisdiction. Prior to this investigation, concerns over the prominence of sexual violence on college campuses, and the phenomenon known as “Rape Culture”, became vocalized in a myriad of discourse-mediums. However, while discussions of sexual violence proliferate, less is understood about the language employed within such discourse.

As issues of sexual violence on college campuses justifiably receive an increasing amount of public attention, programs will be developed to address its prevalence—intervention programs for students, or sensitivity programs for collegiate faculty and corporate employees. These programs will use terms such as *rape* and *sexual assault*, or *grope* and *fondle*. But how will this language be deployed, and more importantly, how will it shape public behavior

My research thesis addresses the following question: are term pairs, used to discuss issues of sexual violence, emotionally interchangeable? That is to say, while *grope* and *fondle* seem like similar, perhaps interchangeable, terms, do individuals react exactly the same to one as the other? Might the term *grope* evoke anger or contempt, while *fondle* evokes reactions of disgust?

To investigate this, I utilize two distinct surveys. Survey 1 collects term-pairings from participants based on definitions of sexual violence. Survey 2 employs the predominant term-pairings from Survey 1, providing written vignettes of sexual violence utilizing one of the two paired-terms, and asking participants to rate their emotional reactions to the vignette. Because the sole difference between the vignettes is the term used, any difference in emotional responses is attributed to the variable word or phrase, allowing Survey 2 to measure specific emotion(s) elicited by specific terms.

To ensure a representative generation of term-pairs, responses to Survey 1 were collected throughout the summer of 2014. Currently, findings indicate that while terms such as *grope* and *fondle* are seen as synonymous and interchangeable, terms such as *rape* and *sexual assault* are not seen as synonymous. In fact, findings suggest that, among lay usage of the terminology, *sexual assault* is deemed primarily synonymous with *sexual abuse*. Additionally, the term *child molestation* was found to have no synonym, while when participants were asked to provide a term for the definition “bullying of a sexual nature,” the term *sexual abuse* was used more frequently than the term *sexual harassment*, which was negligibly indicated. As a whole, the results to Survey 1 provide an empirical foundation for understanding the lay usage of sexual violence language.

Survey 2 will be deployed at the beginning of fall 2014, and will indicate whether term pairs such as *sexual assault*—*sexual abuse* elicit identical emotional responses.



Jury Smith
Department of Art
Saint Joseph's University

M.F.A. Tyler School of Art of
Temple University

Research Interest: Ceramics

My current research focuses on non-utilitarian clay objects. In practice, I utilize a craft approach (repetition and systems) coupled with my own conceptual responses to that practice. I am interested in horizons and boundaries: visual, cultural, and historical. I am also curious about deconstructing the path of identity—from object to thing to category to value. For this reason, I welcome the friction invoked when my work expresses a flexible identity—an identity that shifts among notions of art, design, and craft.

Overall, I am motivated by the questions that a practice inspires and how these questions might reflect certain human conditions. In this sense, I use ceramics as a means to explore what historian M. Anna Fariello describes as a “document, ritual, metaphor, and talisman.” For me, my pieces: document an approach, create a ritual, exist as tangible things representing something less tangible, and serve as an interpretive tool.



A Study of Anthropomorphic Sculpture

Meghan Burke, '15

Faculty Mentor: Jury Smith
Department of Art



Supported by the SJU Summer Scholars Program

In my research for Summer Scholars I studied nature, wildlife, and the human figure. Being an art major, my research consists of observing and studying the shapes and gestures of objects around me. I take forms from nature, animals, and humans to express certain movements and figures in my work.

I started Summer Scholars believing I was going to create realistic, figurative ceramic sculptures of animals to evoke certain relationships between humans and animals. The more I observed animals in their natural habitats; the more I became inspired by the setting of it all. Since then, I have been creating abstract coiled sculptures that combine the gestures and structures of animals, humans, and nature combined. I have been focused on the gestural aspect of sculptures and captivating a certain feeling through movements and body language with my own pieces.

My process of creating these pieces start with rough sketches of how the sculpture should move and what shape it should ultimately be. I then roll out individual coils of clay and stack them on top of one another while manipulating which way the sculpture moves. As more coils are added, their weight moves and pushes the coils even more. This creates more dramatic folds and bulges in the sculpture. The coiling technique has allowed me to create abstract, figurative sculptures involving all of my inspirations.





Karen Snetselaar
Department of Biology
Saint Joseph's University

Ph.D. University of Georgia

Research Interests: Plants and Fungi,
Especially Fungal Diseases

For many years the major focus of my lab has been a system involving corn (maize) and the plant pathogenic fungus *Ustilago maydis*. The disease caused by this fungus is known as corn smut, and it's generally known to people who grow corn all over the world. It has been fairly easy to breed smut-resistant corn plants, so our reasons for working on this fungus aren't so much about trying to stop this particular disease. Rather, we study corn smut because it is a very useful model system. Corn plants that are just a week old can be reliably inoculated with fungal cells that are easily grown in culture. We can study the progress of disease in many ways, using a variety of different kinds of microscopy. In addition, because the entire genome of *Ustilago maydis* has been sequenced, we have access to well-characterized mutants and other tools that can help us link form with function.

Recently one area of research has involved experiments to determine what the fungus senses on plant cells that provide the signal for infection to begin. Students have used living leaves and leaf replicas to try to answer this question, documenting what they see with various types of microscopy, including confocal microscopy. A second focus in the lab has been to study how the fungus overwinters in the soil, between times when the host plant is available. Students have carried out experiments to look at the survival of fungal cells in different types of soils, also varying temperature and moisture conditions.

As a broadly-trained botanist, I also have some more general interests in the distribution of plants and fungi. My students and I have recently been doing work on the SJU experimental green roof. We are documenting the distribution of plants that make up the roof community and how it has changed since the roof was planted. The next step is to determine which factors are most important in determining the success of the various kinds of plants on the roof. Factors such as moisture, temperature extremes, sunlight and wind are being considered, as well competition and other biotic factors. Most recently, summer scholars began examining soil pH, nutrient levels, and microbial soil communities across the roof.

Greenroof Soil Microbial Community

David Arnold, '15

Faculty Mentor: Karen M. Snetselaar

Department of Biology



Supported by the GeoKids Program and the Botsteiber Foundation

This summer I examined the microbial communities that make up the green roof soil ecosystem. Green roofs are an understudied and relatively new technology. It is an engineered system designed to make urban settings more environmentally friendly. Green roofs accomplish this by reducing storm water runoff, decreasing urban heat island effects, returning species lost to urbanization, and more beneficial effects. The green roof soil differs greatly from typical agricultural and gardening soil. It is designed to be light weight so it is low in organic matter, mineral rich, and only 3 inches deep. Soil microbial communities are responsible for releasing vital nutrients into the environment, for symbiotic relationships with over 90% of plant species, and help break down harmful environmental

contaminants. DNA amplification methods are typically used to analyze soil microbial communities and determine what specific species occupy the soil. My focus was not on the systematic diversity, but rather the functional diversity of the microbes. A microbial community's functional diversity is the different substrates which the community can readily metabolize. Before I looked into the community's functional diversity, I took a rough estimate of soil biomass using a dilution series. The bacterial and fungal counts were constant across the whole roof regardless of how the plants were growing. Bacterial biomass was estimated to 10^4 cells/gram growing media and fungal biomass was estimated to be 10^3 cells/gram of growing media. To inspect to green roof soil functional diversity I used BIOLOG Eco Microplates. Each microplate contains 96 wells; the plate has three replicates of 32 wells, each containing a different carbon substrate. In addition to a carbon substrate in each well, a tetrazolium dye is added. As a carbon sourced is used up, the tetrazolium dye is reduced to formazan and a purple color results. The tetrazolium dye is designed so only bacteria are capable of reducing it. These plates are measured for optical density at 590 nm, the wavelength corresponding to the purple dye. Measurements are taken over a period of 120 hours at each 24 hour mark. From the gathered data, average well color development values are calculated for each plate for each time it was measured. From the plots looked at thus far there is no evidence supporting that the soil physiological profile is driving the differences in plant growth.



BIOLOG Eco Microplate tetrazolium dye is only reduced by bacteria, so a different approach was used for soil fungi. Dilution series were made from soil samples. From the environmental plates made, colonies were isolated and streaked into tilt tubes. From the tilt tubes, pure colonies were again streaked onto plates to make sure only one colony morphology resulted. Differential interference contrast microscopy was used to identify the groups of fungi on the roof. Once colonies were producing spores, the conidia and conidiophore were observed. Fungal conidia are asexual spores which form on the conidiophore. So far we have identified a *Penicillium* which was located at every test site across the roof.

The Effect of the Auxin Polar Transport Inhibitor, NPA, on the Entry Site of Infection by *Ustilago maydis* into *Zea mays*

Amy Brady, '15

Faculty Mentor: Karen Snetselaar
Department of Biology



Supported by a Gift From Nick Nicolaides '87

Ustilago maydis is a biotrophic fungus that is able to infect corn (*Zea mays*). The fungus begins its life cycle as a nonpathogenic haploid saprophyte. When it encounters a compatible mating type, the fungus will form an infection filament. The fungus then creates a structure called an appressorium in order to enter the corn host. Previous students in Dr. Snetselaar's lab have looked at 200 appressoria on a number of different corn silks. They found that 90% of these 200 appressoria were formed along the long walls of the silk epidermal cells. This result is suggestive in that perhaps the fungus takes advantage of the plant cell elongation processes in order to determine its means of entry. Plant cell elongation involves the naturally occurring plant hormone, auxin. Auxin is transported throughout the plant by means of influx and efflux transport proteins that work differently; therefore, there is a polarity in the distribution of auxin.

This summer, I have been looking at the early stages of infection in the corn silks (i.e., 15-24 hours post inoculation). I inoculate ears of corn with the mating-compatible strains of fungus, and then remove the silks several hours after inoculation. I fix the silks so that only plant and fungal cell walls remain, and then I stain them with fluorochromes in order to view them under the confocal microscope. In order to test whether or not the fungus takes advantage of the plant cell elongation processes, an auxin polar transport inhibitor (*N*-1-naphthylphthalamic acid, or NPA) is applied at the time of inoculation. So far, my results have suggested that the polar distribution of auxin does not affect the fungus' method of initial infection. In other words, the fungus continues to enter the plant silks at the long wall of the epidermal cells.

One thing I must consider in the future is to confirm that NPA is actually exerting an effect on the corn silks. Before working with the silks, I had looked at early infection in the corn seedlings, both with and without the inhibitor. The seedlings that received the inhibitor did show abnormal growth compared to those that did not receive the inhibitor, suggesting NPA was having an effect on plant growth, but it is possible that silks might respond differently. Another option for testing in the future is to apply extra auxin in order to disturb the polar concentration of the hormone.

Impact of Soil Factors on Green Roof Plant Distribution

Andrew Shafer, '15

Faculty Mentor: Karen M. Snetselaar
Department of Biology

Supported by the SJU Summer Scholars Program and the Department of Biology



A green roof is a living ecosystem constructed on top of a building usually in an urban or suburban environment. Besides the aesthetic value which many green roofs offer, there are a number of environmental and engineering benefits. These include retention of heat in the winter, blocking solar radiation in the summer, storm water runoff management, and reducing the heat effects of an urban environment. In order to achieve these benefits, there must be a consistent amount of growth across the green roof. This is sometimes difficult to achieve since the environment on a green roof is one that is similar to the dry plains of the Midwest.

The green roof atop the Saint Joseph's University Science Center was planted with over 20 different plant species four years ago. Since its construction, there has been a noticeable difference in plant distribution. Integrated into the green roof design are four marked plots which all contain different water retention media. The purpose of these was to study the effects of rain water retention and its effects on the growth of the plants. After reviewing the distributing of plants in relation to the plots, it has been determined that water retention due to different construction material is not a major factor in helping the plants grow.

I examined the abiotic factors of the soil to see if that could offer any insight into the differences in plant growth. I first studied the soil pH by taking the pH from twenty four different points across the roof. The pH was consistently low, about 5.6. This gives some insight into why there is less growth overall on the roof compared to ground level, where the soil pH is much closer to neutral, about 6.8, but it does not help to explain the differences in plant growth across the roof. Next I looked at the levels of both nitrogen and phosphorous. By using commercial soil and water nitrogen testing kits and spectrophotometer techniques to study phosphorous, I was able to estimate the relative amounts in the soil across the roof. For nitrogen, the levels of nitrite, nitrate and ammonia, (the common soil forms of nitrogen) were found to be similar across the roof and very low compared to ground level samples. Phosphorous levels were likewise considerably lower than ground level samples but similar in all roof areas tested. These results suggest that differential nutrient availability is not affecting plant distribution on the roof. Now I have started looking more closely at soil nutrients around individual plant species. I studied *Liatris spicata* and *Sporobolus heterolepis* which have both thrived over the entirety of the roof. For *S. heterolepis*, pH and nutrient values directly under eight plants were similar to those found across the roof. However, *L. spicata* plants had higher levels of ammonia directly under the plants.



Saint Joseph's University
Science Center Green Roof



Sangcheol Song
Department of Management
Saint Joseph's University

Ph.D. The Ohio State University

Research Interest: Uncertainty and
Flexibility

There are three primary research areas where I have made contributions in academies of strategic management and international business. The first is based upon my belief that flexibility under uncertainty is one of core interests for business scholars and practitioners. Specifically, I have added value to the existing literature on multinational flexibility from the real options perspective by examining diverse explanatory constructs related to retaining and exercising MNC's operational flexibility under exchange rate uncertainty, demand uncertainty, or institutional uncertainty in foreign countries; Second, I have contributed to the areas of foreign entry and exit strategies by studying interplays among entry modes, experience types, and exit rates or modes from the real options, transaction cost economics, or organizational learning perspectives; Third, I have also helped scholars and practitioners in areas of strategic alliances including international joint ventures by exploring dynamic aspects of such alliances, including control, ownership, conflict, and instability.

Recently, I have sought to expand my scope of research to organizational learning in the international business realm. For example, I have examined how multinational corporations can learn from successes or failures through a deeper understanding of drivers and barriers to knowledge creation and dissemination. I have also turned my attention to CSR activities of multinational corporations as their ways to gain more legitimacy and enhance longevity. This new research direction is in response to recently-booming needs for research on sustainability at more micro-levels or within shareholders models.

Chinese Social Perceptions of Luxury Auto Makers

Ryan C. Smith, '15

Faculty Mentor: Sangcheol Song
Department of Management



Supported by the SJU Summer Scholars Program

Today, the world is wealthier than it has ever been and with that newly acquired wealth comes the desire for luxury goods. A truly high end luxury car has long been the mark of affluence all over the world, and many new markets are now experiencing that affluence. There is a new breed of consumer that has money to spend in countries that were previously never thought of as possible markets, specifically in China. As more people around the world come into wealth, there is a desire for luxury automobiles that needs to be met.

From my time in China, I noticed that Audi was by far the leader in the premium sedans with Mercedes-Benz nowhere near a close second. I wanted to focus on this because in the United States, Mercedes-Benz is considered to be one of the best, fairly affordable consumer vehicles on the market. It also has an automotive pedigree and history that gives prestige to the brand. I wanted to know why Audi was so successful while Mercedes was suffering so badly. To do this, I first had to understand the nuances in Chinese society that have to deal with “face” meaning how a person is perceived by others. This concept is extremely important in Chinese culture, much more than it is in Western cultures and it can define a person’s future. If a person is too showy and flashy with his money, he will lose respect from others and this can be detrimental to both business and social life. A Mercedes can cause you to lose face because about eight years ago, there was an influx in China of new money and these people wanted to go out and purchase luxury items and many of them purchased a Mercedes-Benz. This led to the majority of the cars being driven by young, newly rich, flashy people which gave the car a stigma it has not been able to shake in the social perception of the public. Simply by being one of the best consumer cars on the market, they inadvertently created a negative association with their brand. Audi, however, is an equal to Mercedes-Benz in the USA but is viewed as the clear choice in China. This is because they did not have a stereotype driver associated with the car and were able to sponsor popular events and position themselves as the quiet, elegant luxury vehicle for those with money. This appealed to the Chinese because it showed status without being flashy. If Mercedes wants to gain market share in China, they need to reposition themselves with a new line of vehicles and marketing catered specifically to the younger population. They need to shake their old stigma and usher in a new generation of owners with automobiles catered to their tastes that will continue to purchase the brand and provide sustainable growth.



Clint Springer

Department of Biology
Saint Joseph's University

Ph.D. West Virginia University

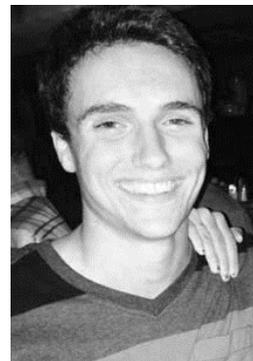
Research Interests: Biological Effects of Global Climate Change on Plants; Urban Agriculture; Science Education

Research in the Global Change Plant Ecophysiology Lab at Saint Joseph's University focuses on the physiological, developmental, and growth responses of natural and agricultural plant species to human-induced climate change. The work of my students and I seeks to understand how physiological processes of plants will change in the near future as humans continue to negatively impact our environment. While working to meet this goal, we are also asking important questions about the basic biology of both natural and agricultural plant species. Our research uses techniques in plant physiology, quantitative genetics, genomics, and plant ecology. Past studies carried out by our lab have investigated the effects of altered precipitation patterns on the biofuel plant species, *Panicum virgatum* or switchgrass; the interaction of elevated atmospheric carbon dioxide (CO₂) and a severe pathogen of oak trees, *Xylella fastidiosa*; the interaction of the soybean cyst nematode and elevated atmospheric CO₂ in soybeans; and the use of water resources by *Pinus rigata* or Pitch Pine growing in the pinelands of southern New Jersey. Currently we are investigating the physiological mechanism involved in altered developmental timing in plants caused by elevated atmospheric CO₂; the role of mycorrhizal fungi in improving the yield of crops in an urban setting; and the changes in soil bacteria that occur throughout the year in a variety of composting techniques used in urban environments.

Genetic Variation in the Flowering Time Response of *Arabidopsis thaliana* at Elevated CO₂

Mark McShane, '15

Faculty Mentor: Clint J. Springer
Department of Biology



Supported by the SJU Summer Scholars Program and the Department of Biology

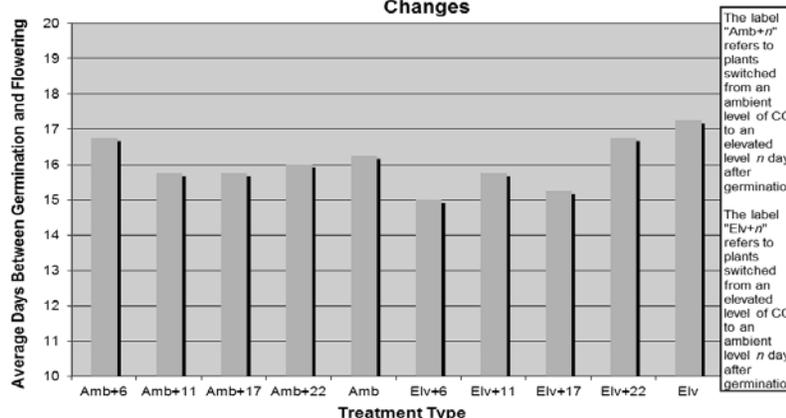
Atmospheric carbon dioxide (CO₂) concentration has dramatically increased in recent decades due to human activities such as deforestation and industrial processes. Atmospheric CO₂ is expected to continue increasing at rapid levels, which will impact plant growth and development. Typically, plants have increased levels of growth and reproduction at higher CO₂ concentrations because they exhibit higher levels of photosynthesis. Recently, the carbohydrate products of photosynthesis have also been shown to act as signaling molecules for many important processes in a plant's life cycle, including the initiation of flowering.

The initiation of flowering is a critically important stage of a plant's life cycle, marking the end of vegetative growth and the beginning of the reproductive stage. *Arabidopsis thaliana* is a well-studied plant with a rapid turnover rate, making it an ideal species to use in laboratory settings. Many of the genes that control floral initiation and the growth of reproductive organs in *A. thaliana* have been identified. However, the effects of elevated CO₂ on flowering time are varied among different species and genotypes. The ability to understand the mechanisms behind changes in flowering times as a result of elevated CO₂ will be remarkably important in predicting the future responses of ecosystems.

In this study, the naturally-occurring WS-2 strain of *A. thaliana* was used to test the effects of switching seedlings between ambient and elevated levels of CO₂. Equivalent numbers of seedlings were planted at ambient (400 ppm) and elevated (1000 ppm) levels. Certain seedlings were switched 6 days after germination, while others were switched at either 11 days, 17 days, or 22 days. Those that acted as controls were not switched at all. Seedlings were watered and treated with Hoagland's nutrient solution until they produced a 1-cm flowering stalk, at which point they were removed for data collection. The number of leaves and the total biomass of the plant were recorded, and the plant was then frozen for future genetic analysis.

The results of this study show that the average time between germination and flowering decreases as the amount of time under elevated CO₂ increases (Figure 1). However, there seems to be a threshold effect after spending at least 17 days under elevated CO₂. This phenomenon will be further studied and may shed light on the role of carbohydrate signaling molecules.

Figure 1. Variations in Flowering Time with Atmospheric CO₂ Changes



Financial Reporting of EU Companies Participating in the Emissions Trading System

Evan Megill, '16



Faculty Mentor: A. J. Stagliano
Department of Accounting

Supported by the SJU Summer Scholars Program

In recent years, the issue of climate change, and the liabilities that accompany it, has been a pressing matter for countries worldwide. Consequently, it comes as no surprise that the risks and opportunities surrounding climate change pose a legitimate concern for investors and corporations alike. The leading regulator of climate change reporting is the SEC, a government agency that wants to ensure the protection of investors through increased transparency of corporate reporting. Since February 2010, enhanced guidance provided by the SEC has led to positive results with respect to disclosures regarding climate change. The goal of our research project is to bridge this financial reporting regime to the European Union to see how and if companies are disclosing financial risks related to climate change. All disclosures found, or even the lack thereof, will create questions and issues concerning the clearness of climate change risks as they apply to particular businesses.

My role in this project was to extend a previously developed database of annual financial reporting information into year 2013 filings. First I downloaded company Form 10-K documents to start the examination process. Text disclosures regarding climate change were then extracted in paragraphs and organized by company and key words. My work will allow content analysis to be performed by the principal researchers. The results will allow us the opportunity to compare the outcomes of how companies in the United States are disclosing financial information under the EU-ETS program. This research will give us a better understanding of how SEC climate change disclosure guidance is impacting firms around the world.



In addition to the climate change project, I also have assisted in verifying the accuracy of data for 750 large companies. Through analysis of Form 10-K annual reports, it was determined whether companies were still public or if they had been acquired by another entity at any point during the last few years. The correctness of these data is necessary for research purposes, as we move forward with specific projects pertaining to investor-owned firms.

Cybercrime Financial Disclosures by SEC Registrants

Louis Vassallo, '16

Faculty Mentor: A. J. Stagliano
Department of Accounting

Supported by the SJU Summer Scholars Program



Cybercrime is a growing issue not only in the United States, but also around the world. It affects the way business is done and is making a large impact on Fortune 500 companies. This issue is taking the world by storm, and new technology must be developed to put a halt on this theft of private information. Cybercrime has major financial implications for both producers and consumers. The U.S. Securities and Exchange Commission is well aware of this issue and is making moves to prevent the continuation of these illegal activities.

Based on my analysis of annual reports for certain large pharmaceutical firms, I have found that most firms do not disclose any information pertaining to cybercrime. Those that do document some type of cyber activity mention it as a “risk factor” for their operations. There are data showing that the issue is slowly being recognized, since in 2008, none of these pharmaceutical companies studied reported anything related to cybercrime in their annual reports. Now, in 2012 and 2013, some companies are reporting cybercrime on a consistent basis. The biggest jump in disclosures came from 2011 to 2012. Coincidentally, this jump comes during the same time that Wyndham Worldwide Corporation—operator of nearly 7,500 hotel and resort properties—was having major issues with multiple cyber breaches of client data.

An issue with cybercrime is its unpredictability and the ever-changing landscape. There are not many ways to prevent cybercrime from occurring, and, since it is such a new issue, companies are hesitant to report it as a risk. Technology companies are taking advantage of this problem by charging very large fees to have cybercrime tracked and data breaches prevented. Smaller companies may not be able to include this additional cost in their yearly budget.

In addition to this cybercrime research, I also have assisted in verifying the accuracy of data for 750 large companies. Through analysis of Form 10-K annual reports, it was determined whether companies were still public or if they had been acquired by another entity at any point during the last few years. The correctness of these data is necessary for research purposes, as we move forward with specific projects pertaining to investor-owned firms.



Eileen L. Sullivan

Department of Interdisciplinary Health
Services

Saint Joseph's University

Pharm.D. Shenandoah University

**Research Interests: Dementia and
Alzheimer's Disease**

As a clinical pharmacist and Health Services faculty, my research includes improving the quality of life in patients diagnosed with dementia and Alzheimer's Disease. Patients diagnosed with dementia or Alzheimer's Disease require coping mechanisms to help maintain quality of life not only for the patient, but also for caregivers and family members who are impacted by this debilitating disease. Creative Expression has been proven helpful in the patient population. Over this past year I have been researching a program called TimeSlips®, a creative expression program used as an activity builder in patients with dementia. I am interested in researching Alzheimer's Disease quality of life as a whole to include the patient, the caregiver, and the family. My interest is to identify what daily tasks a patient with Alzheimer's Disease can re-learn to increase their quality of life and how caregivers and family members can maintain their own quality of life while caring for a loved one, once diagnosed. My interests also include supportive in-home care for patients with Alzheimer's Disease, lower stress levels for caregivers, and identification of coping skills to keep family units intact and their relation to overall quality of life.

I am interested in researching the co-morbidities which affect caregivers of patients with Alzheimer's Disease. Caregiver stress is a great impact related to Alzheimer's Disease. In the clinical setting, we are now seeing when an Alzheimer's Disease diagnosis is made; heart disease, blood pressure, diabetes, and depression are just several of the Alzheimer's Disease co-morbidities which affect the caregiver. Prevention of caregiver illness, as well as patient illness prevention, is of utmost importance. I am interested in researching the use of disease prevention education, coping mechanisms, and Alzheimer's Disease education.

Dementia and Alzheimer's Disease trickles down to the patient and to the family. Coping skills (to include the patient, caregiver, family unit) and caregiver co-morbidity prevention are my main interests of focus.

Reduction in the Agitation of People With Dementia and/or Alzheimer's Disease

Jennifer Donohue, '16

Faculty Mentor: Eileen L. Sullivan
Department of Interdisciplinary Health Services



Supported by the SJU Summer Scholars Program

The prevalence of anxiety and agitation associated with dementia and Alzheimer's disease is common and affects up to 70 percent of patients. The need for a reduction in agitation and anxiety in people affected by dementia is necessary in promoting a better life-style and environment for patients and caregivers. Research suggests that pharmacologic treatments are not always effective, which leads to an increase in need for non-pharmacologic interventions for reducing agitation and anxiety. Therapies such as bright-light therapy, art, music, and creative story telling have shown to decrease agitation and anxiety in people affected by dementia, while increasing sociability and mental acuity.

Timeslips, a creative story telling program designed to encourage creative expression among people affected by dementia is one form of non-pharmacologic intervention. Through the use of pictures and open-ended questions, patients participate in creating a story. This therapy is used worldwide throughout nursing homes, and care facilities to help engage people affected by dementia in a social activity that exercises creativity, and promotes self-assurance.

I have gathered information regarding the use of Timeslips in care facilities, and its use in benefitting people affected by dementia, as well as certified Timeslips facilitators, and caregivers/family members. We have created two online surveys, each consisting of 20 questions that will be administered to a group of certified Timeslips facilitators. These surveys will gain information regarding the effectiveness of Timeslips through a satisfaction survey, as well as possible social and behavioral changes the program has had on people affected by dementia through a second survey. Timeslips is not only a program that encourages expression among people affected by dementia, but it also changes sociability, behavioral aspects, and promotes better relationships among staff/caregivers and people affected by dementia.

Additionally, we are preparing to conduct a cross-comparison study at St. Ignatius nursing home between patients and caregivers/family, which will take place during the fall semester. The purpose of the study is to determine specific colors and textures that promote a physical environment that can provide safety, security, and promote a degree of orientation which can help lessen anxiety and agitation in people affected by dementia.



Ilene Warner-Maron

Department of Interdisciplinary Health Services
Saint Joseph's University

Ph.D. University of the Sciences

Research Interests: Gerontology, Health,
Nursing, Health Disparities, Long-Term Care
Administration

The summer of 2014 provided students with the opportunity to explore the impact of the Affordable Care Act (ACA), which had many provision enacted in January of this year.

Javier Vasquez diligently interviewed various stakeholders in the community including health providers, government officials, clergy members and health care consumers regarding the question of how the ACA impacted undocumented Philadelphians. His research echoed the consensus of many people in the community which identified the lack of health care resources for this population, estimated nationally at 10-12 million, while noting concern about how the US can afford to pay for the health care expansion sufficient to meet the needs of citizens, let alone the needs of non-citizens. He was able to identify issues in the respondents of his qualitative study regarding political barriers to care and the impact that the ACA has in preventing undocumented immigrants from accessing preventative care services. Mr. Vasquez identified some “common ground” issues that could serve as the basis for further discussion regarding mechanisms to improve access to health care for this population.

Alison Palmer researched the impact of the ACA by interviewing staff at Federally Qualified Health Centers. She found that although Medicaid expansion and the use of health exchanges have allowed some individuals to access health care, there remains a high level of people who remain uninsured. She also identified significant strain on the resources of these clinics as more people require services while the facilities ability to provide medications and support are increasingly compromised.

Both Javier and Alison have contributed to our understanding of the effects of the ACA. The further effects of the law have yet to be realized but will undoubtedly provide opportunities for further research.

Navigating the Healthcare System Uninsured

Alison Palmer, '16



Faculty Mentor: Ilene B. Warner-Maron
Department of Interdisciplinary Health Services

Supported by the SJU Summer Scholars Program

As the problems within the healthcare industry grow, the nation was promised relief through the Affordable Care Act. However, a year later just how effective has the new program been for the people who need the help the most? On the surface it may seem as though a number of Americans have seen benefits from the new law, but upon further examination it becomes evident there are still millions of citizens unable to access health care. Whenever a new law is implemented it naturally takes a few years to settle in and function to its full potential, although, as the number of people who are not getting the care they need remains large and the Emergency departments continue to overflow, uninsured Americans do not have years to wait to reap the benefits.

Programs such as Mercy Ambulatory Center and Saint Luke's Medical services in the Philadelphia and Camden areas work long hours trying to assist the people who cannot afford private health insurance or who do not qualify for Medicaid. Community clinics such as the St. Catherine Laboure Health Center have closed; health entities that are still in practice struggle to keep their doors open, help their patients, and surrounding community as best they can with what they have.

Additionally, there are many difficulties in accessing care for people who are not insured. There is a lack of information about what exactly the patient has available to them even when they are eligible for Medicaid. Such people need to find out if they are eligible which they cannot always accomplish on their own. For example, only 1.8 million people have signed up for insurance. This leads to the physicians in these areas having to take on not only the primary care responsibility, but they have to aide their patients in determining if they are eligible or not for coverage.

In order to address the problem of lack of insurance research was done through qualitative interviews. Kathy Gavin, who works at Mercy Ambulatory Center and Dr. D'Ambola who is the practicing Dr. at Saint Luke's Medical Center, provided primary information for my research. These providers shared the daily experiences they have with patients they encounter who lack health insurance.

The major problems they are faced with at both centers are very similar. There are more patients than time for the providers to see them all. The clinics can only provide primary care, therefore referrals to specialists or diagnostic technologies are beyond their access. With regard to the issue of money, coming back into the facilities at Saint Luke's especially, who asks their patients to pay what they can; however there is often not enough resources generated to cover the costs of care. Undocumented immigrants suffer greatly because they may be reluctant to seek treatment for fear of being discovered as not having legal status in this country. In addition, many people who are citizens, may wait too long to get the help for their symptoms because of the fear of costs, causing life threatening conditions to occur which otherwise may have been able to be addressed. The delay may actually add to the cost of care.

Another common issue at both centers is that of prescription drugs. Mercy and Saint Luke's give out samples to their patients, however there are fewer samples available. Mercy Ambulatory center is in partnership with Sunray Drugstore which enables patients to pay 4\$ per month for their prescriptions. Once a patient receives this deal they are able to continue it indefinitely. Even though receiving prescription drugs would be cheaper at a public health clinic, these clinics are many times over crowded and very time consuming due to the long wait for service. Of note, the main health problems seen in this population include diabetes, elevated cholesterol levels and hypertension among patients, which require multiple medications.

As the future of health care unfolds both centers are trying to work on preventative care with their patients and monitor their overall health. The Camden Coalition of health care providers for example is working to keep the number of patients in the ER low by encouraging patients to see their primary care doctors. Additionally, once patients are discharged they are asked to see their primary Dr. within 7-14 days. However, there continues to be a large gap of people missed by the Affordable Care Act. Through speaking with providers it is evident that opinions vary from uncertainty to confidence when dealing with the Affordable Care Act. Although, it can be agreed upon that there needs to be increased money from the government to allow more people to become covered and it is necessary that additional money is put into primary care. The expansion of Medicaid and the increased access of patients to health care exchanges may close the gap in health care for this population in the future if they are able to navigate the system.

The Impact of the Affordable Care Act on Undocumented Immigrants

Javier A. Vazquez, '15

Faculty Mentor: Ilene B. Warner-Maron
Department of Interdisciplinary Health Services

Supported by the SJU Summer Scholars Program



President Barack Obama signed the Affordable Care Act (ACA), commonly known as “Obamacare”, on March 23, 2010. The main purpose of the ACA was to provide affordable, quality health insurance to Americans in the United States. In 2013, 44 million Americans did not have health insurance because their employers did not provide it; they lacked employment or did not qualify for government-based insurance programs, including Medicare and Medicaid. Similarly, approximately 10 million undocumented immigrants did not have affordable health care, making them the second largest of the uninsured population.

To recruit my respondents, I contacted local hospitals, clinics, medical professionals, professors, and government officials. Unfortunately, I noticed that many hospitals and clinics had institutional policies that prohibited them from participating in student research or required that I be apart of their staff to get any interviews. In addition, I met restraint when trying to interview government officials because many did not want to talk about the issues plaguing the ACA.

In my research, I interviewed 8 healthcare providers and 7 knowledgeable non-providers about the ACA and its impact on the undocumented immigrant population. The provider interviews showed a distinct 6 to 2 split that undocumented immigrants should not be covered under the ACA. The 6 who were not in favor believe that the government should not help the undocumented because they do not pay taxes and they firmly believe that uninsured American citizens should be taken care of first. The non-provider interviews showed an almost even split with a 4 to 3 vote that undocumented immigrants should be covered under the ACA. Some of the disputes that arose within the two groups were the notion that business insurance mandates would hurt struggling businesses and that medical cost would decrease as more were insured. As a result, a cost versus benefit debate arose. One non-provider even stated, “Cheap is not always better” and another commented, “If done correctly, benefits will outweigh the costs like the systems in the UK and Canada which have been proven to be effective healthcare systems”.

Despite the differing stances on undocumented coverage between the providers and non-providers, both groups shared many of the same ideas. Both the providers and non-providers agreed that insurance premiums, deductibles, prescriptions and copays are too high for people to afford. Also, many believe that there are not enough primary care physicians in the medical field. In the case of the undocumented, the providers and non-providers believe that the undocumented face many difficulties, such as language barriers, threats of deportation, and the failure to attain prescriptions and keep appointments. The providers seemed to have a limited understanding of the difficulties undocumented immigrants face in comparison the their non-provider counterparts. Since the undocumented cannot apply for insurance under the ACA, they are often forced to use emergency rooms (ERs) for their primary care needs, which result in rather expensive medical bills. Therefore, the undocumented often provide false names and false address or in move severe cases they are forced to move to a different residence so that they do not have to pay for the medical bills, which they cannot afford. Unfortunately, this leaves many Americans confused, frustrated, disappointed and unsettled about the inefficiency of the ACA.

Providers and non-providers believe that educating and health screening the undocumented, as well as increasing the amount of residents in family medicine would help with this ongoing problem. To increase family physicians, one non-provider suggested that the government should offer free medical schooling for students as an incentive to practice family medicine. Both providers and non-providers also believe that the undocumented should be able to purchase private insurance if they could afford it. Other suggestions included placing a cap on pharmaceutical companies and on tort law, in addition to increasing the amount of clinics in the neighborhood. Currently, the undocumented receive their care from clinics, faith-based hospitals, and ERs, which have been proven ineffective. There was an overwhelming consensus between the providers and the non-providers that preventative care is essential in keeping costs down. Similarly, a consensus was also found that the bigger issue in question is not only the ACA, but also the unrealistic immigration laws that are currently in place. Both the providers and non-providers believe that immigration reform must be enacted to help fix the current healthcare issue. Mercy Hospital, MedExpress, Puentes de Salud and the Institute of Bioethics were some of the local institutions and organizations that the respondents believe are proactive in trying to address the issues that the ACA has with the undocumented.



James Watrous
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Research Interests: Nonlinear
Dynamics Associated With Epilepsy,
Tremor and Circadian Rhythms

My research focus is the analysis of the time series generated by the electrical activity of nerve cells connected together in what is referred to as a small world network. Small-world networks are commonly used to model complex systems like epilepsy, circadian (24 hr) rhythms and tremor; their inherent properties of rapid signal propagation, synchronicity and high computational power arise from the many local connections that exist between neighboring nodes (Watts *et al.*, 1998). The synchronous behavior of the small-world network is what makes it useful as a model for epilepsy, as these systems are a hallmark of hippocampal network architecture in regions CA3 and CA1. Designing small-world models of neural networks within regions CA3 and CA1 of the hippocampus allows for an observation of relationships between network properties and the arising activity. Building upon the findings of Netoff *et al.*, (2004) on the ability to manipulate a small-world network to transition from bursting to seizing, we study small-world models of regions CA3 and CA1 to study the relationship between variable network properties and the resulting epileptiform activity. Specifically, simulations of random network rewiring to introduce long-distance synaptic connections, stochastic ion channel behavior, variable $[K^+]^o$ and the nature of subsequent electrical activity are observed in models with excitatory synaptic connections.

The small-world network approach is also being used to study models of a region in the brain called the suprachiasmatic nucleus (SCN). It is a tiny region on the brain's midline, situated directly above the optic chiasm and composed of around 20,000 neurons. It is responsible for controlling circadian rhythms. The neuronal and hormonal activities it generates regulate many different body functions in a 24-hour cycle. We are building models of the SCN in order to determine the mechanism of the rhythm changes that are observed during the day vs. at night. There is a complex genetic mechanism that controls much of the electrical activity of the neurons and that relationship has yet to be understood.

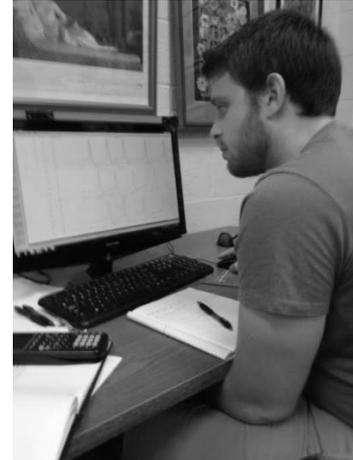
There are many varieties of tremor and we look at a form referred to as “essential tremor”. This type of neural output is distinct from both Parkinsonian and Intention tremors. These tremors are highly localized and affect the motor pathways to muscle and have unique frequency outputs that can be studied using variations of the small world network model.

The Role of Calcium and Hyperpolarization Currents on the Development of Essential Tremor

Nicholas Shafer, '15

Faculty Mentor: James Watrous
Department of Biology

Supported by the SJU Summer Scholars
Program and Department of Biology



Essential Tremor is the most common movement disorder characterized by uncontrollable shaking in the limbs. Essential Tremor (ET) differs from Parkinsonian Tremor due to the fact that ET occurs at a lower frequency. Essential tremor is the result of increased membrane excitability in motor neurons as well as instability in agonist and antagonist muscles combined with increased membrane excitability to create tremor activity. The development of tremor activity is the result of the hyperpolarization activated current and low threshold calcium current (Shaikh 2008).

To represent the typical essential tremor creating neuron, the software program Simulator for Neural Networks and Action Potentials (SNNAP) was used to build a network consisting of 36 neurons. The neurons used in the simulation were SHK neurons, based on the research done by Shaikh (2008) and are slightly more complex than typical Hodgkin-Huxley (HH) neurons, which are the default neurons used by SNNAP. SHK neurons differ from HH neurons because they contain a hyperpolarization activated current (H current) and low threshold calcium current, as well as the usual Sodium, Potassium and Leak currents, which are common to both types of neurons. The thirty-six SHK neurons were connected using excitatory and inhibitory synapses. Excitatory connections ran in a clockwise direction; inhibitory, anticlockwise. Next, the roles of the H and calcium currents were studied by first examining the conductance values associated with each. Examining the kinetic behavior of each channel followed this.

The role of conductance in the hyperpolarization current on the frequency of the action potential was studied by adjusting this parameter in one neuron in a three-neuron network and looking at the number of actions potentials which occurred in four tenths of a second and then expanding that value to one minute. The normal conductance of the H current is $0.09 \mu\text{S}$ (Moran 2013) and a frequency of 6390 action potentials fired per minute in a three-neuron system. The conductance and the frequency of the action potentials was found to have a negative linear relationship which followed the equation $y = -1454.5x + 6520.9$, with the frequency of action potentials decreasing as conductance increased. A similar relationship was observed in the thirty-six-neuron system, though there was a lower frequency of action potentials at all values of conductance due to the larger network size.

The conductance of the calcium current was studied using the same process as the one used to study the hyperpolarization current. Changing the values of the calcium current did not seem to have an effect on the frequency of the action potentials of the first neuron in the three-neuron system. This work continues through the academic year.



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Research Interest: Social justice in Organizations

My first year seminar “Serious Comedy and Social Justice” course uses comedic and humorous material as a lens through which students examine social justice issues. It’s a fun, funny, engaging, hard, and, at times, fairly intense class. Teaching the course has taught me a lot about serious comedy, my students (they are open with their viewpoints and arguments), and about why I teach.

By “serious comedy” I mean humor as a form of social commentary. There exists a long tradition of using comedy/humor to speak truth to power and challenge the status quo. Pedagogically, “serious comedy” works because it is both interesting and because it makes it safer for students to examine deeply about what they think and how they feel about these issues (e.g., Dustin Hoffman in “Tootsie”).

Our society is immersed in media, or so it seems. Media is influential in what we see, read, hear, and what and how we think about the world around us. Unfortunately, a lot of “comedy” or “humor” occurs at the expense of the vulnerable and serves to reinforce the status quo, to perpetuate privilege.

Christine’s research project explores how we more critically examine the negative messages concerning gender constantly sent to and aimed at us via the media. Some negative media messages are blatant (e.g., Seth MacFarlane at the Oscars), while others are more subtle (e.g., Teri Garr and Michael Keaton returning to the “natural order” of the work-and-home of the early 1980s in “Mr. Mom”).

Developing the capacity to think critically is a cornerstone of a broad-based liberal arts education. Developing a commitment to think critically about media (including “entertainment”) is a specific application of that critical capacity. I believe the results of Christine’s research will be of benefit beyond my students, to anyone trying to interpret a complex and changing world saturated with media.

Gender Specific Media Literacy Training for College Students

Christine Dignam, '15

Faculty Mentor: C. Ken Weidner
Department of Management

Supported by the SJU Summer Scholars Program



It is no secret that the media is littered with negative messages that have a substantial impact on young people's perceptions of their role in society. For young women, especially, the media plays a major role in shaping self-image and perceptions of societal norms. Research has shown that these negative media messages are linked with impaired cognitive ability, increased rates of low self-esteem and mental disorders such as depression and eating disorders, and development of unhealthy sexuality and beliefs about one's own value and worth. These messages have also been shown to lead to societal issues such as sexism and unrealistic standards of beauty for both women and men. The research findings have highlighted the need and importance of greater media literacy by both men and women. Media literacy is a tool to combat the negative effects of gender specific media messages and calls people to take a more critical and active role in their own media consumption by assessing what is presented to them and determining its credibility and value to society.

In the fall of 2012, Dr. Ken Weidner introduced a new First Year Seminar course in the Management Department of the Haub School of Business. The course, entitled "Serious Comedy and Social Justice," focuses on perceptions of issues of justice related to race, gender, sexuality, and class and uses works of comedy in the form of movies, television, and video clips to address those issues. In some cases, the comedic work brings attention to negative messages embedded in other media and in other cases, students must use their media literacy skills to critically examine works that contain these negative messages. My project this summer involved collecting background information on media literacy training and working with Dr. Weidner to incorporate some of these techniques into his class. I also put together my own presentation urging students to take a more critical look at the images they see in the media to prevent the further oppression of both women and men through the media's sexualization of women.

