

THE HONORS SCHOOL ANNUAL RESEARCH CONFERENCE

*It is with great pleasure that the Honors School
presents its Spring 2015 Research Conference.*

Student presenters include research in the fields of:

*Biology, Chemistry, Criminal Justice, English, Health Studies,
History, Math, Music, Political Science, Psychology,
Sociology, Software Engineering*

PRESENTERS

(in alphabetical order)

Sabrina Alfassa (PY)

Jessica A. Calabro (HE)

Peter Chase (BY/CE)

Jessica R. Cobb (MA)

Shayna Conde (EN/MU)

Jacquelyn N. Corsentino (PS)

Kevin Dillon (BY)

Jamie Esposito (HS)

Taylor A. Glynn (EN)

Megan A. Hodges (BY)

Toniann D. Keiling (BY)

Jessica L. Kostiou (SE)

Christopher J. Mahrous (BY)

Brian J. Martin (SO)

Alexandra A. Mazyck (HS/EDE)

Susan Pagano (PS)

Taylor Rodenberg (BY)

Paige L. Tannenhaus (CJ)

Jayde A. Valosin (PY)

MAY 1, 2015

WILSON AUDITORIUM

SESSION A: 1:00 p.m. – 2:50 p.m.

**Welcome: Dr. Kevin Dooley
Dean of the Honors School**

Jamie Esposito (HS)
Jessica A. Calabro (HE)
Jacquelyn N. Corsentino (PS)
Susan Pagano (PS)
Brian J. Martin (SO)
Paige Tannenhaus (CJ)
Taylore A. Glynn (EN)
Shayna Conde (EN/MU)
Jayde A. Valosin (PY)

SESSION B: 3:00 p.m. – 5:00 p.m.

Sabrina Alfassa (PY)
Jessica L. Kostiou (SE)
Christopher J. Mahrous (BY)
Kevin Dillon (BY)
Peter Chace (BY/CE)
Taylor Rodenberg (BY)
Megan A. Hodges (BY)
Toniann D. Keiling (BY)
Jessica R. Cobb (MA)
Alexandra A. Mazyck (HS/EDE)

Closing Remarks: Kevin Dooley

Welcoming Remarks

DR. KEVIN DOOLEY, Dean of The Honors School

Presenters (in alphabetical order)

SABRINA ALFASSA | *The impact of self-esteem and self-expansion on emotional and cognitive reactions to various “crossing the line” scenarios: The best friend’s sex and sexual orientation.*

Chief Advisor: Dr. Jack Demarest

This study consisted of two parts: a pilot study and study one. The pilot study determined what qualities were considered to be most self-expanding (interesting, exciting, and challenging). Study one then examined what is considered acceptable and unacceptable behavior of a partner with his or her best friend and whether the acceptability of certain behaviors is influenced by the sex and sexual orientation of the partner’s best friend. Participants completed a series of surveys about their expectations regarding their significant other, their feelings about the appropriateness of various activities between their partner and his/her best friend, their self-esteem (Rosenberg, 1965), their personality (Eysenck & Eysenck, 1975), and how closely they identified with traits that were considered high and low in self-expansion (taken from the results of the pilot study). The partner’s best friend varied in these scenarios from same sex, to opposite sex, to opposite sex gay/lesbian. It was hypothesized that scenarios such as your partner and a friend working together on a school project would be acceptable regardless of the sex of the friend, but scenarios providing opportunities for emotional or physical intimacy would be rated as unacceptable if the best friend was of the opposite sex. It was hypothesized that scenarios depicting a partner’s opposite sex best friend would elicit higher ratings of jealousy, insecurity, and betrayal than scenarios depicting a same sex best friend or a gay/lesbian opposite sex best friend. It was hypothesized that men and women with lower self-esteem would report stronger ratings of jealousy, insecurity, and betrayal than participants with higher self-esteem. It was hypothesized that participants with high levels of neuroticism and introversion (measured by the Eysenck Personality Inventory) would experience more emotional reactions than those who had high levels of stability and extroversion. Finally, it was hypothesized that participants who identified closely with qualities that had low ratings of self-expansion would experience more emotional reactions than participants who identified themselves as having qualities with high self-expansion ratings.

JESSICA A. CALABRO | *Walkability of Synagogue Communities in New Jersey: A GIS Analysis*

Chief Advisor: Dr. James Konopack

Most walkability studies operate from the causal perspective that characteristics of the built environment determine levels of or changes in walking as a health behavior, but there are certain groups who must walk, irrespective of their neighborhood’s walkability. One such group with religiously compelled walking is the Hasidic and Orthodox Jewish population. No published study to date has measured the walkability of synagogue communities, which has obvious implications for the safety of Jewish people who must walk, irrespective of environmental factors. The purpose of this study was to measure the walkability of 15 synagogue communities in Monmouth County, New Jersey using a combination of geographic mapping and on-the-ground surveillance, to determine the extent to which their environments are suitable for walking during Shabbat.

PETER CHASE | *Characterizing chemical fluxes in estuarine sediments under acute hypoxia*

Chief Advisor: Dr. Ursula Howsen

Second Reader: Dr. Tsanangurayi Tongesayi

Of the many effects stemming from the anthropogenic development of watersheds, hypoxia (fatally low oxygen levels) is often considered the gravest side effect threatening the health of our coastal estuaries. While known for being important shelters to many macroscopic species, coastal estuaries also serve as major biogeochemical controllers, contributing heavily to the cycling of sulfur, nitrogen, and carbon, in addition to acting as major sinks for carbon storage. This biogeochemical influence is largely carried out by the dynamic community of microbes and invertebrates present in sediments, and this cycling is often overlooked when we consider the impact of hypoxia on an estuary. Here we attempt to measure the chemical response of a sediment community in New Jersey's central Barnegat Bay to simulated sudden and acute hypoxic events that have become somewhat characteristic of the Mid-Atlantic. Sediment cores were obtained from relatively pristine locations in the central Barnegat and incubated ex situ to measure oxygen levels in the overlying water of each core.

JESSICA R. COBB | *Survival Analysis and its Applications*

Chief Advisor: Dr. Richard Bastian

Survival analysis is a family of statistical techniques that are used to describe time to a specified event. It is a method that is employed in a variety of different fields including medicine, biology, and engineering. These techniques get the most use in medical and epidemiological fields, which is why it is most commonly referred to as "survival" analysis. The most basic form of survival analysis has been used for over one hundred years to model morbidity rates, but it can be broken down into two main analyses: Kaplan-Meier analysis and Cox proportional hazards regression methods. This thesis will show the methodology behind these methods in a theoretical approach and then in an applied setting. These methods are used in a lot of the very important fields in our society; describing and being able to predict time to machine failure or time to death for a certain disease is very useful and beneficial for individuals as well as professionals and even government officials. This wide range of applications and the overall advantageous nature of the survival analysis techniques are what make the understanding of these methods so important.

SHAYNA CONDE | *Shakespeare and Shayna: Heightened Language and Character Analysis*

Chief Advisor: Dr. Stanley Blair

A comparative analysis between three original works and three Shakespearean monologues and how they intersect and diverge in terms of character analysis and development.

JACQUELYN N. CORSENTINO | *The Presidential Character: Predicting Hillary Rodham Clinton's Leadership Style*

Chief Advisor: Dr. Joseph Patten

Second Reader: Dr. Johanna Foster

Back in 1972 James David Barber wrote *The Presidential Character: Predicting Performance in the White House*. This groundbreaking research in political psychology changed the way political scientists' viewed American presidents and the desired characteristics of leadership. Barber's seminal work in political psychology was the first to move from the individual case study approach to an analytic generic typology that portrayed certain personality traits are better suited for the presidency than others. Barber examined the personality types of the sixteen 20th century American presidents derive at this seminal typology. He extensively studied each of the leader's childhood, teenage experiences, and adult life to establish the president's character, worldview, and style prior to categorizing the leaders into four personality types: 1) active-positive; 2) active-negative; 3) passive-positive; 4) passive-negative. This in-depth analysis will examine Hillary Rodham Clinton's personality type through Barber's typology. It is hypothesized that Hillary's personality type is the preferred active-positive.

KEVIN DILLON | *Profiling of bacteria from sewage and water bodies that degrade 1,3,7-trimethylxanthine (caffeine)*

Chief Advisor: Dr. Karen Pesce

Second Reader: Dr. Ellen Doss-Pepe

Pharmaceuticals and personal care products (PPCPs) are a rising environmental concern mainly due to possible harmful health effects. A widely used PPCP is caffeine (1, 3, 7 trimethylxanthine), which is mostly introduced to the environment through anthropogenic sources. When in high concentrations in water, caffeine can be toxic to aquatic organisms. As a result, the biodegradation of the compound is of interest. Specifically, bacteria are able to degrade caffeine by the C8-oxidation and N-demethylation pathways. To isolate caffeine-degrading bacteria a sediment sample from the Manasquan River, NJ and activated sludge from a local wastewater treatment plant (WWTP) were obtained and cultured with caffeine as the only carbon and nitrogen source. The cultures were serially diluted and bacterial isolates were confirmed to utilize caffeine for growth. Phylogenetic analysis of the isolates revealed that they were Pseudomonads. The degradation of caffeine by selected isolates in culture occurred in two days and was quantified by HPLC. PCR was used to amplify a possible segment of a gene (ndma) of a caffeine N-demethylase subunit from several isolates. Through RT-PCR, it was found that the gene was transcribed when caffeine was present, thus indicating that it is involved in caffeine degradation. It is important to understand the fate of caffeine in the environment with one possible route being biodegradation by bacteria. These bacteria could be utilized in caffeine bioremediation efforts and for possible industrial applications in the future.

JAMIE ESPOSITO | *The Monroe Doctrine and its Involvement*

Chief Advisor: Dr. Fred McKittrick

Second Reader: Dr. Chris DeRosa

What has been described as an evasive (and is a well discussed Principle of foreign policy in American history), the Monroe Doctrine, which has been interpreted as a principle of isolationism has been used in history, contrary to that interpretation, as a means of war. While there is evidence to support that the writer of the Monroe Doctrine, John Quincy Adams was a proponent of isolationism and it is safe to say that that theme is present in the doctrine, then why has it be used as an excuse of imperialism which is in direct contradiction to the intention of the writer. The answer stretches from 1823-1898 or from when the Monroe Doctrine speech was given to and including the Spanish-American War. In fact the United States uses the doctrine to defend her increasingly imperialistic role. Before the war there are new socio-political ideas forming that change the way people think on. The first new idea to hit the United States is Manifest Destiny, which is the dogmatic belief that it is the destiny, duty, and God's will that the US to spread westward and gain territory. The second wave of thinking that hit the US was in the 1870s and it was Social Darwinism which is the belief that certain social groups are more likely to survive and be successful based on the idea that they are racially superior because they are the smartest and the strongest. These two ideas will not only lead to the manipulation of the Monroe Doctrine but also imperial wars, and poor treatment of the conquered natives.

MEGAN A. HODGES | *MAPK/ERK signaling and E-cadherin cleavage in Human Fibrosarcoma HT-1080 cells.*

Chief Advisor: Dr. Dorothy Lobo

Second Reader: Dr. Ellen Dose-Pepe

The hallmark traits of cancerous cells are their lack of growth control and their enhanced ability to migrate from primary tumors. This thesis focuses on the molecular mechanisms within cancer cells that allow them to alter their protein expression in such a way that they are able to metastasize throughout the body. Signal transduction is the process through which a protein kinase cascade controls a cells response to external stimuli at the level of transcription. Cancer cells often exhibit mutations in proteins involved in signal transduction pathways leading to uncontrolled cell proliferation through various methods. E-cadherin proteins function as cell-cell adhesion molecules and are regulated by healthy cells throughout the cell cycle. Cell-cell adhesions lead to contact inhibition and a cessation of proliferation in healthy cells, yet this is not observed in cancerous cells. This lack of density dependent regulation of growth leads to the formation of tumors and eventually metastasis. E-cadherin has been observed to be down regulated in metastatic cancer tissues allowing the cells to have increased migratory capacity due to fewer connections tying them to neighboring cells. Cancerous cells are also able to cleave E-cadherin into an inactive form through matrix metalloproteins (MMPs). Increases in the expression of MMPs have been observed in the peripheral regions of tumors where cells are likely to gain migratory properties. The MAPK/ERK signaling pathway found in all cells functions to regulate the expression of genes involved in cell cycle progression. Specifically, active ERK increases the expression of MMPs that degrade the extracellular matrix surrounding cells and cleave E-cadherin attachments allowing for cell differentiation and division. The lack of growth control and migratory capacity observed in cancer cells is in part due to the over activation of ERK. This makes inhibiting ERK and the MAPK signaling pathway an important avenue in cancer research. Inhibiting ERK would lower the expression of MMPs therefore decreasing the amount of E-cadherin cleavage and preventing cancerous cells from being able to migrate. Experiments in our laboratory have found that PD98095, a MEK inhibitor that prevents the activation of ERK, successfully lowers the amount of phosphorylated ERK in fibrosarcoma HT-1080 cells in vitro. Western blot detection showed lowered expression of pERK in the cells treated with the inhibitor. This chemical was also found to significantly lower the fibrosarcoma cells ability to form colonies in soft agar plates as compared to control cells without the MEK inhibitor. Transfection of cells with pSR α -FLAG-ERK2DN was performed to express constitutively active ERK in fibrosarcoma HT1080 cells and confirm the decrease in expression of full-length cadherin through Western blot detection. Colony formation assay also verified active ERKs correlation with a cells increased ability to migrate and form new colonies.

TONIANN D. KEILING | *Carbon Sequestration of Mangrove Soils on Eleuthera, Bahamas*

Chief Advisor: Dr. Pedram Daneshgar
Second Reader: Prof. John Tiedemann

A growing body of evidence suggests that mangrove ecosystems may serve as strong sinks for atmospheric carbon, storing carbon in both mangrove biomass and in the sediment they trap. The quantity of sequestered carbon in Caribbean mangrove ecosystems has yet to be described. The purpose of this study was to determine carbon storage estimates in mangrove sediments to compliment previous work of mangrove carbon storage in The Bahamas. Sediment cores were extracted from four already-established sites on the island of Eleuthera, The Bahamas. A CN elemental analyzer was used to determine the carbon and nitrogen content as well as carbon nitrogen ratios of the sediment. Litter decomposition rates were also determined using litterbags, which were either kept at the sediment's surface or buried five centimeters below. Results show variable amounts of carbon among the sites, ranging from 13,945 - 54,853 g of carbon per square meter. Litter decomposition rates were greater belowground than at the surface at every site, suggesting that litter must be buried for the form of carbon storage to change. Carbon storage may be correlated with site maturity and soil depth, with more mature forests and deeper depths storing greater amounts of carbon. This study helps complete the picture of the tremendous value Caribbean mangroves hold in storing carbon that can help mitigate rising atmospheric carbon.

JESSICA L. KOSTIQU | *Personality Type Implementation in Robots*

Chief Advisor: Dr. Allen Milewski
Second Reader: Dr. Jiacun Wang

Social robots are becoming a prevalent part of modern society. They aid research of diseases, take care of the elderly and perform calculations faster than the human mind. They are part of daily life, and are expected to increase in importance as the technology age advances. The main barrier preventing robots from integrating into society is human acceptance and perception. Humans are still not completely comfortable with the idea of machines taking an active role in society. One way to improve this relationship is to implement more human-like characteristics in robots to make them more familiar to users. This study aims to isolate factors that contribute to personality in autonomous (self-governing) robots, and interpret whether humans are more willing to help robots based on their associated personality type.

CHRISTOPHER J. MAHROUS | *Development of a Ratiometric Room-Temperature Phosphorescence Nanosensor for Bisphenol-A Monitoring in Aqueous Solutions*

Chief Advisor: Dr. Tsanangurayi Tongesayi & Dr. Massimiliano Lamberto
Second Reader: Dr. William Schreiber

Detection of bisphenol A (BPA), an endocrine disruptor, using an inexpensive optical method is of great interest to the scientists conducting high throughput studies (especially environmental surveillance studies). In order to use functionalized "quantum dots" (QDs) as photoluminescence sensors in field analysis, interferences such as short-lived autofluorescence and scattering light have to be eliminated. In this study, we developed a composite nanostructure, QD-MIMS, incorporating molecularly imprinted mesoporous silica (MIMS) and phosphorescent Mn doped ZnS quantum dots (ZnS: Mn QDs), which can be utilized as a photoluminescence sensor for BPA in natural water samples. BPA was molecularly imprinted in MIMS using a covalent imprinting technique. A bisphenol A (BPA) imprint molecule was linked to two functional alkoxysilane monomers through thermally reversible covalent bonding to generate a covalently bound imprint precursor. This precursor was incorporated into a cross-linked periodic mesoporous silica matrix via a surfactant-templated, sol-gel synthesis. The matrix was also made to simultaneously incorporate formed room temperature phosphorescent ZnS: Mn QDs. After thermal treatment, BPA binding sites were selectively formed between the pores of MIMS. The result was a formed QD-MIMS. QD-MIMS showed a linear Stern-Volmer phosphorescence quenching relationship for BPA. Owing to the proximity of the binding sites to the QDs, QD-MIMS demonstrated good sensitivity for BPA analysis. QD-MIMS had a larger quenching constant for BPA than QD-MS (non-imprinted mesoporous silica encapsulating QDs) had for BPA. QD-MIMS showed significantly lower binding for both smaller and larger molecules containing phenol moieties. Thus, we developed a composite structured nanosensor for BPA with high sensitivity and selectivity. We exploited application of our sensor system in high-throughput monitoring of BPA concentrations in various natural water samples.

BRIAN J. MARTIN | *Facebook and Gender: The Other You*

Chief Advisor: Dr. Nancy Mezey
Second Reader: Dr. Johanna Foster

Facebook has grown into the most popular social media platform today. How do college students do gender on *Facebook* to create a desired image? Using the sociological lens of Dramaturgy in tandem with hegemonic masculinity and emphasized femininity, I will analyze the content of *Facebook* profiles. My target population for this study is college students, selected from a random sample of public profiles on *Facebook*. My findings conclude that *Facebook* is a stage upon which the individual is an actor in social interaction, as defined by Dramaturgy. My findings also demonstrate both males and females using masculine or feminine actions on social media to perpetuate gendered actions. These two theories when applied to my research, demonstrate that *Facebook* is the ideal vehicle for normalizing gender norms and providing students the tools to choose content to create their desired online image.

ALEXANDRA A. MAZYCK | *Hairitage: Hair as a Source of Identity and Division amongst Black Women*

Chief Advisor: Prof. Maureen Dorment

Hair throughout American history extends beyond the aesthetic and has taken on sociopolitical connotations. For members of the black culture, the significance held by the way hair is styled can be traced back to the tribal tradition in fifteenth century Africa. As such, it can be argued that the importance of hair is something deeply-rooted in the African-American psyche. The institution of slavery by Europeans in the United States not only worked to acknowledge this, but to further establish division based on a European-centered standard of beauty. The appearance of hair, therefore, became a means of survival and allowed for a (very limited) sense of mobility. This paper examines how this division not only persisted outside the bounds of slavery, but was further exacerbated within the black culture - specifically for black women. It traces the influence of media, politics, and social movements on the way hair was worn and the backlash both natural and relaxed (chemically straightened) hair received as a result.

SUSAN PAGANO | *“ Southern (dis) Comfort: Voting Rights in the 21st Century ”*

Chief Advisor: Dr. Joseph Patten
 Second Reader: Dr. Stephen Chapman

The right to vote is now the cornerstone of American democracy, but this was not always the case. Suffrage was historically a privilege that was reserved for the elite few who were holders of property and free of debt, which largely excluded many individuals, especially African Americans. This struggle for voting rights continued until the enactment of The Voting Rights Act in 1965, which has proved to be an extremely effective tool for ensuring the right to vote for all citizens. Section four of the act contained a preclearance provision that required states with histories of disenfranchisement practices to get permission from the federal government before making any changes to voting legislation. However, in the summer of 2013, in the case of *Shelby County v. Holder*, the Supreme Court struck down Section four of the Voting Rights Act as unconstitutional. With this ruling, many states, especially those who were previously unable to change their voting laws without federal oversight, are now enacting legislation that restricts voting rights. Some of these restrictions include photo identification requirements, cutbacks on early voting, and limitations on voter registration. This study examines why some states are passing these laws and finds that states are enacting these laws for regional and partisan reasons.

TAYLOR RODENBERG | *Carbon Sequestration of Invaded and Native Dunes*

Chief Advisor: Dr. Pedram Daneshgar
 Second Reader: Prof. John Tiedemann

Carbon storage in dunes may change with the introduction of a non-native invasive species. Carbon storage was compared between native dominated and Asiatic sand sedge (*Carex kobomugi*) invaded dunes. We hypothesized that invaded dunes would store greater amounts of carbon because they have greater below-ground biomass accumulation. Six study sites were established at Island Beach State Park and Sandy Hook National Park in New Jersey. Ten 1-square meter plots were randomly selected at each site; five in an invaded area and five in a completely native area. Plots were sampled in July and December 2014 to compare seasonal differences of diversity and carbon storage. Percent cover was used to determine the species diversity of each plot. During each sampling time, above and belowground biomass (up to 30 cm) was harvested from two invaded plots and two native plots at each site. Aboveground biomass was separated by species and belowground biomass was separated into roots and non-roots. The harvested biomass was dried, weighed, and a subsample was ground for analysis. A CN elemental analyzer was used to determine carbon and nitrogen content and C/N ratios of each sample. Though diversity was decreased with invasion, carbon storage was increased due to greater belowground biomass in invaded dunes. Aboveground biomass did not differ between native and invaded dunes, but both were reduced from summer to winter. Although sedge reduces native diversity of dunes, it holds value in potential carbon storage, which could help mitigate the effects of global climate change.

PAIGE TANNENHAUS | *The Effect of Gender on Reluctance to Pursue an Online Relationship Face-to-Face as a Result of Fear of Violent Crime Amongst College Students*

Chief Advisor: Dr. Michele Grillo

Online dating has become highly popular amongst college student. According to statistics, college-aged students (18-25 years old) are the most frequent users of social networking and dating sites. While online dating has benefits for those looking to pursue relationships, there are also some serious downfalls. The worst of these consequences being possible death or assault resulting from a face-to-face meeting with an online suitor. Because online dating has become such a problem in criminal justice, especially with cybercrime on the rise, the main objective in this research is to find out about the perceptions that college students hold about online dating, and what kind of factors affect those perceptions. Fear of violent crime, as a result of a face-to-face meeting that goes horribly or fatally wrong, is the main hypothesized motivation for negative perceptions about online dating. Gender will affect fear of crime, thus affecting perceptions about online relationships. It has been proven that women fear crime more than men - especially sexual assault. This "shadow of sexual assault" phenomena will result in negative perceptions about online dating, and therefore, more reluctance to pursue an online relationship face-to-face.

JAYDE A. VALOSIN | *Using Scent to Influence Affect Following Ego Depletion*

Chief Advisor: Dr. Natalie Ciarocco

The purpose of the current study is to combine the concepts of scent and emotion and to understand how scent may moderate affect. Approximately 50 students ranging in age from 18 to 42 completed a writing assignment that served as an ego depletion task intended to make participants more susceptible to emotional change. Participants were then exposed to a negative mood induction in the form of a sad video clip and asked to smell one of three scents. It was hypothesized that participants who smelled a grass scent would report high levels of happiness as compared to participants in the lavender and smoke conditions. It was expected that participants who smelled a lavender scent would report high levels of calmness as compared to participants in the grass and smoke conditions. Finally, it was expected that participants who smelled a smoke scent would report high levels of anxiousness as compared to participants in the grass and lavender conditions. Results and implications will be discussed.

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