

# THE HONORS SCHOOL RESEARCH CONFERENCE

*It is with great pleasure that the Honors School presents its Spring 2017 Research Conference.*

*Student presenters include research in the fields of Accounting (BUBA), Art (AR), Biology (BY), Business (BU) Chemistry (CE), Computer Science (CS), Marketing (BUBK) Psychology (PY), Social Work (SW), Software Engineering (SE)*



**SPRING 2017  
HONORS SCHOOL  
RESEARCH CONFERENCE SCHEDULE  
Friday, APRIL 21, 2017**

**SESSION A: 10:30 a.m. – 12:00 p.m.**

**Opening Remarks: Dr. Walter D. Greason**

**Dean of the Honors School**

Lena Sharesky, Business Marketing  
Sabrina Kvalo, Psychology  
Devyn Streisel, Chemistry  
Danielle Compitello, Biology  
Calliope O'Shea, Biology  
Kristen Jezycki, Biology  
Cayla Sullivan, Biology  
Rachael Thalheimer, Social Work

**SESSION B: 12:30 p.m.—2:00 p.m.**

Stephanie Cornick, Computer Science  
Mohammad Jafri, Chemistry  
Emily Townsend, Business Accounting  
Erin Hoag, Biology  
Alexa Scarpaci, Social Work  
Anthony Vito Cosentino, Art

**Closing Remarks: Dr. Stanley S. Blair**

**ANTHONY VITO COSENTINO (AR) | *The Revival of Vinyl***

Chief Advisor: Prof. Mark Ludak

Second Reader: Dr. Stuart Rosenberg

The topic of my research for my honors thesis is the revival of vinyl in the digital age of music, and how an association with vinyl records affects one's identity in music culture. The comeback of vinyl records, despite their relative inconvenience in comparison to modern methods of music consumption, requires a multifaceted explanation. To explain this phenomenon, it is important to look at the history and growth of the music industry, how the digital age has drastically affected the way we consume music, and how music culture contributes to a sense of belonging. Overall, the purpose of my honors thesis was to analyze the factors that led to vinyl's decline and subsequent revival, as well as the cultural significance of records and how they contribute to identity in both a personal and sociological context. My research began by collecting online and print sources that provided me with a general idea about what factors have collectively led to vinyl's resurgence. I then used the information I gathered to create a list of questions to ask record store owners and managers, which I used to create a documentary video with footage from ten independent record stores. They all offer valuable insight about why people still buy vinyl, the sociological aspect of getting involved with record collecting, and the potential for the vinyl market to either grow or decay over time. In conjunction with the documentary video, I also created a photographic portfolio that depicts the unique characteristics of each record store that I visited. My hope is that providing visual context will aid viewers in understanding why the vinyl record has defied obsolescence all these years. Records and record stores are about forming a deeper connection with music.

**ERIN HOAG (BY) | *Determining the Binding Selectivity of Perspective Anti-Cancer Drugs to Telomeric and Double-Stranded DNA Using Computational Techniques***

Chief Advisor: Dr. Dmytro Kosenkov

Second Reader: Dr. Massimiliano Lamberto

The binding of organic ligands to telomeric G-quadruplex DNA (gqDNA) has the potential to act as an anti-cancer therapy. It has been shown that the stabilization of the gqDNA using polycyclic aromatic ligands prevent the rapid cell division that ultimately leads to cancerous tumors. However, these ligands may also have toxic effects due to their high affinity to the coding double stranded DNA (dsDNA) interfering with normal gene replication. This work is focused on investigation of interactions of recently synthesized polycyclic aromatic ligands derived from naphthalene diimide (ND) and diminazene (DMZ) with gqDNA and dsDNA. The modeling presented here has been to test the relative affinities (binding energies) of DNA-ligand binding in order to establish the ligand structure that will provide the best selectivity for gqDNA over dsDNA and minimize potential negative side effects. By simulating a natural molecular environment, an efficient assessment can be made using computational methodologies that include molecular docking and molecular dynamics simulations.

# *Welcoming Remarks*

**DR. WALTER D. GREASON** *Dean of The Honors School*

## *Presenters (in alphabetical order)*

**DANIELLE COMPITELLO (BY)** | *An analysis and comparison of available and anticipated treatments for Muscular Dystrophy*

Chief Advisor: Dr. Ellen Doss-Pepe

The purpose of the following literature based, theoretical study was to develop an understanding of the different types of muscular dystrophy (MD) and the available and anticipated treatments of MD. Through the analysis of several research articles, a comparison of treatments was made and a conclusion about which treatment might be most beneficial to patients with MD was proposed. Muscular dystrophy is a group of more than thirty genetic disorders that generally cause progressive muscle weakness and deterioration. In order to develop an understanding of the causes and effects of muscular dystrophy, multiple scientific fields such as genetics, cell biology, and biochemistry have been employed. Our growing knowledge of the causes of muscular dystrophy have not yet led to a cure for the disease, but several research projects have been performed in order to investigate different treatments to help those with MD. Treatments range from specific gene therapies to stem cell therapies. This study attempted to analyze the currently available therapies and those being developed in order to hypothesize which one might be the most successful in treating MD. In order to fully understand the proposed treatments and therapies, several literature sources explaining muscular dystrophy and important aspects of the disease were also utilized so that a complete understanding of MD could be developed. Then, a determination of which treatment might theoretically be the most beneficial and lead to more progress in treating patients with MD was determined based on an established set of criteria. The criteria included assessing the stage of development each therapeutic technique is in (i.e. basic research, pre-clinical studies, clinical trials, etc), assessing the success of each therapeutic strategy in the phase of testing that it is in, and determining how many forms of muscular dystrophy each strategy might be able to treat. Using these criteria, it was established that exon skipping with antisense oligonucleotides is one of the most promising upcoming MD therapies.

**STEPHANIE CORNICK (CS)** | *Smart Desk*

Chief Advisor: Dr. William Tepfenhart

Second Reader: Dr. Betty Liu

This thesis explores the development of a Smart Desk, a computer system set up to allow people to communicate and collaborate in a work environment from remote locations. In general, this project achieved the development of a Smart Desk through installation and use of software and accessories on an existing operating system in a computer. The introduction sheds light on where the idea originated and the history of office work, what was expected to be the end result, and a general overview of how the approach to creating the Smart Desk went. Following that, the overview of the technical approach is used as a template for the body of the thesis, the research results. Each step of the process of researching and building the Smart Desk is described in this section, from establishing needs through reengineering of a prototype, as well as the results of all research or testing done along the way. In the end, after all the development and testing of the prototypes have been built and evaluated, what can be conclusively said is that most of the capabilities needed exist, though there are some limitations in what is available and gaps in functionality that have not been satisfactorily filled.

## **MOHAMMAD JAFRI (CE) | *Biofilm Modeling in Hydrothermal Systems***

Chief Advisor: Dr. Kayla Lewis

Second Reader: Dr. Dmytro Kosenkov

The rate at which biofilms grow in high-temperature seafloor hydrothermal systems were studied as well as the conditions necessary for their growth in this setting. The goal was to determine the conditions under which a biofilm may attain steady-state, the thickness of such a steady-state biofilm, and the effect of the film on properties of the porous rock matrix as well as fluid velocities. The motivation for this research and analysis was to understand the impact biofilms have on hydrothermal vents. The mathematical model employed predicted that a biofilm can only attain a stable thickness when a certain relationship holds between parameters representing the fluid velocity, bacterial substrate ingestion, and sloughing off of the film into the fluid stream. It is demonstrated that, when this condition does not hold, the biofilm either grows to fill all available space or that no biofilm can be supported. Finally, the effects of the biofilm on porosity and permeability were calculated.

## **KRISTEN JEZYCKI (BY) | *Impacts of Increased Salinity on Red Mangrove (Rhizophora mangle) Sediment Respiration Rates***

Chief Advisor: Dr. Pedram Daneshgar

The aim of this study was to explore how climate change and increases in salinity will affect the sediment respiration rates of red mangroves in The Bahamas. The salinity of marine ecosystems in tropical areas is expected to rise as a result of increased surface water evaporation due to warming. As fluctuations in salinity occur, mangroves are susceptible to change as their productivity is closely linked to salinity, exemplified by the presence of dwarfed mangroves in the Caribbean. Mangroves have been shown to be important carbon sinks and should continue to be so as long as carbon gains outweigh losses due to soil respiration. Thus, it is important to assess how these processes will be impacted in the changing climate. Four tidal creeks on the island of Eleuthera in The Bahamas were chosen as part of this study due to their natural salinity gradients ranging from ambient ocean levels near the mouth of the creeks to hypersaline in the upper portions of the creeks. Sediment samples were taken along this salinity gradient and incubated in two different salinity treatments, ambient and hypersaline. Each sample was then examined using an infrared gas analyzer to assess its respiration. Results showed that there were differences in the rates and cumulative carbon outputs by site and treatment overall, exemplifying the changes that are likely to occur to mangrove ecosystems as the climate changes. Along with this, it is important to consider and assess other external factors that may contribute to the functioning of these vital ecosystems in order to ensure they will remain productive despite the changing climate.

## **SABRINA KVALO (PY) | *Decision Making in Relationships***

Chief Advisor: Dr. Gary Lewandowski

This study examined logical and emotional thinking's effect on tolerance of bad relationship behaviors (e.g. gets jealous easily, lies frequently) and deal breakers (e.g. the person is currently dating multiple partners, the person is currently dating multiple partners). In addition, the study examined whether type of thinking had a different influence depending on whether considering behavior from one's own vs. one's friend's perspective. As a part of a 2x3 factorial design, 117 college students were randomly assigned to either the own relationship or friend's relationship condition and to a second condition of either logical, emotional, or neutral thinking. In order to manipulate type of thinking, participants completed a modified version of the Affective Norms for English Words, which asked participants to rate the relatedness of sets of words that were either logical, emotional, or neutral in nature. Participants then filled out two questionnaires from either their own perspective or the perspective of their best friend. There were no significant differences between the own relationship and friend's relationship conditions. However, type of thinking had an effect such that those in the emotional condition were more likely to tolerate bad relationship behaviors and less likely to see undesirable traits as deal breakers than those in the logical condition. This suggests that when people are using their emotions to guide their decisions, their decision-making abilities become clouded.

**CALLIOPE O'SHEA (BY) | *Effects of Alcohol and Caffeine on Lipid Raft-Associated Receptors Within the Adolescent Brain***

Chief Advisor: Dr. Dennis Rhoads

Second Reader: Dr. Ellen Doss-Pepe

Co-use of stimulants such as caffeine or amphetamine has added significantly to the existing concern over binge patterns of alcohol consumption among college students. Initial work in this lab has modeled prolonged alcohol-stimulant co-use with behavioral studies of adolescent Long-Evans rats. This work suggested that stimulants mask or block certain symptoms associated with alcohol withdrawal. Thus, they mask behavioral signs of alcohol dependency. The goal of this thesis was to determine both molecular and cellular targets for interaction between alcohol and caffeine in the brain. At the molecular level, alcohol has been shown to upregulate an important excitatory glutamate receptor known as NMDA. At the cellular level, alcohol altered the properties of lipid raft structures in brain cell membranes. Western blotting was the technique used to confirm isolation of these lipid rafts and to characterize the effects of alcohol. Of prime importance for this study, the changes following alcohol administration were all eliminated when caffeine was administered with ethanol. Given that the appearance of withdrawal symptoms can be a cue to emerging dependency, understanding the ability of stimulants to mask these symptoms is crucial to both education and treatment strategies related to adolescent alcohol abuse.

**ALEXA SCARPACI (SW) | *Socio-demographic Characteristics and their Relation to Stress Among College Students***

Chief Advisor: Dr. Sung-Ju Kim

The purpose of this study is to examine the issue of stress and college students. Specifically, the study aims to examine the relationship between a student's perceived stress level and his or her socio-demographic characteristics. This study is important because the negative impacts of stress among college students are currently on the rise. If socio-demographic risk factors of stress can be identified, measures can be taken to reduce these risk factors, thus reducing a student's perceived level of stress and the negative consequences that result from it.

**LENA SHARESKY (BUBK) | *Soulstice Digital Business Portfolio***

Chief Advisor: Prof. Janice Rohn

Second Reader: Dr. Joseph McManus

This thesis applies research that contributes to successful online businesses into the development of a digital creative portfolio for Soulstice, an online philanthropic retailer. Understanding the significance of building a strong brand image through online consumer engagement led to the development of Soulstice's two-week social media planning calendar for Instagram, Twitter, and Facebook. In addition to creating a social media plan, implementing an aesthetically pleasing company website that is easy to navigate and provides valuable information was essential. Further discussion highlights other logistical factors of digital marketing including search engine optimization, social media and website analytics, and consumer online word of mouth. By applying methods and patterns identified in existing scholarly research, this thesis develops a strong digital brand image for a small startup company.

**DEVYN STREISEL (CE)** | *Intramolecular hydrogen exchange at rhenium(V) pentahydride complexes stabilized by a primary amine ligand*

Chief Advisor: Dr. Greg Moehring  
Second Reader:

This thesis describes the intramolecular hydrogen exchange for several rhenium(V) pentahydride complexes where the metal center is supported by a primary amine ligand in addition to two triphenylphosphine ligands. In three of the new complexes the primary amine includes a second dangling amine or alcohol functional group while in one new complex the primary amine is simply n-butylamine. In the cases of all of these new complexes hydride ligands undergo a fluxional exchange between coordination sites as well as a site specific exchange of one hydride ligand with the ortho protons of the triphenylphosphine ligands. A second exchange process is observed involving the same ortho protons of the triphenylphosphine ligands and hydrogen from the primary amine ligand. The net of the exchange processes makes some triphenylphosphine protons, some hydride ligands, and some of the protons from the primary amine ligand equivalent in the <sup>1</sup>H NMR spectrum of these compounds at higher temperatures. At lower temperatures separate proton resonances are observed for all of the exchanging protons. The proton exchanges are observed by two dimensional EXSY NMR.

**CAYLA SULLIVAN (BY)** | *The Effects of Anthropogenic Sourced Nitrogen Deposition on Salt Marshes*

Chief Advisor: Dr. Pedram Daneshgar

Nitrogen deposition, a naturally occurring process, has been increasing particularly in metropolitan areas due to anthropogenic factors. The specific effects of increasing nitrogen deposition on salt marshes, ecologically and economically important coastal ecosystems, are unknown. Through the use of isotopic enriched fertilizer additions, the impacts of rising nitrogen deposition on salt marshes can be assessed. Six salt marsh locations along the coast of New Jersey and Long Island, New York were analyzed to determine the fate of nitrogen added through deposition using nitrogen isotope tracers. At these sites, five different treatments were assigned to 1-square meter plots of salt marsh: a) a control, b) nitrogen isotope enriched fertilizer added in amounts equivalent to one year of N deposition, c) non-enriched fertilizer added in amounts equivalent to one year of N deposition, d) an isotope enriched doubling of current annual values of N deposition and e) a non-enriched doubling of current annual values of N deposition. After a month, all plant biomass was harvested and separated by species. Soils were sampled with an auger. All biomass and soils were dried and weighed and subsamples were ground and sent to stable isotope laboratory for analysis. Our results suggest that there are a lot of site to site differences in marsh composition and productivity. Overall, salt marsh productivity increased with deposition, but allocation of nitrogen and biomass was different from site to site. This project provides a better understanding of the potential degradation of salt marshes and may help provide insight to develop management plans to conserve and restore the salt marsh ecosystems for the future.

**RACHAEL THALHEIMER (SW)** | *Perceived Effectiveness of Music Therapy among Adults with Co-Occurring Mental Health and Substance Abuse Disorders*

Chief Advisor: Dr. Michelle Scott

The purpose of this study is to describe the perceived effectiveness of various techniques of music therapy among individuals with co-occurring mental health and substance abuse disorders. This study will use a cross-sectional online-based survey research design. Convenience sampling will be used for the purpose of this study. The sample size is 191 certified American Music Therapy Association music therapists, quantitative and qualitative measurements will be used. All techniques listed (drumming, lyric analysis, vocal and instrumental improvisation, music performance/re-creation, recorded and live listening, composition, music imagery, and movement with music) had average scores between 3.61 and 4.33, thus describing them as "very effective." The most commonly used and highest scored music therapy technique is lyric analysis/discussion. The lowest scored music therapy technique is vocal improvisation. Findings of this study may add to the knowledge of music therapy as well as understanding the most effective music therapy technique(s) to use with individuals with co-occurring disorders.

**EMILY TOWNSEND (BUBA)** | *The Voice of One to Save Many: The Whistleblower Predicament*

Chief Advisor: Prof. Ryan Tetro  
Second Reader: Dr. Scott Jeffrey

The purpose of this research is to research the legal side of Whistleblower cases in the white collar business fields. Specifically, the research is an examination of the actual whistleblower and not the specific cases. The research consisted of looking at laws already in the system used to protect those individuals, but also looking at what happens after the case is brought to court. Ultimately, the paper looks at a new case study on how to address these situations, which means, more compensation for the individuals that report. The two laws in place right now that are working for the government are the Whistle Blower Protection Act of 2001, this act protects individuals from allowing a former company retaliate on them, and cause damage to their business reputation. The other law in place is the Dodd Frank Act, this act gives monetary damages to whistleblowers of 10-30% of the settlement amount. Both of these laws are in place and are working in allowing those who have come forward get some compensation, however the Whistleblower is seen as a social pariah in the business field. The United States Government has provided laws to protect Whistleblowers from retaliation of former employers, because of the information the individual provides; the Federal Government should revise the laws to allow the Whistleblower to be seen as an advocate for those in company rather than a pariah.

*Congratulations to our  
Honors Graduates*

*Danielle M. Compitello*

*Sabrina R. Koala*

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*Maxim Maltsev*

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—Amanda Kontor '16  
Major: Communication/Public Relations  
Class of 2016 Valedictorian  
Currently pursuing a Master's in Communication Science,  
University of Vienna

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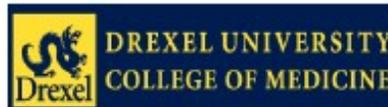
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