The 6th Annual

UNDERGRADUATE RESEARCH & SCHOLARSHIP SYMPOSIUM

WEDNESDAY, April 9, 2014

Sponsored by:

Academic Affairs
Office of the Provost
Office of Research
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ACKNOWLEDGEMENTS

The organizers would like to thank all of the faculty mentors for their service and support of our undergraduate scholars.

A special thank you to the Bayer School of Natural and Environmental Sciences for their generous donation of the corkboards used in the poster session.

We would also like to thank the following organizations and individuals for their generous support of this important event:

Academic Affairs
Academic Community-Engaged Scholarship
Bayer School of Natural and Environmental Sciences
Center for the Catholic Intellectual Tradition
Center for Spiritan Studies
Committee of Student Jurors
Enrollment Management Group
Gumberg Library
Honors College
Mary Pappert School of Music
Mylan School of Pharmacy
Office of the Provost
Phi Kappa Phi
School of Nursing
University Academic Sustainability Committee
Duquesne Undergraduates Jamie Jackson, Joylynn Pruitt and Emily Scott
Duquesne Undergraduate Molly Fallone for the cover photograph
Office of Research, Christine Pollock and Mary McConnell
WELCOME

Students, Faculty and Guests:

I would like to welcome you to the 6th Annual Undergraduate Research and Scholarship Symposium. The URSS serves as a way of recognizing the achievements of our undergraduate scholars while highlighting the research and scholarship which is so much a part of a Duquesne education. It has grown to become an annual celebration of undergraduate research and the breadth of scholarship in our university. I would like to thank all of our participating undergraduates for the hard work and their excellent posters and presentations.

I especially want to thank our faculty who train and encourage young scholars and without whom this event would not be possible.

The URSS has relied on our award sponsors and judges who provide awards and give their time to make this an outstanding experience for our students. Their continued support has been vital to the success of the symposium. Finally I must thank the organizing committee and the Office of Research staff who devote their time to ensuring the success of this event.

Enjoy the day and celebrate your research and that of your fellow undergraduate students across the diverse disciplines which are part of Duquesne University.

Sincerely,

Alan W. Seadler, Ph.D.
Associate Provost for Research and Technology
# Schedule

**Tuesday, April 8, 2014 | Power Center Ballroom**

<table>
<thead>
<tr>
<th>Event Description</th>
<th>Time</th>
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<tbody>
<tr>
<td><strong>Student Participant Set-up</strong>&lt;br&gt;Participants are required to stop by, sign in and set up posters between 9:30 a.m. and 2:00 p.m.</td>
<td>9:30 a.m. to 2:00 p.m.</td>
</tr>
<tr>
<td><strong>Welcome Reception for Participants and Sponsors, Shepperson Suite</strong>&lt;br&gt;DU faculty, student participants, and URSS sponsors are invited to attend. Light appetizers will be served.</td>
<td>2:00 to 4:00 p.m.</td>
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<tr>
<td><strong>Judges-only “Sneak Peak” of Posters</strong>&lt;br&gt;Judges are invited to view posters during this time.</td>
<td>4:00 to 7:00 p.m.</td>
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**S C H E D U L E**

*Wednesday, April 9, 2014 | Power Center Ballroom*

<table>
<thead>
<tr>
<th>Event</th>
<th>Time</th>
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<tbody>
<tr>
<td><strong>Student Participant Check-In</strong></td>
<td>8:00 to 9:00 a.m.</td>
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<tr>
<td>(Continental Breakfast provided for participants)</td>
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<tr>
<td><strong>Doors Open to the Public</strong></td>
<td>9:00 a.m.</td>
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<tr>
<td>Opening Remarks</td>
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<tr>
<td><strong>Keynote Speaker:</strong> Dr. Philip Reeder, Dean of the Bayer School of Natural and Environmental Sciences**</td>
<td>9:30 to 10:30 a.m.</td>
</tr>
<tr>
<td><em>Building a Program of Research: Fifteen Years of Multidisciplinary Research in Israel</em></td>
<td></td>
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<tr>
<td>Biography on Page 10</td>
<td></td>
</tr>
<tr>
<td><strong>Poster Session</strong></td>
<td>9:00 a.m. to 1:00 p.m.</td>
</tr>
<tr>
<td>Guests are invited to walk around, peruse student projects and engage with students. *Poster session will continue to run throughout the duration of the URSS</td>
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<tr>
<td><strong>Formal Presentations: Session 1</strong></td>
<td>10:45 a.m. to Noon</td>
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<tr>
<td>Details on Page 7</td>
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<tr>
<td><strong>Break for Lunch</strong></td>
<td>12:00 to 12:30 p.m.</td>
</tr>
<tr>
<td>(Boxed lunches are provided for participants. We encourage you to eat lunch while watching the second presentation session)</td>
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<tr>
<td><strong>Formal Presentations: Session 2</strong></td>
<td>12:30 to 1:45 p.m.</td>
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<tr>
<td>Details on Page 8</td>
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</tr>
<tr>
<td><strong>Awards and Closing Remarks</strong></td>
<td>1:45 p.m.</td>
</tr>
</tbody>
</table>
PRESENTATIONS: SESSION 1

10:45 a.m.  Jordan T. Oeler  
*A Structure for Evaluating Common Stocks: Independent Audit*  
A.J. Palumbo School of Business  
Abstract Number: 85

11:00 a.m.  Andrew Witchger  
*Gas Electron Multiplier and Multi-Anode PMT Analysis for RICH Detector in CLAS12*  
Bayer School of Natural and Environmental Sciences  
Abstract Number: 66

11:15 a.m.  Briana Gebhart, Maggie Betschart, Francisco Baralt  
*Food for Thought: Can eating the material actually enhance memory*  
McAnulty College and Graduate School of Liberal Arts  
Abstract Number: 33

11:30 a.m.  Christopher Ignatz  
*Depression, Pain, and Anxiety Modulation through a Novel CNS Active Marine Cyanobacterial Compound*  
Bayer School of Natural and Environmental Sciences  
Abstract Number: 38

11:45 a.m.  Abigail Jones  
*John Vanderlyn’s Visual and Political Representation of George Washington*  
McAnulty College and Graduate School of Liberal Arts  
Abstract Number: 74
12:30 p.m. Rachel Marini
The effect of atypical antipsychotic medications on body temperature in patients with Prader-Willi syndrome
Mylan School of Pharmacy
Abstract Number: 35

12:45 p.m. Andrew Gula
Implementation of a Ten-tone Equal Temperament System
Mary Pappert School of Music
Abstract Number: 58

1:00 p.m. Tonya Temoff, Jaclyn Daher, Kayla Edkins, Kerri Pavlik, Meghan Wilson
Nica’s Niños
School of Nursing
Abstract Number: 23

1:15 p.m. Amanda Bucheit and Scott Harman
The Sight of Music
McAnulty College and Graduate School of Liberal Arts
Abstract Number: 48

1:30 p.m. William Gangewere
Assessing the Impact of a Privacy Breach on a Firm’s Market Value
A.J. Palumbo School of Business Administration
Abstract Number: 83
SPECIAL AWARDS

ACES: Academic Community-Engaged Scholarship
Outstanding Community-Engaged Scholarship Project: $250

Bayer School of Natural and Environmental Sciences
Two for Excellence in Research in the Basic Sciences: $300

Center for the Catholic Intellectual Tradition and Center for Spiritan Studies
Catholic Intellectual Tradition and Spiritan Studies Award for Undergraduate Research: $250

Gumberg Library
Gumberg Library Award for Undergraduate Research: $250

Honors College
Outstanding Poster: $250

Mary Pappert School of Music
Mary Pappert School of Music Undergraduate Award: $250

Mylan School of Pharmacy
Award for Undergraduate Research: $250

Office of the Provost
Outstanding Scholarship Award: $250
Two Honorable Mentions: $125

Phi Kappa Phi, National Honors Society
Outstanding Scholarship Award: $500
Two Honorable Mentions: $250

School of Nursing
School of Nursing Undergraduate Award: $250

University Academic Sustainability Committee
Excellence in Sustainability and the Environment: $250
Dr. Philip Reeder
Dean, Bayer School of Natural and Environmental Sciences

Dr. Philip Reeder's research and areas of expertise focus on paleo-environments, paleo-climate and the human role in environmental change. During his career, Dr. Reeder has garnered grant funding from the National Science Foundation, the U.S. Man and the Biosphere Program, the National Geographic Society and the Alphawood Foundation, to name a few. His fieldwork and research have been conducted around the world, including sites in South Korea, New Zealand, Israel, Belize, Peru (where he was a Fulbright Scholar), the Philippines, Poland, Spain and Mexico. Prior to joining the Bayer School as Dean, Dr. Reeder served as Director of the Environmental Science and Policy Division, in the College of Arts and Sciences, at the University of South Florida for ten years. Dr. Reeder's research has been published in *The Journal of Cave and Karst Studies; Palaeogeography, Palaeoclimatology, Palaeoecology; Quaternary Research; and the Journal of Environmental Management*. He earned his Doctoral Degree in Physical Geography from the University of Wisconsin-Milwaukee, his master's degree in Geoscience from Western Kentucky University, and his bachelor's degree in Earth Science from Frostburg State University.
ABSTRACTS

1 Understanding the Church Modes in Liturgy
Jessica Baier
Junior | Mary Pappert School of Music
Faculty Advisor: Ann Labounsky, Ph.D.

ABSTRACT:
The church modes are musical scales that originated in the first century, and define how the church sings different chant. The analysis and knowledge of these modes are crucial to understanding music. My poster will discuss the use of the eight modes especially in the Medieval and Renaissance eras, as early composers primarily kept with these in their works. I will have musical examples of the different modes, and will also have sound clips of chant that is still used today that is based on the different modes.

2 Overcoming Teammate Inaccuracy Blindness
Elise Carter, Aimee Kane, Ph.D.
Junior | A.J. Palumbo School of Business Administration
Faculty Advisor: Aimee Kane, Ph.D.

ABSTRACT:
Teams of analysts working on complex problems can be influenced by inaccurate information provided by teammates (Kang, Kane, Kiesler, 2013). The current behavioral research examines ways to overcome this problem of “teammate inaccuracy blindness” using a 2 (partner origin: insider/outside) x 2 (report evaluation: yes/no) factorial design. Participants worked on solving homicide cases that required them to piece together clues from case files and bus route information to identify a serial killer. Before doing their own analysis, participants received a progress report from their partner that identified incorrect suspects. Results show that analysts are least likely to be led astray by inaccurate information when it comes from an insider and the interface prompts them to evaluate the logic of the report. Personally, I found it both rewarding and challenging to take on the role of an experimenter conducting research with my peers, particularly when participants were individuals I knew well.

3 Are Tissue Adhesives more Effective in the Wound Healing Process than Conventional Suture Technique?
Meghan Bartlebaugh, Alex Hess
Senior | School of Nursing
Faculty Advisor: Lichun Chia, Ph.D., RN

ABSTRACT:
Background: Conventional suture technique and adhesive skin glue are most used methods for closing wounds. The purpose of this research is to determine which method is more effective in the wound healing process through a review of primary research comprised of original data. Conventional suturing technique has been used for decades prior to the development of adhesive skin glue, but both are currently used in practice. Methods: A systematic literature review using three databases found nine evidence based research articles providing data in support of adhesive glue. These articles were searched for primarily using healthcare professional databases such as PubMed and CINAHL. Results: There were a few design flaws found within the articles chosen, including tension...
of the lacerations and wound location. Overall, tissue adhesives were found to be overwhelmingly superior. Aspects that contributed to this conclusion included more concise closure time, greater cosmetic outcome, and increased patient satisfaction.

4 Goodworks: The Importance of Health & Wellness
Kate Patterson, Ali Guzewicz, Lauren Smilek
Senior | Rangos School of Health Sciences
Faculty Advisor: Anne Marie Witchger Hansen, Ed. D., OTR/L

ABSTRACT:
Recidivism rates in the United States are far too high. Unfortunately, “many inmates lack the community living skills necessary for community reintegration” (Eggers, Muñoz, Sciulli, & Crist, 2006). Goodworks is a six week program that works with 5-15 ex-offenders on health and wellness skills to incorporate into their everyday lives. The program focuses on a different skill each week: positive thinking, time management, stress management, anger management, ergonomics, body mechanics, body weight exercises, accessing resources, proper interview and job appearance, and exploration of careers. The program integrates these skills into enjoyable, hands on activities to teach the skills of the session. The men demonstrate the ability to use these skills by demonstration, discussion, and homework activities. The goal of Goodworks is to improve the mind, body, and spirit of the men in order to improve their participation with others as well as their own well-being for a holistically balanced being.

5 Evaluation of a Sexual Assault Nurse Examiner’s Impact on Patients
Lauren Duffy, Amanda LeBreton
Sophomore | School of Nursing
Faculty Advisor: Alison Colbert, Ph.D

ABSTRACT:
Sexual assault is any type of sexual activity that one does not agree to. The rate of sexual assault in the U.S. is high; one in every 5 women have been raped and 44% of those that experienced this are 18 or younger. The effects sexual assault has on the victims can be short term and long term impacting their physical and emotional health. A sexual assault nurse examiner (SANE) is a nurse that helps obtain forensic evidence, and help care for the victim(s) of sexual assault. The question arises does the training a SANE has compared to a regular nurse compare in taking care of the patient’s needs? A literature review using the database CINAHL will be used to critique whether or not this is true. We will describe the findings that we have in regards to the impact SANE nurses had on patients.

6 “Independence, Now!” Developing the Skills of a Practice Scholar using community-based participatory research methods.
Keira DiSpirito, Andrea Harold, Jenna Small
Senior | Rangos School of Health Sciences
Faculty Advisor: Anne Marie Witchger Hansen, Ed. D., OTR/L

ABSTRACT:
The purpose of Independence Now is to enhance women ex-offenders’ self-confidence and self-esteem by embedding these psychosocial skills into activities that teach tangible skills like job searching and resume building. This 11 week long community-based service learning project was developed over two semesters in conjunction with occupational therapy students and staff at the Renewal community agency. Students used community-based
participatory research methods and evidence based research during the fall semester to discover the needs of the population. During the spring semester, students carried out the project by leading weekly group sessions for the consumers focused on skill development. The results of this study will show how an 11-week community-based occupational therapy program impacted women ex-offenders at Renewal. The results of this study will provide “best practices” for enhancing the self-confidence, self-esteem, and job searching skills in women ex-offenders. In addition, OT students will enhance their clinical reasoning and gain practice scholar experience.

7 The Role of Music in Slavery
Molly Cavanaugh, Andrew Kurtz
Senior | Mary Pappert School of Music
Faculty Advisor: Kathleen Glenister Roberts, Ph.D.

ABSTRACT:
Scholarship in the history of the Civil War in the United States reveal that a complex set of factors were needed to overcome slavery in this country. Of the many efforts exerted by the slaves themselves, the use of music was highly significant. In our project we examine in-depth the role of music - specifically the form known as "spirituals" - in coded communication as well as community-building. We hope that by understanding the past role of music in overcoming American slavery, we can better work against human slavery that continues in our world today.

8 Assessing the ABCs of Diabetes for Patients Enrolled in a Community Pharmacy Diabetes Education Program
Alli Jerman, Angelo Greco
Senior | Mylan School of Pharmacy
Faculty Advisor: Angelo Greco, PharmD.

ABSTRACT:
Community Pharmacy diabetes education programs emphasize treatment goals based on the American Diabetes Association (ADA) Standards of Medical Care in Diabetes. Three key laboratory values used to measure disease and medication management include A1C, blood pressure, and cholesterol (The ABCs of Diabetes). A retrospective chart audit assessed the ABCs of Diabetes for 50 patients enrolled in the Giant Eagle Live Well for Diabetes Program and determined whether patients were prescribed medications (i.e. Angiotensin Converting Enzyme (ACE) inhibitors or Angiotensin Receptor Blockers (ARBs), antiplatelet therapy, statins) in accordance with the ADA standards. Results revealed that 38% of patients met the A1C goal, 78% of patients met the blood pressure goal, and 78% of patients met the LDL cholesterol goal. Seventy-four percent of patients were prescribed an ACE inhibitor or ARB, 50% were receiving anti-platelet therapy, and 66% were taking a statin. Prescriber communication forms were then created to address identified gaps-in-care.

9 Health Education and Awareness Program: Take a Leap into H.E.A.P.
Morganne Fair, Ashley Bertino and Katie Wright
Senior | Rangos School of Health Sciences
Faculty Advisor: Anne Marie Witchger Hansen, Ed. D., OTR/L

ABSTRACT:
The purpose of this community service-learning project “Take a Leap into H.E.A.P.” is to increase health and wellness knowledge and skills in individuals with substance-abuse issues. Students used community-based
participatory research methods during the fall semester to create a program alongside consumers and community staff at Renewal Inc. Throughout the spring semester, students carried out an 11-week program, leading a 1hr and 15min group session once a week. The sessions focused on skill development and increasing consumer knowledge on health and wellness. The results of this program will be to uncover how an 11-week community-based OT program impacts these individuals that are living in an alternative housing facility. It will also help to inform “best practices” for engaging persons with a history of substance-use in healthy eating habits, meditation, and exercise. Through participation in this 2-semester long service-learning project, OT students will develop and improve upon skills of practice scholars.

10 Matching spatial relationships between schemas, pictures, and words
Haley Pisarcik, Brooke Eaton, Austin Ramsey, Robert Lawrence
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Alexander Kranjec, Ph.D

ABSTRACT:
Matching spatial relations between schemas, pictures, and words  A schema is an iconic representation where perceptual detail has been abstracted away from reality in order to provide a more flexible structure for cognition. Maps, graphs, and diagrams frequently use such simplified forms to represent basic spatial relations. Previous work with stroke patients suggests that (1) the brain distinguishes between spatial relations as depicted in different formats like schemas, complex images, and words, and (2) that schematic representations facilitate spatial relational processing in a manner that symbols and complex images do not. The present study tests neurotypical participants using a speeded same/different judgment task. Several behavioral measures (accuracy, reaction time, and eye tracking) will be collected while participants judge the spatial relations between schemas, pictures, and images as same or different. Analyses are expected to reveal differences in how spatial relations are processed when represented in distinct formats.

11 Evaluating the Clinical Use of Aflibercept for Wet Age Related Macular Degeneration
Alicia Sacco, Cara Koerner, Mary Ketchner, Simon George
Senior | Mylan School of Pharmacy
Faculty Advisor: Marsha McFalls, PharmD

ABSTRACT:
The goal of our project is to evaluate the safety, efficacy, and cost-effectiveness of aflibercept (EYLEA) for intravitreal injection for the treatment of wet age-related macular degeneration (AMD). Age related macular degeneration is the leading cause of blindness due to aging. Wet AMD significantly affects quality of life and is associated with a large financial burden. We compared this to the current standard of care treatment of ranibizumab (LUCENTIS) for intravitreal injection. We evaluated clinical trials and safety profiles submitted by the manufacturer. For the cost-effectiveness evaluation, we performed a series of cost-utility analyses based on utility values from previous studies that were used to calculate QALYs gained from the use of aflibercept. To determine the safety and efficacy of aflibercept, we analyzed the clinical trials for methodology, statistics and real world applications. Our analysis will determine aflibercept’s place in therapy compared to the standard of care for wet AMD.
12 Copper Catalyzed Atom Transfer Radical Addition (ATRA) Utilizing Monohalogenated Alkyl Halides at High Temperature and Pressure
Allison Jansto, Carolynne Ricardo, Ph.D.
Junior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Tomislav Pintauer, Ph.D.

A B S T R A C T:
Atom transfer radical addition (ATRA) has become a fundamental process producing monoadducts useful for further organic syntheses. By the addition of a reducing agent, catalyst regeneration in ATRA and atom transfer cyclization (ATRC) has significantly reduced the amount of catalyst, thus creating a “greener” process. This method was first applied in the addition of polyhalogenated alkyl halides to various alkenes, and was extended to the utilization of monohalogenated substrates such as bromoacetonitrile (BrACN), 2-bromopropionitrile (BrPN), and 2-ethylbromophenylacetate (EBrP). The single carbon-halogen bond formed from the monohalogenated alkyl halides is more expedient for further organic transformations. After optimizing the reactions in NMR tubes, reactions performed in pressure tubes allowed for increase in reaction temperature regardless of solvent, resulting in significantly higher yields in shorter reaction times with BrACN, BrPN, and EBrP. The reactions were performed with BrACN, BrPN, and EBrP with alkenes such as 1-octene, styrene, methyl acrylate, and methyl methacrylate.

13 A Pilot Project in the PharmD Curriculum to Enhance Student Pharmacist Confidence in Application of Evidence Based Guidelines and Making Physician Recommendations
Joy Jakubek, Chelsea Konopka, Katherine Sulkowski, Holly Lassila, DrPH, MsEd, RPh
Senior | Mylan School of Pharmacy
Faculty Advisor: Jamie L. McConaha, PharmD, CGP, BCACP

A B S T R A C T:
Objectives: To investigate the learning of third professional year student pharmacists through the application of evidence-based guidelines in making recommendations to physicians in response to care alerts issued by third party payers. Methods: Third professional year student pharmacists (PY3) participated in a pilot project to determine their level of confidence and degree of learning through application of evidence-based guidelines to real-life clinical scenarios. Student participants evaluated weekly care management alert letters sent to a primary care physician group. These letters included recommendations for gaps in care according to published guidelines, medication adherence issues, and potential drug-drug or drug-disease interactions. Students analyzed each letter using knowledge of disease-specific clinical guidelines learned through their didactic curriculum to determine whether the proposed intervention was appropriate and necessary. Students then prepared and submitted evidence-based recommendations to a pharmacist faculty preceptor at the physician’s office for evaluation. Recommendations deemed appropriate by the preceptor were forwarded to the physician for consideration. Those not accepted by the preceptor were sent back to the student with feedback. Student confidence level with providing clinical recommendations was evaluated pre and post data collection through a written survey. Collected data included the categorization of the types of recommendation letters, the number of student recommendations that were sent for physician consideration, and number of accepted physician recommendations. A paired t-test on student pre/post confidence surveys will be performed along with qualitative analysis of student comments on the confidence survey. Descriptive statistics will be used which include cumulative percentages for the types of the requests, the percent of student recommendations that were sent for physician consideration, and the percent of accepted physician recommendations. Preliminary Results: Research in progress. Expected results will illustrate
increased confidence of the student pharmacists as a result of the application of previously acquired knowledge of current clinical guidelines.

14 The Effects of Stress Hormones on Pathogen Susceptibility in Amphibians
Christopher Garbark, Chris Fonner, Sarah Woodley
Senior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Sarah Woodley, Ph.D

A B S T R A C T:
Amphibian species are currently experiencing global population declines. The declines may largely be due to Batrachochytrium dendrobatidis, a fungus that causes the disease chytridiomycosis. Understanding what may cause amphibian susceptibility to Bd infection will better aid in conserving these valuable environmental indicators. A possible cause is stress, as the stress hormone corticosterone (CORT) may suppress aspects of the immune system. We hypothesized that salamanders treated with CORT will be more susceptible to Bd infection and chytridiomycosis development. Plethodon shermani salamanders were stressed using CORT patches for 7 days before and after Bd exposure. The salamanders were measured for changes in body weight, locomotory activity, skin sloughing, and Bd infection by means of qPCR analysis. There was a greater instance of skin sloughing in Bd treated groups, whereas there were no significant changes in body weight or locomotory activity among the treatments. qPCR data is currently being analyzed for infection status.

15 The Philosophical Connection Between Medication Errors and Nursing
Joelle Augustine, Claire Hardman
Sophomore | School of Nursing
Faculty Advisor: H.A. Nethery, Ph.D.

A B S T R A C T:
Foucault states that philosophy is the care of both oneself and of others. Nursing is an art where we take care of others, but before we can take care of our patients we must take care of ourselves. When working a long shift, you are not properly taking care of yourself so therefore patient care will suffer as a result. Your mind and body deteriorate so this leads to an increase in medication errors, which in turn harms the patient. Studies have found that longer shifts and a higher patient to nurse ratio increases the number of medication errors. Our project examines technological advances and more rigorous nursing education that are being implemented to help decrease medication errors, thus increasing patient safety and care.

16 Community-based research at St. Anthony’s: “Powering up at the Power Center”
Allison Foschia, Christina Flaherty, Rebecca Mravetz
Senior | Rangos School of Health Sciences
Faculty Advisor: Anne Marie Witchger Hansen, ED. D., OTR/L

A B S T R A C T:
The purpose of this community-based service learning project “Powering up at the Power Center” was to enhance the clients’ self-esteem and to develop basic skills of fitness, health, and wellness of persons with intellectual disabilities. Students used community-based participatory research methods during the fall semester to develop the project in collaboration with clients and community agency staff. During the spring semester, students carried out the project by leading weekly group sessions for the consumers focused on skill development. The results of
this study will reveal how an 11-week community-based occupational therapy program impacted people with intellectual disabilities at St. Anthony’s. The results of this project will inform “best practices” for engaging persons with ID in self-esteem, fitness, health, and wellness activities. Further, through this two-semester service learning process, OT students will begin to develop skills of a practice scholar.

17 **The Effect of Storm Water on Little Sewickley Creek**

Richard Vaerewyck, Chris Stroh, Edward Schroth, Nate Reinhart  
Senior | Bayer School of Natural and Environmental Sciences  
Faculty Advisor: Edward Schroth, M.S.

**ABSTRACT:**  
On Little Sewickley Creek, it has been observed that storm water changes the temperature of the stream, however a few days later there is an increase in groundwater inflow due to the recharged aquifers from the storm event. Duquesne University has been collecting stream water temperatures on Little Sewickley Creek for over a year using a HOBO temperature logger. Major storm events (over 1 inch of rain) were cataloged and recorded using data from the National Oceanic and Atmospheric Administration. Stream temperatures were averaged for 3 days before a storm, and each day for 3 days after a major storm event. This data is being used to determine how much effect storm water has on a stream, and how much effect the delayed influx of groundwater has on the temperature of a stream.

18 **Dissociating Aesthetic Judgments: Form versus Function**

Kendall Seymour, Corey Robinson, Brianne Depcrymski, Katie Ottaviani, Juan Eseudero  
Junior | McAnulty College and Graduate School of Liberal Arts  
Faculty Advisor: Alexander Kranjec, Ph.D.

**ABSTRACT:**  
Empirical studies of aesthetics are becoming mainstream. However, most such studies are only interested in understanding beauty. The current study investigates how judgments of beauty and other kinds of judgments may dissociate when viewing aesthetic objects. We chose the category of “chairs” to investigate how FORM may dissociate from FUNCTION in an object-rating task. A variety of chairs from different historical periods with variable characteristics relevant to the two dimensions of interest were collected. Using Photoshop, backgrounds were removed in order to isolate each chair from any context. Using a 7-point scale, participants rated each chair in two conditions. In the FORM condition, participants rated chairs with respect to perceived shape, pattern, and color. In the FUNCTION condition, participants rated chairs with respect to perceived durability, stability, and comfort. Results will aid in the construction of stimuli for testing further neural hypotheses using fMRI.

19 **Supports and Barriers to Occupational Therapy in Resource-Scare African Contexts**

Raeanne Gialanella, Dr. Anne Marie Witchger Hansen, ED. D., OTR/L and Becky Mravetz  
Senior | Rangos School of Health Sciences  
Faculty Advisor: Anne Marie Witchger Hansen, ED. D., OTR/L

**ABSTRACT:**  
The purpose of this study is to uncover African OTs’ perspectives of the primary challenges faced while providing OT services, how practitioners overcome those barriers, and identify practitioners’ perspectives on contextual factors that impact the development of OT practice in their country. A mixed method design using quantitative
survey research and in-depth phenomenological interviews was used. Descriptive statistics were generated from survey data and interviews were guided by survey results and applied to the Kawa River approach of examining problems in environmental context. Though this research is ongoing, current analysis defines critical features of OT practice in an African context, and synthesizes practitioners’ perspectives on the barriers to and resources for the encouraging the development of the OT profession in African countries.

20 Potassium’s dance with the dopamine transporter
Marco Acevedo, Emily Benner
Junior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Jeffry Madura, Ph.D.

A B S T R A C T:
Neuronal cells communicate with each other chemically with the use of neurotransmitters. Dopamine (DA) is a monoamine that, when released into the synaptic cleft, binds to the post-synaptic neuron’s ligand-gated channels and allows for an excitatory signal. The integration of this signal over an array of neurons is what leads to a happy feeling. Dopamine transporters (DAT) are responsible for the reuptake of dopamine back into the presynaptic neuron to diminish the amount of excitatory stimulus that the postsynaptic neuron is receiving. The translocation of DA involves an open-outward (OO) to open-inward (OI) conformational change of DAT. What is not understood is the reverse conformational change of DAT. We hypothesize that K+ is needed to drive the reverse conformational change of DAT from OI to OO. This phenomenon is simulated using molecular dynamics—the propagation of atomic positions following Newton’s second law of motion.

21 “LIFE Redesign”: Developing the Skills of a Practice Scholar using community-based participatory research methods.
Ali Leri, Francesca Pengidore, Molly Munschauer
Senior | Rangos School of Health Sciences
Faculty Advisor: Anne Marie Witchger Hansen, Ed. D., OTR/L

A B S T R A C T:
The purpose of this community-based service learning project “LIFE Redesign” was to enhance the self-esteem of residents of Michael’s Place recovering from substance abuse through implementing strategies to redesign anger/stress, leisure, and budget management. During the fall semester, the students used community-based participatory research methods to develop service-learning program together with the residents and staff. The second semester of program consisted of 11 weekly group sessions focused on skill development. The results of this program are measured with the Canadian Occupational Performance Measure and Rosenberg Self-Esteem Scale as well as feedback from residents and staff. LIFE Redesign was designed to impact the recovery of the residents through interactive activities to build skills in the areas of anger, stress, leisure, and budget. The results of this community-based program will inform “best practices” for future practitioners to best serve the recovery process.
22 Plato's Cave in Postmodern Literature
Daniel Priore, Instructor James Taylor
Freshman | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Kathleen Glenister Roberts, Ph.D.

ABSTRACT:
A powerful element in The Republic is Plato's display of the role of education, enlightenment, and control in society via the cave analogy. The simple concept where a collection of people have lived in a cave since birth, been chained down, and forced to stare at reflections on a wall withholds many underlying meanings. Images of light that are expressed through fire and the sun as well as the influence that the puppeteers have over the cave prisoners are only a few of the symbolic notions in Plato's vision. This project will examine how the facets of the cave can be found in famous pieces of literature across genres. My studies include The Lord of the Rings trilogy, Fahrenheit 451, 1984, and the Harry Potter series. Plato’s themes of epistemology, authority, and understanding are shown to be particularly relevant for contemporary society.

23 Nica's Niños
Tonya Temoff, Jaclyn Daher, Kayla Edkins, Kerri Pavlik, Meghan Wilson
Junior | School of Nursing
Faculty Advisor: Rebecca Kronk, Ph.D., CRNP

ABSTRACT:
This poster describes a global service learning experience of 14 nursing students from Duquesne University who traveled to Nicaragua during spring break 2014. A long-standing partnership with a “sister school” at the Universidad Politecnica de Nicaragua (UPOLI) helped facilitate the opportunity for students to work in an urban barrio and a rural elementary school. Nursing students had the privilege to work in collaboration with UPOLI, Spanish speaking nursing students and faculty, who helped identify an underprivileged and high risk population of children in both settings. Students were teamed with their Nicaraguan partners, together performed physical health assessments on 78 children ages 5-12 years. Acute conditions such as asthma, lice, and visual problems were identified. Along with treatment and education, interventions were jointly recommended by both teams of students. Although the Duquesne students have departed, the work in Nicaragua continues based on the relationships built with UPOLI students and the community.

24 “Easter Seals University: Hygiene 101” Developing the Skills of a Practice Scholar using community-based participatory research methods.
Rebecca Elber, Jaimi Hicks and Mary Rose Simmons
Senior | Rangos School of Health Sciences
Faculty Advisor: Anne Marie Witchger Hansen, Ed. D., OTR/L

ABSTRACT:
The purpose of this community-based service learning project “Easter Seals University: Hygiene 101” was to enhance the self-esteem of persons with intellectual disabilities and to empower them in their daily lives, by developing skills related to hygiene and wellness. Students used community-based participatory research methods during the fall semester to develop this project together with consumers and community agency staff. During the spring semester, students carried out the project by leading weekly group sessions for the consumers focused on
skill development. The results of this study will uncover how an 11-week community-based occupational therapy program impacted people with intellectual disabilities at Easter Seals. The results of this project will inform “best practices” for engaging persons with ID in self-esteem, empowerment and personal hygiene activities. Further, through this 2-semester service learning process, OT students will begin to develop the skills of a practice scholar.

25 Teachers Perceptions of the Roles of Occupational Therapists
John Mejasic, Jeryl D. Benson, EdD, OTR/L
Senior | Rangos School of Health Sciences
Faculty Advisor: Jeryl D. Benson, EdD, OTR/L

ABSTRACT:
The purpose of this study is to explore the current trends in school-based occupational therapy practice and how teachers in the school system perceive the occupational therapists roles. Occupational therapists work with numerous groups of people within the school setting, including parents, students, teachers, principals, and special education teachers. One of the closest relationships that Occupational Therapists have in the school system is between themselves and teachers. The main focus of this study is to see how the relationship between these two professions impacts the teacher’s perceptions of the role of occupational therapists in the school setting. The data for this study will be collected via an anonymous online survey including demographic information, employment status, and practice patterns of the teachers. Data will be analyzed using descriptive statistics to provide a picture of current trends in school-based occupational therapy practice as they relate to the therapist teacher relationship.

26 Forecasting Vehicle Miles Travelled in a Period of Declining Car Ownership
Andrew Bryk, John Ricco
Senior | A.J. Palumbo School of Business Administration
Faculty Advisor: Antony Davies, Ph.D.

ABSTRACT:
Growth in vehicle miles travelled (VMT) has been slowing for the last decade, and has recently begun to decline. The Department of Transportation, however, continues to forecast large increases in VMT. We estimate a forecast model of VMT with a lower mean squared error than the DoT.

27 Heterologous Cloning and Overexpression of Periplasmic Nitrate Reductase Maturation Proteins, NapL and NapD
Andrew Adams, John Thomas, Courtney Sparacino-Watkins
Senior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Partha Basu, Ph.D.

ABSTRACT:
Most expression studies of the pterin-containing molybdoenzymes have primarily focused on the catalytic subunit and the chemistry therein. However, these complex enzymes require a myriad of chaperones and maturation proteins to bring them to full function. In the case of the molybdoenzyme periplasmic nitrate reductase (NapA) derived from the pathogenic bacterium Campylobacter jejuni, two of these proteins are NapL and NapD. While NapD is relatively well characterized as responsible for blocking the twin-arginine translocation (TAT) leader sequence, probably preventing export to the periplasm temporarily. This is contrasted with NapL, which has not been characterized at all and is of unknown function. In order to investigate the interactions between the catalytic
subunit and the maturation proteins, genes corresponding to NapD and NapL have been isolated from a previous vector and subcloned into a pET based expression vector for overexpression in E. coli and future interaction study with recombinantly produced NapA.

28 The Gift of Appreciation
Katelyn Mehall, John Mejasic, Kelly Reichert
Senior | Rangos School of Health Sciences
Faculty Advisor: Anne Marie Witchger Hansen, Ed. D., OTR/L

ABSTRACT:
This community-based participatory research project began in the fall semester when occupational therapy students conducted a needs assessment with consumers and community agency staff. Students then proposed an 11-week program they would carry out during the spring semester, leading weekly group sessions for the consumers at CLASS. The purpose of “The Gift of Appreciation” is to increase self-esteem and overall quality of life by offering adult individuals with developmental, intellectual, and physical disabilities opportunities to appreciate themselves and to give back to their families, staff members at CLASS, and the surrounding community. The results of the 11-week community-based occupational therapy program demonstrates how giving back to others can increase self-esteem, interpersonal relationships, and overall quality of life with adults at CLASS. Further, through this 2-semester community-based participatory research process for service learning, OT students begin to develop the skills to become a practice scholar.

29 Home is Where the Heart Is
Maggie Betschart, Justine Huber
Junior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Julia Sienkewicz, Ph.D.

ABSTRACT:
Like life, a house is what you make it. Miranda Lambert's song “The House that Built Me” is evidence of this. In the U.S., the nation is the people and was built on three main principles: life, liberty, and the pursuit of happiness. The American people express these three themes in subjectively in the architecture of their homes; through structural, beautifying, and functional aspects. This resembles Vitruvius’s idea that the domestic qualities exhibit statements about the values and culture of the people; man and house are similar figures. How choose to represent yourself? What does the house say about the inhabitant, and more importantly, why? Architecture is a spectrum with the vernacular on one side and the high-style on the other. Research from house surveys in Upper St. Clair showcases through the neighborhoods that despite the rich and famous stereotype, more than one kind of identity exists in the township.
30 Predicating immunogenicity of Infliximab: pharmacoeconomic implications for biosimilars
Benjamin Andrick, Kaitlyn Stroyne
Senior | Mylan School of Pharmacy
Faculty Advisor: Wilson Meng, Ph. D., Khalid Kamal, Ph.D., Lauren O'Donnell, Ph.D.

Abstract:
Objective: The purpose of the study was to predict immunogenicity of infliximab in the context of perceived economic benefit of biosimilars. Biosimilars are products containing the same active biologic ingredients, with “similar” physiochemical and clinical performance. The anticipated cost-saving has generated strong interests among third-party payers. But manufacturing of biologics is complex; slight product deviance may result in drug-specific antibody responses. A thorough pharmacoeconomic evaluation must consider immunogenicity-related adverse drug events and not just drug acquisition costs. In the present study, the amino acid sequence of infliximab was analyzed for antigenic and aggregation potential, both factors contributing to induction of antibodies. Methods: The antigenic potential of infliximab was evaluated using the bioinformatics tool “SYPEITHI”. The sequence was screened for peptides that conform to the binding motifs of HLA-DRB1, human major histocompatibility molecules (MHC) linked to rheumatoid arthritis. Aggregation propensity was analyzed using the algorithm “PASTA.” Proteins are more likely to enter MHC pathways when aggregate. The pharmacoeconomic framework needs to address budget impact of introducing the biosimilars in the formulary. Results: Scanning infliximab for HLA-DRB1001 motifs yielded GPIYKRVDGKWMREL (light-chain residues 94-109) as a potential ligand. This fragment resembles the influenza A virus nucleocapsid segment YKRVDGKWVRELVLYDK, also a potential ligand of HLA-DRB1001. The resemblance suggests patients exposed to the influenza may be sensitized towards infliximab. PASTA analysis identified several segments in infliximab that may drive beta-fibril-like aggregation. Inflectra and Remsima are two biosimilar products of infliximab that have been approved by the EMA. The acquisition costs (per 100 mg) of the biosimilars are $399.99 versus Remicade which is $665.65. Future pharmacoeconomic framework should weight the lower acquisition costs of the biosimilars against costs incurred from adverse events, if any. The results will help payers decide the true value of these biosimilar drugs.

31 Novel Polymorphic Li2-II-IV-S4 Diamond-like Semiconductors
Kasey Devlin, Kimberly R. Daley, Meghann A. Moreau, Jacylynn A. Brant
Junior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Jennifer A. Aitken, Ph.D.

Abstract:
Diamond-like semiconductors (DLSs) have structures that are derived from either the cubic or hexagonal form of diamond. The I2-II-IV-VI4 diamond-like semiconductors are particularly interesting systems for their tunable nature and technological applications in photovoltaic solar cells, spintronics, and non-linear optics, specifically second harmonic generation. Polymorphism may affect important physicochemical properties in these materials. Polymorphs differ in the closest-packed arrangement of the anions, cubic versus hexagonal respectively. Polymorphism may also be observed in quaternary DLSs that maintain the same anion packing, but differ only in the cation ordering arrangements within the tetrahedral holes. In this work, high-temperature solid-state synthesis in a Li2-II-IV-VI4 system led to the discovery of two new polymorphic compounds, crystallizing in the Pna21 and Pn space groups. The two polymorphs were analyzed using optical diffuse reflectance UV/Vis/NIR spectroscopy, single crystal X-ray diffraction, and synchrotron X-ray powder diffraction. The National Science Foundation supports this work under Grant No. DMR-DMR-1201729.
32 Does animal-assisted therapy decrease anxiety and depression among psychiatric patients?
Allison Spada, Liliane Schwedfeger
Senior | School of Nursing
Faculty Advisor: Lichun Chia, Ph.D., RN

ABSTRACT:
Animal-assisted therapy is currently used as patient therapy as an alternative style of coping. The purpose of this review is to provide the evidence that explained how animal-assisted therapy could positively contribute to human mental health. Methods: We analyzed eight research studies that explained how animal-assisted therapy could positively contribute to human mental health. Results: Findings show that animal-assisted therapy does decrease anxiety in not only psychiatric patients, but patients in general. Using surveys, the State-Trait Anxiety Inventory (STAI) scale, and questionnaires, researchers discovered that patients reported decreased feelings of anxiety after interacting with animals. Usefulness of animals in therapies was supported. Conclusion/Implication: This review indicated that animal-assisted therapy greatly benefits patients with anxiety in therapy sessions. Nurses, physicians, and therapists can use animal-assisted therapy as an alternative treatment to medication. The research studies focused on animal-assisted therapy and prove the need for its implementation in health care.

33 Food for Thought: Can eating the material actually enhance memory for it?
Briana Gebhart, Maggie Betschart and Francisco Baralt
Junior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Alex Kranjec, Ph.D.

ABSTRACT:
Theories of embodied cognition suggest that we think about very abstract concepts (like ideas) in terms of concrete experiences (like eating). This metaphorical conceptual organization is pervasive in language (e.g., “Your argument is hard to swallow”) but may reflect a deeper organization of our cognitive unconscious. Could ingesting a physical object actually improve performance on a memory task? Can literally digesting an idea make it easier to remember? In our experiment, participants will complete three conditions: ingesting a list of 25 words written on individual pieces of edible paper using edible ink, placing a list of words in a backpack or purse, or throwing a list of 25 words in a trash can. Next, a verbal distractor task will be followed by a recall task for each list. We predict that eating the material will improve item memory.

34 The Formation of Self-Assembled Monolayers on Metal Oxide Surfaces Using Carboxylic and Phosphonic Acids
Avani Dalal, Maria R. Signore, Nina A. Zyvith
Junior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Ellen Gawalt, Ph.D.

ABSTRACT:
Stainless Steel 316L and titanium are commonly used as synthetic implant materials. Self-assembled monolayers can be used to increase the applications of these biomaterials as well as control interfacial properties of the metals. The aim of this study is to form monolayers using two different head groups. Self-assembled monolayers of octadecylic acid, octadecylphosphonic acid, and a mixture of both were covalently bound to the surface of stainless steel 316L and titanium metal substrates. The results of this study should indicate which acid head group
preferably binds to metal surfaces. Diffuse reflectance infrared Fourier transform spectroscopy was used to determine the presence and binding of the self-assembled monolayers to the metal surface. Infrared spectra revealed that octadecylcarboxylic acid films and the mixed acid solution films formed best when aerosol spray deposition was used while, octadecylphosphonic acid films formed best using solution deposition. Spectra also indicated the mixture of octadecylcarboxylic and octadecylphosphonic acid monolayers survived through the sonication process. However, stable binding of the carboxylic acid molecule was more difficult to achieve. This indicates that phosphonic acid head groups form more stable monolayers on metal surfaces.

35 The effect of atypical antipsychotic medications on body temperature in patients with Prader-Willi syndrome.
Rachel Marini, Megan Cockroft, Elizabeth Bunk, Ashley Modany
Senior | Mylan School of Pharmacy
Faculty Advisor: Jennifer Elliott, PharmD

ABSTRACT:
Purpose: Atypical antipsychotics (AAP) are often prescribed to treat behavioral and psychiatric disorders in patients with Prader-Willi syndrome (PWS). AAP use and PWS have both independently been associated with impaired thermoregulation; thus the study objective was to evaluate the effect of AAP on body temperature in patients with PWS. Methods: A retrospective cohort study was conducted at The Children’s Institute of Pittsburgh using the electronic medical records of all patients (n=540) admitted to the inpatient Prader-Willi Syndrome Program from March 2002 to May 2012. Pediatric and adult patients exposed to an AAP upon admission were matched based on age and gender to those not exposed to AAP, and mean temperatures as well as deviations from euthermia were assessed. Results: Mean body temperatures of pediatric patients (n=59) exposed to an AAP (97.61°F) were similar to that of pediatric patients (n=59) not exposed (97.86°F)(p=1.000). The same trend was observed in the adult population, with mean body temperatures of adult patients (n=78) exposed to an AAP (97.47°F) similar to those of adult patients (n=78) not exposed (97.67°F)(p=1.000). Hyperthermia (≥101°F) was not observed in any pediatric or adult patients. The frequency of hypothermia (≤95°F) was similar among both pediatric and adult AAP use groups, with 1 and 2 pediatric and adult patients not exposed to AAP, and 1 and 1 pediatric and adult patients exposed to AAP experiencing hypothermia, respectively. Conclusions: Exposure to AAP upon admission did not have a significant impact on the mean body temperatures of pediatric and adult patients with PWS in this study. None of the patients experienced hyperthermia, and although rare, hypothermia was experienced at similar rates between adult and pediatric subjects, regardless of AAP exposure. The effect of AAP on body temperature in patients with PWS warrants further research.

36 Developing Skills of a Practice Scholar at Shepherd’s Heart: Mission Toward Independence
Alyssa Hines, Megan Rindfuss, Nicole McManus
Senior | Rangos School of Health Sciences
Faculty Advisor: Anne Marie Witchger Hansen, Ed.D., OTR/L

ABSTRACT:
The purpose of this community-based service-learning project, “Mission Toward Independence”, was to aid in the development of skills for living independently in the community, after experiencing homelessness, secondary to substance abuse. The development of such life skills intended to promote increased independence, upon acquiring skills such as money management, meal preparation, and socialization. The students used interview and observations to understand the veteran’s initial understanding and implementation of the skills, and tracked
changes in the skills throughout the 11-week program. The project was carried out through weekly group sessions focusing on the various skills. The results of this study will disclose the how an occupational therapy program, in the community, is useful in aiding in independent community reintegration for homeless veterans, and how it has influenced their overall self-esteem. The results of this project will contribute to the literature regarding the development of community-based, reintegration programs for homeless war veterans.

37 Correlation between band gap and electronegativity of substituted atoms in the TiO2 crystalline structure
Andrew Glaid, Matthew Srnec, Jennifer Aitken
Junior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Jeffry Madura, Ph.D.

Abstract:
The electronic structure of TiO2 has been extensively studied through a variety of experimental and computational methods. Its properties range from thin film photovoltaic cells to optics. TiO2 provides an excellent model to study computationally due to the wealth of experimental data and its inexpensive computational cost. Our hypothesis is that the electronegativity of a substituent changes the band gap of crystalline TiO2. Atoms of different electronegativities were selected for substitution into the three polymorphic forms of TiO2, which are rutile, anatase, and brookite. Our computational approach utilizes the linearized-augmented plane-wave approach of density functional theory in the WIEN2k computational software, and includes the incorporation of the modified Becke-Johnson potential, to determine the band gap and density of states for each case. Initial results showed that sulfur substitution in a 2x2x2 rutile supercell resulted in a slight decrease in the band gap.

38 Depression, Pain, and Anxiety Modulation through a Novel CNS Active Marine Cyanobacterial Compound.
Christopher Ignatz, Neil Lax, Kevin Tidgewell, Ph.D., Benedict Kolber, Ph.D.
Senior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Benedict Kolber, Ph.D.

Abstract:
Comorbid pain and depression affects millions of Americans. Most pharmaceuticals treat either pain or depression, but rarely both. Those suffering from comorbidity take multiple drugs, sometimes eliciting negative side effects. This project focuses on the anti-depressive, analgesic, and anti-anxiety capabilities of a novel compound from a marine cyanobacterium. Fraction 2064h was extracted and purified from a marine cyanobacterium using chromatography and analyzed using NMR and HPLC-MS. Fractions were pre-screened for activity of the CNS receptors. Fraction 2064h was found to bind to 5-HT2C receptors. It was tested in vivo through administration to the CNS utilizing intracerebroventricular cannula injections in C57Bl/6J mice. We then performed the tail suspension test and forced swim test, widely used depression assays, to test the anti-depressant potentials of this compounds. Analgesic and anti-anxiety qualities of 2064h were tested in vivo using the spontaneous formalin and open field tests, respectively. Biological results to date will be presented.
39 Death and a Rubber Hand: Can Increasing Mortality Salience Affect Body Perception?
Alex Herisko, Nicholas Brango, Lana Baslan, Juan Escudero, Ashley Galazia
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Alexander Kranjec, Ph.D

Abstract:
In the rubber hand illusion, an individual watches a rubber hand as it is stroked with a brush, while their actual hand is being stroked simultaneously out of sight. This multisensory stimulation and subsequent integration frequently elicits feelings of ownership for the fake hand. Terror Management Theory suggests that humans deal with the psychological conflict of impending death in part by suppressing thoughts of physical embodiment. The present experiment uses Terror Management Theory and the rubber hand illusion to observe how awareness of one’s mortality affects body perception. In one group, participants will receive surveys with items intended to increase mortality salience. After visual-tactile stimulation, the strength of the illusion will measured by both a self-report questionnaire and skin conductance methods. Compared to a control group, we predict that for participants primed to think about death, body schema may become more flexible and abstract, modulating signs of the illusion’s strength.

40 Shine Bright in Your Community: Collaboration of Occupational Therapy students with the St. Anthony’s program
Abbey Guzek, Olivia Houser, Katie Kerrigan
Senior | Rangos School of Health Sciences
Faculty Advisor: Anne Marie Witchger Hansen, Ed.D., OTR/L

Abstract:
The purpose of this community-based service-learning project, “Shine Bright in Your Community,” was to integrate socialization and community participation of persons with intellectual disabilities within the St. Anthony’s population for independent functioning. Students used community-based participatory research methods to collaboratively develop the project with the St. Anthony’s staff. During the spring semester, the Duquesne University students carried out weekly activities that focused on building self-confidence and social skills. The results of this study will present how an 11-week community-based occupational therapy program impacts those with intellectual disabilities at St. Anthony’s. The results will uncover best practice methods to engage persons with intellectual disabilities in activities regarding self-confidence, socialization, and community participation through the use of simulations and community outings. Furthermore, this service-learning project will benefit the general community by educating on the topic of interacting and socializing with persons with intellectual disabilities.
41 Does therapeutic hypothermia improve neurologic function after cardiac arrest?
Jaclyn Angstadt, Rachael Desmond
Senior | School of Nursing
Faculty Advisor: Lichun Chia, Ph.D., RN

A B S T R A C T:
Background: Therapeutic hypothermia (TH) is a new treatment for patients post cardiac arrest (CA). This process involves cooling a patient’s core body temperature to 33-34 degrees Celsius in order to decrease metabolic demands of the body. The purpose of this literature review is to examine if therapeutic hypothermia improves neurologic outcome in post CA patients. Methods: A systematic literature review was conducted to locate eight evidence based research articles that studied the use of therapeutic hypothermia after CA. Results: The research articles conclude that TH is beneficial in producing positive patient outcomes in the adult population. TH has been shown to improve neurological function and decrease mortality when implemented in patients after CA. Discussion: Further research is needed to determine the most effective technique for implementation. Barriers identified in the articles included a lack of education regarding when and how to implement TH, and the most effective method of cooling.

42 “Renewal, Men: Computer Skills for Professional Development” Developing the Skills of a Practice Scholar using community-based participatory research methods.
Rachel Horgan, Rachel Thomas, Nicole Whiston, Anne Marie Hansen
Senior | Rangos School of Health Sciences
Faculty Advisor: Anne Marie Witchger Hansen, Ed. D., OTR

A B S T R A C T:
The purpose of this community-based service learning project “Computer Skills for Professional Development” is to enhance the self-esteem of ex-offenders through providing them with the computer skills necessary for both personal and professional development. Through the use of community-based participatory research methods during the fall semester, this project was developed together with consumers and Renewal, Inc. staff. During the spring semester, students carried out the project by leading weekly group sessions for the consumers focused on skill development. The results of this study will uncover how an 11-week community-based occupational therapy program impacted the self-esteem and professional growth of ex-offenders at Renewal, Inc.. The results of this program will inform “best practices” for engaging ex-offenders in developing personal and professional skills necessary for future employment. Furthermore, through this 2-semester service learning process, OT students will begin to develop necessary skills for becoming practice scholars.

43 An Evaluation of a Pharmacist’s Impact on the Avoidance of Adverse Drug Events when Prompted by Third Party Payer Communication
Kimberly Grant, Robert Gwin, Ashley Johnson, Alina Teplitsky
Senior | Mylan School of Pharmacy
Faculty Advisor: Jamie L. McConaha, PharmD, CPG, BCACP and Holly Lassila, Dr.P.H., M.P.H., R.Ph.

A B S T R A C T:
Objectives: This study aims to assess the impact of interventions made by a pharmacist embedded into a primary care physician office, when prompted by a third party payer, on physician cost savings and satisfaction. Methods:
A clinical pharmacist, based in a primary care physician (PCP) office, reviewed weekly patient care communications sent by third-party payers. Medicare, Medicaid, and commercial third-party payers sent communications to notify physicians of potential patient medication-related issues. These alerts often included recommendations for gaps in care according to published guidelines, medication adherence issues, and potential drug-drug or drug-disease interactions. These communications were analyzed by the physician practices’ clinical pharmacist and were either resolved at the pharmacy level or a recommendation was made to the physician. Documented data from this initiative included whether or not the recommendation was accepted, how the issue was able to be resolved (by the pharmacist or physician), and physician-reported satisfaction with the service. Preliminary Results: Research in progress. Preliminary results show that the majority of the care management alerts were able to be resolved by the pharmacist. Qualitative analysis of physician-reported benefits of the service in terms of satisfaction and time savings will also be analyzed.

44 Protonation states of the imidazole side chains of Rieske Iron-Sulfur Cluster histidine ligands distinguished by 15N vibrational frequency shifts
Benjamin Jagger, Scott Boesch
Junior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Ralph Wheeler, Ph.D.

ABSTRACT:
The Rieske iron-sulfur (Fe-S) cluster is a catalytic subunit of the mitochondrial cytochrome bc1 complex critical in ATP synthesis. The cluster accepts an electron and a proton when the mobile electron carrier, ubiquinol, is oxidized at the Qi site. The Fe-S cluster is believed to accept the first electron and, the mechanism of proton coupled electron transfer is dependent on the protonation states of the histidine ligands to one of the Fe-S cluster’s iron atoms. Optimized geometries for the Fe-S cluster were generated and frequency analyses were performed for different protonation states of the imidazole side chains of histidine. Multiple large 15N isotopic vibrational frequency shifts are calculated for the protonated imidazole ligand but not in the deprotonated form. This method presents a possible approach for the experimental determination of the protonation states of the ligands by means of vibrational spectroscopy.

45 Eye-tracking decision making during soccer refereeing
Austin Ramsey
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Alexander Kranjec, Ph.D.

ABSTRACT:
In soccer, it can be challenging for referees to determine what is a fair or unfair tackle. Choosing to call a foul is often a split second decision, and can influenced by low-level perceptual biases. A previous study investigating whether a perceptual motor bias associated with reading direction influenced foul judgments found that soccer-knowledgeable participants called more fouls when the same image of a play moved leftward versus rightward. The present study is designed to further investigate the mechanism behind these findings using eye-tracking methods. Using a go/no-go task and photographs taken from real games, participants will determine whether each play depicts a foul or not. Analyses will determine if overall eye scan path direction (left vs. right) and fixations on particular features of the scene (e.g., arms, legs, the ball) can predict when participants will call a foul or not.
46 Investigation of the strength of the intramolecular hydrogen bond (IMHB) in pseudo-chair carboxyphosphate
Sarah Kochanek, Steven M. Firestine, Jeffrey D. Evanseck
Junior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Jeffrey Evanseck, Ph.D.

A B S T R A C T:
Dianionic and monoanionic carboxyphosphate is predicted to exist in a novel conformation known as pseudo-chair, stabilized by an intramol. hydrogen bond (IMHB). Carboxyphosphate has significant mechanistic implications in understanding ATP-grasp carboxylases important in obesity, diabetes, and microbial infections. To quantify the IMHB strength, the open-closed method and calcn. of NMR shielding consts. have been employed using Truhlar’s Minnesota M06-2X functional and Dunning’s aug-cc-pVnZ (n=D,T,Q,5) basis sets. These estn. methods have been evaluated for their ability to provide quant. accurate results. Additonally, NBO anal. was implemented but was inconsistent between the E(2) perturbation and deletion methods. The IMHB strength in the both the dianion and the monoanion is about 15 kcal/mol in vacuum and 6 kcal/mol in implicit water. It is noted that the IMHB strength decreases by 50% when in implicit water in both cases. These findings support the existence of the pseudo-chair conformation of carboxyphosphate in both the dianionic and monoanionic states.

47 Resveratrol Stability after Exposure to Common Environmental Stresses
Daniel DiMaggio, Sheha Potdar, Jane Cavanaugh, Kevin Tidgewell
Senior | Mylan School of Pharmacy
Faculty Advisor: Kevin Tidgewell, Ph.D.

A B S T R A C T:
Certain disease states like Alzheimer’s disease are caused by oxidative stress that destroys neurons in the brain. Studies have shown the natural stilbenoid resveratrol to be neuroprotective against the toxicity induced by β-amyloid. Resveratrol slows the disease progression by scavenging oxygen radicals that can damage proteins and begin the formation of the plaques. This study was done to observe the compound resveratrol’s stability when exposed to environmental factors, like ultraviolet radiation and heat. The chemical structure of resveratrol and other studies suggests that it may undergo changes when exposed to light or heat that may decrease its function as an antioxidant. The study will examine the stability of resveratrol when exposed to these two factors. HPLC was used to determine the concentration of resveratrol after exposed to either heat or light. Results to date will be presented.

48 The Sight of Music
Amanda Buchheit, Scott Harman, Lana Baslan
Sophomore | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Alexander Kranjec, Ph. D.

A B S T R A C T:
In synesthesia, a stimulus in one sensory modality (e.g., hearing) involuntarily elicits a secondary perceptual response in another modality (e.g. vision). Likewise, perception of a form (e.g., a letter) may induce an unusual perception in the same modality (e.g. a color). Artists are often thought to have synesthesia due to their ability to combine different sensory experiences into their work. Anthony Braxton is an experimental jazz musician who
claims to have visual-auditory synesthesia. He represents his music by assigning each song a visual title (his own drawings) that illustrates what the song “looks like” to him. This study aims to determine the objectivity of synesthetic experience. Musicians vs. controls were asked to match one of four visual titles to a corresponding Braxton composition. If Braxton’s specific visual-form/song-form synesthesia is based on more universal principles of perceptual organization, participants should score at above chance in matching visual titles to songs.

49 Quantum Models of Methylphosphonate Adsorption onto the Rutile (110) Surface
Sadie Clifford, Sebastien P. Hebert, Matt N. Srnec
Junior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Jeffrey D. Evanseck, Ph.D., Ellen S. Gawalt, Ph.D.

ABSTRACT:
Adsorption modes and strength of the bond(s) between the rutile (110) surface and methylphosphonate have been investigated using quantum chemistry. Surface model systems were developed to conserve the coordination geometry and valency of each atom within the periodic cell. Crystal09 was used with the unrestricted open-shell in combination with the Perdew-Burke-Erzerhof functional and the triple-zeta valance with polarization quality basis sets corresponding to each atom; Ti, O, H, P, and C. The hydrogens on a simple model, Ti3O11H10, were optimized with the surface fixed. Energy minimization found a monodentate configuration 48 kcal/mol higher in energy than the final energy minimized bidentate structure. In the final energy minimization structure, the phosphate oxygens have intermolecular bond lengths of 1.99 Å and 1.91 Å that were originally 2.5 Å from the TiO2 surface. Headway on larger models has been made. Consistent with experimental data, the results suggest that bidentate adsorption is preferred.

50 Aphasia Workshop for Physical Therapy Students
Emily Atton, Sarah Kozar, Kaitlin Maize, Amelia Spangler, Alicia Taylor, Gabrielle Walsh, Kelsi DeLaurentis, Gina Dipaolo, Kelly Francis
Sophomore | Rangos School of Health Sciences
Faculty Advisor: Sarah Wallace, Ph.D. CCC-SLP and Caterina Staltari, M.A. CCC-SLP

ABSTRACT:
Individuals with the language disorder aphasia may experience persistent challenges understanding other’s speech and language as well as producing their own utterances to communicate. Effective communication is critical when providing rehabilitation services and medical care because it increases patient engagement. However, many healthcare providers do not receive training in how to best communicate with people who have aphasia. Forty fourth year physical therapy students completed a workshop designed to increase knowledge of aphasia and the practical application of effective communication strategies. The participants were divided into two groups in order to see which learning method was most effective. The first group received hands-on role-play instruction and viewed a skit demonstrating proper communication techniques. The second group of participants observed clips from the documentary, “Inside Aphasia.” After conducting a pre and post-test measuring the amount of knowledge gained from the workshop, researchers found that the first group learned more communication techniques.
51 **Analysis and Historical Context of the St. Anne Hymn Tune**  
Aaron Sproul  
Junior | Mary Pappert School of Music  
Faculty Advisor: Ann Labounsky, Ph.D.

**ABSTRACT:**  
Musical composition technique varies from composer to composer and from century to century. How are melodies created? My research looks into this question by analyzing a tune, called St. Anne, from a traditional hymn, “O God Our Help in Ages Past.” Before the hymn was written, several composers including J.S. Bach, Dietrich Buxtehude, George Frederic Handel, and William Croft each used the melody, seemingly without any knowledge of each other’s work. Did they each compose the same tune out of pure coincidence, or did they subconsciously copy each other after hearing the tune? The historical context and background of each composer will be explored to determine whether or not they would have had any prior knowledge of the tune before writing their respective pieces.

52 **We Can Do**  
Lauren Nelson, Raeanne Gialanella, Jeannine Gillett  
Senior | Rangos School of Health Sciences  
Faculty Advisor: Anne Marie Witchger Hansen, ED. D., OTR

**ABSTRACT:**  
The purpose of this community-based service learning project at Blind and Vision Rehabilitation Services of Pittsburgh (BVRS) was to enhance the self-efficacy of adults with intellectual disabilities and to empower them in their daily lives, by developing skills related to exercise and healthy eating. Students used community-based participatory research methods during the fall semester to develop this project together with consumer and community agency staff. During the spring semester, students carried out the project by leading weekly group sessions for the consumers focused on decisions in nutrition and exercise. The results of this study will uncover how an 11-week community-based occupational therapy program impacted adults with intellectual disabilities at BVRS. The results of this project will inform “best practices” for engaging adults with ID in self-efficacy, exercise, and nutrition activities. Further, through this 2-semester service learning process, OT students will begin to develop skills of a practice scholar.

53 **Development of the Organ Symphony**  
Rebecca Yoder  
Senior | Mary Pappert School of Music  
Faculty Advisor: Ann Labounsky, Ph.D.

**ABSTRACT:**  
The genre of the organ symphony definitively began with nineteenth-century French composer César Franck, continued to develop with Charles-Marie Widor, and reached an extraordinary level of maturity with Louis Vierne. Although other composers, such as Camille Saint-Saëns, composed works for organ and orchestra, Franck’s Grande Pièce Symphonique represents the first composition for solo organ with distinct movement-like sections that are symphonic in nature and demonstrate the orchestral qualities of the organ. Widor expanded upon the ideas of Franck with his ten organ symphonies. His works present greater technical difficulty for the performer while continuing to explore the organ as an orchestral instrument. As a student of both composers at the Paris
Conservatory, Vierne combined the chromatic romanticism of Franck and the technical prowess of Widor in his organ symphonies. The organ symphony thus became a genre that demonstrated the breadth of both the organist’s technique and the instrument’s power.

54 Effects of road salt and abandoned mine drainage on the behavior, weight, and mortality of Pimephales promelas
Kelsey Temple
Sophomore | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Brady Porter, Ph.D.

ABSTRACT:
Pollution in western Pennsylvania waterways has been correlated with native fish population decline in streams, but specific effects on native species are not well characterized. To examine the effects of road salt and abandoned mine drainage (AMD) exposure on the Fathead Minnow, Pimephales promelas, minnows were exposed to three concentrations of road salt and AMD for 24 hours. Weight, mortality, and behavior were measured. The experiment was designed with a two-day pre-treatment period, 24-hour treatment period, and a two-week post-treatment period. The weights of the fish were measured pre- and post-experiment. Behavior was measured by recording and quantifying movements of the P. promelas in their boxes. Results indicate an effect from AMD, but a significant bench effect was a confounding result. Based on these results, recommendations for future experimental design can be determined so as to lessen the bench effect.

55 Dixie Hippies: Hippies and their search for Nirvana in the Southern United States
Michael Praskovich
Junior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Carmen Thomas

ABSTRACT:
In 1970 the countercultural “Flower Children” and “New Left” movements of San Francisco’s Haight-Ashbury neighborhood combine into one and migrated from the “Haight” with the goal of “Saving the World.” Hippies had spread throughout the United States settling down in communes founded largely independent of the mass-mediated image of Hippie “free-love” and drug-experimentation; instead, post-Haight-Ashbury Hippies opted for self-sufficiency and living of the land. Given the South’s history as a bastion of tolerance, it would seem futile for Hippies to have settled and start communes throughout the Southern states. This research analyzes the mechanics, and also presents the narrative of three Southern Hippie communes: The Farm in Tennessee, the “Tight Squeeze” in Georgia, and the Long Branch Hotel in Louisiana. These communes are of particular interest because of the bold decision to settle in the part of the nation notoriously known for stubbornly defending antiquated ideologies throughout the 20th century.
56 “Music and the Military: Evaluating Management of Stress-L evels in High Pressure Operations”
Stephanie Sloan
Junior | Mary Pappert School of Music
Faculty Advisor: Ann Labounsky, Ph.D.

A B S T R A C T:
This research project will review and analyze studies done on evaluating performance in high-pressure operations, specifically music performance, sport competition, and military training. Additionally, an neurological analysis will be conducted to postulate on how to increase performance capabilities and confidence in those respective situations. A comparative neurological analysis of military performances affected with and without PTSD concerning biofeedback to decrease anxiety and the quality and enhancement of performance among professional and amateur musicians will be considered in the comparison of literature.

57 The Transition Process of Aristotles’s Three Forms of Friendship
Aaron Wilkinson
Sophomore | A.J. Palumbo School of Business Administration
Faculty Advisor: Janie Harden Fritz, Ph.D.

A B S T R A C T:
In Nicomachean Ethics, one of Aristotle’s central focuses is on the qualities of friendship. In this literature he describes friendship as taking on one of three forms: friendship of utility, friendship of pleasure and friendship based on goodness. However, instead of these three forms being viewed as independent relationships, another way to look at them is as a transition process starting from the moment a friendship begins until it reaches its purest form. This research project uses a real example by examining the dynamic of the Duquesne Men’s Cross Country team and conducting interviews with its members to assess their views on friendship. Backing this up with fundamental topics covered in the field of Interpersonal Communication, the study concludes that Plato’s three types of friendship may not exist independently, rather transition from one into the other, beginning with friendship of utility and ending with friendship based on goodness.

58 Implementation of a Ten-tone Equal Temperament System
Andrew Gula
Junior | Mary Pappert School of Music
Faculty Advisor: Jessica Wiskus, Ph.D.

A B S T R A C T:
Tracing back to the ancient Greeks, humans have always been interested in the “harmony” that music creates. Throughout time, many composers like Du Fay, Monteverdi, and Schoenberg have strayed from traditional musical practices in the hope of developing a more expressive sound. In this study, a system was created that is based on ten tones instead of twelve in an attempt to make a new expressive sound. As the world moves into the 21st century, is it possible that a new melodic sound is yet to be discovered? By generating new frequencies that adhere to the equal temperament scale, a new ten-tone equal temperament system is created. Then, using a program called “Cycling ’74 MAX/MSP,” these new frequencies can be assigned to the notes on a keyboard. This system opens up a new procedure for the creation of a unique intervallic system.
59 The Cave: Plato’s Allegory and the Rise of Western Civilization
Michael Lawrence
Freshman | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Kathleen Glenister Roberts, Ph.D.

ABSTRACT:
The development of Western Civilization will always be inseparably rooted in its founding philosophies. Plato’s allegory of the cave is less of a fable than a practical, working metaphor with countless applications; it can even illustrate the emergence and bloom of Western thought. From the Greek classics, through the Dark Ages, and forward into the Scientific Revolution and Enlightenment, the most significant intellectual advances in history play perfectly into this tale. If we can imagine the European (and later in history, American) people as a man chained by his ignorance in a cave, and show him the wonderful world just beyond the horizon, we can better understand how and why these radical changes came to be. The allegory is still relevant today, as modern science reveals more and more hidden truths that dramatically reshape our basic understanding of reality.

60 John Cage: A Music Philosopher
Amanda Albright
Junior | Mary Pappert School of Music
Faculty Advisor: Benjamin Binder, Ph.D.

ABSTRACT:
The purpose of this study is to identify John Cage’s role as a music philosopher. Some scholars of music grapple with the question of whether or not John Cage’s ideas prove to be greater than his music. Cage composed countless avant-garde musical works however these works challenged audiences’ expectations of music and prompted a new approach to listening. Influenced by Zen Buddhism, his later series of compositions exhibited thought-provoking concepts that relinquished control of sound over to chance unlike any composer before him. One might argue that music left up to chance does not embody the essence of true musical originality although this research will show that Cage’s music simply redefines the task of a composer. Rather than organizing sound like traditional composers, he constructs a system that creates a unique musical work. Cage’s music extends beyond the theory of composition and into a realm that intertwines with philosophy.

61 A Comparative Study on the Ethical Issues Surrounding the "Baby Box"
Priam Chakraborty
Senior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Kathleen Glenister Roberts, Ph.D.

ABSTRACT:
Child abandonment is unfortunately a global problem. Different countries around the world have implemented different services and programs to help deal with this long-standing issue. The baby box, also known as a baby hatch, is one such solution that has regained popularity recently. A baby hatch is a place, commonly attached to a hospital or care facility, where people can anonymously leave a baby. The hospital then arranges for appropriate care for the child with the help of government services. This system was originally created during the middle ages, and has resurfaced in many European countries in the past century. There has been significant debate over the ethicality of this system. My study aims to both compare the different issues posed by the baby hatch in different countries and to compare the baby hatch system to other methods used to deal with abandoned infants.
62 Romantic Influences on the Writings of Matt Bellamy
Elizabeth Chitester
Junior | Mary Pappert School of Music
Faculty Advisor: Benjamin Binder, Ph.D.

A B S T R A C T:
Matt Bellamy is most well known as frontman of the brit-rock band Muse. However, he began as a classically trained pianist. Eventually, he switched to guitar because it was “more fun, less pressure” according to NPR. He also told the radio station that he planned on joining a jazz band, but switched to rock music because it was “one of the most fun ways you can make a living out of music.” At thirteen, Bellamy and his friends formed their first rock band, which eventually evolved into Muse. Despite his break from classical music, many of Bellamy’s songs involve direct quotations of romantic era pieces. Those that do not often display piano sweeps that are reminiscent of Rachmaninoff, or arpeggios a la Chopin. This point begs the question of how Bellamy’s engagement with classical material reveals his perspective on classical repertoire, and what impact this has on his music.

63 The Relationships between the People and the Land of St. John
Megan Miller
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Kathleen Glenister Roberts, Ph. D.

A B S T R A C T:
This project looks at the relationship between people and their environment on the island of St. John in the U.S. Virgin Islands, especially through the author’s personal experiences on the island from her research at the Virgin Islands Environmental Research Station in the National Park. The history of the people and their environment, how they interact with others, and how that can affect the natural resources there are all important aspects of this intricate ecosystem of people and land. Specifically, the project studies how different groups of people interact with the environment on the island. Those groups are the indigenous Taíno people; the Dutch and their slaves in the cotton industry; the National Park Service; the local inhabitants today; and the tourists. Close attention is paid to the marine biology that is a part of the environment on the island, and therefore greatly affects all the populations mentioned above.

64 Acceptance Studies for 4He(e,e'p)X Reaction up to High Missing Energies and Momenta
Drew Finton
Senior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Fatiha Benmokhtar, Ph.D.

A B S T R A C T:
Data collected from the Helium-4 target in Hall A at Thomas Jefferson National Accelerator Facility (TJNAF) in Newport News, Virginia, was analyzed using the object-oriented data analysis software ROOT and used to create Missing Energy Spectra for Missing Momenta ranging from 150 MeV/c to 755 MeV/c for 4He(e,e'p)X reaction channels. Jefferson Lab is a continuous electron beam accelerator facility, and Hall A contains two high resolution spectrometers as well as the cryogenic Helium-4 target. Acceptance cuts were made to six measured variables to remove background noise, and then applied to produce a Missing Energy Spectrum showing two- and three-body break up channels as well as pion electro-production energy threshold. The analysis of these missing energy spectra will be used to understand the contributions of one-, two-, and three-body interactions.
George Moses Horton: Subversive Meanings in Poetry
Amy Dick
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Faith Barrett, Ph.D.

ABSTRACT:
George Moses Horton (1797/8–1884) was both an enslaved African American in the United States as well as a poet-for-hire. He composed love poems for young white men at the University of North Carolina, Chapel Hill, to give to their sweethearts, dividing the money between him and his master. Horton became so established as a harmless figure, he was later able to express his thoughts bluntly in his address to students at the University of North Carolina, Chapel Hill. Horton later published three books of poems. Despite the abundant restrictions Horton faced due to his situation, Horton capitalized on the popularity of poetry at the time, the potential for poems to be laden with ambiguity, and the public’s tendency to overlook his art as a threatening gesture. In “The Creditor to His Proud Debtor” the reader can see Horton’s work as an example of artistic mediums used for subversive expression.

Gas Electron Multiplier and Multi-Anode PMT Analysis for RICH Detector in CLAS12
Andrew Witchger
Senior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Fatiha Benmokhtar, Ph.D.

ABSTRACT:
Thomas Jefferson National Accelerator Facility (Jefferson Lab) is performing a large-scale upgrade to the Continuous Electron Beam Accelerator Facility (CEBAF) to reach energies of 12GeV/c. CEBAF Large Acceptance Spectrometer (CLAS12) in Hall B is also undergoing a major upgrade to collect data at these high energies. A new Ring Imaging Cherenkov (RICH) detector is being developed to provide better kaon – pion separation for CLAS12 in the 3 to 8 GeV/c range. With this addition, when the electron beam hits the target, the resulting pions, kaons, and other particles will pass through a wall of translucent aerogel tiles and create Cherenkov radiation. This light can then be accurately detected by a large array of Multi-Anode Photo-Multiplier Tubes (MA-PMTs). The supporting hardware and software systems for MA-PMTs were developed by the CLAS12 RICH collaboration. I am presenting my work on the testing and analysis of these systems and results that will amplify the physical capabilities of the spectrometer.

White Privilege and Systemic Racism
Jacob Dodd
Freshman | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: George Yancy, Ph.D.

ABSTRACT:
This project examines white racism as it exists in American society and as individuals experience it. I investigate white privileges and how they give white people unearned advantages, while systematically disadvantaging black people. Through the lens of privilege and the history of racial discrimination in the United States, this project demonstrates that racism is systemic; it is deeply embedded in our society. I examine these issues from a philosophical perspective, utilizing firsthand experiences of individuals, and the analyses of respected scholars. This project challenges the myth of meritocracy. It argues that there exist serious disparities in possibilities for achievement between white people and black people in society. My argument is that whiteness is the
transcendental norm that sees white people as "normative" and black people as "deviant." Furthermore, I argue that the white gaze, and its impact on black self-perception, makes systemic racism and white privilege self-perpetuating systems.

68 An Exploration Of Current Trends In School-based Occupational Therapy Practice
Nicole McManus
Senior | Rangos School of Health Sciences
Faculty Advisor: Jeryl D. Benson, EdD, OTR/L

ABSTRACT:
The purpose of this study is to understand how school-based occupational therapists describe the role of occupational therapy in an educational setting and which current educational and practice trends influence school-based occupational therapy practice. Survey research methods were used. The data for this study was collected via an anonymous online survey including demographic information, employment status, and practice patterns. Descriptive numeric data from the completed questionnaire was compiled and summarized (frequencies, means) using statistical software. This study in progress will explore the role of occupation in the practice of school-based occupational therapy with the intent of providing insight into current practice trends and contributing to research literature. Preliminary results will be presented.

69 An Examination of First-Year Students' Procrastination and the Role of the Writing Center
Emily Lamielle
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: James Purdy, Ph.D.

ABSTRACT:
While the UCOR 101 and 102 courses at Duquesne University challenge students to produce numerous drafts to signal key stages of the writing process, many first-year students overlook or dismiss this course objective. Unfortunately, they seem to dismiss the significance of these assignments and writing as a process, and complete college writing assignments the night before or day that they are due. This study investigates how often first-year students in the UCOR 102 courses truly procrastinate, why they do so, and the role the Writing Center plays in their procrastination, as well as explores how the Writing Center can assist these students in the future. Using a 12-question survey, this study measures first-year students' perceptions of their writing assignments, experiences at the Writing Center, and their personal procrastination on college coursework, revealing steps the Writing Center can take to help first-year students with their procrastination behaviors on college writing assignments.

70 Reality versus virtual experience of war: Lecture recital on the opera War Without End
Jason Hoffmann
Senior | Mary Pappert School of Music
Faculty Advisor: Jessica Wiskus, Ph.D.

ABSTRACT:
War Without End is a 1-act opera for which I composed the music and wrote the libretto. The story of the opera is fiction so that it might not tell one specific story but tell a story that could be applied to all who are involved. When the U.S. goes to war, the perspectives of soldier, family and civilian must all be included; war affects everyone, just in different ways. This fictional profile of the opera is purposefully obfuscated by the inclusion of video interviews
(nonfiction) of combat veterans who answer questions, introducing themes of each scene. Yet it is the musical setting of this fictional narrative that brings the experience to the audience in a visceral, emotional way. Rather than solely focus on the visual elements as the best way of understanding the “reality” of experience, music expresses another level: shifting lines of communication as they impact the emotions.

71 “He Liked Me, So I Loved Him:” A Critique of Social Stereotypes and the Loss of Female Identity in Tennessee Williams’s The Glass Menagerie, Suddenly Last Summer, and, The Eccentricities of a Nightingale
Katie Bennett
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: John Lane, M. A.

ABSTRACT:
In his body of work, Tennessee Williams addressed many of the issues prevalent in twentieth century America. Perhaps one of his strongest critiques exists within his analysis of gender roles and their influence over relationships between males and females. Throughout his plays, Williams addresses the implications of a paradigm that places men in a position of power over women. The archetype suggests that women must fulfill certain expectations of their male superiors. To review this societal assumption, the stereotypes are caricatured to such an extent that the gender roles become an absurdity. Williams creates women so debilitated by the feminine norms that they completely lose their identities to inadequate males. In The Glass Menagerie, Suddenly Last Summer, and The Eccentricities of a Nightingale, the depiction of weak female characters that idolize flawed male figures critiques a type of unconditional love that results in the loss of independent female identity.

72 Dissecting the Kaleidoscope
Marina Lopez
Junior | Mary Pappert School of Music
Faculty Advisor: Jessica Wiskus, Ph.D.

ABSTRACT:
I composed Kyrie, an original piece in the style of Western Medieval music. At first, I intended to research their compositional techniques in order to write a work that would be true to this style. However, I soon realized that I wouldn’t be able to understand the significance of this style and incorporate its techniques into my own work by simply looking at it. Rather, I had to take into account my own historical situatedness. That is to say, my grasp of Medieval music would always be affected by the different layers of history that have shaped my artistic vision. Instead of trying to override these layers, I decided to embrace them. Thus, my investigation turned toward them. The result is an expression of a present-day young composer’s relationship to antiquity. My objective became a reason to understand the means. The light became a reason make sense of the kaleidoscope.

73 Biodigestion as an alternative fuel source
Kevin Betz
Junior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: John Stolz, Ph.D.

ABSTRACT:
Biodigestion is a biological process in which bacteria digest organic material and produce biogas. Biogas is
composed of methane (natural gas), carbon dioxide and other trace gases. Byproduct is also produced, but is unique to each site. There are numerous biodigester designs and feedstocks that can be used effectively. Methane production can be maximized through evaluation and maintenance of each digester, as not all sites will run the same. Biodigesters hold high potential as a renewable energy source and an alternative to mining and drilling for fossil fuels. When compared the Marcellus Shale gas, biodigesters are a good alternative as they are much better for the environment, and they have a much longer lifespan. Capital costs can be made back within 10 years, and as early as 3 years. With the current knowledge and continued progress on biogas production, biodigestion is definitely a viable option for sustainable source of energy.

74 John Vanderlyn’s Visual and Political Representation of George Washington
Abigail Jones
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Julia Sienkewicz, Ph.D.

ABSTRACT:
In his 1834 portrait of George Washington, John Vanderlyn was commissioned by the United States House of Representatives to paint a likeness of Washington which today hangs at the Speaker’s right-hand side. Vanderlyn was asked to base his portrait on the archetype established by Gilbert Stuart, and indeed, his portrait clearly replicates the Munro-Lenox portrait by the older artist. However, a comparison of Vanderlyn’s portrait to Jean Auguste Dominique Ingres’ portrait of Napoleon demonstrates how French neoclassical artists created portraits that effectively combined myth, history, and reality. This paper seeks to examine the impact of the radical French neoclassical style that made Vanderlyn’s portrait of Washington – one of the most prolifically represented national leaders – distinct. By critically examining the life, work, and public reception of Vanderlyn, this paper seeks to explain what exactly was – in the disenchanted words of Vanderlyn himself – “the lot of the American artist at home.”

75 New Life to Humans Through the Death and Resurrection of Jesus
Heather Konstanzer
Freshman | School of Nursing
Faculty Advisor: Kathleen Glenister Roberts Ph.D.

ABSTRACT:
Through the coming of Jesus and His death and rising, Christians were given new life. The various birth narratives of the Bible by Matthew, Mark, Luke and John, as well as Romans chapters one and two provide various depictions of Jesus coming to being as a Human. Through His earthly life and untimely death on the cross, God became man, thus providing humans with a template for righteous living. His death and resurrection gave humans the hope that one day, they too can evade sin and be one with God. A life of sin, ends in death, however through understanding the monopoly God holds on salvation, humans can endeavor to lead their lives like Jesus and attain new and eternal life upon death. This project evaluates the belief that human beings are all subject to sinning, however if they attempt to live faithfully and follow Jesus’ example, God will grant reconciliation at the time of their passing.
76 Romani Culture and Policy Implementation
Stephanie Mullen
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Kathleen Glenister Roberts, Ph.D.

Abstract:
Numbering between ten and twelve million, the Romani people claim Europe’s largest minority population. Throughout modern history, Europeans have widely segregated, marginalized, and discriminated against the Romani population. Used as slaves until the 1890s and then subsequently isolated, the Romani people a European mindset or culture that characterized present-day Europe. Today, the struggle to integrate the population into European society plagues every nation. Though the European Union and its sub-bodies have passed multiple reports and legislation regarding integration, the process continues to encounter hurdles from both country governments and the Romani. Roma culture encourages isolation and counter-culture society, which remains inclusive and skeptical of non-Roma peoples. In examining the Romani sub-culture, a deep tension challenges the role of policy. This research focuses on the impact of Romani culture in the implementation of integration policy, paying particular attention to the Roma exclusivity.

77 The Papacy in the High Renaissance of Rome
Franklin J. Giovannelli
Junior | A.J. Palumbo School of Business Administration
Faculty Advisor: Kathleen Glenister Roberts, Ph.D.

Abstract:
When it comes to the many works of art and architecture in Rome, a person who is arguably more significant than the painter or work of art itself, is the patron behind the scenes who commissioned the work to be completed. It is because of patronage to the arts that we see the names and works of Bramante, Bernini, Raphael, and Michelangelo; we have the many incredible structures and museums throughout Rome and Europe; and generations of artists and people have been inspired to make great artistic creations. Of many benefactors, the two contributors who arguably impacted the arts the most during the High Renaissance were Popes Sixtus IV and Julius II, whose visionary ideas included the establishment of the Vatican Museums, the Sistine Chapel, the Vatican Library, and the Capitoline Museums.

78 Kung Fu as Religious and Cultural Integration
Megan Boley
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Kathleen Glenister Roberts, Ph.D.

Abstract:
Kung fu as it is practiced in the West is a fitting example of the merging of Eastern philosophy and Western culture. However, according to John Keenan, Professor of Religion at Middlebury College, some martial arts schools in Western society strip the martial arts of all of their religious and spiritual meaning, choosing to focus simply on the physical part. This, however, is detrimental to the entire practice, because the idea of balance is important in the Eastern religions and in martial arts as well. If there is not a focus on discipline of the mind, as well as discipline of the body, then there is an imbalance. Participation in martial arts (with a specific focus on kung fu) encourages not
only self-discipline and personal health, but also the ideas of cosmopolitanism and a melding of Eastern philosophy with Western lifestyle.

**79 Identification of the Binding Site of the SSRI Citalopram on the Human Serotonin Transporter**

Hannah Palmer  
**Senior | Bayer School of Natural and Environmental Sciences**  
Faculty Advisor: Michael Cascio, Ph.D.

**ABSTRACT:**  
The human serotonin transporter (h-SERT) has been the subject of much research because of its role in serotonin reuptake from the synaptic spaces to the presynaptic neurons. Serotonin is a well-known monoamine neurotransmitter since it contributes to feelings of well-being and happiness in the brain. Selective serotonin reuptake inhibitors (SSRIs) are the most effective treatment for depression but there are still many negative side-effects due to interaction with off-target receptors and proteins. In order to better define its binding site we are implementing the use of photoactivatable crosslinkers as well as a fluorescent tag attached through click chemistry onto the SSRI Citalopram, commercially known as Celexa. Once it is covalently bound we propose to identify sites of interaction using mass spectrometry. Identifying the binding site and monitoring the interaction of SSRIs with h-SERT helps distinguish the chemical make-up of the site and will allow for better drugs to be developed.

**80 Hate at the Border: An Analysis of Anti-Immigrant Websites**

Stephanie Confer  
**Senior | McAnulty College and Graduate School of Liberal Arts**  
Faculty Advisor: Marco Gemignani, Ph.D.

**ABSTRACT:**  
This research project will analyze the narratives and discourses adopted and performed by hate-groups that oppose illegal immigrants. After analyzing the content of the most prominent hate-groups’ websites common themes and performances of identity became apparent. Hate-groups are not necessarily as they seem: many believe their actions are a means of protection. They believe themselves to be heroes and brave men who are fighting to preserve the United States. They communicate and perform a particular American subjectivity, which is ultimately defined in opposition to a supposed invader who may stain the purity (whiteness) of the American society. This research project demonstrates the functional role that extreme positions on immigration carry not only for the identity definition of members of these hate-groups, but also for the creation of “the illegal immigrant” and his/her subjection to racist discourses in the U.S. society.

**81 Analysis of the Elk River Chemical Spill through the POCET Model**

Kathleen Kelly  
**Senior | Bayer School of Natural and Environmental Sciences**  
Faculty Advisor: Michael Irwin, Ph.D.

**ABSTRACT:**  
The POCET model is a viewpoint of the New Ecological Paradigm of Environmental Sociology. This model views social interactions as a connection between populations, organization, culture, technology, and the environment. On January 9, about 10,000 gallons of crude 4-methylcyclohexane methane (MCHM) and PPH were detected in the Elk River in Charleston, West Virginia. While this spill had direct environmental effects on the population of West
Virginia, the sociological effects can be analyzed using the POCET model. This spill affected the population and environment through immediate toxic effects, and immediate economic effects on the community. The organization of West Virginia community is responding to the spill through organized protests and lobbying for better legislation protecting their water from harmful chemicals. These efforts are reflective of a culture where government regulation of chemicals in our environment is lacking and not properly enforced.

82 Inferring Authorship through Myers-Briggs Type Inventory
Elizabeth DeCarlo
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Patrick Juola, Ph.D.

Abstract:
In the instance of attributing an author to the anonymous volumes, American Husbandry JGAAP provided results which were too inconclusive. A novel method of analysis became vital to solving this problem. First, we used a stylometry based personality analyzer which uses Myers-Briggs types to discern authorship. Plugging in known works of authors suspected to have written American Husbandry, John Mitchell and Arthur Young, we assessed each author’s type in comparison to the disputed volumes’ respective types. There was a definitive distinction between the results of Young and Mitchell. In comparing the personality of the unknown author to Young and Mitchell we could infer which was the likely author. In order to further solidify our results, we decided to utilize Bayesian Parametric Inference. After analysis, we obtained a Bayes factor, Young/Mitchell of 4.5 indicating strong evidence of Young as the author and conclusive results to the problem.

83 Assessing the Impact of a Privacy Breach on a Firm’s Market Value
William Gangewere
Senior | A.J. Palumbo School of Business Administration
Faculty Advisor: Pinar Geylani, Ph.D.

Abstract:
Firms are being exposed to an increasing amount of security and privacy risks. In an attempt to counter these risks and protect consumers, data breach disclosure laws have been enacted. These laws require firms to notify impacted parties that sensitive information has been accessed or acquired without authorization in the event of a data breach. Previous research has shown that the effect of data breach disclosures on a firm’s overall market value is negative. In this event study, I estimate the cumulative abnormal returns (CAR) that publicly traded entities suffer due to privacy breaches. Afterwards, a model is constructed using firm specific variables to discover the driving forces behind the magnitude of the CARs. The results of the model suggest that firms that suffer multiple breaches tend to receive stronger negative feedback from investors. The model also suggests that firms with more growth opportunity are associated with a greater negative stock market reaction. Lastly, the effect of time on CARs is discussed.
84 Molecular dynamics simulations of human γD-crystallin aggregates found in cataracts
Sarah Richards
Junior | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Ralph Wheeler, Ph.D.

A B S T R A C T:
Human γD-crystallin is a structural protein in the lens of the eye that misfolds and aggregates to form cataracts. The purpose of this research is to determine if there is a critical part of the protein that can be targeted in drug design to prevent cataracts. It is hypothesized that a hydrophobic core of five contiguous hydrophobic residues is critical for aggregation, as seen with the human amyloid-beta protein. Molecular dynamic simulations of small peptides with and without the hydrophobic core of γD-crystallin were performed to determine if one of the two hydrophobic cores present in full-length γD-crystallin is critical for aggregation. The mechanism of formation and structure of the aggregates were also examined.

85 A Structure for Evaluating Common Stocks: Independent Audit
Jordan Oeler
Senior | A.J. Palumbo School of Business Administration
Faculty Advisor: Ryan Garvey, Ph.D.

A B S T R A C T:
The opportunity and difficulty of earning positive abnormal profits on common stock investments have vexed both amateur and professional investors since the late 1600s. As markets have developed, so have valuation techniques. This study serves as an independent audit of one such technique, developed in 1974 by Ron Muhlenkamp, at his request. Using an adaptation of the original author’s methodology, GICS groups were examined on the parameters of price-to-book and return on equity over the period of 1979-2012. The original author’s model was compared to this data to determine the continuity of the model over time; it was then updated using graphing functions in Microsoft Excel and other graphing packages, and adjusted to maximize R2. While the author’s original model may be useful for investment purposes, it is not statistically valid to apply the model to the data used in this study over the time period indicated.

86 Musical Enrichment For All Ages
Jenna Hayes
Junior | Mary Pappert School of Music
Faculty Advisor: Sister Carole Riley, Ph.D.

A B S T R A C T:
As the head Community Engagement Scholar for the music school, I hold the position to ensure all freshmen music students serve the community. My project for the past two years has been at St. Ambrose Manor on the North Side. This assisted living facility is run by The Little Sisters of the Poor. This underserved population of residents knows all of my singers because I have developed such a deep relationship with St. Ambrose. Students from all music majors, and a few non-musicians, join my choir each year. I run weekly rehearsals for the choir to prepare choral and instrumental selections; we travel to St. Ambrose Manor twice a month to perform a one-hour concert and visit afterward. This service has matured me greatly for the music teaching profession; I have learned to appreciate music for its power to influence humans at any age or point in their life journey.
The Odyssey: The Untold Story
Sophie Noonan
Sophomore | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Sara Miller

Abstract:
The adventure of Homer’s the Odyssey may be regarded as one of the greatest tales ever told. Although the most fascinating part of the story is what may remain untold: the powerful and tempting women’s account. The seductive and destructive women of the Odyssey such as: Cerci, Helen, Calypso, the Sirens, and Clytemnestra stand as a social commentary of the rampant misogyny during Classical Antiquity. Through the women’s actions, words, and powers, Homer illustrates what the men of Greece feared most in women. They are dreaded as much as they are desired. They are as powerful as they are cunning. They each use their charm to manipulate Odysseus and his crew, as well as distract and prolong their ultimate goal. They are seductresses that are masters of their own sexuality, which would have been controversial to ancient Greece’s concept of the ideal woman.

Meaningful Life Experiences of People Connected to the Hill District
Emily Stokoski
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Susan Goldberg, Ph.D.

Abstract:
The present experiment was designed to learn about meaningful life experiences of individuals who have spent much of their lives in Hill District of Pittsburgh. Students in Dr. Susan Goldberg’s Psychology and Social Engagement service-learning course conducted interviews of volunteer participants living in the Hill District through the nonprofit community organization, FOCUS Pittsburgh. Student researchers asked about the participant’s most meaningful or life-changing experiences, how he or she made sense of these experiences, and how such experiences have related to the community of the Hill District neighborhood. The particular interview that will be profiled revealed themes of trauma, connection and disconnection, family, and neighbor relationships.

Meaningful Life Experiences of People in the Hill District: A Lacanian Analysis of the "Unsayable"
Donovan Wright
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Susan Goldberg, Ph.D.

Abstract:
The purpose of the project was to take transcriptions of interviews conducted and analyze the text, as well as audio, looking for trends in terms of events leading to psychological trauma (abusive households, substance issues, sexual abuse, etc.) but also in terms of the comeback from trauma, the redemption aspect of the experience. The second analysis is articulated by Annie Rogers in her book The Unsayable in which the interpretation of the language of people who are victims of trauma can lead to uncovering hidden aspects of the trauma itself, taking a more psychodynamic approach to the issue (2006). Two residents of the Hill District from Pittsburgh, PA were the participants for this project. Trends uncovered involved patterns of abuse, (substance, physical, mental, and sexual) as well as trauma brought on by crime, poverty, and death. The primary method for interpreting the language was looking for spaces and gaps in speech, rapid transfer in conversation topic, open ended speech and thoughts that do not properly follow each other. Possible uses of the analyses of the hidden language found in
victims of trauma can be used in clinical applications as well as applications in forensic psychology and law for purposes of evaluation.

90 The Human Body As Psychological and Spiritual
Olivia Reddick
Senior | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Will Adams, Ph.D.

A B S T R A C T:
This paper explores the integral nature of the human mind, body, and spirit. Contrary to the Cartesian dualism that pervades the foundations of Western culture, many religious traditions, including Christianity and Buddhism, recognize the importance of the physical body as an aspect to living a full life. I assert that Western psychology should draw from these traditions to incorporate bodywork in talk therapy. A holistic approach, such as Gestalt Therapy, treats the human client in a deeper and more meaningful way than those focusing only on the mind. The future of psychology and therapy should learn from the wisdom of spirituality and include work on embodiment in addition to cognitive based treatment.

91 Trashed Perception? A Socioecological Comparative Investigation
Brittany Urban, Shacini Mustachi
| McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Michael Irwin, Ph.D.

A B S T R A C T:
This research aims to explore the waste disposal and recycling system within the residence halls at Duquesne University, compared to student perception of the system. Many students seem to have the opinion that recycling is not taken very seriously at Duquesne, which can affect their individual recycling habits and in turn have a negative impact upon the entire system. Through investigation using data gathered through interviews and surveys, we can collect and analyze information about this delicate relationship, and hopefully use the results to improve upon the recycling system and sustainability efforts here at Duquesne.