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Artwork by Emily Wooddell

11TH ANNUAL

Undergraduate Research & Scholarship Symposium

Wednesday, April 3, 2019

Charles J. Dougherty Ballroom | Power Center

Sponsored by Office of Research and Office of the Provost





The 11th Annual

URSS

Undergraduate Research
& Scholarship Symposium



April 3, 2019

Charles J Dougherty Ballroom
Duquesne University

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We would like to thank

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.

Academic Affairs

Bayer School of Natural and Environmental Sciences

Biomedical Engineering Department

Center for African Studies

Center for the Catholic Faith and Culture

Center for Community-Engaged Teaching and Research (CETR)

Center for Healthcare Ethics

Center for Spiritan Studies

Center for Teaching Excellence

Center for Women's and Gender Studies

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Counselor Education Program

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Office of Disability Services

Office of Research

Rangos School of Health Sciences

School of Nursing

School of Pharmacy

University Academic Sustainability Committee

Office of Research, Christine Pollock, & Mary McConnell-Krepps

Honors College Student Jury



From the Associate Provost for Research

April 3, 2019

Students, Faculty, and Guests:

Welcome to the 11th Undergraduate Research and Scholarship Symposium (URSS), which highlights undergraduate scholars and their faculty advisors. This Symposium serves as a celebration of scholarship fundamental to a Duquesne education and it represents an endeavor which has become part of the fabric of Duquesne.

The URSS has grown from its simple beginnings into an annual event celebrating the value of a liberal education and the breadth of undergraduate scholarship across the College and Schools which make up Duquesne University.

I would like to thank all of our participating undergraduates for their hard work and their excellent posters and presentations. I especially want to thank their faculty advisors who go beyond classroom instruction to train and encourage young scholars. They guide our undergraduates to fully develop their passion for research. Without faculty support, this event would not be possible.

The URSS has depended on the generosity of our sponsors to provide numerous awards in recognition for exceptional scholarship and on the judges who give their time to make this an outstanding experience for our students. Their continued support has been essential to the success of the symposium.

Finally, I must thank the organizing committee and the Office of Research staff who devote time outside of university duties to ensure the success of this event.

Enjoy the day, celebrate your scholarship, and share in the work of your fellow undergraduate students across the all of the disciplines that are part of Duquesne University.

Sincerely,

Alan W. Seadler Ph.D.
Associate Provost for Research and Technology
Edward V. Fritzky Chair in Biotechnology Leadership

Welcome

Schedule - Tuesday, April 2, 2019

Charles J. Dougherty Ballroom – Power Center

9:30 a.m. - 2:00 p.m.

Student Participant Set-Up

Participants are required to stop by, sign in, and set up posters during this time.

2:00 p.m. - 4:00 p.m.

Welcome Reception for Participants, Judges, and Faculty (Shepperson Suite)

DU Faculty, student participants, and URSS award sponsors/judges are invited to attend. Light appetizers will be served.

4:00 p.m. to 7:00 p.m.

Judges-Only Preview of Posters

Judges are invited to view posters (without students present) at this time.

Schedule - Wednesday, April 3, 2019

Charles J. Dougherty Ballroom

8:00 a.m. - 8:30 a.m.	Student Participant Check In Continental Breakfast provided for participants.
8:30 a.m. - 9:00 a.m.	Welcome by Dr. David J. Dausey, Provost & Vice President for Academic Affairs Open Poster Session and Judging Guests are invited to walk around, peruse student projects, and engage with students.
9:00 a.m. - 10:00 a.m.	Oral Presentation Session 1 Students participating in the poster sessions should attend the formal presentations. Poster Session is closed at this time. Please respect the formal presenters.
10:00 a.m. - 11:00 a.m.	Open Poster Session and Judging Guests are invited to walk around, peruse student projects, and engage with students.
11:00 a.m. - 12:00 a.m.	Oral Presentation Session 2 Students participating in the poster sessions should attend the formal presentations. Poster Session is closed at this time. Please respect the formal presenters.
12:00 p.m. - 1:00 p.m.	Open Poster Session and Judging Boxed lunches provided for participants and judges. We encourage you to eat your lunches while viewing posters.
1:00 p.m. - 2:00 p.m.	Oral Presentation Session 3 Students participating in the poster sessions should attend the formal presentations. Poster Session is closed at this time. Please respect the formal presenters.
2:00 p.m. to 3:00 p.m.	Open Poster Session and Judging Guests are invited to walk around, peruse student projects, and engage with students.
3:00 p.m.	Awards and Closing Remarks

Session 1: Oral Presentations - Ballroom Section A

- 9:00 **Jacob Salvatore**
Biomedical Engineering
Faculty Advisor: Kimberly Williams, Ph.D.
Abstract: 11
Analysis of the Effects of E-Fluids on Cultured Lung Cells
- 9:15 **Katie Anna**
Pharmacy | School of Pharmacy and the Graduate School of Pharmaceutical Sciences
Faculty Advisor: Jane Cavanaugh, Ph.D.
Abstract: 48
Dual ERK5 and AKT inhibition decreases cell viability in PTEN mutant triple negative breast cancer and glioblastoma cells
- 9:30 **Christian Campbell, Elizabeth Sullivan**
Psychology | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Alexander Kranjec, Ph.D.
Abstract: 118
Won't You Be My Neighbor
- 9:45 **Lillian Saitz, Cassondra Griger, Ashley Evans**
Athletic Training | Rangos School of Health Sciences
Faculty Advisor: Erica Beidler, Ph.D.
Abstract: 10
An Investigation of Site-Specific Sport-Related Concussion Protocols in Pennsylvania High School

Session 2: Oral Presentations - Ballroom Section A

- 11:00 **Andrea Sajewski**
Biomedical Engineering and Mathematics | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Stacey Levine, Ph.D.
Other Authors: Jonathan Kamis, Ralf Loeffler, Claudia Hillenbrand
Abstract: 90
Quantifying Iron Overload using MRI, Active Contours, and Convolutional Neural Networks
- 11:15 **Kelly Mazzei, Olivia Erickson, David Fiumara, Zachary Moszczenski, Kelly Slipak**
Pharmacy | School of Pharmacy and the Graduate School of Pharmaceutical Sciences
Faculty Advisor: Anthony Guarascio, PharmD
Abstract: 27
Comparison of a calculated vancomycin area under the curve dosing strategy versus traditional trough-based dosing in obese patients with methicillin-resistant Staphylococcus aureus bacteremia
- 11:30 **Anna Fish**
Occupational Therapy | Rangos School of Health Sciences
Faculty Advisor: Jaime Muñoz, PhD, OTR/L/FAOTA
Abstract: 41
Developing Occupational Identity in Refugee Youth
- 11:45 **Choniece Phillips, Lindsay Roberts, Kathleen Dawson**
Pharmacy | School of Pharmacy and the Graduate School of Pharmaceutical Sciences
Faculty Advisor: Jamie McConaha, PharmD, Megan Bookser, PharmD
Abstract: 74
Improving Physician Office Quality Measures by Evaluating Statin Prescribing in Type 2 Diabetic Patients

Session 3: Oral Presentations - Ballroom Section A

- 1:00 **Shannon Moore**
Biology | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Elisabeth Chalovich, Ph.D.
Abstract: 66
H1N1 Influenza A Virus Evolution in Swine & Humans Since the 2009 Pandemic: HA Stability
- 1:15 **Andrew Burns**
Computer Science | McAnulty College and Graduate School of Liberal Arts
Faculty Advisor: Patrick Juola, Ph.D.
Abstract: 105
The effect of punctuation formatting on authorship attribution of formal writings
- 1:30 **Sophia Bakar, Matthew Nestler**
Biomedical Engineering | Biomedical Engineering
Faculty Advisor: Benjamin Goldschmidt, Ph.D.
Abstract: 63
Fluoride Removal From Water Using a 3D Printed Calcium Carbonate Filter
- 1:45 **Jordan Denk**
Biology | Bayer School of Natural and Environmental Sciences
Faculty Advisor: Wook Kim, Ph.D.
Abstract: 60
Exploring spatial competition within biofilms through a pleiotropic regulator

Video Competition - Featured in Shepperson Suite

The URSS Video Competition allows DU undergraduates a creative opportunity to convey their research or scholarship via a video platform. Students must create a video under 3 minutes, which will be viewed by a panel of judges, and featured during the annual Undergraduate Research and Scholarship Symposium. Video links are available on our website www.duq.edu/urss

Fostering Independence for Youth at the Auberle 412 Youth Zone

Jennie Dyer, Jemma Grogan, Haley Dengler

Major: Occupational Therapy | **School:** Rangos School of Health Sciences

Faculty Advisor: Amy Mattila, Ph.D, OTR/L

Throughout this semester, Duquesne OT students are leading programs at the Auberle 412 Youth Zone to promote self-esteem, role competency, leadership, and independence for youth who are transitioning out of the foster care system and/or have experienced homelessness.

Video Link: https://www.youtube.com/watch?v=n_SauahqX3g

Our Vincentian Home CEL Experience

Natalie Falcione, Rachel Tokarski, Fiona Kessler, Shelby Seyler, Mallory Wright

Major: Occupational Therapy | **School:** Rangos School of Health Sciences

Faculty Advisor: Amy Mattila, Ph.D, OTR/L

This video captures our experience as occupational therapy students working with older adults living in a senior care home and how we impact their lives.

Video Link: <https://youtu.be/VqecbskTFCo>

Occupational Therapy at Gwen's Girls: Giving At-Risk Girls a Stronger Voice

Melissa Lees, Kelly Burton, Amanda Seidl

Major: Occupational Therapy | **School:** Rangos School of Health Sciences

Faculty Advisor: Amy Mattila, Ph.D, OTR/L

Describe the benefits of occupational therapy programming for at-risk girls at an after-school program in the North Shore of Pittsburgh.

Video Link: <https://www.youtube.com/watch?v=sCO4aZPNYI0&t=0s>

The Migration Crisis and Italy

Kailey Love, Josiah Martin

Major: Journalism and International Relations | **School:** McAnulty College of Liberal Arts

Faculty Advisor: Margaret Patterson

This is a shortened version of a video that features selected interviews conducted with local advocates working or volunteering with organizations that assist refugees in Rome, Italy.

Video Link: <https://m.youtube.com/watch?feature=youtu.be&v=z9avDqhKMYg>

Stronger Than Hate

Katrina McNally, Abigail Gore, Amy Castagnino

Major: Occupational Therapy | **School:** Rangos School of Health Sciences

Faculty Advisor: Amy Matilla, Ph.D, OTR/L

This video is about our time working with ACHIEVA.

Video Link: <https://youtu.be/ZSsdOlz1HmY>

Downtown Outreach Center Services: The Role of OT

Rachel Petrus, Alicia Stewart

Major: Occupational therapy | **School:** Rangos School of Health Sciences

Faculty Advisor: Amy Mattila, Ph.D, OTR/L

We explore the role of occupational therapy at Downtown Outreach Center Services, a shelter for individuals ages 18-24.

Video Link: https://www.youtube.com/watch?v=Pb26Zjau_ME

Leisure Exploration and Social Participation at St Anthony's

Alexandria Raymond, Jenna Gallipoli, Katherine Gammer, Kyle Horan, Colleen Garrison

Major: Occupational Therapy | **School:** Rangos School of Health Sciences

Faculty Advisor: Amy Mattila, Ph.D, OTR/L

This video displays the importance of fostering meaningful activities related to life skills, community engagement, and social participation in the St Anthony's curriculum in order for the students to become integrated into society.

Video Link: <https://www.youtube.com/watch?v=fJgLy1txbl8>

Shepherd's Heart: The House of Hope

Jenna Roth, Sydney Giangliuli, Beth Kozuch

Major: Occupational Therapy | **School:** Rangos School of Health Sciences

Faculty Advisor: Amy Mattila, Ph.D, OTR/L

The role of occupational therapy students at nearby Veteran's home for individuals of the Pittsburgh area experiencing homelessness.

Video Link: <https://www.youtube.com/watch?v=DVjYZ1L5Di4>

Occupational Therapy Health and Wellness at Renewal Inc.

Nicholas Settecase, Erin Buckley

Major: Occupational Therapy | **School:** Rangos School of Health Sciences

Faculty Advisor: Amy Mattila, Ph.D, OTR/L

Duquesne OTS experience working with clients at Renewal

Video Link: <https://www.youtube.com/watch?v=WKHwxDPoaHg>

Award Opportunities

Bayer School of Natural and Environmental Sciences

2 for Excellence in Research in the Basic Sciences: \$300

4 Honorable Mentions: \$100 each

Students participating in the Undergraduate Research & Scholarship Symposium whose project fall within the realm of the basic sciences will be considered for this award.

Biomedical Engineering

Duquesne Award for Excellence in Biomedical Engineering: \$100

Students participating in the Undergraduate Research & Scholarship Symposium whose project fall within the realm of the biomedical engineering field will be considered for this award.

Center for the Catholic Faith and Culture

Common Good Research Award: \$250

This year, the Centers will recognize and reward research from any discipline that aligns with Duquesne's Catholic, Spiritan mission, particularly our commitments to:

- the dignity and equality of all persons
- working with vulnerable populations for systemic change
- preserving justice, peace, and integrity of creation

Center for Community-Engaged Teaching and Research

CETR Award for Undergraduate Research: \$150

The aim of this award is to recognize and celebrate research that contributes to authentic partnerships between scholars and community that generates knowledge that is relevant to disciplinary discovery as well as application to community concerns. The award will include a prize of \$150 as well as a gift to the researcher's community partner.

Center for African Studies

Award for Undergraduate Research in African Studies: \$300

Award for Undergraduate Research in Global Health: \$300

This award is intended to encourage and reward undergraduate research in African Studies and related areas that engage Duquesne's ongoing commitment to Africa.

Center for Healthcare Ethics

Award for Undergraduate Research in Ethics: \$250

This award aims to promote the interest of students for issues in healthcare ethics within contemporary society and culture. It also intends to encourage undergraduate research in the area of healthcare ethics. The HCE price is for the presentation that best highlights ethical issues in healthcare and ethical dimensions of developments in science and technology for human health and wellbeing

Center for Teaching Excellence

Award for Undergraduate Research: \$250

CTE is pleased to honor a project that focuses on the study of human learning in any of its many contexts, including but not limited to K-12 education, college, community, and clinical settings. Eligible projects will explore topics such as how and where learning happens or what empowers or hinders people in their learning.

Center for Women’s and Gender Studies

Award for Undergraduate Research: \$250

The Center for Women’s and Gender Studies supports research that embraces diversity, inclusion, justice, and freedom—values that are central to a liberal education. The URSS award thus recognizes outstanding research addressing issues in women’s, gender, or sexuality studies in any discipline. We believe that such research is vital to Duquesne University’s mission of providing students with opportunities for intellectual growth and ethical inquiry.

Classics Department

Best Poster/Presentation: \$250

The Department of Classics aims to promote the study of language, literature, history, and material culture from Ancient Greece, Rome, and the Middle Ages. This award recognizes excellent research addressing issues or questions relating to the field of Classics or its influence on later historical periods.

Counselor Education Program

Award for Undergraduate Research: \$250

Preference for this award will be given to research topics related to the mental health, school, and marriage and family counseling fields, such as addiction, mental health diagnosis, advocacy, child development issues, trauma and crisis response, etc.

Gumberg Library

Gumberg Library Award for Undergraduate Research: \$500

The Gumberg Library Award judges posters based on their intellectual merits and demonstration that the research presented meets the standard of its field.

Honors College

Outstanding Poster: \$150

Symposia posters are at their best when they optimally combine intellectual sophistication with legibility to the non-specialist. Therefore, criteria for this award include: scholarly rigor; visual appeal; organization; professional polish.

Mary Pappert School of Music

Mary Pappert School of Music Undergraduate Award: \$250

The Mary Pappert School of Music Undergraduate Award is open to all music students who participate in the URSS.

McAnulty College and Graduate School of Liberal Arts

Outstanding Research Merit: \$250

The McAnulty College and Graduate School of Liberal Arts Outstanding Merit Award is open to undergraduate participants in the liberal arts. A committee of Liberal Arts faculty and administrators will evaluate the posters' intellectual merits and demonstration that the research presented meets the standard of its field.

Office of the Provost

Outstanding Scholarship Award: \$150

1 for Best Poster: \$150

1 for Best Oral Presentation: \$150

This award serves to recognize outstanding scholarship within the university across all of the fields of study. The awards will be given to a student demonstrating exceptional scholarship through either poster or oral presentation.

Office of Diversity and Inclusion

Outstanding Undergraduate Research: \$250

The Office of Diversity and Inclusion is pleased to sponsor an award for outstanding, undergraduate research. The aim of this award is to recognize and celebrate research that contributes to creating, and maintaining an inclusive campus community here at Duquesne University and in the Greater Pittsburgh area.

Office of Disability Services

Outstanding Undergraduate Research: \$500

The aim of this award is to recognize and celebrate research that contributes to the field disability research through direct services, policy development, community service, research, or organizational leadership.

Office of Research

Video Competition Award: 2 awards, \$150 each

The URSS Video Competition allows DU undergraduates a creative opportunity to convey their research or scholarship via a video platform. Students must create a video under 3 minutes, which will be viewed by a panel of judges, and featured during the annual Undergraduate Research and Scholarship Symposium. The top two videos will win cash awards.

Rangos School of Health Sciences

2 for Rangos School of Health Sciences Award for Undergraduate Research: \$250

Students of the Health Sciences who are participating in the URSS will be eligible for these awards.

School of Nursing

School of Nursing Undergraduate Research Award: \$250

The School of Nursing Undergraduate Award is available to students participating in the URSS whose research is applicable to the healthcare and/or nursing field. Projects will be evaluated based upon the use of existing research for support, understanding and application of principles of research, effective communication, etc.

School of Pharmacy

Award for Undergraduate Research: \$250

The School of Pharmacy Award for Undergraduate Research serves to recognize projects in the field of pharmacy which demonstrate a high level of scholarly merit.

University Academic Sustainability Committee

Excellence in Sustainability & the Environment: \$250 and Honorable Mention: \$125

Projects demonstrating excellence with a focus on sustainability and the environment will be considered for this award.

Student Abstracts

*Indicates oral presenter

1 (Dis)Abilities in the Workplace

Elena Martino

Rangos School of Health Sciences | Occupational Therapy

Faculty Advisor: Ann Huang, Ph.D.

ABSTRACT:

According to a 2015 study, 55% of adults with autism do not seek employment after high school and 25% of young adults with autism are socially isolated (Roux 2015). For years, students with special needs have been outcast by society through a lack of opportunities in social and work settings. Employment is a way to provide people with a sense of purpose in life, especially in our work-based, American society. There are several ways for students with special needs to transition from school to the workforce, in which they must receive necessary preparation to do so. The purpose of this study is to examine the different methods that integrate students with disabilities into the workforce, including transition service programs and postsecondary education. Through this examination it will become evident how with these preparations, individuals with special needs can achieve a successful, fulfilling position in the workplace and society as a whole.

2 A Comparison of Self-Reported and Objective Measures of Activity Levels in College Students

Kelly Burton Natalie Falcione (OTS), Elena Donoso Brown (PhD, OTR/L)

Rangos School of Health Sciences | Occupational Therapy

Faculty Advisor: Kimberly Szucs, PhD, OTR/L

ABSTRACT:

In past research, a link between physical activity, physiological health, and QOL has been established among university students, demonstrating strong positive correlation between activity levels and self-esteem (Joseph, Royce, Benitez, & Pekmezi, 2014). Current research shows that students who achieve the recommended minimum amount of moderate-to-vigorous PA are still at risk for negative effects of sedentary behavior, during long hours of school (Perterson, Sirard, Kulbok, DeBoer, & Erickson, 2017). An online health survey validates these findings, as 736 university students reported spending 144 minutes on average dedicated to screen time and 96 minutes on homework daily (Fountaine, Liguori, Mozumdar, & Schuna, 2011).

The purpose of this study was to compare perceived PA levels as reported by college students to actual PA levels measured by an Actigraph. The Actigraph is a research grade activity monitor worn on the non-dominant wrist all day for 7 consecutive days. Participants first completed a gross motor screen followed by the International Physical Activity Questionnaire (pre-test, post-test), and they provided a schedule of their typical week. Data was collected from 18 college students, aged 18-22.

Descriptive statistics of the measured activity levels from the Actigraph have been completed. Participants showed weekly averages of 55.6% sedentary, 37.8% light, 6.53% moderate, and 0% vigorous or very vigorous PA levels. With students spending a majority of their time sedentary or lightly active, University staff and health care workers should offer healthy solutions that promote more movement and physical activity regularly during students' typical weekdays.

3 A Forensic Science Revolutionary

Dylan Baxter

Bayer School of Natural and Environmental Sciences | Forensic Science and Law

Faculty Advisor: Pamela Marshall, Ph.D

ABSTRACT:

Frances Glessner Lee has been called "the Mother of Forensic Science" because of her contributions to the field while it was still in its early stages. She did not enter the science field until she was in her 50s because, at the time, women were not permitted to have science careers. Once she broke into the field, it was changed forever. Lee created a set of dioramas called "Nutshell Studies of Unexplained Death" that changed the way that forensic investigations were conducted. Because of the excruciating detail in the scenes, they helped to teach investigators how to properly collect evidence without contamination and process crime scene without bias. This poster will explore the life of Lee and her contributions to the forensic science community.

4 A Literature Review of Female College Student Awareness of Chemical Exposures in Personal Care Products

Jessica Chan

School of Nursing | Nursing

Faculty Advisor: Rosanna Henry, MSN, RN

ABSTRACT:

Numerous personal care products contain toxins and chemical ingredients that can cause harmful effects on the endocrine and neurological systems of an individual. These chemicals can also contribute to infertility and birth complications. This poster presentation investigates the usage of personal care products among college women and their awareness of the exposure to chemicals. The researchers in the study created a questionnaire for college women to obtain the results. Seventy-two female college students from a medium-sized university were surveyed on their knowledge of the chemical ingredients in personal care products. Additionally, participants were asked how many products they use daily. The results can be used by environmental and occupational health nurses about daily exposure to chemicals and the effects on preconception health.

5 A Modern Reflection on Colonialism in Puerto Rico

Shawn Robinson

McAnulty College and Graduate School of Liberal Arts | Political Science and History

Faculty Advisor: Emad Mirmotahari, Ph.D

ABSTRACT:

In wake of Hurricane Maria, there have been renewed calls to reanalyze the US relationship with Puerto Rico. In this vein, it is important to consider again the case for Puerto Rican statehood and the effects of the current status on Puerto Rico. In our political system, this question has substantial implications on representation in government. To answer this question, this project uses historical analysis of political, legal, and economic structures. This analysis helps in order to understand the structural disparities which face those living in Puerto Rico and how they have developed over time. In order to do this, case law will be used to demonstrate the rights that Puerto Rico was allowed and denied. Additionally, this uses primary sources from legislators and official congressional statements describing the autonomy of the state. Finally, this paper will seek to link how these official acts affected rights and quality of life of Puerto Rican citizens. Due to these problems, this paper would recommend allowing for Puerto Rican Self-determination in order for them to claim their own status. This would fall in line with representational values and would help protect Puerto Rican rights, enshrining them in constitutional law for the future. Finally, this also should urge viewers on a path of reflection for the United States history of colonialism. In doing this, the project would hopefully open viewers' minds to America's imperial path in Latin America.

6 A Qualitative Study of the Transition from an Educational Setting to Adulthood for Youth with Intellectual and Developmental Disabilities (IDD)

Rachel Tokarski

Rangos School of Health Sciences | Occupational Therapy

Faculty Advisor: Jeryl Benson, Ed.D

Additional Authors: Jeryl Benson, Ed.D, Ashlyn Geubtner, OTS (doctoral candidate)

ABSTRACT:

A Qualitative Study of the Transition from an Educational Setting to Adulthood for Youth with Intellectual and Developmental Disabilities (IDD) is an on-going phenomenological study that seeks to understand the perspectives of parents of young adults aged 16-21 with IDD who are transitioning out of an educational setting, as well as the perspectives of these young adults themselves. This research is necessary because there is a gap in the current literature regarding how these parents and children feel the transition process is working or is not working for them. Participants are found via purposive snowball sampling, and semi-structured interviews are recorded, transcribed, and coded. Preliminary results show six emerging themes: Finding the right fit: The match between client & context, "Walking the path alone": Understanding the parent & student perspectives, Going above and beyond: the relationship between family & the professionals, Building a bridge between family & community via resource sharing, "Pathway of the transition process": from exploration to implementation, and creating a supportive environment through open communication.

7 A Review of CF Animal Models and Vector Types

Nicole Van Wagenen

School of Nursing | Nursing

Faculty Advisor: Kelley Baumgartel, Ph.D., RN

ABSTRACT:

Cystic Fibrosis is a life-altering disease caused by a mutated gene located on the long arm of chromosome 7. The mutation of this gene results in a defective Transmembrane Conductance Regulator (CFTR), which would normally regulate the Chloride Channels. The blocked chloride channels lead to the production of thick mucus, which primarily affect the lungs and digestive organs. This integrative review seeks to highlight commonly used CF animal models and vector types. To this end, we will report on and compare eligible studies. Examining animal models that share similar phenotypic traits of CF with humans will aid in determining which vectors have been most effective in specific animals. Additionally, this review will help inform how the vectors used in these animals can be modified and replicated in humans. This systematic literature review of PubMed uses the search terms "Cystic Fibrosis," "Vector," and "Animal." It will include studies that: 1) examine vector types that have been most effective in translocating the wild type CFTR, and 2) use an animal model. Some of the existing barriers to creating an effective vector include the well protected airway epithelium and not knowing exactly how many cells are needed to transduce to have clinical benefit. To date, no gene therapies in animals have been effective. Knowledge of which vectors are most effective in animal models can inform future research. Additionally, this line of research will help to create a vector that can treat rare mutations and correct the underlying problem with the CFTR gene.

8 Ambiguity of Social Class: An Exploration Through Jane Eyre

Catherine Lippert

Rangos School of Health Sciences | Physician Assistant Studies

Faculty Advisor: Erin Speese, Ph.D.

ABSTRACT:

In Charlotte Bronte's coming-of-age novel entitled Jane Eyre, her protagonist, Jane, is set up as a character who never seems to be able to find a place in society. Growing up as an orphan in her cruel, rich aunt's home, Jane battles strong desires to find people that she can truly call family while simultaneously dealing with her intense need for independence. Jane often finds herself at the margins of different economic classes and therefore drifts between them. By placing her in such positions, Bronte suggests that there are no absolute boundaries that cannot be crossed. In addition, given her constant "outside looking in" viewpoint, Jane can form evaluations of other characters based on their actions and personalities, rather than their physical appearance and social and economic statuses alone. Jane's ability to look past these defining limits is distinctive in this period, especially as a lower-class woman who is experiencing the worst of their restrictions. This poster explores how Brontë develops the character of Jane as a commentary on the ambiguity of social class in contrast to the notion of this time that states it is concrete for the individual based on their economic status and physical appearance.

9 An Analytical Review of the Cognitive and Psychological Effects of Neglect in Russian Orphanages

Sage Mansbarger

McAnulty College and Graduate School of Liberal Arts | Psychology

Faculty Advisor: Eva Simms, Ph.D.

ABSTRACT:

This review studied and analyzed several different experimental studies and case studies pertaining to the effect of neglect on children that lived in or grew up in Russian orphanages. The review compiled the data and information found in several different sources providing an overall deeper understanding of the way in which life in orphanages, especially those in Russia and similar Eastern European Countries, affects children's development. Each of these sources that had been compiled produced similar findings that children who grew up in or lived in Russian orphanages grew up with cognitive, psychological, developmental, or behavioral problems. The review determined that the children that stayed in the orphanages required attention that was equal with that of a parent and without that the medical problems they suffered would be intensified. This review also produced findings that many Russian orphans that only left the orphanages when they became legal adults became alcoholics, became addicted to drugs, began living in the streets, or committed suicide within a few years of leaving the orphanage.

***10 An Investigation of Site-Specific Sport-Related Concussion Protocols in Pennsylvania High Schools**

Lillian Saitz, Cassondra Griger, Ashley Evans

Rangos School of Health Sciences | Athletic Training

Faculty Advisor: Erica Beidler, Ph.D.

ABSTRACT:

Sport-related concussion (SRC) continues to be a prominent injury in high school athletics, causing acute and potential long-term issues. Although Pennsylvania's Safety in Youth Sports Act provides general guidelines for SRC management, it does not provide comprehensive information to help high schools navigate this complex issue. The purpose of this study was to develop a standardized, site-specific SRC protocol that could be distributed to Pennsylvania Interscholastic Athletic Association (PIAA) schools to improve quality of healthcare, as well as protect school districts and healthcare professionals from litigation. This was done by collecting site-specific SRC protocols from Pennsylvania high schools and determining what components were included in these protocols. A sample of protocols from 12 districts was taken and scored. The coding scheme addressed reference to the PA Safety in Youth Sport Act, concussion education for students and staff, removal of student-athletes with a suspected concussion, clearance from a medical professional prior to return-to-play, completion of a concussion management course by the coach, and penalties for a coach found in violation of these guidelines. Frequency counts and chi square analysis will be used to examine the data for prevalence of corresponding guidelines and relationships between included guidelines, respectively. We hypothesize that many site-specific protocols will be insufficient in outlining concussion care and management. This research may demonstrate the need for revision of current concussion protocols and the implementation of a state-wide, standardized protocol, which will ultimately aim to improve the quality of healthcare of sport-related concussions in young student-athletes.

11 Analysis of the Effects of E-Fluids on Cultured Lung Cells

Jacob Salvatore

Biomedical Engineering

Faculty Advisor: Kimberly Williams, Ph.D.

Additional Authors: Andre Samuel, Ph.D.

ABSTRACT:

Viewed as a healthier alternative to smoking, vaping and e-cigarettes are gaining popularity amongst teenagers and adults. Companies advertise the e-juices, comprised of vegetable glycerin, propylene glycol, and sometimes nicotine, as having little to no effect on the health of the users; however, few studies have been performed to back this statement. This study used cultured mouse lung cells and varied contents of e-juices to analyze the impact of each to the viability of the cells. Various dyes including DAPI and Trypsin Blue were used with a hemocytometer to determine the concentration of living cells. After exposing the lung cells to e-juices and e-juice vapors, a proliferation assay was used to assess the death rate. Evidence suggests that the nicotine may have harmful effects on the user when in the presence of Vegetable Glycerin.

12 Analyzing the Effectiveness of Using Character n-grams to Perform Authorship Attribution in the English Language

David Berdik

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Faculty Advisor: Patrick Juola, Ph.D.

ABSTRACT:

Authorship attribution is a subfield of natural language processing which can be applied to practical issues such as copyright disputes. While there are many different methods that can be used to perform such an analysis, the effectiveness of these methods varies depending on the material that is being analyzed as well as the parameters chosen for the selected methods. One of these methods involves using groups of n consecutive characters, called n -grams, where n refers to the number of characters in the gram. It is expected that n -grams of different lengths will vary in their accuracy of attributing the correct author to a questioned document. Specifically, it is expected that as n -grams become larger, performance will improve, reach a peak, and then begin to degrade.

Using Patrick Juola's Java Graphical Authorship Attribution Program (JGAAP), we performed an analysis on Koppel Schler's blog corpus by taking all corpus entries with at least 300 sentences, separating their first 100 sentences and last 100 sentences into separate entries, and running n -gram tests from 1 to 50 to determine what an ideal size would be for performing authorship attribution using character n -grams. Based on the results of testing, we showed that contrary to the bell curve-like performance that was anticipated, n -gram accuracy peaks fairly early before beginning its decline. Future work will include character n -gram analysis on different languages to determine how much variance, if any, is present between languages.

13 Antibiotic Resistance in Metal and Triclosan Exposed Bacteria

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Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Nancy Trun, Ph.D.

ABSTRACT:

Abandoned mine drainage (AMD) is the result of contaminated water coming from mine sites no longer in use. Passive remediation systems have been constructed across Pennsylvania in order to control the drainage and minimize harm to the environment. Boyce AMD is a passive acidic system with 9 ponds. This system is particularly high in metals like magnesium and aluminum and displays pH levels as low as 2. Along with the metals found in AMD, the components in antimicrobials like Triclosan have also been found to cause a tolerance of antibiotics. We tested the acquired antibiotic resistance of lab strains *Escherichia coli*, *Serratia marcescens*, *Klebsiella pneumoniae*, and *Bacillus subtilis* after exposure to AMD and antimicrobials. The bacterial strains were exposed to AMD and triclosan under several different conditions. In order to test for antibiotic resistance in the exposed bacteria, disk assays were performed using multiple antibiotics with different modes of action, including rifampicin, norfloxacin, spectinomycin, tetracycline, kanamycin, and ampicillin. Our results indicate the development of antibiotic resistance as a result of exposure to AMD and triclosan.

14 Anti-proliferative effects of antiviral cytokines on neural stem/progenitor cells are age-independent

Abigail Dunphy

School of Pharmacy and the Graduate School of Pharmaceutical Sciences | Pharmacy

Faculty Advisor: Lauren O'Donnell, Ph.D.

Additional Authors: Manisha N. Chandwani (graduate student); Yashika S. Kamte (graduate student); Apurva Kulkarni (post-doc); Lauren A. O'Donnell (faculty)

ABSTRACT:

Viral infections of the brain are uniquely debilitating due to disruptions in normal brain development. During viral infections, secondary inflammation disrupts multipotent neural stem/progenitor cells (NSPCs), which are instrumental in fetal neurodevelopment and continued adult neurogenesis. In response to viruses, resident and migratory immune cells release a milieu of inflammatory mediators that may lead to downstream effects on NSPC proliferation and differentiation. We hypothesized that the exact nature of the NSPC response to inflammatory cytokines may be influenced by the host's stage of development, possibly due to differences in the type and quantity of active signaling pathways at different developmental milestones. Our lab previously demonstrated that embryonic NSPCs respond with decreased proliferation when exposed to the key antiviral cytokine interferon gamma ($IFN\gamma$). However, neonatal and adult NSPCs are inherently less proliferative than embryonic NSPCs, and may respond to antiviral cytokines in distinct ways. To study the age-dependent effects of $IFN\gamma$ on NSPCs, we compared neonatal and embryonic NSPCs using a neurosphere proliferation assay at various timepoints post- $IFN\gamma$ treatment. When neurosphere area was quantified as a measure of proliferation, we observed a negative correlation between $IFN\gamma$ concentration and neurosphere area in both neonatal and embryonic NSPCs, suggesting that $IFN\gamma$ inhibits NSPC proliferation at multiple developmental stages. Furthermore, although the proliferative capacity of NSPCs declines with age, we found that $IFN\gamma$ exhibits a similar impact on both embryonic and neonatal NSPC growth, which implies that the NSPC response to $IFN\gamma$ is age-independent and may represent a conserved protective mechanism against viral infections.

15 Applying Neo-Riemannian Theory to Today's Pop Music

Greta Zewe

Mary Pappert School of Music | Music Technology

Faculty Advisor: Paul Miller, Ph.D.

ABSTRACT:

The most common way to analyze harmony in tonal music is by identifying the key and relating all harmonic functions to this key center using Roman Numerals. This is based on a tradition starting in the early 18th century, called Stufentheory, or scale "step" theory. However, sometimes the harmonic progressions in tonal music are not easily understood in this way. Neo-Riemannian theory, originating in the early 20th century, is an alternative way to analyze harmony in music which illustrates coherence without relying on a key center or scale. I have analyzed three popular songs: "Rhubarb" by Aphex Twin, "Dayvan Cowboy" by Boards of Canada, and "Cat Thruster" by deadmau5. I have analyzed the songs' respective chord progressions using Tonnetz diagrams, which are geometric representations of Neo-Riemannian transformations. The goal of my poster is to demonstrate coherence among harmonies in today's popular music where using Roman Numerals does not yield meaningful results by applying Neo-Riemannian theory.

16 Are e-cigarettes more effective than nicotine replacement therapy products in increasing the chance of long-term cessation?

Macy Zimmerman, Marlana Werderber

School of Nursing | Nursing

Faculty Advisor: Lichun Chia, PhD

ABSTRACT:

Background/Significance: Electronic cigarettes (ECs) are battery-powered devices that heat a nicotine solution into nicotine vapor that is inhaled into the mouth, upper airways, and lungs. ECs are becoming an increasingly popular method of cessation among smokers. Though smokers have access to over-the-counter nicotine replacement therapy (NRT) products (patch, inhaler, lozenge, gum), previous research has shown that NRTs are not associated with greater success rates than unaided attempts to quit smoking. With smoking being one of the leading causes of death and disability, this literature review aims to evaluate the effectiveness and long-term health implications of ECs comparing to NRT as a cessation tool.

Methods: A systematic literature review was conducted using CINAHL and PubMed databases. Statistics relating to cessation rate, relapse rate, withdrawal symptoms, and treatment compliance with ECs and NRTs were analyzed and compared. Database searches were limited to peer-reviewed journals that were published within the past five years to ensure that the selected articles are current and relevant.

Results: Several studies reported that NRTs had lower cessation rates. Differing from NRTs, ECs simulated the visual, sensory, and behavioral aspects of smoking. They did not contain tobacco and many of the harmful toxins in cigarettes, and had higher cessation rates compared to NRTs. Furthermore, ECs had fewer health-related risks, such as cancer and heart disease, than cigarettes.

Lastly, across all studies, it was common for smokers using NRTs or ECs as cessation tools to experience mild withdrawal symptoms, however, no statistically significant difference were found in occurrence of adverse events. Our findings indicated that ECs were effective as cessation tools that can contribute to potentially better long-term health outcomes when replacing cigarette use.

17 Assessing for Intimate Partner Violence - A Quality Improvement Pilot Project for Nurses

Leanna Tobin, Millicent Micho, Morgan Smith

School of Nursing | Nursing

Faculty Advisor: Melanie Turk, Ph.D., RN

ABSTRACT:

Intimate Partner Violence (IPV) is recognized as one of the most common forms of violence against women. Health care providers play a key role in assessment and identification of intimate partner violence. A thorough literature review revealed that proper education, assessment, and intervention by health care providers can bring about positive change in which women are able to find support. Health care providers have the duty to provide confidential, safe spaces in which women may address their concerns regarding violence with their partner as well as connecting the patient to resources to help them stay safe. Using in-person in-services and an evidence-based program, we educated registered nurses, patient care technicians, and nursing students on women's health and medical surgical units at a local hospital about how to best screen for IPV with all patients. We emphasized the importance of assessment as well as interventions for addressing the issue of intimate partner violence with patients as a part of routine care. Participants completed a pre-test that revealed many talked to their patients about domestic and sexual violence only some of the time. After completing the educational program, the majority of participants strongly agreed or agreed that the training increased their understanding of how to provide referrals to local and national resources for patients experiencing IPV. The majority also reported that they were more likely to offer patients a safety card about healthy relationships and IPV.

18 Assuming Environmental Responsibility: Why Does it Fail?

Meredith Bennett

Bayer School of Natural and Environmental Sciences | Environmental Science

Faculty Advisor: Kristin Klucevsek, Ph.D.

ABSTRACT:

There is a great amount of deficiency in promoting environmental responsibility among the average citizen. In response, quite a bit of research has investigated scientific literacy, specifically regrading climate change news. Many of these studies have focused on how people respond to environmental emergency situations as communities. There is relatively little data on why personal efforts to become more environmentally responsible often fail. This study investigates the reasons people give for their own failure to make environmental improvements in their lives. This is important because understanding the most common deterrents and restrictions in efforts to become environmentally responsible is necessary for increasing the likelihood of success in the future. This study uses campus-wide surveying to collect data on environmental responsibility from a diverse range of Duquesne students. The survey inquires about the main deterrents and hesitations that students experience when

trying to become more environmentally responsible and asks them to explain their reasoning. In addition, it asks about their views on what personal characteristics and resources are necessary to create an effective leader in the development of large-scale environmental responsibility. The survey also collects demographic data on students to distinguish possible patterns between students' thoughts and their backgrounds. Although this study is limited by the number and diversity of the Duquesne University population, it could potentially provide a unique and useful insight into the reasoning behind failure to assume environmental responsibility.

19 Barriers to Recovery Among People Who Use Opioids in Allegheny County

Puneet Gill

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Additional Authors: Noelle E. Spencer MSc1, Simone Taubenberger, PhD1, Judy C. Chang, MD, MPH2 Magee-Womens Research Institute, 1 Department of Obstetrics, Gynecology and Reproductive Sciences and General Internal Medicine, Magee-Womens Research Institute, and Center for Resear

ABSTRACT:

Background: A qualitative study was undertaken to gain a deeper understanding of the opioid crisis in Allegheny County from the point of view of stakeholders in affected communities. People at risk of overdose who choose to seek treatment face financial and location-based barriers to accomplishing these goals. The study objective was to explore opioid users' barriers to seeking treatment in Allegheny County.

Methods: Semi-structured, in-depth in-person or telephone interviews were conducted with over 110 individuals living in or working with eight affected communities. Interviews were audio recorded and transcribed. A code-book was developed utilizing a priori topics from the interview guide and updated iteratively utilizing a semi-grounded theory approach. This paper reports on the analysis of a subset of 28 interviews. Thematic analysis focused on participants' discussions of barriers to treatment.

Results: A preliminary review of 28 transcripts indicated two main themes in stated barriers to treatment access, particularly within lower income neighborhoods. Participants indicated that lower income neighborhoods faced higher barriers to accessing treatment programs due to financial and location-based challenges. The main financial barriers included healthcare and transportation costs. Location-based barriers centered on transportation and proximity of recovery services. In addition, several participants indicated that eligibility criteria for certain types of programs and the high demands the recovery process requires posed barriers to both accessibility and maintenance of recovery.

Discussion/Implications: Further research is needed to determine what can be done on a community level to create more accessible and effective treatment options for those facing opioid addiction.

20 Beauty Valuation for Functional and Artistic Objects

William Stevens

McAnulty College and Graduate School of Liberal Arts | Psychology

Faculty Advisor: Alexander Kranjec, Ph.D.

ABSTRACT:

Philosophers and psychologists have long discussed the relevance of intended function to the valuation of beauty in artifacts. Similarly, art educators have argued that engaging with artifacts as "works of art" may increase people's appreciation for everyday objects. The current study explores the relative effects of adopting a more "pragmatic" vs. an "aesthetic" stance when engaging with artifacts. This study will prime participants to adopt either a pragmatic or aesthetic stance by making particular kinds of judgments about artifacts. Participants primed to think about FUNCTION will answer questions such as "to what extent could the chair perform well in different contexts" or "to what extent are the materials of the chair fit to their purpose" before making beauty ratings for the same chairs. Participants primed to think about ART will answer questions such as "to what extent could the chair represent a social idea or historical time period" or "to what extent does the chair encourage contemplation" before making beauty ratings. A control condition will require a third group to rate chairs for beauty with no priming. The study aims to determine if the beauty of artifacts is better predicted by peoples' valuation of its worth as an object well-built for its intended purpose or by its status as art.

21 Being Pro-Life Beyond Political Divides

Teresa Klaber, Mary Kate Modico

Rangos School of Health Sciences and School of Pharmacy | Speech Language Pathology and Pharmacy
Faculty Advisor: Radu Bordeianu, Ph.D.

ABSTRACT:

Americans who identify as Pro-Life tend to embrace only some aspects of this identity. This presentation first considers the definition of what it means to be an advocate for the right to life according to National Right to Life and compares it to the divergent attitudes of those Christians who identify as Pro-Life or Pro-Choice as reflected in various PEW research studies. The Catholic Church, as represented by the US Conference of Catholic Bishops, rejects abortion, influencing American politics and voter practices. We propose a comprehensive approach that goes beyond these positions and transcends political divisions by focusing on all the moral aspects inherent in being Pro-Life including abortion, gun control, and the death penalty.

22 Biotinylation of Bacteriophage for Quicker Bacterial Detection

Tori Kocsis

Biomedical Engineering | Biomedical Engineering

Faculty Advisor: John Viator, Ph.D.

Additional Authors: John Viator, Ph.D. (faculty), Robert Edgar (Graduate Student)

ABSTRACT:

Bacterial detection and identification is a long process that takes 3-4 days to complete. Currently, a patient's blood sample is tested in a laboratory for bacterial identification. Bacteriophage are viruses with the ability to attack and destroy specific bacteria based on their antigen binding capabilities. The goal of this work is to produce bacteriophage particles with magnetic beads for quicker identification of bacteria from an unknown sample. Bacteriophage are built from repeating protein subunits and

therefore prime targets for biotinylation. Biotinylation of bacteriophage allows the functional amino acids group of the biotin reagent to react with the surface proteins of the bacteriophage. Through highly affinitive biotin-avidin interactions, the biotin labeled bacteriophage are attached to magnetic streptavidin beads and separated with a strong magnet. Ultimately, biotinylation and magnetizing highly concentrated bacteriophage without affecting their infecting capabilities allows for quicker separation from leukocytes and other particles present in patient's blood sample.

23 Calculus of Variations Based Deep Learning for Image Processing

Ryan Cecil

McAnulty College and Graduate School of Liberal Arts | Mathematics

Faculty Advisor: Stacey Levine, Ph.D.

ABSTRACT:

Processing image data can be performed in a mathematically sound (or 'predictable') way, by using models based on the Calculus of Variations. More powerful models have recently been proposed using the deep learning framework of convolutional neural networks, but these are not well understood and their solutions could potentially demonstrate critical flaws. In this work, we study several mathematical models for image processing based on the Calculus of Variations and analyze their connection to the new deep learning based Trainable Nonlinear Reaction Diffusion model of Chen and Pock. Ultimately we hope to exploit the good properties of the theoretically sound models within the deep learning framework by incorporating image geometry in a unique way.

24 CHARACTERIZATION AND REGULATION OF STEROID SULFATASE ACTIVITY IN A MOUSE FIBROBLAST CELL LINE

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Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Kyle Selcer, Ph.D.

Additional Authors: Dr. Kyle W. Selcer (faculty)

ABSTRACT:

Steroid hormones circulate in the blood as inactive sulfated forms, such as estrone sulfate and dehydroepiandrosterone sulfate. The enzyme steroid sulfatase (STS) converts these steroids into active forms, mainly estrogens, in peripheral tissues. We have previously characterized STS activity in human and mouse breast and bone tissues, and we have shown that STS can provide estrogens to these tissues from circulating sulfated precursors. This study was designed to characterize STS activity in a mouse fibroblast cell line (NIH-3T3). Using a radioactive estrone sulfate conversion assay, we found high levels of STS activity in cultured NIH-3T3 cells. This activity was blocked by the STS inhibitor EMATE, indicating authentic STS activity. We also found that microsomes prepared from NIH-3T3 cells had high STS activity, and that cytosols had low activity, consistent with the known distribution of this enzyme to the endoplasmic reticulum. Western blotting confirmed the presence of immunoreactive STS in NIH-3T3 microsomes. Steroid hormone treatments of cultured NIH-3T3 cells revealed that glucocorticoids decreased STS activity in fibroblast cells, as we have found for other tissues. However, estradiol also decreased STS activity, which has not been shown previously. This may reflect negative feedback of

estradiol on estrogen formation by STS. Our results could have important implications with regard to local estrogen activation by STS in fibroblasts, which are widely distributed throughout the body.

25 Civilians' Perceptions of Intelligence: How Popular Culture Affects Understanding of Government Operations

Shana Walklet

McAnulty College and Graduate School of Liberal Arts | International Relations

Faculty Advisor: Jennie Schulze, Ph.D.

ABSTRACT:

The modern debate of whether mainstream entertainment has given the civilian population a valid portrayal of the inner workings of intelligence operations is explored. Examples of popular television and films are displayed to provide insight into the kinds of rhetoric that dominate this subfield. Research was conducted by gathering data from multiple media platforms as well as provided individually based findings. The scope was narrowed to a select few representative pieces to avoid unwarranted repetitiveness. Case studies of the works are the main focal point of the presentation, supporting the hypothesis clearly established and defined in the early stages of research.

26 Clairton

Zachary Ference

McAnulty College and Graduate School of Liberal Arts | History

Faculty Advisor: Andrew Simpson, Ph.D

ABSTRACT:

Clairton, Pennsylvania is a former steel town along the Monongahela River. The city fell onto hard times after the collapse steel industry but it now trying to make a comeback. My research shows that the early history of the city starts in the colonial period with the first settlers in the area who were interested in the agricultural possibilities. Industry though soon found a home due to the river and the traffic on it. Steel mills were established in 1900 and eventually came under ownership from US Steel, who also established a coke works at the city. The presence of the mills was the chief reason for the incorporation of the city in 1922. Steel became the city's main industry and source of wealth until the collapse in the 1980s. This was due to the resistance of the steel industry to change from a vertical integration model centered on old methods of manufacture to modern and efficient means. According to my research, the city's population can also be tied to the industrial fortunes. As the steel industry showed success, the population grew, as it faced hardships, the population fell. The city though has tried to bounce back via new tax policies and the introduction of a new grocery store. I also give suggestions in the paper for solutions such as new elected officials and new businesses.

27 Comparison of a calculated vancomycin area under the curve dosing strategy versus traditional trough-based dosing in obese patients with methicillin-resistant Staphylococcus aureus bacteremia

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School of Pharmacy and the Graduate School of Pharmaceutical Sciences | Doctor of Pharmacy

Faculty Advisor: Anthony Guarascio, PharmD

ABSTRACT:

Purpose: Vancomycin efficacy for treatment of methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia has targeted a goal AUC:MIC ratio of ≥ 400 . Recent studies indicate vancomycin AUC:MIC targets may be achieved with lower total daily doses (TDD), reducing risk of nephrotoxicity. The objective was to evaluate vancomycin TDDs achieving trough targets versus calculated dosing achieving AUC:MIC targets.

Methods: A retrospective review was performed within a large teaching hospital network. Patients were eligible if they were treated between 1-1-2016 and 8-31-2018, had a blood culture positive for MRSA, and an appropriately drawn trough, defined as 15-20 milligrams per liter (mg/L) occurring after at least three doses of vancomycin. Cockcroft-Gault was used to calculate creatinine clearance, which was then used to estimate vancomycin clearance and estimated AUC. The patients were divided into two groups based on BMI. This study was IRB-approved.

Results: Of 311 patients with MRSA bacteremia, 122 (39.2%) met inclusion criteria, including 54 (44.3%) and 68 (55.7%) with high/lower BMIs, respectively. The actual TDD from the therapeutic trough-based dosing strategy (2366.8 ± 1224.8 mg) differed significantly from estimated TDD from calculated AUC:MIC-based dosing (1782.8 ± 744.8 mg) across the cohort ($p < 0.0001$). For high BMIs, there was a significant difference ($p = 0.001$) between trough-based (2569.44 ± 1333.01 mg) and AUC:MIC-based (1648.15 ± 716.25 mg) strategies. Across all patients, 49 (40.2%) experienced AKI while receiving vancomycin; with a significantly higher rate in the high BMI group (57.4 vs 26.5%; $p = 0.0005$).

Conclusion: Using an AUC:MIC-based dosing strategy may reduce TDD required for treatment of MRSA bacteremia when compared to traditional trough-based dosing, particularly among obese patients.

28 Comparison of immediate release and extended release diltiazem post-intravenous conversion in the treatment of atrial fibrillation

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School of Pharmacy and the Graduate School of Pharmaceutical Sciences | Pharmacy

Faculty Advisor: Branden Nemecek, Pharm.D., BCPS

ABSTRACT:

Diltiazem is a non-dihydropyridine calcium channel blocker used to achieve heart rate control for atrial fibrillation. Currently, most inpatient settings employ initial treatment with intravenous diltiazem infusion followed by conversion to a form of oral diltiazem after heart rate stabilization is achieved. The purpose of this study was to compare conversion strategies from intravenous to oral diltiazem by analyzing average heart rate and calculated mean arterial pressure in atrial fibrillation patients. Heart rate and mean arterial pressure within ± 10 percent of baseline were considered goal. Data was collected and analyzed including patients admitted between 2014 and 2018 at a 404-bed urban hospital. Of the 419 patients studied, average age was 72.6, 224 (53.5 percent) patients were female, and 361 (87 percent) patients were Caucasian. 84 (20 percent) patients transitioned from intravenous to an extended release product, while 335 (80 percent) patients transitioned to the immediate release

product. Of those who only received immediate release diltiazem, 282 (62.8 percent) and 247 (52.1 percent) patients maintained their mean arterial pressure and heart rate within goal ranges, respectively. For those who only received the extended release formulation, 44 (58.7 percent) were within the mean arterial pressure goal and 45 (52.3 percent) were within the heart rate goal. Immediate release diltiazem demonstrated more consistent stable heart rate from baseline upon conversion. Extended release diltiazem displayed supra-therapeutic effects more often, with heart rate demonstrating larger decreases from baseline. Changes in mean arterial pressure were generally stable across both oral dosage forms.

29 Comparison of novel mini-barcode primers for eDNA-based monitoring of freshwater ray-finned fish communities

Ashton Callipare

Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Brady Porter, Ph.D.

Additional Authors: Haley Wetzel, Brandon Hoenig, Brady Porter, Ph.D.

ABSTRACT:

The state-adopted survey method of electrified benthic trawling of fish communities on large river systems (such as the Allegheny, Monongahela, and Ohio) has been labor intensive, expensive, and imposed dangers for both organisms and surveyors. Advancements in Environmental DNA (eDNA) and metabarcoding technology with Next-Generation Sequencing (NGS) have the potential to provide improved detection of aquatic organisms from water samples without the imposed costs and dangers of traditional sampling. Alignments of mitochondrial DNA COI gene sequences obtained from GenBank were used to design mini-barcode PCR primers that could amplify DNA from a wide variety of ray-finned fishes. We then tested the ability of several mini-barcode primer sets to exclusively detect ray-finned fishes from a mock mixture of tissue-extracted DNA samples from 17 target fish species without amplifying human and other non-target taxa. The amplified PCR products from the mock mixture were submitted for 250bp paired-end NGS on an Illumina MiSeq platform. The bioinformatic tools within QIIME were used to filter resulting sequencing reads based on the quality and length of each read. These high-quality reads were then clustered based on their similarity with other sequencing reads, and representative sequences from each of these clusters were aligned to reference genomes to determine the taxonomic assignment of representative sequence. Future work is focused on applying these primer sets to water samples taken from the Three Rivers Region to evaluate their detection efficacy of ray-finned fish communities in environmental samples.

30 Comprehension of multimodal information by people with aphasia: Investigating varied rates of auditory information

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Rangos School of Health Sciences | Speech-Language Pathology

Faculty Advisor: Sarah Wallace, Ph.D.

ABSTRACT:

Aphasia is a communication disorder characterized by deficits in language comprehension and

production. Utilizing multiple communication modalities, such as auditory and visual stimuli, can improve comprehension in people with aphasia. The purpose of this study was to measure accuracy, response time, and preferences of people with aphasia when presented with combined written and audio newspaper articles at three different speeds. The participants included 25 adults with chronic aphasia, post-stroke, who read text and listened to a computer-generated voice under three conditions: slow, medium, and fast. After reading, participants answered multiple choice questions regarding the article content. Participants ranked their preference of each listening condition and provided a rationale for their selection. The researchers measured accuracy of multiple-choice questions for each article. Results show no statistically significant difference in accuracy for the different listening speeds. However, participants preferred the medium speed voice. Reasons given for this preference included being able to read at the same time they listened to the voice, struggling to maintain attention during the slow voice, and inability to read at the same rate as the fast voice. Regardless of statistical significance, participant preferences may indicate relationships between speed of presentation and auditory comprehension.

31 Conquering Caregiver Challenges of Daily Living - A Secondary Analysis

Megan Mann, Morgan Gruender

School of Nursing | Nursing

Faculty Advisor: Pamela Spigelmyer, Ph.D., RN, CNS, CSN

ABSTRACT:

Family caregivers face many challenges providing daily care for someone with dementia. The purpose of this study was to uncover the wide range of challenges and anxiety that caregivers experience, as they assist the person with dementia in daily tasks. After IRB approval, a secondary analysis was conducted using de-identified interview data from eight family caregivers who participated in a qualitative phenomenology study. Using a secondary analysis, it became evident that informal family caregivers face many challenges in caring for an individual with dementia and they are able to overcome these challenges. Amid trying circumstances, caregivers delayed tasks including medication administration and hygiene. Upon reflection, caregivers created a separation between the person and the disease and realized that their anger is geared toward the dementia and its progression. The caregivers faced changes in their quality of life, that they ultimately deemed inevitable and just learned to live with. In order to cope with these, and many other challenges, caregivers sought out support groups and accepted assistance from family and friends. The identified challenges could be targets for future interventions and research to help family caregivers manage these challenges.

32 Continuing the 20th Century Cycle: A Reinterpretation of Staging in August Wilson's Radio Golf

Haley Radcliffe

School of Education | Secondary English Education

Faculty Advisor: Rebecca Cepek, Ph. D.

ABSTRACT:

Set in Pittsburgh's Hill District in the late 1990s, August Wilson's drama, Radio Golf, follows the story of Harmond Wilks, an African American man who is running for mayor. As the final installment of his

twentieth-century play cycle, Radio Golf stands as the capstone of the other nine plays, reiterating and unifying their arguments, namely, that the systemic racism of the societies in which Wilson's characters reside makes ethical autonomy impossible for them. This analysis of Radio Golf's theme is supported by a variety of published articles on the Gumberg Library database and relies as well on race theory and ethnic studies to establish its theoretical background. This project reimagines the ways staging could be utilized in Radio Golf to reflect its theme in a contemporary American setting, relying mainly on casting, props, and the scenic background, and challenges the idea that racial inequities no longer exist in contemporary American society.

33 Contributing Factors of Genocide: A Comparative Study of Nazi-Era Germany and Modern-Day America

Katrina Mulherin

McAnulty College and Graduate School of Liberal Arts | International Relations and Women and Gender Studies

Faculty Advisor: Leswin Laubscher, Ph.D

ABSTRACT:

The horrific events of the Holocaust have left an indelible mark on the way human beings regard human life. Despite the rise of Hitler's Nazi Party offering warning signs of totalitarianism, many nations today seem to be gradually becoming authoritarian states and increasing violence persists around the world. The occurrence of numerous other genocides since the Holocaust confirm that it was not a one-time event. It was a tragedy that can and will only repeat itself unless society is made aware of the causes of genocide and takes preventative measures. In order to emphasize the relevance of the Holocaust in today's world of violence and persecution, this project will determine the main contributing factors of genocide along with comparing elements of modern-day American society to those of Nazi-era Germany. In order to determine such factors, the project will utilize various studies conducted by the National Holocaust Memorial Museum, the Wiener Library for the Study of the Holocaust and Genocide, and Dr. Leswin Laubscher, head of the psychology department at Duquesne University. Such research will exemplify how the political climate of a state contributes to genocide. The project will thus aim to question the validity of comparing the current state of American society to that of Nazi-era Germany under Hitler, determining if another genocide is likely to occur in the near future.

34 Creating a Waste-Negative 3D Printing Recycling System

Karli Sutton, Alexander Evans

Biomedical Engineering

Faculty Advisor: Benjamin Goldschmidt, Ph.D

ABSTRACT:

Where do 3D printed materials go when they are no longer in use? Most commonly, the various failed prints and obsolete parts would be processed through the standard waste systems present at most institutions. Although the materials used for 3D printing (PLA) are biodegradable, they can take over six months to deteriorate. This time frame allows for most of the plastic to be processed and sent to a landfill. The goal of this research project was to create a 3D printing filament recycling system that could

take failed prints and recycle them into new, usable filament without adding virgin material, thus creating a zero-waste cycle of printing and recycling. Once this process was perfected, the next step was to transition into a waste-negative 3D printing recycling system. This would allow us to take plastic waste generated around campus at various events and turn it into usable 3D printing filament and eventually functional 3D printed biomedical devices like braces or prosthesis. By creating this waste-negative system, not only has the waste generated from 3D printing within the biomedical engineering department decreased dramatically, we are now able to lower the waste production of the entire campus. We have partnered with the Duquesne Pure Thirst organization to integrate our project into different events on campus with the plan to assist them with creating devices for water filtration out of our recycled materials. This project is a first of its kind environmentally friendly 3D printing recycling system to be created and implemented at Duquesne.

35 Cultural Impact on Quality of Life Following Implantable Cardioverter Defibrillator Implantation: A Literature Review

Jennifer Lim, Carrie Dahlmann

School of Nursing | Nursing

Faculty Advisor: Karen Jakub, Ph.D., RN

ABSTRACT:

Advances in medical technology have led to the utilization of implanted cardioverter defibrillators (ICDs) in patients experiencing life-threatening arrhythmias in order to prevent sudden cardiac death. However, patients with ICDs have reported continued physical and psychosocial distress that negatively affects their quality of life. Although many studies focus on quality of life in ICD patients post-implantation, little is known about the experience of specific cultural groups following ICD implantation. The purpose of this integrated literature review was to investigate how culture may influence quality of life post-implantation. Eight studies were identified using CINAHL and Medline database searches.

Studies were limited to those published within the last decade, written in English, full-text, peer-reviewed, and with adult samples. Results included five studies from Asian countries, two studies from Middle Eastern countries, and one African American study. In Asian populations, ICD acceptance and positive perspectives increased quality of life. However, belief in destiny affected their readiness for education, which hindered advanced planning for ICD deactivation. Middle Eastern populations experienced changes in social role and familial challenges after implantation, which were directly associated with increased frequency of shock. African Americans were less likely to have ICD implantations, which correlated with a lack of device acceptance, a higher level of device-related distress, and shock anxiety. The lack of research articles about ICD recipients within specific ethnic groups suggests further research is needed in this area. This knowledge would provide nurses with information necessary for providing care interventions for ICD recipients from diverse populations.

36 Database Management for Clas12 at Jefferson Lab

Collin Mccauley

Bayer School of Natural and Environmental Sciences | Physics and Computer Science

Faculty Advisor: Fatiha Benmokhtar, Ph.D

Additional Authors: Fatiha Benmokhtar, Ph.D. (faculty), Harut Avakian

ABSTRACT:

Data Management is very important in Particle Physics, as particle detectors are complicated equipment and huge amount of information needs to be stored.

CLAS12 at Jefferson Lab is a four-pi spectrometer and holds different detector for particle identification. One has to manage all this data and also the work of the many scientists and users analyzing it. My own work is on storing the geometry information for reconstruction purposes and calibration in the main CLAS12 database. In addition, I worked on two programs that add functionality to the database. The first of which was an email notification service that would send emails out every day to the responsible parties of the directories where a table has been updated. This email service is currently running daily sending emails out to over seventeen responsible users letting them know which tables were updated in the last twenty-four hours and giving them the exact path of the table. The other program I wrote is an integrity maintenance program that can analyze how a certain value changes over time. The program takes the input name of a table and then the user will select from a drop-down menu two of the variations of the table. Then the user will select a column from the drop-down menu that the program will graph two lines for each variation selected. This can help the users see how a desired value from the table changed over time.

37 Death Becomes Us: A Look at the Ethics and Benefits of Physician-assisted Suicide

Travis Jenkins

McAnulty College and Graduate School of Liberal Arts | Physical Therapy

Faculty Advisor: Andrew Simpson, Ph. D.

ABSTRACT:

Are you ready to die? It isn't an easy question to answer and most try not to think about it. You push the thought to the back of your head for fear of the unknown consuming you. You forget about the macabre feeling and continue about your day, ignorant to what could be. Unfortunately, a circumstance such as a terminal illness may enable one to know the answer to this morose question. Should we, as people and medical practitioners, be able to determine what their answer is? This is the contentious question that faces our society today. Physician-assisted suicide (also called Euthanasia), or the practice of death by choice with the aid of a doctor, is a highly contested issue as a large proportion of the population thinks that it is not morally or ethically correct. In this paper I will be examining the quality of life of patients who request/are considered eligible for euthanasia and argue in favor of the expansion of physician-assisted suicide policy. My research will be partly compiled through internet and library research as well as personal interviews. In doing this, the goal is to impart onto the audience the benefits of physician-assisted suicide and its importance for people with a poor quality of life.

38 Deep Learning for Image Curvature Data

Jonathan Kamis

McAnulty College and Graduate School of Liberal Arts | Computer Science

Faculty Advisor: Stacey Levine, Ph.D.

Stacey Levine, Ph.D. (faculty)

ABSTRACT:

Deep learning has been shown to work well for image denoising. Still, there are shortfalls in retaining fine image details, which are critical in important applications such as medical or biological imaging. In this work we demonstrate that it might be more effective to use a deep learning model to denoise geometric features in an image. In truth, nobody really understands how the convolutional neural networks used in deep learning algorithms work. One of the few understood facts is that the more layers in the neural network you add, the better the result becomes. Our work uses the trainable nonlinear reaction diffusion model of Chen and Pock to try and place a more mathematically sound reasoning behind the workings of convolutional neural networks. In addition, we believe using the model to denoise an image's geometric features, or curvature, can help preserve details that are lost with the original model.

39 Deepwater Horizon Gulf Oil Catastrophe

Gabriella Popko

McAnulty College and Graduate School of Liberal Arts | Accounting
Faculty Advisor: Andrew Simpson, Ph.D.

ABSTRACT:

The 2010 Deepwater Horizon oil spill left the Gulf of Mexico's waters and nearby shorelines in complete and utter chaos as flaming and spewing oil created obstacles for workers and rescue crews to stop or even tame the disaster. In the weeks and months following the spill, the full extent of its damage prevailed in the destruction of entire habitats, the loss of industries that relied on the Gulf, and the impacts on thousands of oil-covered animals and long-term illnesses that many displayed. This paper focuses on the many effects the spill, like the destruction of marine life and habitats, and how affecting one area's ecosystem changes the food web in another, and those regarding humans, like illness that resulted from pollution in the atmosphere and the closing of coastal fisheries and other related businesses. Lessons learned from the Deepwater Horizon spill include further prevention and maintenance for oil rigs, which was the cause for the disaster. If taken more seriously, better management in these areas could have prevented the disaster from occurring or at least lessened the severity of it. This paper concludes by identifying a few ways that this type of destruction can be avoided in the future in order to prevent the world from witnessing a similar type of devastating environmental disaster.

40 Developing a Microsatellite Multiplex to Individually Identify African White-Bellied Pangolins

Amelia Bullard

Bayer School of Natural and Environmental Sciences | Forensic Science and Law
Faculty Advisor: Jan Janecka, Ph.D.

Additional Authors: Jan Janecka, Ph.D. (faculty), Lisa Ludvico, Ph.D. (faculty)

ABSTRACT:

Pangolins are the world's most trafficked mammal due to poaching and their use in traditional Chinese

medicine. But because of their elusive and nocturnal behavior, coupled with a lack of previous research, not much is known about this small armadillo-like creature. In this study, we attempted to come up with an individual identification technique for pangolins to assist with the conservation of their species. Pangolins have not been fully genotyped and the discrepancies between the several subspecies have long been ignored. By developing a multiplex polymerase chain reaction (PCR) to individually identify African white-bellied pangolins, we can begin down the long road of separating subspecies to hopefully be able to differentiate between samples confiscated from the black market. If we can tell which species was killed, we can trace it back to its geographical origin, and improve conservation efforts in that area. By extracting blood samples acquired from zoos across the United States onto FTA cards, conducting PCR with the extracted DNA, and analyzing them with a genetic analyzer, we will be able to visualize the differences between samples and between species. We can then coalesce the most efficient PCR primers into a multiplex to provide a technique capable of differentiating between individual pangolins. This is pertinent to the wildlife forensic community by providing knowledge that will assist with the conservation of the worlds most trafficked mammal.

***41 Developing Occupational Identity in Refugee Youth**

Anna Fish

Rangos School of Health Sciences | Occupational Therapy

Faculty Advisor: Jaime Muñoz, PhD, OTR/L/FAOTA

ABSTRACT:

This research focuses on identifying challenges that refugee youth face, along with some of the approaches to overcome these challenges with an Occupational Therapy perspective. Specifically my research focuses on the challenges facing refugee youth's of adjusting to a new home and school environment. To overcome this challenge, my research focuses on implementing Occupational Therapy related health and educational activities. The goal of these activities is to develop occupational identity in refugee youth and improve their occupational roles as a student, family member and friend. The health and educational activities centered around self-identity, love, goal setting, teamwork, conflict resolution and communication. Throughout the semester, I was able to plan and implement these activities with refugee youth at AYRSE's after-school program. AYRSE is a non-profit organization that focuses on supporting immigrants to become academically successful and engaged members of the community. Overall, understanding the challenges that refugee youth face, and implementing activities to overcome these challenges with the refugees at AYRSE gave me a better understanding of the role that an Occupational Therapist can have with the refugee population.

42 Development and Depopulation: The Story of Pittsburgh's North Shore

Connor Ridge

McAnulty College and Graduate School of Liberal Arts | History

Faculty Advisor: Andrew Simpson, Ph.D.

ABSTRACT:

Pittsburgh's North Shore has been developing a tourist based economy over the past 40 years. This development has revitalized the area which gone through serious economic stagnation as the steel

industry began to leave the city. At the same time, this new development has forced almost the entire permanent population out of the neighborhood through eminent domain and rising land value. This paper explores the social and economic implications of developing a section of a city to attract tourism and raises the questions of who cities should develop their infrastructure for and how cities should treat its residents, particularly the lower class. This paper uses census data and other historical records to trace the economic and social developments of the North Shore over the last century and the effects of its dramatic population loss. This research will help future city planners determine proper courses of action when beginning large construction projects in already well populated, lower class areas as well as raise attention to problems concerning American cities such as transportation, housing value, the benefits of large scale entertainment venues and dramatic examples of gentrification.

43 Development of a Photoacoustic Flow Cytometry System for the Detection of Circulating Adrenal Cancer Tumor Cells

Justin Cook

Biomedical Engineering | Biomedical Engineering/Math

Faculty Advisor: John Viator, Ph.D.

Additional Authors: John A. Viator, Ph.D. (faculty), Robert H. Edgar

ABSTRACT:

Adrenal cancer diagnoses are rare with an approximated 200 to 500 new cases each year, however, once symptoms are severe enough to warrant exploratory testing, the cancers are quite large and there is a greater likelihood of metastasis (American Cancer Society). Identified adrenal cancers are usually late stage due to the inability of clinicians to palpate the adrenal glands in the retroperitoneal space. Development of a detection system for circulating adrenal cancer cells could allow for earlier diagnosis and a better prognosis for patients. Adrenal carcinomas are unique in that they contain a very high concentration of cholesterol relative to their cellular composition. Since cholesterol is a precursor molecule for the synthesis of steroids, endocrine cancer cells have a surplus of the biomolecule for typical endocrine tissue processes and for cell membrane structure (Morin et. al). Photoacoustic flow cytometry utilizes a pulsed laser system to irradiate a sample passing through a flow chamber. Targeted specimens will absorb the laser energy and produce an acoustic wave that can be detected by a transducer and ultimately communicated to an oscilloscope where signals can be analyzed. We propose that the utilization of a photoacoustic flow cytometry system with a tunable laser system operating in the visible wavelengths tuned to the appropriate wavelength for the absorbance of densely packed cholesterol will allow for the identification of circulating adrenal cancer cells. The system could be expanded to collect detected circulating tumor cells for analysis and sequencing to determine what genes are being expressed.

44 DNA ANALYSIS AND SEX DETERMINATION OF ANCIENT HUMAN REMAINS

Rhianna Beaver

Bayer School of Natural and Environmental Sciences | Forensic Science and Law

Faculty Advisor: Lisa Ludvico, Ph.D

ABSTRACT:

Rhianna M. Beaver*¹ Lisa R. Ludvico, Ph.D.²; Pamela L. Marshall, Ph.D.¹

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The forensic science community has made several advancements since the discovery of DNA extraction from human skeletal remains. Because the decomposition of soft-tissue occurs almost immediately, bone material is favored in order to extract nuclear DNA (nDNA) and mitochondrial DNA (mtDNA). This study will show the differences between extracting nDNA and mtDNA from about 6-7 individuals whose skeletons were found in the Flevaeis Plot in Rhodes; the dates of these skeletons range from around 3200 BCE to 650 BCE. Given this time period, the quality and quantity of the DNA can be assessed for the nDNA and mtDNA by using short tandem repeat analysis and pressure cycling technology (PCT). Nuclear DNA only presents itself in usually two copies per cell, whereas mitochondrial DNA is much more abundant with about 100-1,000 copies per cell. Because of this, the degradation of nDNA is not as well-known as mtDNA; therefore, this study aims to fill the gap in the knowledge of nDNA degradation. Also, while working with these ancient bones, amelogenin markers were used in order to determine the sex of each bone sample. This is done by amplifying the AMEL locus to see if there are one or two lengths in fragments. One fragment indicated that the individual has only X chromosome (female), whereas two lengths indicated both an X and a Y chromosome (male).

45 Does Good Press Lead to Happy Adopters?: The Impact of News Articles on Internet of Things Community Sentiment

Merlyn Reuss

A.J. Palumbo School of Business Administration | Information Systems Management

Faculty Advisor: Jacqueline Pike, Ph.D., Pinar Ozturk, Ph.D

ABSTRACT:

The Internet of Things (IoT), which enables the networked interconnection of everyday objects, is increasingly popular in terms of adoption by consumers and availability of devices. It is estimated that over 23 billion IoT devices were in use in 2018, and by 2020, the IoT market is projected to be worth \$1.7 trillion. A significant portion of the devices fall into the smart home devices category, and 75 percent of households are predicted to adopt at least one by 2020 according to TechCrunch. As IoT devices have captured the interest of many consumers, they have also been featured in popular press articles, highlighting both the opportunities associated with IoT devices as well as their challenges. This research seeks to study the impact of the examination of IoT devices in popular press articles on sentiment towards the devices. Hypotheses suggest that the sentiment of popular press articles is positively associated with sentiment towards IoT devices by adopters. Particularly, positive sentiment in popular press articles leads to positive sentiment expressed by adopters, and negative sentiment in popular press articles leads to negative adopter sentiment. To examine the hypotheses, a dataset was collected of popular press articles containing IoT information and user forum posts from Samsung's "Smart Things" community over a three-year span. To quantify the sentiment of both the popular press articles and the posts, a Lexicon-based sentiment classification system was used. A regression analysis

supported most of the hypotheses, finding a positive relationship between sentiment in articles and sentiment in community posts.

46 Doodles From Pupils

Brittney Lybarger

McAnulty College and Graduate School of Liberal Arts | Integrated Marketing Communication, Minors in Business Management and Digital Media Arts

Faculty Advisor: Sarah Deluliis, Ph.D.

ABSTRACT:

A study of the many doodles, drawings, and sketches made by students while note-taking. 'Doodles From Pupils' explores departmental modes of thought and self-expression through notes while fostering an appreciation for art beyond the academic study of it. The project challenges traditional ideas of what holds artistic value and provides insight into the way students pass time, gather their thoughts, or simply keep busy.

47 Drinking Social Norms

Victoria Profeta, Jackie Lindsey, Salena Moran

McAnulty College and Graduate School of Liberal Arts | Psychology

Faculty Advisor: Kaitlyn Abrams, MS

ABSTRACT:

A variety of information exists on drinking in college and social norms, however few if no research ties these two topics together. This study aims to find evidence that drinking affects group formation on a college campus. A sample of 60 respondents at varying collegiate levels of education from Duquesne University in Pittsburgh, PA participated in an online survey consisting of questions from the Alcohol Use Disorders Identification Test (AUDIT)(Saunders et al., 1989) and questions designed by the researchers. A statistical analysis of this quantitative data run through SPSS found a correlation among data regarding AUDIT total scores (indicating hazardous drinking levels), comfort levels while drinking and curiosity about the way individuals are viewed while in a drinking setting. The purpose of the results intends to provide researchers with further information on the social implications of college drinking and behavior in order to gain a better understanding on how groups form.

***48 Dual ERK5 and AKT inhibition decreases cell viability in PTEN mutant triple negative breast cancer and glioblastoma cells**

Katie Anna

School of Pharmacy and the Graduate School of Pharmaceutical Sciences | Pharmacy

Faculty Advisor: Jane Cavanaugh, Ph.D.

Additional Authors: Akshita Bhatt (graduate student), Thomas Wright (graduate student), Mohit Gupta (graduate student), Saloni Patel (graduate student), Patrick Flaherty, Ph.D. (faculty), Jane E. Cavanaugh, Ph.D. (faculty)

ABSTRACT:

New therapies for cancer are being developed that focus on mutations in a tumor rather than on the anatomic origin. The tumor suppressor phosphatase and tensin homologue deleted on chromosome 10 (PTEN) regulates cell proliferation, growth, and survival. When mutations occur in PTEN there can be a loss of tumor suppression and downstream cellular pathways, including AKT and ERK5 pathways, are disinhibited permitting enhanced cell viability and proliferation. This loss of function mutation in PTEN is present in two aggressive cancer cell lines: the triple negative breast cancer cell line BT-549 and the glioblastoma cell line U87. In this study, we treated PTEN mutant cells with Ipatasertib (Ipat) and XMD-8-92, inhibitors of AKT and ERK5, respectively. Dual treatment with these inhibitors significantly decreased cell viability compared to either inhibitor alone. These data suggest that this synergistic combination may be more effective as a cancer therapeutic strategy. We then explored a novel dual inhibitor of both the AKT and ERK5 pathways, MG5-5, on cancer cell viability. Dual inhibition by a single small molecule is advantageous due to a decrease in the number of treatments needed as well as a potential decrease in toxicity to healthy cells. Treatment with MG5-5 decreased cell viability, proliferation, and migration. Overall, these studies suggest that dual inhibition of parallel signaling pathways may be a more effective treatment for aggressive cancers.

Keywords: PTEN mutants, ERK 5, AKT, glioblastoma, TNBC, tissue agnostic

49 Ecopsychology and Music Therapy

Victoria Reid

Mary Pappert School of Music | Music Education

Faculty Advisor: William Adams, Ph.D

ABSTRACT:

The positive effects of nature and music toward mental health have been studied by humans since ancient times. This project explores the parallels between the principles of ecopsychology and music therapy and discusses the effect their combined use may have on the human psyche. While ecopsychology and music therapy are not commonly linked at present, this project intends to illustrate that their similarities create the potential for a mutually beneficial relationship. Within this presentation, an overview of the two fields is given before parallels are drawn between them. These parallels create the basis for the body of the project, which explores their compatibility. Previous research conducted by experts in both fields is discussed throughout the project and plans for future research are suggested in the conclusion.

50 Effects of Early Ethanol Exposure on Tadpole Development

Lindsay Pelcher, Madison Durbin

Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Sarah Woodley, Ph.D.

ABSTRACT:

Fetal alcohol exposure (FAE) during pregnancy can result in an array of developmental disorders. The physiological and behavioral defects can range from mild to severe, and are largely dependent on timing and consistency of alcohol exposure. Most FAE experiments examine moderate to heavy alcohol

exposure, while fewer studies examine the severity of lower levels of alcohol consumption on development. Here, we tested the effects of relatively mild ethanol exposure on development, behavior, and hormone levels in Northern Leopard Frog tadpoles. Tadpoles are a useful model to study post-embryonic growth because they develop outside of the mother where alcohol exposure is relatively easy to control. We hypothesized that exposure to low ethanol during post-embryonic period will cause adverse physiological and behavioral effects. We predicted that ethanol-exposed tadpoles would exhibit higher corticosterone levels, decreased body size and mouth width, and alterations in behavior. Over four weeks, we exposed tadpoles to low ethanol (0.009%), and moderate (0.4%) ethanol. Controls were not exposed to ethanol. Ethanol exposure corresponded to elevated corticosterone levels, suggesting increased stress levels. Moderate ethanol exposure decreased mouth width as expected but surprisingly increased body mass. There was a marginally significant effect of ethanol treatment on boldness, which displayed a positive correlation. Our study suggests that tadpoles are a good model for FAE and for better understanding the impacts of relatively low levels of FAE on vertebrate development, including humans. Future experimentation aims to replicate our study and support our findings. We would like to acknowledge students from BIOL 372W who assisted in executing this experiment.

51 Effects of Fluoride on the Human Body in Tanzania

Abbey Whitewood

Bayer School of Natural and Environmental Sciences, School of Nursing | Nursing

Faculty Advisor: David Kahler, Ph.D.

Additional Authors: Jessica Devido, Ph.D, CRNP (faculty)

ABSTRACT:

Fluoride is an element often found in the groundwater in Olkokola, Tanzania. In low levels, fluoride is beneficial to the human body, strengthening the teeth and bones. In high levels, fluoride causes dental and skeletal fluorosis. Fluorosis is caused by an interaction with calcium in the teeth and bones creating a weakened matrix. These high levels are in direct correlation to the location of Olkokola in the East African Rift Valley due to volcanic activity and sediment creation. In a study performed in Olkokola, the fluoride levels were evaluated to contain high amounts of fluoride which was reflected in the surrounding community. Research is being performed to find the most cost effective ways to remove the fluoride safely and efficiently using a 3D printed filter. As a nurse, the impact that fluoride has is very alarming. In addressing the water crisis in Tanzania, it is possible to provide health promotion through education about the water as well as work on creating safe alternatives for those exposed to the contaminants. A large part of understanding health promotion abroad is in conjunction with understanding culture and the effects it has on the general population. Without an understanding of cultures worldwide, health promotion is not as effective as it can be because one is not taking into account the resources and potential of the already developed community and way of life.

52 Effects of Sulphur Bacteria Encapsulated in Growth Media Beads on Contamination in Passive Bioremediation Systems

Bethany Parsons

Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Nancy Trun, Ph.D.

Additional Authors: Nancy Trun, Ph.D. (Faculty Mentor), Michelle Valkanas (Graduate Student/Ph.D. candidate)

ABSTRACT:

Abandoned mines often contaminate the surrounding environment with toxic pollutants that can be hazardous to ecological and human health. Abandoned Mine Drainage (AMD) is the polluted discharge from mine sites. AMD can contain heavy metals such as iron (III), manganese, and lead, as well as toxic levels of sulfate. Because these systems are open to the environment, they also contain bacteria that adapt to the contaminants. Sulfur Oxidizing Bacteria (SOB) oxidize sulphur to gain energy, while Sulfur Reducing Bacteria (SRB) reduce sulphate during metabolism. These bacteria have the potential to reduce AMD contamination.

Using biological organisms to treat environmental pollution is called bioremediation. AMD can be treated with bioremediation techniques to reduce the spread of contamination around the abandoned mine. We are studying the effects on contaminant levels using specific groups of bacteria. The sulfur metabolizing bacteria (either SOBs or SRBs) are being tested to determine if they can decrease soluble contaminant levels in AMD. We have encapsulated these bacteria in agar beads to determine if the bacteria survive better when surrounded by a protective coating, and if they can decrease soluble contaminant levels in the AMD. Sample bacteria from Lowber and Boyce Passive Remediation Systems were mixed with growth media and formed into beads using sterile silica molds. These bacteria beads were incubated in AMD and soluble levels of contaminants were measured.

53 Electrochemically Fabricated Substrate Dependent Smart Electrocatalysts Ni-Fe-double and Ni-Co-Fe-triple hydroxides for Efficient Water Splitting to Oxygen and Hydrogen

Meron Metaferia

Bayer School of Natural and Environmental Sciences | Biochemistry

Faculty Advisor: Shahed Khan, Ph.D.

ABSTRACT:

Water electrolysis is a significant method that uses renewable energy to produce hydrogen fuel "" an energy that can transform earth towards a clean energy future. Activity of electrocatalysts for water oxidation is fundamental for energy conversion technologies including integrated solar power generating devices and water electrolyzers. Hence, in this study we have electrochemically fabricated the naturally abundant and stable electrocatalysts Ni-Fe-double hydroxides and Ni-Fe-Co-triple hydroxides, for efficient splitting of water to oxygen and hydrogen. Oxygen-evolution activity of different electrocatalysts, such as Ni-Fe-double hydroxide and Ni-Fe-Co-triple hydroxide were examined in an alkaline solution of KOH. In this study, we focused on determining electro-catalytic activity of these double and triple hydroxides electrodeposited on different substrates such as Ni-foam, electrodeposited Ni-Co-oxide on Ni-foam and pressed porous Ni-Co oxide under varying electrodeposition bath composition, electrodeposition time and electrodeposition current and potentials. We found that Ni-Fe-Co-triple hydroxide electrodeposited for total of 10 min on pressed porous Ni-Co-oxide sheet acted as a superior electrocatalyst for oxygen evolution reaction during water splitting reaction. This electrocatalyst generated a current density of $\sim 100.0 \text{ mA cm}^{-2}$ at an oxygen

overpotential of 0.270 volt (= 1.5 V vs RHE) in 1.0 M KOH at electrolyte temperature of 25 oC. However, the triple hydroxide deposited for 7 min generated 81 mA cm⁻² at the same overpotential and electrolyte temperature. The synergistic effect of multiple hydroxides and the substrates, and electrolyte temperature were important in enhancing the current density because of exponential dependence of reaction rate on temperature and substrate.

54 Empress Wu and Other Notable Women of Traditional China

Vicente Zamarripa-Zoucha

McAnulty College and Graduate School of Liberal Arts | History

Faculty Advisor: Jing Li, Ph.D.

ABSTRACT:

China has an extensive history ranging back to approximately 10,000 BC where their civilization arguably began. While a multitude of artifacts, government documents and artwork exist to give historians insight into Chinese history and civilization, little is discussed of the role of women. In terms of Emperors, important writers and artists, almost all are exclusively men. This paper looks past the male-centered view that history has a tendency to present us with and focus on the women that contributed to traditional Chinese culture and history. Some of the figures including Empress Wu and the Mother of Mencius will aid in exemplifying the significant political and philosophical thought women contributed to Chinese culture.

55 Evaluation of vitellogenin as a biomarker for endocrine disruptors in the African clawed frog, *Xenopus laevis*.

Garrett Struble

Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Kyle Selcer, Ph.D.

ABSTRACT:

Many anthropogenic chemicals in the aquatic environment can alter the hormonal systems of wildlife and humans. These so-called "endocrine disruptors" can be detrimental to normal reproductive and developmental processes, and may affect wildlife populations. Endocrine disruptors fall into many chemical categories, so chemical tests are not feasible. We have been developing tests for endocrine disrupting chemicals based on biomarkers produced upon exposure to such compounds, particularly those that mimic the steroid hormone estrogen. Our biomarker is the egg-yolk precursor protein vitellogenin, typically produced only by females. However, males can produce vitellogenin when exposed to an estrogenic agent. We began with a laboratory model for induction of vitellogenin, the African clawed frog, *Xenopus laevis*. Adult male frogs were exposed to the estrogen ethinyl estradiol (1 mg/ml) in their water for two weeks. Control animals received vehicle only (EtOH). Frog serum proteins were evaluated by SDS-PAGE. Sera from estrogen-treated frogs contained high levels of a 200kDa protein, the size of vitellogenin, that was absent in control sera. Western blotting, using a vitellogenin antibody, confirmed that this protein was vitellogenin. We purified the vitellogenin using DEAE chromatography. Sera from estrogen-treated frogs had several peaks in the later fractions that were absent in control sera. SDS-PAGE, Western blotting and ELISA assays confirmed that these fractions

contained vitellogenin. Our results show that vitellogenin can be a useful biomarker for exposure to estrogenic environmental endocrine disruptors. We plan to extend this work to red spotted newts as a potential field model.

56 Examining Political Evolution in Eastern Pennsylvania

Nikola Ranick

McAnulty College and Graduate School of Liberal Arts | Political Science

Faculty Advisor: Kristen Coopie, Ph.D

ABSTRACT:

This paper will firstly evaluate demographic data such as racial composition, relative wealth, education history, and other topical categories within Eastern Pennsylvania. A particular emphasis will be placed on its higher education attainment and income levels. This examination will then shift to breaking down the area's political swing between three election cycles pivotal in charting its suburban evolution: 2012 saw traditional Republican leanings with presidential, congressional and state/local support results remaining firmly in the GOP camp. 2016 saw a transitional swing with discomfort of candidate Trump leading to a movement towards the Democrats in terms of both the presidential race as well as other tight state and congressional elections. Lastly, the 2018 midterm saw the discomfort with Trumpism fully enunciated via numerous flipped congressional seats, an influx of new Democratic state and county legislators, and substantial winning margins by statewide Democrat candidates. Some proposed explanations for this adjustment are temporary turnout differentials in correspondence with high Democrat enthusiasm, suburban partisan changes favoring non-Trumpian candidates, and/or direct and indirect redistricting effects from the 2018 State Supreme Court decision. The severity of this partisan change as well as its duration will speak to the political evolution within Pennsylvania: If these suburbs become consistently Democratic, a plausible Democratic edge could emerge within the typical purple state at-large. Still, that revelation is barring further significant Republican gains in both central and western Pennsylvania, which recent political history maintains is certainly possible.

57 Exploring Derivatization Methods to Improve the Detection and Quantification of Surrogates for Illicit Monoamine Compounds

Hannah Zimmerman

Bayer School of Natural and Environmental Sciences | Forensic Science and Law

Faculty Advisor: Michael Van Stipdonk, Ph.D.

ABSTRACT:

Derivatization of illicit monoamine surrogates is done to improve separation, ionization, and quantification through various mass spectrometry methods. This study was conducted to determine if aldehyde based derivatizing agents allow for better separation, ionization, and quantification of illicit monoamine surrogates and to determine if this method can be implemented into crime laboratories for testing of these illicit monoamine drugs. Derivatization studies have been done before, but the derivatizing agents used were harmful to the scientist doing the analysis. Because of this, these derivatization analysis methods are often used as a last resort in a forensics lab. However, they are a more accurate and faster method of testing. By using an aldehyde based derivatizing agent like

benzaldehyde, it is safer for the scientist and yields more robust results. The question is answered through several experiments involving derivatization of several illicit monoamines surrogates like phenethylamine and aniline. These monoamine surrogates are used because of their structural similarities to illicit drugs like methamphetamine, amphetamine, and methylenedioxymethamphetamine (MDMA). The samples are protonated with acetic acid and then analyzed via several spectroscopic techniques like Gas Chromatography-Mass Spectrometry (GC-MS), Liquid Chromatography-Mass Spectrometry (LC-MS), and Electrospray Ionization (ESI). After this testing, their reaction pathways were mapped out and interpreted. Several samples were made over time for each spectroscopic method. The results yielded from this study will aid forensic scientists because of safer derivatization methods that will also improve the separation, ionization, and quantification of illicit monoamine drugs.

58 Exploring gender disparities in the scholarly activity of physician assistant educators

Ana Brandt

Rangos School of Health Sciences | Physician Assistant Studies

Faculty Advisor: Bridget Calhoun, Ph.D., PA-C

ABSTRACT:

When first established in 1962, the physician assistant profession was male dominated. Since then, the profession has grown exponentially and now 68.2% of all physician assistants are women. The female predominance will continue since 73.2% of all currently enrolled first year physician assistant students across the nation self-identify as women. Prior studies have found that female PA faculty members are paid less than their male counterparts. In the U.S., male PA associate professors are paid approximately \$9,000 more per year compared to female associate professors. Differences in publication histories also exist between genders, with men out publishing females. The purpose of this study was to further explore gender disparities within the profession by comparing proportions of gender among presenters at the annual education forum for the Physician Assistant Education Association in 2017 and 2018. Sole and co-presenters were identified by gender and included oral presenters and authors of posters. The study showed that the distribution of women to men was consistent with gender distribution of the profession. Females dominated the poster presentations in 2017 with 72.7% of presenters being women. We concluded that during the blinded, peer-review process, the distribution of women presenters was similar to the distribution of women in the profession. However, when keynote speakers were selected by the association or when individuals were elected for leadership positions within the profession, men out numbered women, suggesting a gender bias.

59 Exploring Plethodontid Salamander Skin Peptides for Antimicrobial Therapeutics

Tiffany Ricketts

Bayer School of Natural and Environmental Sciences | Biochemistry

Faculty Advisor: Sarah Woodley, Ph.D

Additional Authors: Patrice Clemenza, Kenzie Pereira (graduate student)

ABSTRACT:

Antibiotic-resistant pathogenic bacteria represent an urgent threat to global health. This requires

innovations in antimicrobial therapy that are efficacious but less prone to induce resistant genes. Host-defense peptides are promising alternatives in anti-infective medicine because they are naturally occurring molecules that interact and disrupt bacterial cell membranes to inhibit growth.

Amphibian skin secretes a diverse collection of host defense peptides. While frog skin has been extensively studied, very little is known about salamanders. Plethodontids are lungless salamanders that inhabit microbe-rich environments. However, many species appear resilient to specific infections in nature, which may be attributed to their antimicrobial peptides.

The dermal secretions of several species within the Plethodontidae family were processed using solid phase extraction for peptide isolation. The antimicrobial activity was assessed using growth inhibition assays against *S. aureus*, *A. baumannii*, *P. aeruginosa*, and *E. aerogenes*.

At a maximum treatment of 50 µg/mL, all isolated peptides had no inhibitory effects on growth for the tested microbes. This suggests that skin peptides in plethodontid salamanders may have other functions such as wound healing or pheromonal communication.

***60 Exploring spatial competition within biofilms through a pleiotropic regulator**

Jordan Denk

Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Wook Kim, Ph.D.

Additional Authors: Anton Evans (graduate student), Collin Kessler (graduate student), Wook Kim, Ph.D. (faculty)

ABSTRACT:

Bacteria form dense communities known as biofilms that cause a plethora of chronic diseases due to their recalcitrant nature. These dense communities also inherently pose significant spatial and resource constraints to individual bacterial cells. How do bacteria solve this intrinsic problem? Our work with *Pseudomonas fluorescens*, suggests that multiple secretions regulated by a translational repressor, RsmE, function to capture space and optimal positioning within a dense colony. We first hypothesized that RsmE regulates multiple secretions which play an important role in defining the structural architecture of bacterial communities. We have identified a mucoid polymer and biosurfactant that are RsmE-regulated and have engineered them to investigate their function. Epifluorescence microscopy reveals that the mucoid polymer pushes away neighboring cells while the biosurfactant prevents their encroachment into the newly created space. We have also observed that *rsmE* mutants producing both the biosurfactant and mucoid polymer outcompete those that produce only the polymer. The mutants producing both secretions are strong competitors and are associated with the bound mRNA while weak competitors producing only the polymer are not. However, a varying level of fitness exists within a competitor group. Thus, we hypothesized that a gradient of fitness exists among *rsmE* mutants and the extent to which mRNA is regulated can be explained in terms of molecular structure and function. Our work shows that bacteria produce specific structures to compete for space and that the formation and spread of biofilms due to molecular underpinnings could influence the development of therapeutic strategies to eradicate biofilm infections.

61 Exploring the Use of Microsoft Bands to Measure Task Repetitive Practice

Fiona Kessler, Jenna Gallipoli

Rangos School of Health Sciences | Occupational Therapy

Faculty Advisor: Elena Donoso Brown, Ph. D., OTR/L

ABSTRACT:

Frequent, intense repetitive practice of specific motor tasks is critical for functional motor recovery post-stroke and is often included as part of a home program to improve upper extremity function. This provides individuals with the opportunity to complete exercises independently. Due to lack of adherence and reliance on client report, better methods for monitoring home program interventions are needed. One method to monitor home program adherence is the use of accelerometers (Microsoft bands). However, accelerometers have been found to present with challenges when capturing upper extremity movement. Therefore, the purpose of this preliminary research project was to test the reliability and validity of accelerometers in measuring upper extremity repetitive practice in healthy adults. This poster is a continuation of previous work to determine if this accelerometer can detect change across number of repetitions and speed during repetitive practice. A convenience sample of 24 adults: 8 males and 16 females, with an average the age of 47, without a history of limited movement were recruited. Twenty-two were right-handed. Participants in the study engaged in five functional tasks in a single session while wearing accelerometers across four different conditions and one repeated condition. The accelerometers were used to collect duration, angular velocity and acceleration in the x, y, and z planes during each set. Repeated measures ANOVA, t-tests and intraclass correlation coefficients were used to evaluate the primary research questions. The results will be used as a baseline for research with individuals post-stroke.

62 Expression of semenogelin I in humans and chimpanzees to study molecular evolution of reproductive proteins

Hannah Johnstonbaugh, Raahi Modi

Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Michael Jensen-Seaman, Ph.D

ABSTRACT:

Reproductive proteins are among the most rapidly changing proteins in mammals, and therefore allow us to study molecular evolution, as even closely related organisms can vary tremendously in their sequence, structure, and function of these proteins. This variability can be the result of the difference in mating patterns between species, in this case chimpanzees and humans. One such gene, semenogelin 1, codes for a protein that influences the coagulation of ejaculated semen in primate species. In order to understand the function of this protein, we used PCR to amplify segments of semenogelin 1 from human and chimpanzee DNA, cloned these amplicons into an E. coli expression vector to then produce recombinant fusion proteins for further study in functional enzymatic assays, in order to understand the nature of the selection pressures driving the rapid change of these proteins in humans and our closest relatives.

***63 Fluoride Removal From Water Using a 3D Printed Calcium Carbonate Filter**

Sophia Bakar, Matthew Nestler

Biomedical Engineering | Biomedical Engineering

Faculty Advisor: Benjamin Goldschmidt, Ph.D.

ABSTRACT:

Groundwater containing high amounts of fluoride is the most common source of drinking water in rural areas in parts of east Africa, India, and China. The elevated levels of fluoride cause the onset of skeletal and dental fluorosis, which is the weakening and decay of bone structures due to the leeching of calcium from the body. Over 150 million people are suffering from some form of fluorosis due to the consumption of groundwater. Calcium carbonate has been demonstrated to influence fluoride removal in several forms. To make fluoride removal a cost-effective and user-friendly process, a study has been done to test the efficacy of a 3D printed water filter using a filament composed of 30% calcium carbonate and 70% PLA (a non-toxic plastic). The influence of varying conditions concerning the removal of fluoride from water pH of the water, time spent in contact with the filter, and design of the filter have been investigated. To ensure that the calcium carbonate was homogeneous throughout the filter and that no other harmful elements were present, a scanning electron microscope was used to observe the chemical composition of the printed filter. Preliminary results show that the filter removes on average 0.05 milligrams of fluoride per gram of calcium carbonate, which is comparable to previous studies on the adsorption capacity of calcium carbonate and fluoride. To maximize the amount of calcium carbonate in the filters and make the filter production sustainable, recycled cups made of PLA were ground down and mixed with calcium carbonate to create a new 3D printing filament.

64 Freshwater Sponges of Western PA: A comparison of species level identification using molecular and morphological techniques

Emily Simon

Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Brady Porter, Ph.D.

Additional Authors: Marc Yergin

ABSTRACT:

While 31 freshwater sponge species have been detected across North America, documentation of freshwater species within western Pennsylvania is limited, and vague. From our collections conducted from local waters from 2016-2018, we report the presence of two freshwater sponge species, tentatively identified as *Ephydatia muelleri* and *Ephydatia fluviatilis*. These species were identified and differentiated based on the morphology of spicules, tiny crystalline skeletal structures that support the structure of the sponges and protect them from predation. Megascleres and gemmuscleres are the spicules present in *E. muelleri* and *E. fluviatilis*, and show subtle differences in morphology between the species. Unfortunately, morphological identification can be unreliable due to potentially subjective interpretations of spicule traits. Ambiguity in classification is especially prevalent in closely related sister species, due to similarity of spicule morphology and a lack of morphological reference samples. In order to support our morphological identifications, we isolated genomic DNA from our freshwater sponge

samples and used PCR to amplify and sequence a 660bp hyper-variable region of the mitochondrial cytochrome oxidase I (COI) gene. Preliminary alignment of reference sequences from GenBank to our sequences reveals seven variable sites among the sequences, with only two DNA positions appearing to be potentially species-diagnostic; leaving limited distinguishing sequence features between these closely-related species. Future directions will focus on confirming the accuracy of our sequences and the morphological validity of the GenBank reference samples. If adequate interspecific sequence variation is confirmed, future identification strategies should consider including COI sequencing to support morphological identifications of freshwater sponges.

65 Graduates, Gender, and Gentrification in Pittsburgh's Neighborhoods

Sydney McCabe

McAnulty College and Graduate School of Liberal Arts | International Relations; Women's and Gender Studies

Faculty Advisor: Elisabeth Vasko, Ph.D.

ABSTRACT:

This project investigates the intersection of gender and gentrification with a special focus on how recent and near recent college graduates participate in the process of gentrification in the Pittsburgh region. The driving question of this project is “How do perceptions about gender and race inform the ways in which recent college graduates enter into the Lower Hill, East Liberty, and Homewood?” This study marries census data and gender theory through an exploration of three different neighborhoods in three different stages of gentrification. In these communities, to varying degrees, gentrification has contributed to educational stratification as well as loss of community and erasure of culture.

As one of the most rapidly evolving, formerly industrial cities, Pittsburgh provides a useful backdrop for tying together trends of gender theory and psychology in order to produce useful, community-engaged strategies to integrate community and restore memory.

***66 H1N1 Influenza A Virus Evolution in Swine & Humans Since the 2009 Pandemic: HA Stability**

Shannon Moore

Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Elisabeth Chalovich, Ph.D.

ABSTRACT:

Diverse influenza A viruses circulate globally in a reservoir of wild aquatic birds. Occasionally, these viruses become endemic in domestic animals (e.g., poultry and swine) and cause human pandemics. The last three human influenza pandemic viruses emerged from swine, a host that has enabled humanization of influenza viruses by reassortment of influenza viral genome segments and adaptation of molecular properties such as receptor-binding specificity. To be transmissible between hosts, the surface protein hemagglutinin (HA) must have a suitable stability (or resistance/susceptibility to activation by pH) for survival outside the host and cells and replication within cells. Preferred HA stability appears to vary between different hosts. During the start of the 2009 H1N1 pandemic, isolates had moderate HA stability with an activation pH of approximately 5.5. Later isolates adapted to humans

have more stable HA proteins (pH 5.2-5.4). The Russell lab has obtained recent H1N1 strains from humans and swine to study the impact of HA stability on influenza host range. This work is now being continued by developing a system to study contemporary H1N1 swine and human viruses to learn more about the viruses are now circulating in the human population.

67 Hoods and the Valuation of Character

Devon Pickard

McAnulty College and Graduate School of Liberal Arts | Psychology

Faculty Advisor: Alexander Kranjec, Ph.D

ABSTRACT:

Hoods carry stigmas in places that can affect the valuation of the person wearing them. Specifically, in schools, students are often prohibited from wearing hats and hoods or told that wearing such head coverings is disrespectful. While wearing a hood may have no real impact on student learning by itself, the stigmas carried by it may still lead to negative valuations of a student's character and ability, and impact learning experiences. To measure the effects of such biases the current study examines how educators judge hooded students in comparison to students with hats and no head coverings. In Experiment 1, pictures of students from each group (hood, hat, AND none) are paired with positive and negative scholastic situations. Participants will be asked to sort the students with respect to the likelihood that they would participate in the depicted behavior. In Experiment 2, individual pictures of students from each group (hood, hat, OR none) will be paired with a morally ambiguous academic situation and participants will be asked to rate the character of the depicted individual. Across both experiments, as compared to students with hats and no head coverings, students with hoods are predicted to be rated as more likely to participate in negative behaviors and ambiguous behaviors are predicted to be rated as more negative when paired with hooded students. Findings could suggest ways that students are being unfairly stigmatized by educators for wearing certain kinds of head wear.

68 Housing Discrimination in Mt. Lebanon

Adam Ruby

McAnulty College and Graduate School of Liberal Arts | Double Major: History and Mathematics

Faculty Advisor: Andrew Simpson, Ph.D.

ABSTRACT:

Throughout the twentieth century Housing discrimination against African Americans was carried out by realtors in Mt. Lebanon as a means of maintaining the prosperity of the community. Realtors, regardless of their personal position on civil rights, found themselves as the gatekeepers of the exclusive community. A realtor did not maintain segregation could face threat to their career or even their life. Stuck between civil rights advocates and Mt. Lebanon's citizenry, realtors resorted to subtle tactics as a means of maintaining Mt. Lebanon's racial homogeneity. A far cry from burning crosses or broken windows, suburban housing discrimination often took the form of an unreturned phone call or being quoted prices that were intentionally outside of one's budget. By examining newspapers articles, Census data, and M. A. Jackson's *The Way We Were* this poster will demonstrate the importance of property access in a bedroom community such as Mt. Lebanon. It will also use books by Thomas J. Sugrue and

Joe William Trotter to situate the discrimination occurring in Mt. Lebanon within the broader context of segregation and racist housing policy happening nationwide. Understanding these events, the reasons behind discrimination, and the legacy of racial discrimination helps to undermine prejudice and racism in the modern day. Only by understanding situations like Mt. Lebanon can one hope to propose effective solutions to modern problems caused by racism.

69 How does the use of medical marijuana affect patients suffering from headaches?

Lilly Shupe, Sean Edmonds

Rangos School of Health Sciences | Athletic Training

Faculty Advisor: Sarah Manspeaker, Ph.D.

ABSTRACT:

Clinical Scenario: The analgesic properties of marijuana make it a useful treatment for patients suffering from pain. Pain from various headaches are a common problem that people seek treatment for.

Focused Clinical Question: How does the use of marijuana and cannabinoids affect the pain in patients suffering from headaches? Literature Search: PubMed, EBSCO Medline, and Cochrane Library were used to find articles. Data Extraction: The articles by Piper, Rhyne and Robbins measured headache pain when treated with medical marijuana. The articles by Pini and Robbins measured headache pain when treated with cannabinoids.

Results: The data searches returned ninety articles. Only four articles fit inclusion criteria and included that the use of medical marijuana or cannabinoids caused a decrease in headache pain. Summary of Key Findings: The articles by Pini, Piper, Rhyne, and Robbins showed that increasing cannabinoid or medical marijuana consumption decreased headache pain. Clinical Bottom Line: Medical marijuana and cannabinoids may be an effective treatment for headache pain. Approved medical marijuana and cannabinoid treatments have shown results in decreasing headache pain without adverse effects associated with opioid medications. Clinically, medical marijuana and cannabinoids may be considered as a substitute to opioids and other headache medications prescribed to treat pain.

70 How World War One Shaped Modern Warfare

Samantha Jordan

School of Education | Early Childhood Education

Faculty Advisor: Charles Steinmetz, Ph.D

ABSTRACT:

The purpose of this research is to discover the implications of advancements in military technology and tactics made in World War I and the impact they have on today's warfare. World War I gave birth to modern warfare by introducing technological advancements that would be used in war for generations to come. The war introduced warfare among the clouds, the rolling thunder of tanks, advancements in naval warfare, the horrific results of chemical warfare, and the deadly reality of new types of rapid firing guns. These military advancements resulted in the deadliest war in history at the time and still impact how wars are fought today. A discussion concerning why these advancements were developed is vital to understanding their role in World War I and in future military ventures. This research will be conducted through analyzing firsthand accounts, historical documents, and articles. This investigation is significant

because it provides answers as to how warfare was forever changed due to the technological productions made in World War One

71 Hydrodynamic Multi-Particle Trapping

Jarrett Boyd

Biomedical Engineering | Biomedical Engineering

Faculty Advisor: Melikhan Tanyeri, Ph.D.

ABSTRACT:

Recent advancements in science and engineering have allowed for trapping and manipulation of individual particles and macromolecules within an aqueous medium using a flow-based confinement method. However, simultaneous contact-free trapping of multiple particles using fluid flow remains elusive. We investigated the feasibility of trapping and manipulating multiple particles using connected planar extensional flows within a microfluidic device. Using Brownian dynamics simulations and a proportional feedback control algorithm, we show that an arbitrary (odd or even) number of particles/molecules can be confined and manipulated at stagnation points of planar extensional flows coupled in series. We further discuss the benefits of this new approach and highlight some of its applications in polymer science, specifically, trapping and stretching a linear polymer with micro/nanoparticles attached at each end. Our study demonstrates the versatility of flow-based confinement and our further understanding of feedback-controlled particle manipulation.

72 Identification of MRSA infection in blood using photoacoustic flow cytometry

Anie-Pier Samson

Biomedical Engineering | Biomedical Engineering and Maths

Faculty Advisor: John Viator, Ph.D

Additional Authors: Robert Edgar, Justin Cook, Dr. John Kellum, Dr. John Hempel

ABSTRACT:

Multi-drug-resistant bacteria have become an ever-increasing problem. Currently, broad spectrum antibiotics are prescribed until bacteria can be cultured, a process that takes 3-4 days and is unable to deliver quantitative information about relative number of bacteria present. Photoacoustic Flow cytometry ability to rapidly detect bacterial contamination in blood samples and to accurately count the detected bacteria using photoacoustic flow cytometry and labeled bacteriophage. Photoacoustic Flow cytometry is the generation of ultrasound waves created by the absorption of laser light in objects under flow.

Bacteriophage are viruses that infect bacteria and poses the ability to discriminate bacterial surface antigens allowing the bacteriophage to bind only to their target bacteria. Bacteria can be tagged with dyed phage and processed through the photoacoustic flow cytometer where they are detected by the acoustic response. We previously showed E.coli can be discriminated from Salmonella using this method. Our goal is to develop a method to determine bacterial contamination and decrease the time required to obtain results from 3-4 days to under 1 hour.

A mixture of bacteriophage that infect clinical isolates of Methicillin Resistance Staph Aureus (MRSA) or Methicillin Susceptible Staph Aureus (MSSA) will be used. This will provide the ability to discriminate antibiotic sensitive Staph strains from resistant strains based on surface antigen differences. The detection threshold of unbound bacteriophage and the detection limit of bound bacteriophage on target bacteria will be investigated. This research presents an innovative way of rapidly identifying and potentially quantifying bacteria as well as providing antibiotic sensitivity information.

73 Imaging the Localization of Car Nk Cells in a Humanized Lupus-Like Mouse Model

Margaret Engelman

Bayer School of Natural and Environmental Sciences | Environmental Science

Faculty Advisor: Stephen Waggoner, Ph.D.

Additional Authors: Stephen Waggoner, Ph.D. (faculty), Seth Reighhard (graduate student), Cassia Busch

ABSTRACT:

Natural killer (NK) cells play a vital role in killing cancer and virus-infected cells. We are hoping to harness this killing ability to treat autoimmune diseases, such as lupus. Lupus is characterized by rampant autoantibody production, which is often the result of aberrant interactions between B cells and follicular helper T cells (TFH) in lymphoid follicles. We have engineered an immunosuppressive chimeric antigen receptor (CAR) NK cell that we hypothesize can kill TFH cells and suppress autoantibody production in lupus. In order for this treatment to be successful, CAR NK cells must enter tissues such as the spleen and directly kill TFH cells. Our pilot study, in which human CAR NK cells were injected into humanized lupus-like mice, demonstrated that CAR NK cells could reach the spleen, liver and lungs. However, this data did not reveal the exact location of CAR NK cells within these organs. Herein, we stained tissue slices from these organs and used fluorescent microscopy to more accurately determine the localization of injected CAR NK cells. In the spleen we found that CAR NK cells are spread throughout the tissue, but most importantly, are in close contact with human T and B cells. These findings suggest that our CAR NK cells may be able to interact with the human T and B cells that drive disease in our lupus-like mouse model. In future experiments, we plan to test whether our CAR NK cells can kill TFH cells and reduce autoantibody production in these mice, thus representing a potential option for treating lupus in humans.

***74 Improving Physician Office Quality Measures by Evaluating Statin Prescribing in Type 2 Diabetic Patients**

Choniece Phillips, Lindsay Roberts, Kathleen Dawson

School of Pharmacy and the Graduate School of Pharmaceutical Sciences | Pharmacy

Faculty Advisor: Jamie McConaha, PharmD, Megan Bookser, PharmD

ABSTRACT:

Objective

The focus of this study was to evaluate the impact of pharmacists intervention on quality metrics focusing on patients with a diagnosis of diabetes mellitus type II (T2DM) not currently prescribed statin therapy.

Methods

This retrospective cohort investigational study was conducted in four office locations of a regional primary care physician group practice. Inclusion criteria included a diagnosis of T2DM without active statin therapy. Data was excluded from analysis for patients younger than age 40 or older than age 75, or if the most recent LDL documented was less than 70 mg/dL. Recommendations for initiation of statin therapy were sent electronically to the patient's primary care physician via the EMR software.

Results

Preliminary screening in March 2018 demonstrated a total of 2206 patients with a diagnosis of T2DM, for which 790 patients were not actively prescribed statin therapy. 468 patients were identified as eligible for statin therapy. Endpoint analysis in November 2018 showed that of the initial 468 patients who were eligible for a statin, 74 had subsequently been prescribed a statin, and 23 patients fell out of study criteria.

Implications

The efficacy of statin interventions is supported by the practice entity's improvement in STAR ratings for the Medicare Advantage populations, in which two major payer groups saw increases in statin use in diabetes measures. Standard of care combined with pharmacist-led interventions correlated to a 4-STAR rating for the practice entity as of October 2018. Pharmacists can play an important role in helping physicians meet these quality metrics.

75 Influence of Cognitive Behavioral Therapy on Anxiety in Individuals with Autism Spectrum Disorder

Tesla Knight

Rangos School of Health Sciences | Occupational Therapy

Faculty Advisor: Matthew Ussia, Ph.D.

ABSTRACT:

The purpose of this poster was to examine the impact of Cognitive Behavioral Therapy (CBT) on the anxiety levels of individuals with Autism Spectrum Disorder (ASD). This poster looked at several different research articles to summarize the current research on using CBT as a treatment for anxiety in people with ASD. The poster specifically focused on the use of CBT to treat anxiety as a symptom of ASD, rather than other symptoms that are also associated with ASD.

76 Insertion of GFP into the *Asaia bogerensis* chromosome using homologous recombination

Sumer Jasmine

Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: David Lampe, Ph. D.

Additional Authors: David Lampe (Ph. D.), Tom Kelly (graduate student)

ABSTRACT:

Paratransgenesis is a technique in which symbiotic bacteria are engineered to secrete anti-pathogenic molecules within vector species, thereby altering the phenotype of the host to control zoonotic diseases. This technique has the capability to eradicate malaria, the most prolific insect-vector-borne disease.

in the world. *Asaia bogorensis*, a proteobacteria naturally found in the midgut of *Anopheles* mosquitoes, can be modified to secrete anti-malarial effectors. In recent experiments with the bacterium, we have inserted a gene coding for glowing fluorescent protein (GFP) in the *Asaia* chromosome downstream of a native blood meal-induced promoter using the first step of a twofold recombination method. In the first step, we integrated a plasmid into the chromosome at a fixed site using the machinery of the bacterium. We have since verified that the gene was successfully incorporated and codes for GFP after analyzing *Asaia* under fluorescence microscopy. The second step requires the I-SceI meganuclease to remove any nonessential DNA other than the GFP sequence from the plasmid. This project is intended to demonstrate the feasibility of modifying the *Asaia* genome to eventually create antiplasmodial strains of bacteria.

77 Investigation of Oxidative DNA Damage in an Animal Model of Parkinson's Disease

Sandhya Vijapurapu

School of Pharmacy and the Graduate School of Pharmaceutical Sciences | Pharmacy

Faculty Advisor: Rehana Leak, Ph.D.

Additional Authors: Rehana Leak, Ph.D. (faculty), Kristin Miner, Tarun Bhatia, Rachel Gongaware

ABSTRACT:

All neurodegenerative diseases, including Lewy body disorders such as Parkinson's disease, are characterized by high levels of oxidative stress. However, the impact of oxidative stress on genomic integrity is not well understood in this family of conditions. The degeneration of the dopaminergic nigrostriatal pathway in Parkinson's disease can be modeled with infusions of the oxidative toxicant 6-hydroxydopamine (6-OHDA) in the mouse striatum. Here, we report that a robust marker of DNA damage, 8-hydroxy-2'-deoxyguanosine (8-OHdG), is dramatically increased in the mouse substantia nigra and striatum following infusions of 6-OHDA in the striatum. These findings suggest that free-radical toxicity in Parkinson's disease may contribute to oxidative lesions in DNA and perhaps contribute to loss of the nigrostriatal pathway, although a causal link remains to be established.

78 LCMS Method Development for the Identification and Quantification of Illicit Drugs Introduced into Correctional Facilities

Erica Maney

Bayer School of Natural and Environmental Sciences | Forensic Science and Law

Faculty Advisor: Stephanie Wetzel, Ph.D.

Additional Authors: Logan Miller (previous grad student); Sean Fischer (grad student)

ABSTRACT:

As illicit drug use continues to rise in America, there is an increased need to detect drugs being smuggled into correctional facilities. More and more individuals attempt to conceal illicit materials in articles of mail, believing that facilities will be unable to detect the presence of these substances. This project's focus is to develop a Liquid Chromatography Mass Spectrometry (LCMS) method to identify and quantify commonly trafficked drugs: methamphetamine, ketamine, heroin, cocaine, phencyclidine (PCP), fentanyl, and methadone.

This project is in collaboration with ChemImage Corporation and their hyperspectral imaging system, the VeroVision[®],[®] Mail Screener. Excisions from positively screened mail materials were extracted using sonication in a solution of water and Acetonitrile. Upon extraction, the solutions were syringe filtered, then identified and quantified with the developed and optimized method on the Agilent 6460 QQQ LCMS with 1200 Series LC System.

Each of the samples were analyzed using the MRM transitions (m/z) for each of the illicit substances listed above. By using MRM transitions, the analyte can be more accurately identified by requiring the presence of each fragment. In order to evaluate drug concentrations within samples, calibration curves were created for each analyte using both external and internal deuterated standards.

Overall, the method has produced extremely accurate results, with a relatively high efficiency rate of approximately 70%. Currently, 38% of confiscated mail samples tested have shown high concentrations of methamphetamine, an extremely common and dangerous illicit substance responsible for overdoses all over the country.

79 Left-Right Biases in Evaluating Personality Traits in Mugshots

Victoria Profeta, Adam Dehm

McAnulty College and Graduate School of Liberal Arts | Psychology

Faculty Advisor: Alexander Kranjec, Ph.D

ABSTRACT:

Previous research has shown that left-facing images are judged more negatively than right-facing ones. There is a preference for right-facing profiles across different media, like film and comics, and across diverse domains like soccer and politics. The current study examines the prominence of left-right biases in mugshots to determine the effects of spatial direction on personality judgments. Standard mugshots will often show a portrait view and a left facing profile view. Measuring left-right biases of mugshots can help determine how superficial features of a portrait may affect people's judgments on personality traits of a criminal. Witnesses look at mugshots, for example, to help identify the perpetrator of a crime. These images can potentially influence a jury when shown in court. Given general preferences for right-facing portraits, we predict that there will be higher ratings for negative qualities, such as aggressiveness, and lower ratings for positive qualities, such as intelligence, for left-facing as compared to right facing mugshots. Determining the effect of directionality can demonstrate the inherent bias in people's decisions and potentially inform a more equitable method for displaying mugshots in the real world.

80 Mapping Mental Experience Inside and Outside the Brain

Julie Heintzel, Joseph Stockman

McAnulty College and Graduate School of Liberal Arts | Psychology

Faculty Advisor: Alexander Kranjec, Ph.D

ABSTRACT:

Different emotions are associated with topographically distinct and culturally universal bodily

sensations. In the first part of the present study, we intend to conduct a replication of Nummenmaa et al. (2014) using simple tools in Qualtrics. Part two intends to discover whether people have systematic, intuitive ways of localizing experiences of mental processes, memories, and emotions in their head. The localization of mental experiences may be structured according to how we think about abstract mental processes metaphorically (e.g., memories are behind us; complex reasoning is higher order.) For part one we designed a survey where participants are asked to indicate by clicking on a body map where they feel emotions. For part two, we created a survey that presents a task or story to the participants to evoke cognitive functions (e.g. memory, math) or emotions (e.g., think of something that made you angry) and then indicate where on a brain map they feel that mental experience. We predict that people have common, systematic intuitions about where to place their mental processes in their head. Part one aims to show that the previous results are reliable and replicable using simple software for online experiments. Part two aims to see if people have similar intuitions about where to place their mental processes, memories, and emotions in their head. We predict there is shared structure between where people experience thoughts with metaphorical conceptualizations of thought, actual anatomical localization of function in the brain, and mental maps generated by pseudoscientific fields like phrenology.

81 Measuring Face-ism on Instagram

Jessica Tracy, Spencer Garner

McAnulty College and Graduate School of Liberal Arts | Psychology

Faculty Advisor: Alexander Kranjec, Ph.D.

ABSTRACT:

Face-ism refers to a bias across many forms of media where men showing relatively more face than body in a picture are perceived as better or more likeable. Face-ism can be indexed by measuring the face to body ratio displayed in a portrait. In previous studies men who exhibited more face-ism in pictures were deemed more competent. The researchers hypothesized that visual representations including more or less face would contribute to stereotyping particular to each gender. Newspapers and magazines had more of an inclination to focus on men's faces instead of their bodies concluding that there is an innate preference towards exhibiting more face-ism. To understand this bias in modern forms of social media, the current study analyzes Instagram photos of women and men from two distinct social groups (famous vs. non-famous). Five pictures of 40 different individuals of each sex will be indexed with a face-ism score (20 people from the Duquesne community (with over 800 followers) and 20 Instagram models (with over 50k followers (400 photos total)). We will analyze the relation between face-ism scores and Instagram "likes." It is predicted that men will get more likes for showing more face in their photos and women will get more likes for showing more body and less face. These findings can be used for people trying to improve their "influence" on Instagram while casting light on bias between men and women in social media.

82 Mechanisms of Multicellular Interactions in *Pseudomonas fluorescens*

John Mauro Gloninger

Bayer School of Natural and Environmental Sciences | Environmental Science

Faculty Advisor: Wook Kim, Ph. D.

Additional Authors: Diana Klein, Vineet Madduru, Collin Kessler, and Wook Kim, Ph.D. (faculty)

ABSTRACT:

Cyclic di-GMP (CdG) is a universal second messenger in bacteria responsible for both clinical and environmental perturbations. Despite this broad impact, major gaps remain in our understanding of the regulation of this central molecule. Previous work from our lab demonstrated that two phenotypic variants repeatedly and bi-directionally emerge in *Pseudomonas fluorescens* colonies that spread together to conquer new territory. Genome sequencing of multiple concurrently evolving lineages indicate that these variants likely emerge through intracellular modulations of CdG. We hypothesize that each sequential switch between the two phenotypes manifests through discrete genetic changes that act to either up- or down-regulate CdG production. We confirmed this by utilizing a fluorescent biosensor of CdG and also by synthetically manipulating the intracellular CdG pool to manually force the phenotypic switch. Thus, our parallel evolution system has the potential to comprehensively map out all regulatory elements and mechanisms that govern CdG production and bridge the significant gap in our understanding of CdG regulation.

83 Microglial cells mitigate α -synucleinopathy in preclinical Lewy body disease

Elizabeth Eckhoff

School of Pharmacy and the Graduate School of Pharmaceutical Sciences | Pharmacy

Faculty Advisor: Rehana Leak, Ph.D.

Additional Authors: Tarun N. Bhatia (graduate student), Rehana K. Leak, Ph.D. (faculty)

ABSTRACT:

Lewy body disorders such as Parkinson's disease are characterized by inclusions containing aggregated, fibrillar α -synuclein protein. The resulting α -synucleinopathy may spread through the brain from cell to cell. Microglia are brain phagocytes that respond to injury and may engulf α -synuclein, which would be expected to mitigate this spread. Therefore, we tested the hypothesis that microglia are activated by exposure to pathological, fibrillar α -synuclein and that this activation enhances their ability to protect neighboring neurons from subsequently developing Lewy pathology. First, we observed that the introduction of α -synuclein fibrils into CA2/CA3 fields of the mouse hippocampus in vivo increased global brain expression of Iba1, an established marker of activated microglia. Specifically, Iba1 was significantly upregulated in the nigrostriatal pathway and the dentate gyrus of the hippocampus. In an extensive series of in vitro studies, we discovered that the presence of a microglial layer plated underneath primary hippocampal neurons significantly reduced the emergence of Lewy-like neuropathology, as expected. However, this neuroprotective effect was not altered by microglial exposure to pro-inflammatory stimuli such as lipopolysaccharide and interferon-gamma, anti-inflammatory stimuli such as interleukin 4, or even by preconditioning the microglia with preexposure to α -synuclein fibrils. Collectively, these findings suggest that microglial cells are activated by exposure to pathological α -synuclein in vivo, but that exposure to α -synuclein may not enhance their natural abilities to robustly mitigate Lewy-like pathology in neighboring neurons in vitro.

84 Multi-Anode Photo-Multipliers in Particle Detectors and Nuclear Medicine

Connor Pecar

Bayer School of Natural and Environmental Sciences | Physics

Faculty Advisor: Fatiha Benmokhtar, Ph.D.

Additional Authors: Fatiha Benmokhtar, Ph.D. (Faculty member), Marco Mirazita, Ph.D. (External advisor)

ABSTRACT:

The RICH detector (Ring Imaging Cherenkov Detector) in Jefferson Lab's Hall B is part of the CLAS12 project (CEBAF Large Acceptance Spectrometer) and is designed to separate pions and kaons in the 3-8 GeV/c momentum range. The detector employs aerogel tiles used to produce Cherenkov radiation from incident particles, a mirror setup, and 391 MAPMTs (multi-anode photomultiplier tubes) with 64 channels each attached to additional readout electronics, resulting in 25024 channels to analyze. The high sensitivity of the MAPMTs allows for the detection of single photons produced during experiments. This sensitivity is achieved by use of a dynode effect, turning a single photon hit into a cascade of electrons which produces a signal in the readout electronics. In the past year, work has been done to analyze calibration data recorded using the RICH detector. This data provides crucial information regarding the stability of the detector over time. In addition, it allows for the analysis of the MAPMTs and readout electronics of the detector. I will be presenting the analysis of the MAPMTs and how they are used in medical Physics.

85 Music Education as a Human Right

Lauren Petrillo

Mary Pappert School of Music | Music Education

Faculty Advisor: Rachel Whitcomb, Ed.D.

ABSTRACT:

Music is pervasive in all human cultures and across many aspects of daily life. Understanding this experience and how it connects with oneself and the world should form an integral part of humanistic education. This project defines this knowledge as music education and argues for music education as a human right. Many people have sought to articulate the value of music education, but whether they understand music as promoting social cohesion, mathematical ability, or discipline, they cannot identify one single value for music education because they fail to consider music itself as integral to the broad range of life experience. To limit the essence of music to a definitive value overlooks the fluidity of the rich presence and importance it has always had within the human experience. Since all known cultures partake in some type of music, this study argues that the universal presence of music is enough reason to require that students understand such a vast part of their human experience. Boyce-Tillman (2004) has adopted the term "ecology" in reference to the incorporation of music in the wider social, cultural, moral, and spiritual curriculum of study. Accepting music as an ecological trait of human life articulates the significance and prominence music has always had for humanity.

Boyce-Tillman, J. (2004). Towards an Ecology of Music Education. *Philosophy of Music Education Review*, 12(2), 102-125. Retrieved from <http://www.jstor.org/stable/40327232>

86 Negative Effects of the Sensualization of the RMS Titanic

Julia Cardinal

McAnulty College and Graduate School of Liberal Arts | Classical Latin and History

Faculty Advisor: Katherine Rask, Ph.D

ABSTRACT:

The sinking of the Titanic caused great disaster in the lives of 1,500 passengers and the ship herself with artifacts widespread across the ocean floor in what is called the debris field. The debris field was located by Bob Ballard through his discovery of the boilers. Even though Ballard and his team were the ones to discover the Titanic, they did not remove anything from the seafloor which would have made them the salvor-in-possession. Premier Exhibitions of RMS Titanic Incorporated was the first to do such. They have conducted several expeditions to determine the cause of the wreck, but none of them involve any or a significant amount of drive for archaeological research. They rarely have archaeologists or even forensic scientists on their team for studies. Their notes do not survey the context of where their artifacts come from in an archaeological manner. Perhaps their studies can show the artifact's context in its usage or history, but artifacts' relation to each other, the Titanic, and the entire debris field are not clearly catalogued. This is important information to know for the conservation of the Titanic as an underwater archaeological site. Unfortunately more is lost due to third parties scavenging artifacts from the wreck site for the black market. The sensualization of the RMS Titanic, and the demand for artifacts, has caused significant damage to the potential archaeological data of the debris field. This project analyzes the negative effect of the Titanic's sensualization on the archaeological data of Titanic artifacts.

87 Physical Therapy as an Alternative to Prescription Opioids

Ryan Rios

Rangos School of Health Sciences | Physical Therapy

Faculty Advisor: Andrew Simpson, Ph.D

ABSTRACT:

The research I conducted shows physical therapy is a more efficient and a more fiscal mean of curbing the opioid crisis. Since 1999, the sale of prescription opioids to pharmacies has risen 300% with more than 80% of the global number of opioids produced being used in the United States. The increase in the number of opioids prescribed has forced the CDC to declare the opioid death toll to be at an "epidemic level" in 2011. More recently, as of June 2018, around 40 people die of an opioid overdose a day. This is a pressing issue since opioid crisis is not just those addicted to pain killers and heroin, those affected could very likely be our neighbors and friends. A potential resource to help curb the opioid crisis is the utilization of physical therapy to help manage pain and avoid the prescription of opioids. To help argue the point, various sources from different disciplines found on online data bases were used to show physical therapy's advances as a field, its ability to manage pain, and its economic benefit. Results showed that physical therapy is not only a safer means for curbing the opioid crisis but it is also a more cost efficient alternative than prescription opioids. Based off of the research, it appears that physical therapy is an alternative to take into consideration to replace opioids. The evidence of physical therapy's

benefits is overwhelming, future legislation needs to take it into consideration in order to curb the opioid crisis.

88 Physical Therapy Specialties: A Look into the World of Becoming a Specialist

Chloe Warham

Rangos School of Health Sciences | Physical Therapy

Faculty Advisor: Matthew Kostek, PhD, FACSM

ABSTRACT:

The purpose of my research was to examine and understand the different specialties a Physical Therapist can pursue on top of being a general PT. My methodology and approach were to examine the American Physical Therapist Association website as well as the American Board of Physical Therapy Specialists website including some other secondary professional sources. Through this research I discovered that there are currently 9 officially recognized which are Cardiovascular and Pulmonary, Clinical Electrophysiology, Geriatrics, Neurology, Orthopaedics, Pediatrics, Oncology, Sports, and Women's Health. Since Physical Therapy is a constantly evolving and growing field, there are more aspects that are in the process of becoming a specialty. To become a specialist there is an application process and then an exam. Within each specialty there are certain requirements that need to be met before someone can apply and be accepted to take the certification exam. While not all Physical Therapists choose to become specialists, those who do are considered experts in their field and it can increase professional opportunities and compensation. Most importantly, it improves their ability to care for their patients. As a Physical Therapy student, or a health care consumer (i.e. a patient), it is important to understand the options and importance of specialties in the field of Physical Therapy because an informed consumer is able to choose the most efficacious and cost-efficient health care treatments from their PT. This benefits the patient, the health care system, and ultimately society.

89 Production of a protein substrate for analysis of prostate specific protease function

Ghadah Almusallam

Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Michael Jensen-Seaman, PhD

Additional Authors: Michael I Jensen-Seaman (Faculty), Emine F Kahveci (PhD student)

ABSTRACT:

Male reproductive genes exhibit rapid evolution in humans and other primates. One of these genes, the kallikrein-3 protease (KLK3; also known as PSA, a marker for prostate cancer), has evolved rapidly in its amino acid sequence and at the same time has undergone a partial gene duplication in gorillas and gibbons. Performing functional assays using recombinant proteins will help determine the functional consequences of these amino acid substitutions in order to deduce the selective forces acting on KLK3. KLK3 is an enzyme that cleaves the structural extracellular proteins SEMG1 and SEMG2 in the process of coagulation and degradation of the seminal gel. The catalytic rate and efficiency of human, chimpanzee, and gorilla KLK3 will be quantified by measuring its ability to cleave at the amino acid sequence: HSSKLQ. To do this, I am cloning the synthetic DNA coding for HSSKLQ into an E. coli expression vector. I will then express, purify, and quantify the resulting HSSKLQ-containing fusion protein, and test the ability of KLK3

proteins from several primate species in order to understand the functional consequences of previously observed amino acid sequence differences.

***90 Quantifying Iron Overload using MRI, Active Contours, and Convolutional Neural Networks**

Andrea Sajewski, Jonathan Kamis, Ralf Loeffler, Claudia Hillenbrand, Stacey Levine

McAnulty College and Graduate School of Liberal Arts, Biomedical Engineering | Biomedical Engineering and Mathematics

Faculty Advisor: Stacey Levine, Ph.D.

ABSTRACT:

Iron overload, a complication of repeated blood transfusions, can cause tissue damage and organ failure. The body has no regulatory mechanism to excrete excess iron, so iron overload must be closely monitored to guide therapy and measure treatment response. The concentration of iron in the liver is a reliable marker for total body iron content and is now measured noninvasively with magnetic resonance imaging (MRI). MRI produces a diagnostic image by measuring the signals emitted from the body in the presence of a constant magnetic field and radiofrequency pulses. At each pixel, the signal decay constant, $T2^*$, can be calculated, providing insight about the structure of each tissue. Liver iron content can be quantified based on this $T2^*$ value because signal decay accelerates with increasing iron concentration. We developed a method to automatically segment the liver from the MRI image to accurately calculate iron content. Our current algorithm utilizes the active contour model for image segmentation, which iteratively evolves a curve until it reaches an edge or a boundary. We applied this algorithm to each MRI image in addition to a map of pixelwise $T2^*$ values, combining basic image processing with imaging physics. One of the limitations of this segmentation model is how it handles noise in the MRI data. Recent advancements in deep learning have enabled researchers to utilize convolutional neural networks to denoise and reconstruct images. We used the Trainable Nonlinear Reaction Diffusion network architecture to denoise the MRI images, allowing for smoother segmentation while preserving fine details.

91 Recombinant Expression of Human Semenogelin Proteins and Creation of Novel Antibodies for the Detection of Human Semen

David Brown

Bayer School of Natural and Environmental Sciences | Forensic Science and Law

Faculty Advisor: Michael Jensen-Seaman, Ph.D.

ABSTRACT:

The coagulum of human semen is largely composed of a group of proteins called the semenogelins. After ejaculation, these proteins undergo non-covalent interactions through the formation of sulfide bridges that allows for the coagulation of seminal fluid and protection of spermatozoa to give the best chance at fertilization. Because of their abundance"making up nearly 50% of total protein in semen"the semenogelin proteins are an effective marker to detect human semen at crime scenes when there is a suspected sexual assault, even if there are no detectable sperm cells. This study is working to create an optimized method for producing novel antibodies for the semenogelin proteins that can be used for the detection of seminal fluid at a crime scene. Individual segments of the

semenogelin 1 gene were amplified using PCR and cloned into the pScript expression vector for expression in human 293T cells. Following expression and protein purification, antibodies can be created using standard protocols and tested for their ability to detect fragments of semenogelin in semen. While other techniques for the detection of semenogelin in forensic situations exist, our approach may be useful especially in cases where substantial degradation of seminal proteins has occurred.

92 Relations between Clothing Style and Personal Performance

Keri Buczkowski, Ariana Pavlocak

McAnulty College and Graduate School of Liberal Arts | Psychology

Faculty Advisor: Alexander Kranjec, Ph.D.

ABSTRACT:

Relations between personal performance and how a student dresses in the classroom can mean a variety of things to a college student. However, little is known about the relation between how a student dresses and personal performance in a college classroom setting. A survey study will measure classroom performance and the likelihood of dressing up or down for class on a college campus. Questions will probe the extent of participation, focus, confidence, comfort or discomfort, and the amount of sleep participants report in relation to how they decide to dress. Scores between experiential variables and dressing behavior will be analyzed in order to identify important relations. We will also conduct a quasi-experimental small-N study between 2 participants using specific criteria gleaned from the survey study to further investigate critical relations. It remains to be seen if participants have increased personal performance as they (1) dress more professionally for class ("dress for success") (2) dress more comfortably (dress to focus on material vs. self) or (3) dress in accordance to their personal habits (performance increases with dressing either up or down depends on personal habits for dressing up or down). Our prediction is that people feel better and more confident about themselves as they are dressed nicely for class, rather when they dress in casual wear in the everyday setting.

93 Religious conflict and trauma in the lived world for university students.

Adriana Gulli

McAnulty College and Graduate School of Liberal Arts | Psychology

Faculty Advisor: Roger Brooke, PhD

ABSTRACT:

During psychological assessment and treatment, the topic of a client's religious life is often excluded from the conversation. This neglect of discussing religious backgrounds fails to acknowledge history that is integral to the person's lived experience. This failure to address religious conflict and trauma as a component to disorders perpetuates a system that extends time needed in therapy or ultimately fails to assist clients in treatment. To gather information regarding religious conflict and trauma that is as accurate as possible to the participants lived experience, the descriptive phenomenological approach to research as well as the "free imaginative variation". This approach was used to aid research in illuminating some of the central components to the experience of religious conflict, and for those who have experienced religious conflict, how is it presented through their lived daily experiences? A sample of 2 female participants from religious Christian backgrounds who had undergone a traumatic conflict

within their religion were interviewed with a primary question and some guiding questions to ultimately allow them to free-associate. Through this it was found that religious conflict does create trauma in a person's life and the effects of it can be seen in many aspects of life throughout time. Knowing this information may contribute to further studies aimed at improving assessment and therapeutic techniques.

94 Romance or Revolution: The struggle between Patriarchy and Women's Activism in In the Time of the Butterflies

Sara Omer

Rangos School of Health Sciences | Physician Assistant Studies (MPAS)

Faculty Advisor: Erin Speese, Ph.D.

ABSTRACT:

In *In the Time of the Butterflies*, Julia Alvarez illustrates the everyday struggles women faced in the Dominican Republic during the violent dictatorship of General Rafael Trujillo. While attempting to overthrow the dictator who "assaulted Dominican national morality" by "creating broken homes and orphans" in his tyrannous regime, Minerva also struggles against the patriarchal power structure in the Dominican Republic that gave men dominance over women (Manley 63). Alvarez emphasizes the constant clashes with male authority that impeded Minerva's ability to participate in the revolution. My poster explores the various ways Julia Alvarez highlights the struggle women faced between patriarchal expectations and women's activism through Minerva Maribal's fight against the Trujillo regime in *In the Time of the Butterflies*. Ultimately, I suggest that there is an interesting parallel between Minerva's struggle to overthrow Trujillo and women's struggle to overthrow the constraints of masculinized nationalism.

95 SOLFARM

Madelyn Hoying, Garrett Craig, Nina Dorfner, Karli Sutton, Jordan Hoydick, Paige Aley, Sawyer Weitzel, Audrey Steen, Peyton Joiner, Erin Kuhn, Alexander Evans, Sophia Perez

A.J. Palumbo School of Business Administration, School of Education, Rangos School of Health Sciences, Bayer School of Natural and Environmental Sciences, School of Nursing, Biomedical Engineering Physics, Majors: Biomedical Engineering, Chemistry, Nursing, Accounting, Education, Physician Assistant Studies
Faculty Advisor: Benjamin Goldschmidt, Ph.D.

ABSTRACT:

Human space exploration faces a major challenge affecting both the instrumentation used in space systems and the health of the astronauts: radiation. Effective ways of monitoring the solar radiation outside of Earth's magnetosphere are needed in order for safe missions to the Moon and beyond. The Gateway is NASA's next step in space exploration, and logistics modules will be sent to the Gateway to remain for one year before being sent into a disposal orbit. SOLFARM is a module proposed to take advantage of unused mass, volume, and power capabilities of one of the Gateway's logistics modules. It contains the tools necessary to measure the radiation environment during both its orbit around the

Moon while with the Gateway, and in its heliocentric disposal orbit. The orbit was determined to optimize the collection capabilities of the chosen equipment using GMAT software. Additionally, SOLFARM contains a computer system so that the data it gathers can be accessed by students on Earth to be used in various school projects and education initiatives. Currently, NASA is designing missions like the GDC to monitor the radiation environment on Earth. SOLFARM will complement this mission by monitoring the radiation environment in areas not covered by current missions, to further our understanding of the radiation in space and better prepare us to combat this issue to allow us to push the boundaries in human space exploration.

96 Speaking Through Signs: An Exploration of Deaf Identity

Brooke Yurick

Rangos School of Health Sciences | Speech-Language Pathology

Faculty Advisor: Inci Sayrak, Ph.D.

ABSTRACT:

With over 500,000 Deaf individuals in the United States, the Deaf community deserves to have their voices heard in society. Whether in the workplace, education, media, or healthcare, the Deaf community faces daily issues due to the communication barriers and stigmas constructed by the larger hearing society. However, much of the hearing community is unaware of these invisible boundaries and how to communicate with the Deaf. Society must learn how to recognize the value the Deaf community's unique and powerful insight offers the world, including their focus on the gains of being Deaf rather than solely their inability to hear. Through online articles as well as an interview with a member of the Deaf community, this research presents ways hearing individuals can better communicate and build relationships with Deaf individuals, pushing through cultural lines towards understanding.

Keywords: Deaf community, Deaf gain, disability stigma, intercultural communication

97 Stephen King's Incorporation of Children in his Works "It" and "The Shining" to Invoke Fear and Highlight the Dysfunction of Families

Morgan Loftis

Rangos School of Health Sciences | Physician Assistant

Faculty Advisor: Gregory Specter, Ph.D.

ABSTRACT:

Stephen King is an extremely gifted writer that has a special talent for scaring his audience. He uses similar techniques in many of his novels to create plot lines of pure horror. Something that he incorporates into many of his works is the involvement of children. His novels *It* and *The Shining* are two of his most well known works that utilize children as main characters. The children in his novels allow his audience to realize that fear does not discriminate against anyone, no matter the age. This adds to the terrifying plots of both books. However, there is a deeper meaning for the use of these characters. In both novels, the main characters have difficult home lives; he is able to show the impact broken and dysfunctional family dynamics have on children as well as their futures. Stephen King masterfully utilizes children to invoke fear as well as highlight the repercussions of a broken home life.

98 Technology Acceptance Model: A New Paradigm for Undergraduate Teacher Preparation Programs

Miranda Zarlino

School of Education | PreK-4 Education

Faculty Advisor: David Carbonara, Ed.D.

ABSTRACT:

The main objective of this research is to find what pre-service teachers' thoughts are on using instructional technology to help them teach. The Technology Acceptance Model (TAM) was initially designed by Venkatesh, Davis, and Morris (2009) with the idea of measuring the perceived use of technology as well as the perceived ease of use of technology for any given teacher.

It is important to know how future pre-service teachers perceive the ease of use of technology, as well as the usefulness of technology. Venkatesh et al. constructed a model to measure the perceived ease of use and perceived usefulness of technology used by teachers and found that their instrument was very reliable (Cronbach's alpha = 0.82).

A sample of students (65) in this investigator's undergraduate education classes were asked to voluntarily submit their responses to the demographic questions such as year in school, number of instructional technology courses completed, major and TAM questions in order to determine their own perception in the usefulness of technology and perceived ease of use of the technology, all with the idea of how it can help them teach in their future classrooms.

Subjects responded to 8 survey questions about perceived usefulness and ease of use of technology. Groups were formed by Year in school, Gender, and Course of study. While the data showed that there wasn't any significant difference in views about future IT courses based on GPA, significant differences were found in some questions based on number of IT and Education courses taken.

99 Text-to-Speech Reading Comprehension for Individuals with Aphasia

Katherine Janov

Rangos School of Health Sciences | Speech-Language Pathology

Faculty Advisor: Sarah Wallace, PhD, CCC-SLP

ABSTRACT:

For individuals with aphasia, the once daily activity of reading can become an onerous undertaking. After stroke or traumatic brain injury, individuals with aphasia are hindered in their ability to communicate, both in-person and through digital communication; they are also limited by the reading materials they can comprehend. Text-to-speech technology offers people with aphasia alternatives to traditional reading by synthetically producing audio versions of the text which can be presented alongside the written material, thus giving the individual with aphasia two accessible versions of a text. This review incorporates studies that analyze the effects that various text-to-speech approaches have on reading comprehension of people with aphasia. Additionally, the review will include information about the perspectives and preferences of people with aphasia.

Keywords: aphasia, reading comprehension, text-to-speech

100 The Balance between Freedom of Speech and Human Dignity

David DeFelice

McAnulty College and Graduate School of Liberal Arts | Political Science and International Relations

Faculty Advisor: Clifford Bob, Ph.D, J.D.

ABSTRACT:

Floyd Abrams in his *Soul of the First Amendment* uses Kathleen Sullivan's dichotomous framework of competing free speech interpretations of the First Amendment to demonstrate an ongoing debate in constitutional law. On the one hand, the free speech clause must remain negative in order to restrain the government, regardless of who the right holder is and the content of the speech. On the other hand, the free speech clause serves to protect speech as long as the ends of political equality are met (Abrams, 2017). These two views beg the question whether the Court should look to deleterious effects speech may have on a society. This paper seeks to explicate both the societal interests of free speech and human dignity, and the ways in which a government can balance both. By first, analyzing Supreme Court precedent with regards to the unconstitutionality of hate speech statutes. Second, by demonstrating the difference in philosophical approaches to the First Amendment using the Sullivan dichotomy. Focusing on both interpretivism and non-interpretivism approaches to jurisprudence. And finally, by theorizing ways in which group libel laws may mitigate the "chilling effect" hate speech statutes have on political speech, while protecting the human dignity of historically discriminated groups based on perceived shared ethnic ancestry.

101 Withdrawn submission

102 The Disconnect Between Forensic Science and the Lawyers Who Represent It

Hannah Reidenbaugh

Bayer School of Natural and Environmental Sciences | Forensic Science and Law

Faculty Advisor: Lyndsie Ferrara, Ph.D.

Additional Authors: Hannah Reidenbaugh (student), Lyndsie Ferrara, Ph.D. (faculty), Pamela Marshall, Ph.D. (faculty)

ABSTRACT:

Criminal lawyers and judges representing the law should be educated in the field of forensic science in order to ensure the justice system is upheld. The problem is that in law schools across the country, there is little to no required curriculum focused on educating upcoming criminal attorneys in the growing world of forensic science. Though educators as well as professionals have voiced the need for more scientific education in our law schools, there has been little progress made. Through review of literature as well as a look at law school curriculums, it is clear there is a need for forensic science training in law schools. Of the top 50 law schools across the country, only 22% of them offer a forensic science course. Of the top law schools known for educating criminal attorneys, 36% offer a forensic science course. Of all law schools who offer criminal law practices, none of them require any forensic science in a student's curriculum. The goal of this research is prove it is necessary to start requiring law school students pursuing criminal law, to be enrolled in an introduction to forensic science course. Through this

research, criminal lawyers will see the importance of forensic science as well as be educated in it so that all trials they represent are fair and just.

103 The Effect of Concussion History on Health Related Quality of Life in Adolescent Athletes: A Critically Appraised Topic

Sara Brenner

Rangos School of Health Sciences | Athletic Training

Faculty Advisor: Jason Scibek, Ph.D.

Erica Beidler, Ph.D. (faculty)

ABSTRACT:

Clinical Scenario: There are possible short and long term repercussions from sustaining a concussion while playing sports that may affect health-related quality of life (HRQOL). Focused Clinical Question: What is the effect of prior history of concussion on health-related quality of life in adolescent athletes? Summary of Measures: Concussion information and HRQOL patient-reported outcome measure scores were the main variables of interest. HRQOL was recorded using mainly PedsQL, PedsQL Multidimensional Fatigue Scale, and the HIT-6 measures. Search Results: A literature search yielded 22 possible articles, and 4 were included in the critical appraisal based on the inclusion and exclusion criteria. Summary of Key Findings: McLeod et al.(2018) found a significant decrease in HRQOL in adolescent athletes with prolonged recovery. McLeod et al.(2010) found those with a concussion history had a greater decrease in HRQOL than a non-concussed group. Vassilyadi et al.(2014) concluded that athletes have the greatest decrease in psychosocial health. Russell et al.(2017) found initial scores were worse in the cognitive and physical categories. Clinical Bottom Line: HRQOL was decreased in adolescent athletes with a history of diagnosed concussion(s). Sports medicine healthcare providers should be aware of and address HRQOL issues in their concussion patients.

104 The effect of GPC1 dosage alteration and temperature on growth in *Saccharomyces cerevisiae*

Maeve Godshalk

Bayer School of Natural and Environmental Sciences | Forensic Science and Law

Faculty Advisor: Jana Patton-Vogt, Ph. D.

Additional Authors: Jana Patton-Vogt, Ph. D (faculty), Brelan Skinner, Alexiy Nikiforov

ABSTRACT:

Phospholipids are major components of cellular membranes and their biophysical properties, such as fatty acid composition, help define membrane structure and function. Phosphatidylcholine (PC) is the most abundant phospholipid in cellular membranes and is synthesized primarily by two well defined metabolic pathways. Gpc1 is a novel acyltransferase involved in PC biosynthesis and PC remodeling.

Remodeling is the process of removing fatty acids from phospholipids (via phospholipases) and replacing them with new fatty acid species (via acyltransferases). These changes can impact lipid and membrane properties, such as fluidity. Gpc1 activity results in the addition of saturated fatty acids during PC remodeling. To investigate the physiological role of Gpc1, we examined growth upon deletion and overexpression of GPC1 at various temperatures. We report, among other things, that the loss of GPC1

negatively impacts growth under normal temperature conditions and positively impacts growth at elevated temperature.

***105 The effect of punctuation formatting on authorship attribution of formal writings**

Andrew Burns

McAnulty College and Graduate School of Liberal Arts | Computer Science

Faculty Advisor: Juola Patrick, PH.D

ABSTRACT:

This paper is to study the impact that the "punctuation separator" canonicizer has on the ability for the JGAAP (Java Graphical Authorship Attribution Program) to analyze documents and determine their author. For clarification, a "canonicizer" is a component of JGAAP to format documents to remove eccentricities that might interfere with the analysis systems. In this case, the punctuation separator puts a space between a word and the period following it. Formal documents refer to pieces of literature where grammar and punctuation are strict, such as academic papers. Much of JGAAP is trial and error in determining the best methods of discerning the authors of different works. The ability to be able to identify an author's writing style can prove vital in the fight against plagiarism in academic works. The resources used are JGAAP 8.0.0 with 270 Victorian era novels used for analysis. Victorian novels can be assumed to be analogous to more modern formal writings. The methodology was to run pairs of several types of analysis, one with the punctuation separator active and one without. The amount of documents that the system was able to correctly determine the author of the paper was used to gauge the effectiveness. Ultimately, there was no difference between the tests. In conclusion, this canonicizer has an insignificant effect on analysis of these documents. Although, it would be wise to run this experiment with a larger data set to exhaustively determine if this formatting is as effective as this sample size lets on.

106 The Evolution of Music

Mitchell Taylor

Mary Pappert School of Music | Piano Performance

Faculty Advisor: Paul Miller, Ph.D.

ABSTRACT:

Music historians recognize distinct eras of contrasting musical style, which they categorize into "periods." The categorization of musical style into periods is partly due to changes in compositional techniques, but it is also a consequence of the effort made by most historians to emphasize the achievements of exceptionally creative individuals. As such, the periodization of music is useful as a means of understanding the development of composition, but it is problematic in that it devalues the collective cultural factors that contribute to its occurrence. The question I will be examining is this: what is the precise nature of stylistic change in music? Since historians ultimately decide what is historically relevant, I will also discuss the challenges this presents in clearly understanding the context of recognized musical periods. Specifically, I will review the Baroque and Romantic eras, as well as film music as an example of an emerging modern style. As a solution to the problem of historical partiality towards the individual, I argue that the technological, cultural, and political environment in which a

composer lives largely contributes to the stylistic change and determines the limitations of their capacity for creative expression.

107 The Fairness of the AP Program

William Heintz

A.J. Palumbo School of Business Administration | Economics

Faculty Advisor: Kathleen Roberts, Ph. D

ABSTRACT:

The Advanced Placement or AP Program has become wildly popular throughout American high schools in the past few decades. How the program works is high school students can choose to sign up to take AP classes and once enrolled in the class choose if they want to take the AP test. The College Board, the sponsor of the AP Program, claims that students who take AP classes in high school will be more prepared for college level classes once they arrive in college. The College Board also brands the AP program as a cost-effective measure because although students must pay to take the test, if they pass there is a chance that they could receive some sort of college credit for passing the test. There is no doubt that the AP Program offers some benefits, but there is some concern on the level of fairness that the AP Program brings. I will attempt to objectively present the fairness of the AP Program in terms of variability in participation across genders, race, and income levels. I will also explore the reliability of colleges and universities actually accepting AP credits.

108 The History and Science of Addiction

Abigail Selan

McAnulty College and Graduate School of Liberal Arts | Physical Therapy

Faculty Advisor: Andrew Simpson, Ph.D.

ABSTRACT:

In the 1990s, The Sackler family was producing powerful drugs through their company, Purdue Pharma. The company's signature drug was OxyContin. The profits made the family important philanthropists and their drug was viewed as a medical miracle for treating chronic and acute pain. More recent evidence shows that non-opioid related treatments such as physical therapy and pain management are effective alternatives to deal with pain, which emphasizes the fact that OxyContin changed doctors' prescribing practices of opioids and consequently plunged the United States into a national epidemic. My research shows why understanding the history of addiction and how the opioid crisis emerged spurs from the lack of understanding surrounding the over-prescription of these drugs, which leads to negative stigmas surrounding addiction where addicts are historically viewed as criminals and societal burdens. Today the perception is shifted to a more empathetic view where addiction is classified as a mental disorder and therefore a medical problem in need of treatment. Individuals suffering from addiction vary in race, gender, age, etc. Age is a key factor for comparing illicit and prescription opioid use when observing and understanding the trends surrounding the crisis. The media portrays young people to be at the heart of the crisis, but older generations are more likely to deal with chronic pain and therefore be prescribed opioids. Thanks to the Sackler family and Purdue Pharma, prescribing opioids to treat chronic pain became a norm, but the drugs created more problems than they solved.

109 The Liberalization of Abortion Through Media Discourse

Lucy Archer

McAnulty College and Graduate School of Liberal Arts | History

Faculty Advisor: Jotham Parsons, Ph.D.

ABSTRACT:

This research project is centered on analyzing the way abortion was being discussed in popular American media (books, magazines, newspaper articles), in the 30 years leading up to the Roe V. Wade decision in the Supreme Court. The examination starts with evidence from the Great Depression and ends with newspaper discussions on foreign countries with more liberal abortion laws from the 1960's. From this analysis, it can be seen that the process of changing the perspectives of many Americans on abortion was slow but steady during this period. Secondary sources concerning individual pieces of primary evidence for this were also consulted.

110 The Madness of Meat Farms: the Negative Effects of Meat Farming and How Vegetarianism can Solve the Problem

Elizabeth Henning

Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Becky Morrow, VMD

ABSTRACT:

The research presented serves to identify the ethical and environmental benefits of a vegetarian diet, and why more people should choose this way of life, through an examination of meat farms. The ethical and environmental impacts of meat farms and their treatment of animals are discussed, and data is pulled from articles, field studies, and books to support and form these claims. The environmental aspect of a vegetarian diet is examined first, starting with the adverse effects that meat farms have on the planet, such as methane release and buildup. Next, facts gathered about what happens in terms of mistreatment of animals at meat farms are presented, and discussed in terms of ethicality. Investigative studies on the hidden truths of meat farms are pulled from as well to support the ethically claims. Finally, a philosophical discussion of assumed animal inferiority, the definition of life, and how this relates to the ethicality of a vegetarian diet and the treatment of animals in farms is examined. The ideas discussed are ultimately drawn together in a series of conclusions about the benefits of a vegetarian diet.

111 The Secular Understanding of Religion in Public Schools

Kaitlin Dodd, Rachel Krotseng

McAnulty College and Graduate School of Liberal Arts | Middle Levels Education

Faculty Advisor: Radu Bordeianu, Fr.

ABSTRACT:

Since the 2016 election of President Donald Trump, there has been a spike in religious hate crimes, evident by recent events such as the shooting at the Tree of Life synagogue in Pittsburgh. Trump's rhetoric has magnified and validated people's preexisting prejudices. We believe that these prejudices

stem not from a genuine fear of others, but rather a misunderstanding of their way of life. One possible solution to this unfamiliarity is by teaching children from a young age that these religious differences are not dangerous and should be celebrated, not feared. Even with the multitude of governmental regulations in place that limit the presence of religion in public schools, it is nonetheless legal to teach religion with a secular purpose in mind. Thus, we believe that it should be the obligation of public schools to educate students on a variety of religions. As children are the future of our country, it is crucial that they are taught to understand and accept others so the United States may become a more tolerant place. Scholars agree that it is more important than ever to understand religions to in turn understand the motivations of others. We will investigate this by examining Supreme Court cases that advocate religion in public schools, and analyzing evidence that this method is beneficial. In this project, we aim to explore the use of religion in public schools and how it can be applied to bring about positive outcomes from interactions with people of different faiths.

112 Upper Extremity Injury Risks Associated with Bilateral Shoulder Range of Motion Deficits in Professional Baseball Pitchers: A Critically Appraised Topic

Donovan Sarnacki, Devon Lyons

Rangos School of Health Sciences | Athletic Training

Faculty Advisor: Jason Scibek, Ph.D

ABSTRACT:

Clinical Scenario: Shoulder range of motion deficits may predispose baseball pitchers to upper extremity injuries. Clinical Question: Are professional baseball pitchers with bilateral differences in shoulder range of motion during preseason testing at greater risk for in-season shoulder and/or elbow injury compared to pitchers without bilateral deficits? Data Sources: PubMed, Medline, Scopus, SportDiscus. Study Selection: Studies published after 2008; outcomes comparing injured and uninjured pitchers. Summary Measures: The desired outcomes were risk measurements for shoulder and elbow injuries. Search Results: Four studies were included from 115 initially identified. Data Synthesis: Wilk et al (2011) found a significant relationship between glenohumeral internal rotation deficit and injury risk. Wilk et al. (2014, 2015) identified a significant relationship between deficits in shoulder flexion and total arc of motion (TRM), and upper extremity injuries. Camp et al. (2017) found a significant relationship between shoulder flexion deficits and shoulder and elbow injuries, and shoulder external rotation deficits and shoulder injuries. Evidence Quality: All articles had PEDro scores of 3. CEBM levels were IV, III, and II. Conclusions: Pitchers with shoulder flexion and TRM deficits $>5^{\circ}$ observed during pre-season screenings are at greater risk for shoulder and elbow injuries throughout the season

113 Use of a Person-Centered Planning Approach to Encourage Vocational Goal Setting Among Adults with Intellectual and Developmental Disabilities

Amy Castagnino, Abbey Gore, Katrina McNally

Rangos School of Health Sciences | Occupational Therapy

Faculty Advisor: Dr. Meghan Blaskowitz, DrPH, MOT

ABSTRACT:

Employment rates among people with intellectual and developmental disabilities (IDD) are historically

low (26%) when compared to people without disabilities (76%). Understanding a person's strengths, hopes and dreams for the future assists them in setting and achieving

vocational goals. As person-centered planning (PCP) is embraced by many state agencies serving people with IDD across the US, occupational therapists have unique skill sets to play a vital role in the PCP process. This mixed methods study is being conducted in two phases. Phase 1 involved development and pilot testing of a PCP interview tool with 10 adults with IDD. During Phase 2, vocational outcomes will be tracked using PCP with an additional 48 participants currently in transition from a sheltered workshop setting to community-based vocational supports.

114 Use of a SapA Protein Fusion for Pertussis Toxin Vaccine Delivery

Madeline Myers

Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Joseph McCormick, Ph.D.

ABSTRACT:

This study aims to develop an alternative method of vaccine delivery through the use of spore-associated proteins of *Streptomyces coelicolor* as a potential vehicle to carry the major pathogenic determinant from *B. pertussis*. The major goal of this project was to create a fusion of pertussis toxin PtxA to the C-terminus of the SapA protein. A fusion was constructed using the spore-associated protein SapA because it is secreted through the standard signal sequence-dependent pathway. Once the strain expressing the fusion was isolated, it was analyzed using various methods, including: SDS-PAGE and Western blot analysis using a commercial polyclonal antibody to PtxA and testing in a mouse model. The Western blot analysis of spore proteins extracted with a non-lethal detergent wash indicated that SapA-PtxA is localized to the surface of the spore. The spores are currently being tested in a mouse model to see if recombinant spores will protect against a *B. pertussis* challenge. In the future, the use of Sap protein fusions to passenger proteins might lead to recombinant *Streptomyces* with epitopes displayed on the spore surface creating an additional method of vaccine delivery.

115 Using Loop-Mediated Isothermal Amplification (LAMP) to Identify At-Risk Species in the Field

Brooke Driscoll

Bayer School of Natural and Environmental Sciences | Forensic Science and Law

Faculty Advisor: Jan Janecka, Ph.D.

Additional Authors: Nickolas P. Walker, M.S.

ABSTRACT:

Species identification for the purposes of wildlife forensics can be difficult in resource-limited areas. Many instances of animal trafficking and populations of endangered species are located in third-world countries or remote areas with little access to advanced scientific technology. A kit has not been developed that can reliably identify species in a non-invasive way with minimal use of laboratory equipment. The main question to be answered is: can a field-accessible kit be developed for species identification using the loop-mediated amplification (LAMP) method? LAMP has similar sensitivities to traditional PCR, but can be done at isothermal conditions. The method is conducted primarily using a

heat block, a fluorescent dye, components of the Lucigen© LavaLAMP kit, and an animal sample. These experiments focus on the endangered snow leopard, using scat placed on FTA cards as a non-invasive sampling source. Around one hundred scat samples, suspected to be from snow leopards, were collected in Mongolia. These were dried for transport, then rehydrated and placed on FTA cards. Punches from these cards were amplified using the LavaLAMP kit on a heat block. A positive or negative result was visualized using calcein, a fluorescent indicator. The expected results of this study are that the scat samples can be identified with high accuracy and reliability without the use of a thermocycler or agarose gel. This allows wildlife forensics to be conducted in resource-poor areas to accurately identify endangered and trafficked species.

116 Utilizing design of experiments to develop a stable and scalable microemulsion platform for resveratrol delivery in inflammatory diseases

Allison Kachel

School of Pharmacy and the Graduate School of Pharmaceutical Sciences | Pharmacy

Faculty Advisor: Jelena Janjic, Ph.D

Additional Authors: Michele Herneisey, Jelana Janjic

ABSTRACT:

Pain treatment today is highly scrutinized due to the opioid epidemic and the largely detrimental adverse effects from traditional pain medications. There is currently a high demand for alternative treatments to opioids for pain relief. The Janjic group and collaborators have recently developed pain nanomedicines for imaging inflammation and prolonged analgesic effects (Janjic et al, JN1, 2018). Natural products such as resveratrol have been shown to decrease inflammation and alleviate pain. However, there are known limitations to resveratrol as a therapeutic agent such as poor bioavailability, poor water solubility, and chemical instability. A way to overcome these barriers to resveratrol therapy are with the use of microemulsions. A microemulsion is a thermodynamically stable colloidal dispersion of oil in water that ranges in size from 10-100nm in diameter. The aim of this study is to identify a stable microemulsion platform that improves the solubility and chemical stability of resveratrol in vitro. For this study, design of experiments and statistical regression was utilized to identify a microemulsion size between 15-30nm in diameter. Additionally, maintenance of the polydispersity index (PDI) was analyzed in response to various stressors. More specifically, microemulsions in this experiment were subject to centrifugation, accelerated shelf life testing through incubation at 50C, thermal cycling, and incubation in cell culture media. Additional microemulsions were developed within a pH range that further maintained the chemical stability of resveratrol. The resveratrol stability and drug loading potential within the microemulsions was further confirmed with high performance liquid chromatography (HPLC).

117 Wagner, Opera, and Anti-Semitism

Olivia Burik

Mary Pappert School of Music | BM Cello Performance

Faculty Advisor: Paul Miller, Ph.D.

ABSTRACT:

My poster will present and analyze the existing information relating to famous German composer

Richard Wagner's controversial association with anti-Semitism. My goal is to inspire conversation on "The Wagner Problem," specifically detailing his portrayal of Jews and Jewish stereotypes in operas including Die Meistersinger as well as Der Ring des Niebelungen. I will compare varying definitions of anti-Semitism, both from noted individuals as well as governmental organizations such as the European Fundamental Rights Agency and the U.S. Department of State. By viewing the problem from a variety of perspectives, I can more thoroughly dissect both Wagner's operas and his problematic essay, "Das Judentum in der Musik," to put into better context what may or may not be anti-Semitism. I will also explore political reactions to Wagner, including the unofficial Israeli state ban on public performances of his music.

***118 Won't You Be My Neighbor**

Christian Campbell, Elizabeth Sullivan

McAnulty College and Graduate School of Liberal Arts | Psychology

Faculty Advisor: Alexander Kranjec, Ph.D.

ABSTRACT:

Social identity is a person's sense of who they are based on their group membership(s). The groups which people belong are an important source of pride and self-esteem. Groups give us a sense of belonging to the social world. Neighborhood communities like Pittsburgh's Hill District can foster social identity for members. However, when the group we belong to is heavily judged and scrutinized our sense of identity can be affected. The current study aims to understand how personal attitudes and perceived external attitudes of one's community effects the same individual's communal identity and personal identity. To understand the relationship between these variables, we have created four surveys. Two of the surveys aim to measure attitude; both what hill district residents think of their community and what hill district residents believe others think of their community (e.g., "the future of the hill district seems promising"). The next two surveys aim to measure hill district residents' sense of identity; both communal identity and personal identity (e.g., "I can trust people in this community"). Surveys will use Qualtrics. There are several possibilities for how these variables may correlate with one another. Perceived external attitudes could foster a greater sense of communal identity, or those same negative external attitudes could lead to negative attitudes towards one's own neighborhood. Regardless of how these variables correlate, these findings will strengthen general understanding of how the way we think others perceive us and our community is correlated to what we personally think of ourselves and community.

119 Disparities in Commercial Success and Popularity of African American Musicians during the 1950s

Nathan Harrold

A.J. Palumbo School of Business Administration | Economics/Mathematics

Faculty Advisor: Jordan Mroziak, Ph.D

ABSTRACT:

The purpose of this report will be to examine the popularity and commercial success of black American music artists in the 1950s. I will demonstrate how there existed a gap in success and popularity due to the attitude on race in America at this time. Specifically, I will show how radio played a large role in

suppressing racial prejudice, due to the fact that medium is strictly audio based. I will discuss at length the artist Nat King Cole, who was by far the most successful African American singer during this time period. I will compare him to fellow black musicians, such as Chuck Berry and Little Richard, and describe what factors contributed to Cole's success. Finally, I will describe the double standard that existed in terms of performance behavior between white and black musicians.

120 Withdrawn submission

121 The Effects of Pictorial Hygiene Education among Adult Women in El Tamarindo, Dominican Republic

Maggie Belcher, Alexa Boni

School of Nursing | Nursing

Faculty Advisor: Linda Garand, Ph.D

Additional Authors: Dr. Donna White, Dr. Linda Garand,

ABSTRACT:

INTRODUCTION: Health-related educational materials are often distributed in written format; leaving them inaccessible to citizens with low literacy levels. To address this concern, we evaluated the effects of using storyboards (pictures) to communicate messages about the transmission of germs from the environment (soil, water, and sewage) and bodily fluids (blood, saliva, and nasal secretions), as well as proper handwashing techniques.

METHODS: A pre-post design was used to evaluate the effects of a 90-minute picture-based educational intervention to explain the health risks, transmission, and elimination of germs. The sample consisted of 16 adult women with low literacy levels from El Tamarindo, Dominican Republic. Data was collected in an interview format (Spanish).

ANALYSIS: Paired t-tests were used to detect pre-post difference in knowledge after the educational intervention and frequency analyses were used to characterize the sample.

RESULTS: The analysis shows that the intervention is effective for teaching these women about "germ transmission" and that "handwashing kills germs."

DISCUSSION: This study suggests that women with low literacy levels benefit from picture-based hygiene education with handwashing demonstration. Given the public health implications of the study finding, it is imperative that investigators continue to design and evaluate educational techniques targeting individuals with low literacy levels. Finding a valid and reliable way to teach vital health education to such individuals will improve the health of the world's citizens, regardless of their resources.

122 Addressing Underserved Pittsburgh Communities' Social Health Needs With Connections4Health

Madeleine Perry

McAnulty College and Graduate School of Liberal Arts | Political Science

Faculty Advisor: Michael Irwin, Ph.D.

ABSTRACT:

Health encompasses many factors that add up to an individual's overall wellness. An individual's environment contains social factors that determine over 50% of their health outcomes. Where someone lives and how much money they have profoundly impact access to services needed to live well. 2010 US Census Data approximates 23% (70,300) of residents in Pittsburgh are living in poverty. Often though, healthcare systems do not prioritize social factors as part of regular appointments.

Connections4Health aims to close this gap in care. Pittsburgh cultural hubs and medical centers that are free or offer sliding scale services including Carnegie Library of Pittsburgh, Birmingham Free Clinic, and Northside Christian Health Center are utilized to initiate contact with patients/clients interested in creating an action plan to address social health needs. Community Health Fellows: volunteers from local universities, including myself, work with individuals where they are at. We conduct a social health needs questionnaire with patients/clients to gain a better understanding of the person's individual narrative, and what they are looking for. Then, using a database of social service agencies (often coupled with Google searches or phone calls spent on hold), personalized referrals are outlined based on locality and priority. We follow up often and as needed, so that ultimately, we can help empower individuals to seek public assistance or social service programming they need to live well, no matter their neighborhood or social condition.

123 All in the Same Boat - the Refugee Crisis and Italy

Kailey Love

McAnulty College and Graduate School of Liberal Arts | Journalism and International Relations

Faculty Advisor: Margaret Patterson, Professor

ABSTRACT:

This project explores the political and socio-economic issues that have arisen throughout Europe following the explosion of migration to the continent in the midst of the Syrian Civil War. The major themes focused on in this project deal with public opinion on migration, how this has fueled the rise of European populism, and the challenges migrants face when attempting to integrate in a new country. Focusing on Italy as a microcosm of this phenomenon, this project also zeros in on the unique issues that Italy faces in handling the influx of migrants that arrive to its shores - an already struggling economy, a clash between religion and populist political ideologies in the country's capital, and the pressure placed upon border countries by the Dublin Agreement. Despite the data, however, this project also spotlights different efforts to aid migrants through the integration progress through interviews done with local advocates and affected refugees in Rome from four different organizations.

124 Ceramics - The Intersection of Art and Chemistry

James Matson

Bayer School of Natural and Environmental Sciences | Biochemistry

Faculty Advisor: Kathleen Roberts, Ph.D.

ABSTRACT:

In this poster I will explore each aspect that goes into the process of creating ceramics. From wedging the clay to centering it on the wheel, to holding the fine balance to keep it centered while making a form. I will then explore the portion of ceramics that connects my love of science and art - the firing and glazing of ceramic pieces. Being a portion of this art form that many don't fully understand, I'll go into individual components of the glazing process, and how small changes can make a big impact on the finished look of your glaze, and how it can play off of the form you made earlier.

125 Gun Violence in Hospitals

Meredith Buescher

Rangos School of Health Sciences | Physician assistant

Faculty Advisor: Kathy Glass, Ph.D.

ABSTRACT:

Gun violence has been in the news a lot recently, and it has caused debates on whether or not there should be change made for stricter gun control. One area in specific is directly and indirectly affected by gun violence: hospitals.

How are hospitals and hospital staff affected by gun violence? Too often, people come into the hospital with gunshot wounds. (Not to mention the fact that firearms could be brought into hospitals and used to hurt innocent people.) Whether or not they make it out of the hospital alive, hospital staff must work with patients and families that were affected. Resources are used and time that could be used for other patients are used on gunshot wounds that could have been prevented.

The purpose of this research paper is to research what hospitals are actively doing to prevent gun violence and how gun violence seems to affect the everyday life of people working/staying in hospitals. I will also research the ways in which hospitals are being made safer for the patients and staff (regarding security and the ways guns are prevented from being brought into hospitals).

126 History at Odds with Ambition and Progress: August Wilson's "The Pittsburgh Cycle"

Ashlyn Duda

School of Nursing | Nursing

Faculty Advisor: Erin Speese, Ph.D.

ABSTRACT:

August Wilson's series of plays, known collectively as "The Pittsburgh Cycle", explores various aspects of the African-American experience throughout the twentieth century. Wilson manages to capture aspects of race relations in the United States without simply stating facts in a textbook manner, but rather by crafting stories and characters that bring these textbook facts and statistics to life. Of the many themes or aspects of race relations discussed in these ten plays, history and ancestry being at odds with black ambition and progress is of most interest to me. In this research project, I am going to focus on this theme and how it relates to Wilson's Gem of the Ocean, Radio Golf, The Piano Lesson, and Fences in particular. Investigating how this theme is present in each of these plays and finding similarities and

differences between how it is present will clarify what Wilson is communicating about the importance of history as well as the hopes of progression within the African American community.

127 Impact of Religion on an Individual's Daily Life

Wesley Wagner

Bayer School of Natural and Environmental Sciences | Forensic Science

Faculty Advisor: Kathleen Roberts, Ph.D.

ABSTRACT:

The purpose of this project was to determine the effect of an individual's religion on their daily lives. This includes topics such as the amount of time that a person spends on their religion, doing things such as praying, or if a person has faced any sort of discrimination because of their religion. This data was gathered through a survey of nine questions, ranging from a person's age to the biggest misconception individuals believe others hold about their religion. This survey was distributed through social media, Snapchat and the Duquesne Class of 2022 Facebook page, and through various religious clubs. This project involved only responses from students, between the ages of 16 and 22, and involved people from varying cultural and financial backgrounds. The only financial cost involved in this research project was the components of the poster.

128 Mindfulness Meditation to Improve Body Awareness

Jennie Dyer, Melissa Lees

Rangos School of Health Sciences | Occupational Therapy

Faculty Advisor: Kimberly Szucs, Ph.D., OTR/L

ABSTRACT:

Background: Due to prolonged device use, college-age students may experience difficulty maintaining proper body position during use. Woo et al. [1] found almost 50% of university students who regularly use electronic devices for school-related tasks experience musculoskeletal symptoms. Previous studies have shown positive impacts of mind and body awareness in regard to proprioception training, ergonomics, and decreased pain [2, 3].

Purpose: The purpose of this study is to explore the effects of mindfulness meditation on body awareness in college-aged students over a 2-week period. Student participants are evaluated during laptop and tablet activities, as they are the primary means of device use that emphasize posture and proprioception during school-related tasks.

Participants: Individuals currently enrolled at Duquesne University, age 18-25, who have no history of musculoskeletal or neurological disorders that affect movement.

Methods: This study utilizes a pre/post experimental design, collecting quantitative data. Participants attend 3 in-lab data collection sessions while completing daily 12-17 minute mindfulness meditations over 2 weeks. Currently, 12 subjects have participated in the study with a recruitment goal of 20-25 participants.

Results: 11/12 participants reported an increase or sustained perception of mindfulness and body awareness, based on scores from the Freiburg Mindfulness Inventory. 10/12 of the participants plan to continue mindfulness meditation after this study. Statistical analysis of posture variables will be used to further compare pre/post-test data.

Conclusion: Based on ongoing preliminary data analysis, a 2-week mindfulness meditation shows potential benefits for increasing mindfulness and body awareness in college-age students.

References:

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3. Butwin, A.N., et al., Teaching a series of mind-body techniques to address the risk of work-related musculoskeletal disorders among sonography students: A pilot study. *Journal of Diagnostic Medical Sonography*, 2017. 33(5): p. 392-403.

129 Operation Unthinkable: The Rising Tensions in Europe After World War II

Tegan Carr

McAnulty College and Graduate School of Liberal Arts | Finance

Faculty Advisor: Jotham Parsons, Ph.D.

ABSTRACT:

Operation Unthinkable was the proposed allied offensive against encroaching Soviet forces following the defeat of Nazi Germany in mid-1945. Hatched under the fearful hand of Winston Churchill, if realized Operation Unthinkable would have resulted in a full-scale attack against Stalin, his armies, and communism. In this paper, the question of why Operation Unthinkable was created is explored through declassified military documents and supplemented with full historical texts painting the reality of this period. Starting as early as 1941, Churchill's discontent with the spreading Soviet influence is examined. Then, while interpreting the many allied meetings of the war, it becomes clear that the vision of a liberated Europe is not unanimously agreed upon. Finally, the actual creation of the document for Operation Unthinkable is dissected to unravel what World War III in 1945 might have looked like. Operation Unthinkable is significant because it represents how even when under the shared desire to defeat Hitler and free Europe from tyranny, the two battling ideologies of the East and West could not coexist. In many ways, Operation Unthinkable is the very inception of the Cold War, and its roots predate practically all other indications that another war was on the horizon. Lastly, incorporating the post-revisionism school of thought, we see that the blame for starting the Cold War can not be placed on one side entirely.

130 Race and Lincoln: A Struggle and A Triumph

Jordan Callahan

McAnulty College and Graduate School of Liberal Arts | History

Faculty Advisor: Jotham Parsons, Ph.D.

ABSTRACT:

Abraham Lincoln is widely regarded by many scholars as the greatest president in United States history, and one of the most influential democratic leaders of all time. The testing grounds for his presidency have been the strained race relations and Civil War tensions he hoped to diminish. Still, it has often been difficult to separate fact from fiction for the well-known executive, especially in regards to slavery and racism. This paper will recognize both Lincoln's profound hatred for the system of slavery as well as his own racism during his early years in politics. His influences will also be noted, as the American public in the pre-Civil War era exhibited significant racism as well, culminating in responses given to Lincoln's speeches during the Lincoln-Douglas debates of 1858, and it will explore why they might have held such views. Still, Lincoln had evolved through his first term as president, gaining appreciation for the black Union soldiers and his discussions with Frederick Douglass to eventually encourage limited civil rights reform in the south. Through the popular opinion of his day, and his own battles with racism, Lincoln's Emancipation Proclamation and praise for Louisiana's new constitution encouraging enfranchisement for African Americans can be appreciated in a substantial way.

131 The history and current state of the United States opioid crisis.

Katherine Kukay

Bayer School of Natural and Environmental Sciences | Biology

Faculty Advisor: Andrew Simpson, Ph.D.

ABSTRACT:

The rate of drug overdose deaths in America has been rapidly increasing throughout the last two decades, and continues to do so. Nearly three-quarters of the overdose deaths seen in 2016 were opioid-related. The estimated life expectancy of the average American has likewise declined since its peak in 2014, likely correlated to the ever-growing prevalence of opioid abuse and overdose. This issue has become severe enough to send the United States into a state of public health emergency. Research into the original catalysts of the modern opioid epidemic must continue if successful solutions are to be found. This paper intends to provide a brief history of opioid use, along with an examination of the increasing severity of the United States' drug abuse and overdose crisis. I then discuss my argument that pharmaceutical companies played the most critical role in the epidemic's onset. Finally, after completing extensive reviews of papers written by experts on the topic, articles written at the time of certain significant events, and data from governmental reports and briefings, I was able to suggest possible strategies in which to combat the growing epidemic. While these proposals are merely my own ideas, if we truly hope to see the end of the modern opioid crisis, we must be willing to implement changes to better the state of our country's health.

132 The NRA: An American Tale

Jonah Markle

ABSTRACT:

To many American gun owners, the National Rifle Association (NRA) is a defense against a federal government that, since the mid-twentieth century, has made repeated attempts to infringe on the Second Amendment. To those who are in favor of more gun control, the NRA is a corrupt entity that has prevented the government from taking considerable action to decrease the frequency and/or lethality of mass shootings in the United States. Through an analysis of NRA advertisements, news media articles, and scholarly research on the organization, this paper investigates the NRA's evolution from a group once focused on improving civilian marksmanship to a major lobbying force in Washington, D.C. For the first 100 years of its existence, the NRA remained rather apolitical. However, since the 1970s, the organization has been heavily involved in lobbying for complete freedom when it comes to the Second Amendment. This paper argues that the NRA's advocacy in the American political scene came about during the "Revolt in Cincinnati" when, in 1977, leadership of the organization was hijacked by a faction of hardline, gun rights activists. Also, the rising tide of conservative political culture and fear of social justice movements during the 1960s and 70s ushered many Americans to the ideals espoused by the NRA. These factors allowed for a great rise in the NRA's political stature during the closing decades of the twentieth century.

133 Uncovering the Psychological and Circumstantial Origins of Serial Killers through Imaginative Literature

Logan Hoffman

Rangos School of Health Sciences | Physician Assistant Studies

Faculty Advisor: Erin Speese, Ph.D.

ABSTRACT:

In both the real, physical world as well as in the imaginative realm of literary fiction, the damage and the influences caused by evil are ubiquitous, especially the evil caused by serial killers and mass murderers. In focusing on the upbringings of the main characters in the novels, *Etched in Sand* and *Crime and Punishment*, a question begins to arise- What causes evil? Is it merely a product of circumstance or are people genuinely born to become evil? Rodion Romanovich Raskolnikov, the main character of *Crime and Punishment*, and Regina Calcaterra, the protagonist of *Etched in Sand*, both had a very similar upbringing including neglect and abuse, but Raskolnikov became a murderer and Calcaterra became an award-winning author. The purpose of this paper is to research the reason why some become murderers and evil individuals and why some can overcome their circumstances to become success stories.

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