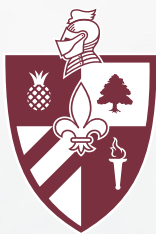


2019 CELEBRATION OF STUDENT RESEARCH + CREATIVITY



BELLARMINE
UNIVERSITY
IN VERITATIS AMORE

2019 CELEBRATION OF STUDENT RESEARCH + CREATIVITY

Sunday, April 7

12:30 - 4:00 p.m.

Honors Student Thesis Presentations

Centro, McGowan Hall: Atrium and Rooms 075, 081 and 176

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Tuesday, April 9

5:00 - 6:30 p.m.

Student Research Poster Session and Reception

Frazier Hall

Thursday, April 11

5:00 - 8:00 p.m.

Celebration of Scholarship and Creativity in the Arts and Humanities

Wyatt Center for the Arts

5:00 - 6:30 p.m.

Student presentations, including scholarship summaries, musical performances, readings from the Ariel and the unveiling of the BecVar Artist-in-Residence artwork

6:30 - 7:00 p.m.

Reception, including music and artwork by the BecVar Artist-in-Residence and the annual juried student show

7:00 p.m.

Capstone Theatre performances begin in the Black Box Theatre



BECVAR ARTIST IN RESIDENCE

Kayla Bailey

About the BecVar Artist in Residence Program

The Lansing School of Nursing and Health Sciences established the Artist-in-Residence program in the 2002-2003 academic year. This program examines the art and science of Nursing and Health Sciences through the eyes of an undergraduate student working in the fine and creative art mediums. Endowed by Mrs. Arthur N. BecVar in 2006 in honor of her husband, this program exemplifies the diverse and many creative and artistic talents of the BecVar family. Having earlier established an endowed nursing scholarship fund during Art's lifetime, with this endowment Jayne BecVar further connects her desire to support and provide to our community caring, ethical graduates. It is our mutual desire that the students' experiences in this program, as viewed through the arts, will give them new ways of thinking to inform their clinical practice, the health care profession, and patient contact and care.

Kayla Bailey's Artist Statement

I have always been captivated by the Arts and Sciences because it is a unique union. This is the driving inspiration behind my being what I am at Bellarmine: a double major in Art and Psychology. Through my artistic lens, I have always loved creating art of any kind. My love for creating has only grown bigger each year since I first started taking art classes in the fourth grade. Most of all, I enjoy painting landscapes and abstraction. I intend on using knowledge of Expressionism and the Health Sciences to further help people understand themselves in their environment by being an art therapist to people with disabilities. I adore assisting those who learn differently express themselves through the outlet of art. They desire to share themselves, they're relatable and vulnerable, and I am beyond ecstatic to portray that to others through art, who might not otherwise have known it.

Cover title: Free

2019 CELEBRATION OF STUDENT RESEARCH + CREATIVITY POSTER SESSION

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SPECIAL THANKS TO

Dr. Susan M. Donovan, President

Dr. Carole Pfeffer, Provost

Dr. Mark Wiegand, Vice Provost

Ms. Connie Smith, Grant & Research Specialist

Ms. Allison Becker, Administrative Assistant to
the Interim Dean of Bellarmine College

Ms. Kathleen Kelty, Director of Campus Communications

ACCOUNTING

POSTER 1

Predictability of Mid-to-Long Term Price Direction Following Price Shocks Unassociated with Regularly Scheduled Earnings Calls in Domestic Equity Markets

Noah Braden / Faculty Sponsor: Bradley Stevenson

This thesis examines the question of whether a company's stock classification as either growth or value oriented, as indicated by its trailing twelve-month price-to-equity (TTM P/E) ratio or price-to-net-tangible-book (TTM PTBV) ratio, has an impact on the price retracement toward, or continued divergence from the previous fair market value of the stock subsequent to a market-moving event uncorrelated with a 10-K or 10-Q filing by the company of interest. The categorization of growth versus value is non-binary and dependent on each firm's TTM P/E ratio and P/B ratio (in a secondary model), with a higher ratio in both cases indicating a greater growth-orientation and a lower ratio indicating a greater value-orientation. The work conducted will contribute to the field of finance by highlighting some of the risks inherent in growth-oriented stocks or by showing the inherent limitations in the predictive value of backward-looking static variables. Unseen factors that are present in the market place, especially for stocks which derive the majority of their value from continued growth speculation, can have serious implications to the wealth of investors when they come to light. These risks are pervasive within the marketplace and can affect the returns of investors' portfolios differently. This risk exposure is largely dependent on the types of equity items they hold in an attempt to seek risk-adjusted returns.

POSTER 2

R&D in the Accounting Landscape

Sebastian Kontic / Faculty Sponsor: David Collins

Ever since the foundation of the authoritative FASB organization, American businesses must directly expense research & development expenses on their financial statements. Prior to this, a choice was given to companies to either directly expense R&D costs in the current year or stretch the expenses out, subject to the rules of capitalization. The arbitrary nature of finding the right time frame to stretch out the capitalized expenses led the self-regulated accounting industry to bar the use of capitalization for R&D assets. These two methods have varying implications on financial statements, directly impacting how investors react to the expenditure of R&D programs. Investor reaction can influence internal decision makers to make preemptive moves to soften any volatility R&D may cause in the company's financial performance. As such, the rate of innovation with the United States can be affected by the permitted R&D accounting methods. A comparative analysis between European and American companies will determine if this impact is relevant as European companies continue to be allowed to use capitalization. The determination of the allowance of capitalization for R&D accounting purposes will hinge on its effect upon the economics of American innovation and its compliance with core principles of accounting.

ACTUARIAL SCIENCE AND ECONOMICS

POSTER 3

Finding the Right Route: An Analysis of the Travelling Salesman

Megan Alexander / Faculty Sponsor: William Fenton

This paper will analyze the history and the curiosity of the travelling salesman: a mathematical problem that has stunned mathematicians for decades. While many have attempted to find a proper algorithm or formula to find the optimal route using different distances and costs associated with travel, there to this day is no proven best-fit solution. While I do not offer a personal solution to the problem, I will analyze the history of the problem, the proposed solutions with explanations to their pros and cons, and an overall conclusion explaining why this problem is one that leaves mathematicians walking in circles.

POSTER 4

An Analysis of the Millennium Development Goals on a Per-Country Basis

Megan Alexander / Faculty Sponsor: Hongwei Song

It is clear that the wealth of the world is not distributed equally. Certain countries have been struck with extreme poverty, hunger, lack of education, and/or other circumstances that make it hard for the country's populations to live comfortably. In 2000, members of the United Nations met to establish the Millennium Development Goals (MDGs), a fifteen year plan which assisted countries in order to diminish the gap between the developed and underdeveloped world. These goals included eradicating extreme poverty and hunger, reducing child and maternal mortality, and combating global diseases such as malaria and HIV/AIDS. Many have argued that goals have been aggregately achieved and that the UN was successful in meeting a majority of their MDG targets. By taking a step closer than the world overall, it's clear that results vary from country to country. In this paper, we will investigate how well the MDGs performed on a per-country basis, allowing a country's 2015 gross domestic product to show how well the goals were achieved.

POSTER 5

Arriving at your Destination, Quick, and in a Hurry

Benjamin Corder / Faculty Sponsor: William Fenton

We all have at one point or another have needed to reach a destination, quick, and in a hurry. Many times these destinations are places we have never been or have forgotten the location. When this happens in the modern day, we usually turn to our phones or computers to look up the location and quickest route, through the use of Google Maps, Mapquest, or many of the other numerous map applications. Through this paper, and the use of operations research and linear programming, I plan on explaining just how these applications work, and how you, yourself can figure out the optimal way to reach your destination.

POSTER 6

Mathematical Approach to Owning the Monopoly Board

Andrea Howard / Faculty Sponsor: Susan White

There is more to winning the popular board game, Monopoly, than just pure luck. This research project focuses on Markov Chains and Linear Algebra when applied to the game of Monopoly. By adjusting the rules of Monopoly slightly and using Markov Chains, a transition matrix is developed for all forty positions on the board to provide the probability of moving from one given property to another. Using the probability of landing on each position around the board, break-even points are calculated to determine when collected rent exceeds the cost of building houses and hotels. Using the probabilities and break-even points, the properties in which one should invest in are determined, creating a strategy for owning the board and forcing other players into bankruptcy.

POSTER 7

Predicting the Winner of the Stanley Cup

Edward Kamer / Faculty Sponsor: Michael Ackerman

Sports are an important part of society. Sports are a multi-billion dollar industry. In addition to the industry, there are people who bet on the outcome of a game. The ability to accurately predict the outcome of a game is an analyst's dream. Fans hope to see their team predicted to win. The National Hockey League (NHL) has a ranking system that is used to decide which teams should be in the playoffs. This project will create a new way to rank teams to determine which teams will make it into the NHL playoffs and who ultimately will win the Stanley Cup.

POSTER 8

Exploring Stocks Through Markov Chains

Brandon Messex / Faculty Sponsor: Michael Ackerman

Predicting the stock market is not an easy thing to do. In fact, it is impossible to accurately predict the value of stocks with certainty. However, there are methods one can use to make these predictions. This paper focuses on using Markov chains to try to predict future stock market values. In particular, this paper looks at two well-known market indices, the Dow Jones Industrial Average (DJIA) and the Standard and Poor's 500 (S&P 500), and uses Markov chains to predict their future behavior.

POSTER 9

Chaos Theory and Its Effect on the World

Daniel Sheridan / Faculty Sponsor: Gregory Kelsey

Chaos is defined as "The property of a complex system whose behaviour is so unpredictable as to appear random, owing to great sensitivity to small changes in conditions" (Oxford Dictionary). For my paper, I am looking at the theory behind chaos and how it affects the natural world. I will be looking at the following aspects of chaos theory: Julia sets, dynamical systems, chaos in nature, and why chaos can be useful in explaining certain happenings in nature. I will be looking at the Julia sets that are described in the complex dynamics branch of mathematics because Julia sets

typically display chaotic behavior. I chose to look at the prevalence of chaos in nature because there are a plethora of examples of chaotic behavior in nature. For example, the rate at which a disease spreads in a community. Chaos can be an important tool to describe this event and many others in nature.

POSTER 10

Visuals and Applications of Pascal's Triangle

Alyssa Wyman / Faculty Sponsors: William Fenton and Gregory Kelsey

Pascal's Triangle is one of the most world renowned mathematical visuals, taught as early as elementary school and known by all. Although the triangle was known as early as ancient India, Persia, China and Europe, it was named after Blaise Pascal due to the number of new properties that he found. It is now one of the most famous visuals of binomial coefficients and recursion in mathematics. In this paper, we will discuss the mathematics behind the triangle, the advancement of elementary probability with binomial coefficients that was done by Pascal, its applications, and the many different visuals it forms.

POSTER 11

An Analysis of Sustainable Development Goals: Are the goals going to be met or not?

Alyssa Wyman / Faculty Sponsor: Hongwei Song

Poverty has been a major issue around the world since the beginning of time, with 10% of the world living on less than the poverty line: \$1.90 a day (the World Bank's most recent international poverty line). Over time, many have realized that ending poverty means a lot more than what is on the surface; this includes ending hunger, promoting economic growth and education, and preserving forests, climate, and animal life. In 2015, 17 goals and a plethora of targets were created by the United Nations to embody these changes named the Sustainable Development Goals (SDGs). These goals, which are aimed to be met by 2030, are a "universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity," (World Bank, 2019). They are built off of Millennium Development Goals (MDGs), another list of goals created in 2015 geared towards the same problems while also including new problems. The goals are extremely interconnected, meaning attaining success in one goal often means attaining success in another. In this paper, we will discuss how many of the goals and/or targets are currently met, and whether the goals and/or targets are still attainable relative to the progress made so far.

ATHLETIC TRAINING

POSTER 12

The Use of Mouth Guards to Prevent and Reduce the Risk of Concussion: Perceptions and Beliefs

Ashley Duvall / Faculty Sponsor: Chelsey Franz

Over the past 50 years, researchers and international bodies have proposed various definitions for concussions. Sport related concussions were defined as representing

the immediate and transient symptoms of a traumatic brain injury. At the fifth international conference in Berlin, the panel deemed this definition of a concussion to be imprecise. Since 2000, the Berlin expert panel modified the definition of a sport related concussion to a traumatic brain injury induced by biomechanical forces. The goal of our study was to find current practices for the prevention and reduction of risk of concussions, and the beliefs and utilization of mouth guards as a preventative measure. Researchers sent out a 21-question survey to 391 Louisville-based medical professionals (physicians, nurse practitioners, neuro-psychologists, physical therapists, and athletic trainers) and coaches. The survey yielded a 13.55% response rate. Survey answers were analyzed using SPSS software. Results demonstrated that practices and perceptions about concussions, signs and symptoms of concussions, and whether or not mouth guards can be used as a preventative tool were varying. There has not been enough evidence reported to determine if mouth guards have an effect on reducing the risk of concussions based on what is known about concussions. Recommendations would be that concussion education is mandated in the medical professionals' continuing education and coaches should be required to take concussion education classes before each season to help promote a safe playing environment.

BIOCHEMISTRY & MOLECULAR BIOLOGY

POSTER 13

Impacts of Ultraviolet Light Exposure on the Activity of Antioxidant Enzymes in the Coelomocytes of the sea urchins *Lytechinus variegatus* and *Arbacia punctulata*

Kandis Arlinghaus / Faculty Sponsor: Roberta Challener

Many sea urchins play important ecological roles in their environments, and it is important to study the impacts of environmental stressors on their physiology. Ultraviolet radiation (UVR) exposure has significant negative impacts on marine organisms including an increase in reactive oxygen species (ROS). Oxidative damage by ROS at the cellular level can cause lipid peroxidation, DNA fragmentation, and even cell death which may result in inflammation or disease. To prevent this cellular damage, organisms generate enzymes, such as superoxide dismutase (SOD) and catalase, that breakdown ROS into harmless substances. Elevated SOD and catalase activities under UVB exposure have been detected for many aquatic organisms, yet it is unknown whether UVB exposure affects the activity of these antioxidant enzymes in many sea urchin species. *Lytechinus variegatus* is well known for its covering behavior in response to UVR exposure whereas *Arbacia punctulata* does not cover with any materials and remains fully exposed. Whether these behavioral differences result in differences in antioxidant enzyme activity in response to UVR exposure is not known. In this study, coelomocytes of *L. variegatus* and *A. punctulata* were exposed to UVB (302 nm) for two hours and catalase activity was measured using colorimetric assays. Results suggest UVB exposure decreases catalase activity in the coelomocytes of these two species. A difference in catalase activity was also observed between the species with higher activity occurring in the coelomocytes of *L. variegatus*. Whether these observed differences in antioxidant activity are associated with covering behavior is yet to be determined.

POSTER 14

A Cross-Sectional Analysis of Endometriosis & Pre-Oncological Comorbidities

Caitlin Wilkerson / Faculty Sponsor: Caroline Doyle

The goal of this study was to act as Phase 1 of a larger study to determine the exact pathophysiology and subsequent effects and comorbidities of endometriosis in women of reproductive age. Phase 1 consisted of a cross-sectional evaluation of women of reproductive age with endometriosis and any additional endometrial comorbidities. It was expected that women with endometriosis would also have patterns of abnormal growth in the form of polyps, fibroids or non-cancerous tumors due to the dysfunction or absence of one known cancer gene (BRCA1) found in women with endometriosis (Govatati et al. 2015). Based on data from around 450 endometriosis positive reproductive aged women at the University of Kentucky's Kentucky Women's Health Registry (currently "Women's Health and You"), the prevalence of various reproductive conditions that may be viewed as "pre-tumors" or pre-cancerous was evaluated. Statistical analyses showed that women with endometriosis report more endometrial polyps, premature labor, miscarriages, and infertility; the chi-squared tests conducted for these variables yielded significant P values when compared to control prevalence rates. These findings indicated that women with endometriosis have more abnormal growths that could be indicative of a pre-tumor state, which would be expected among women with only 1 of 2 needed mutations for cancer (BRCA1 but not BRCA2) in accordance with Knudson's two-step hypothesis. In addition, this study supports the idea that the BRCA1 gene may be absent in endometriosis positive women outside of the Indian ethnic group, which was the focus of the Govatati et al. study, due to the fact that this study contained a more diverse sample of women. Determining the presence of a correlation between endometriosis and pre-oncological, or oncological-like comorbidities will help to outline the hybridized pathophysiology of subsequent oncological-like disease and endometriosis and thus how the two enable each, other in later phases.

BIOLOGY

POSTER 15

Impacts of pH Exposure on the Germination of the Freshwater Bryozoan *Pectinatella magnifica*

Kennedy Erwin / Faculty Sponsor: Roberta Challener

Freshwater acidification, a phenomenon in which the acidity of bodies of freshwater increases due to the deposition of acidic compounds, is becoming a widespread problem as increasing concentrations of air pollutants such as sulfur dioxide react with atmospheric water and oxygen to form acid rain. Exposure to a more acidic pH has been shown to have negative impacts on many aquatic organisms including reduced offspring viability, respiratory stress, and mortality. The freshwater bryozoan *Pectinatella magnifica* is a common inhabitant of aquatic ecosystems that can filter algae and inorganic particles, yet little is known about their ability to tolerate changes in pH. *P. magnifica* reproduces asexually by forming statoblasts, masses of cells that can withstand extreme conditions like cold temperatures, desiccation, and varying levels of salinity. Statoblasts remain in a dormant state until conditions favor their germination, at which point they develop into adult bryozoans. To test the hypothesis

that decreased pH will inhibit the germination of *P. magnifica* statoblasts, individuals (n=10) were incubated in water with pH values of either 4.50, 6.00, or 7.25 for 21 to 24 days. Germination was found to be lowest in pH 4.25 (40.45%), intermediate in pH 6.00 (50.77%), and highest in pH 7.25 (64.60%) with all being statistically significant from one another (one-way ANOVA with a post-hoc Tukey test for pairwise comparisons, $p < 0.001$). The results suggest that increased acidity negatively affects the reproductive cycle of *P. magnifica* as lower pH exposure delays or possibly inhibits statoblast germination.

POSTER 16

The Effect of Resveratrol on the Human Ovarian Cancer Cell Line, OVCAR-3

Mariah Geisen / Faculty Sponsor: Mary Huff

Ovarian cancer contributes to more deaths than any other cancer of the female reproductive system and is ranked fifth in women who die of cancer. While the specific cause of ovarian cancer is unclear, one established risk factor is the use of hormone replacement therapy, suggesting that years of exposure to estrogen following menopause may contribute to its development. Since estrogen activates cellular growth through its receptors, one possible therapy might be to identify compounds that can inhibit its effect by targeting the estrogen signaling pathway. Resveratrol is a phytoestrogen found in grapes, peanuts, and berries and is classified as a selective estrogen receptor modulator. Previous studies have shown that it binds to both estrogen receptors, alpha and beta, and has both antagonist and agonist effects. To determine if resveratrol effects cellular growth differently than estrogen in ovarian cancer cells, the human ovarian cancer cell line, OVCAR-3, was treated for 24 hours with concentrations of resveratrol ranging from 10 to 200 μM , and cell growth was measured using a cell proliferation assay. Separately, cells were also treated with varying concentrations of estrogen ranging from 1 nM to 100 nM. The results suggest that there was an increase in cell proliferation at lower concentrations of resveratrol that declines at 200 μM , while estrogen increases growth. Ethanol served as the vehicle and did not affect cellular growth. We are now in the process of determining if the estrogen receptors, ERalpha and ERbeta are present in this cell line and are affected by resveratrol and estrogen treatment using western blot analysis.

POSTER 17

Using eDNA to Detect Amphibians in Kentucky Waters

Kiana Mattingly / Faculty Sponsor: David Robinson

Many animals are important in their ecosystem, yet can be difficult to detect. This is especially true of amphibious species because they spend so much time underwater. Recently, advances have been made in techniques for finding conclusive evidence of the presence of a cryptic species. One such technique that has been very successful is the use of environmental DNA (eDNA). The purpose of this project is to use eDNA as a tool for better understanding the ranges, preferred habitats, and possible inter-species interactions of the American bullfrog (*Rana catesbeiana*) that can be found in Kentucky streams and ponds. Water samples will be taken at various locations in Central Kentucky and Jefferson County, Kentucky. Testing sites range from rural ponds to urban roadside creeks. These water samples will then be analyzed for eDNA using the Polymerase Chain Reaction (PCR) technique and agarose gel electrophoresis. Positive control was obtained from a formalin fixed American bullfrog dissection

specimen. Information gained from this analysis may be useful in monitoring the recent decline in some amphibian species, as well as assessing the viability of this technique in Kentucky waters, which are often turbid. Since amphibians are often used as indicator species, this data may help characterize the overall health of the water systems being examined.

CHEMISTRY

POSTER 18

Electrophoresis of Caramel Colors

Dalton Baker / Faculty Sponsor: Patrick Holt

Caramel colors are vital colorants to not only the beverage industry, where they are commonly used to give many sodas and liquors their brown hue, but also a variety of other industries that seek to improve the appearance of their products in hopes of attracting consumers. The process of making caramel colors is quite difficult, however, as even a small change in temperature or pH during the cooking process can result in wildly different caramels. The most important variable for caramels being used in the beverage industry is the isoelectric point of each respective caramel, as the charge of the caramel will determine if it will eventually precipitate out of beverages such as beers. Due to this undesirable effect, it is important to understand the factors that contribute to causing a caramel color to have a positive or negative charge. In order to research this, I created large gel slabs in which I inserted a variety of caramel colorants and subjected to electrophoresis in different buffers. Based on the movement of the colorants in the gels during the electrophoresis process, the isoelectric point of each caramel was determined and the factors that caused the differences in charge between each caramel was analyzed.

POSTER 19

Micro-Remediation of Tar Sand Using Mushrooms

Christopher Cassaro / Faculty Sponsor: Joseph Sinski

With the world's reliance on petroleum distillates and the environmentally unfriendly forms in which they are extracted such as coal, liquid petroleum, tar sands, and natural gas, of all the different forms that are extracted, the extraction of oil from tar sands is the most environmentally unfriendly. Tar sands are a mix of clay, soil, and bitumen, a highly viscous form of crude oil; the processes to extract the petroleum are either digging it up from the ground in an open pit mine or in-situ forcing the tar sand up, these processes destroy the land and water making it utterly uninhabitable and unusable, though in this lab the tar sand was from an Alberta strip mine. Previous research has been done using various oyster mushroom rafts to soak up oil in oceanic spills as well as radiation during the Fukushima disaster. In this experiment the ability for a Fungus to uptake PAH's was tested to see what PAH's, and in what concentrations, the mushrooms were able to absorb. In order to test this, pink oyster mushroom spores were mixed into a soils with varying percentages of tar sand, by weight, ranging from 5% to 50% in increasing increments of 5. These samples were then grown in a growth box with temperature and humidity staying within a constant range of ± 5 . Once a growth cycle was completed, a sample was trimmed, cleaned, and soaked in and grade cyclohexane. The sample was then extracted and filtered through a syringe filter before being examined using a Jasco FP-6300 spectrofluoro-

rometer. The results showed that the mushrooms did uptake various different PAH's in all samples, however it was unable to be determined whether or not percentage of tar sand effected the amount of PAH's uptaken.

POSTER 20

Tar Sands

Nathan Summers / Faculty Sponsor: Joseph Sinski

Petroleum plays a big role in our society that we see today. In our society, petroleum is used for plastics, fuel and some clothes. Tar sands constitute a large proportion of the available crude oil in the world; 12.7% of the oil is located in Alberta Canada. Tar sands is crude oil that is molded together with sands under ground that has been sitting for millions of years. The principle method of extracting the oil from tar sands is using large quantities of heated water that can degrade the quality of water. The indigenous people in northern Alberta have brought up the impact on the environment and on their lives. They are fearful of toxins to drink water and eat the fish from the waterways that have been polluted by the externalities of tar sand production. The waterways that are being polluted by the oil companies are dumping the degraded water back into the rivers of Alberta. This polluted water is toxic to the indigenous people that are using the river water as a source of fishing and drinking. Researchers have proposed alternative forms of separation for tar sands which involve the use of ionic liquid to cleanly separate the tar sands. What makes ionic liquids appropriate for this process is that they have a nice range of properties such as a melting point below 100oC. Our research builds on the utilization of ionic liquids. These ionic liquids are expensive so the goal is to find how much does it really cost and the true cost effectiveness of the ionic liquid. The goal is to use as little ionic liquid-to-tar sand ratio. I ran as many as four different experiments with each individual part as many times as six times.

COMMUNICATION

POSTER 21

The Anti-Social Media: High Frequency Social Media Use, Self-Esteem and Loneliness

Emily Turi / Faculty Sponsor: Rain W. Liu

With ease of access, the average person spends more than five years of his or her life on social media – more than the time spent on eating, socializing or personal hygiene (Herhold, 2018). From mindless scrolling to creating content, upwards of 88% of adults between 18 and 29 years old, followed by 78% of adults between 30 and 49 years old are using at least one social media site, often daily (Pew Research Center, 2018). The effects of such exposure to this relatively new, but increasingly ubiquitous form of media are essentially in their early stages of being studied. Yet, with such a quick rise in great popularity and overwhelming regular use, it is vital to address how it is shaping the regular consumer.

The relationship among social media use, self-esteem and feelings of loneliness is examined in this study among adults in the United States who are reported to visit social networking sites regularly. Existing literature showed that social media was found to be used most by adults 18 to 49 years old. Those in this group

who represented high frequency social media use reported more symptoms of low self-esteem. Many of the adults exposed to social media were more likely to participate in social comparison. Based on the previous literature and theories, this study hypothesizes that adults using social media at especially high frequencies, such as eight or more times a day will report lower self-evaluations- exhibiting lower self-esteem- encouraging feelings of loneliness. An online survey with a sample of adults ranging from 18 to 49 years old will be conducted to test this hypothesis. The study is in progress and is expected to be completed by May 2019.

EDUCATION

POSTER 22

Special Education Around the World

Michael Bennett / Faculty Sponsor: Belinda Harlow

This poster is part of the requirement for receiving the Ferguson Scholarship. While studying abroad in Zurich, Switzerland, I was able to collaborate with prospective and current Special Education students from all around the globe. This study focuses on the countries represented and seeks to make comparison on the different types of inclusive education.

POSTER 23

Twenty Shades Of Black: A Phenomenological Study Of The Dating, Hooking Up, Belonging, And Thriving Experiences Of Black Women Students At Private Predominantly White Institutions

Patricia Carver / Faculty Sponsor: Donald Mitchell

This qualitative study explored and described the dating and hooking up experiences of 20 Black women students who attended private predominantly White institutions. Further, this study used a phenomenological approach to explore how the participants' dating experiences influenced their thriving and sense of belonging with particular interest in the intersections of their race and gender. Four frameworks were used to shape the study: Black feminist thought, intersectionality, sense of belonging, and the thriving concept. The following questions guided this study: (a) What are the dating experiences of Black women at PPWIs?; (b) How do these experiences shape their perception of self?; (c) How do dating experiences influence the thriving and sense of belonging of Black women at PPWIs?; (d) How do dating experiences of Black women at PPWIs influence partner choices?; and (e) How do dating experiences of Black women at PPWIs shape the perception of their university? Five central themes emerged: (a) do they call it dating and hooking up or something else?; (b) Black women understand the value of private education but...; (c) what Black women want; (d) the thing about Black women; and, (e) men on campus expect something different. The study closes with a discussion of the findings and implications for practice and future research.

POSTER 24

Analyzing two-year community college student success using structural equation modeling

Jessica Taylor / Faculty Sponsor: Michael Vetter

The goal of this study is to more fully understand the scope of community college student success using the principles of mindset, engagement, and college readiness. Using structural equation modeling ensures this study is able to measure the combined effects these concepts have on student success, group differences, and the combined model of student success. Findings suggest student success can be significantly impacted by self-belief and mindset behaviors that can outweigh the initial effect of academically underprepared students. Groups included in this study are non-traditional students, minority populations, first generation students, and Pell eligible students.

POSTER 25

Using Photovoice to Engage Non-Major Undergraduate Students in Environmental Science Topics

Carolyn Waters / Faculty Sponsor: Kristin Cook

Photovoice is a method developed by Wang & Burris (1994) for participants to use photographs to generate dialogue with community members who may be in a position to mobilize change. This study showcases how students in an environmental studies course for non-majors at a Midwestern university engaged with local ecological issues through photovoice. The thirty students who elected to participate enrolled in the course to fulfill a general education requirement. Using the photovoice model, participants photographed their communities to identify ecological issues of personal concern and shared them at an event with informed community members (Wang & Burris, 1994).

The questions guiding this research were: 1) How did students engage with environmental science topics through photovoice? 2) How did curricular supports strengthen or limit students' connection to environmental science topics? Data sources included written reflections, audio recordings, and classroom artifacts. Data were analyzed by coding emergent themes and were validated through triangulation, and coder consensus.

Initial findings included examples of how photovoice framed course content such that students personally connected to scientific inquiry and understood interconnection between environmental issues. For example, a student photographed paper towel waste in a restroom to connect issues of solid waste, deforestation, and carbon emissions. Findings revealed increased confidence, greater hope about possible solutions, and increased sense of voice and representation after policy-driven environmental discussions with community members. One business major explained: "I thought that government should spend money on conserving the environment after they had fixed the other problems of society. But as I thought about this project more and more, my views on all of that started to shift... Often without a healthy environment, business will falter." These results imply that using photovoice, non-major undergraduate students may become more engaged and knowledgeable citizens, cultivating communities of environmental advocates in a variety of fields.

ENVIRONMENTAL SCIENCE

POSTER 26

Examining Regional and Global Paleoecological Trends in Middle-Devonian Biostrome Builders

Aspen Burman / Faculty Sponsor: Kate Bulinski

During the Middle-Devonian (385 mya), the Kaskaskia Sea was transgressing over what is now eastern North America. Many biostromes, which are layers of densely-packed fossils, have been studied within this region, including those at the Falls of the Ohio State Park in Clarksville, Indiana. These fossil beds include the laterally-extensive Coral Zone of the Jeffersonville Limestone, composed of rugose and tabulate corals and stromatoporoid sponges. The Coral Zone contains few organisms besides these biostrome builders. In order to compare the Falls of the Ohio with similar ecosystems throughout the Kaskaskia, a database of like-environment fossil localities from the Middle-Devonian was assembled using the Paleobiology Database and literature review. Paleomaps of the geographic range of each of the most abundant taxa were generated using the Paleobiology Database by mapping the latitude and longitude paleocoordinates of fossil occurrences. For each locality considered, the paleoenvironmental parameters (e.g., water depth, energy, and substrate) and taxonomic diversity were also noted. The majority of the western Kaskaskia Sea contained similar organisms to the Falls of the Ohio. The biostrome communities in the eastern portion of the Kaskaskia exhibited higher levels of taxonomic diversity, revealing a general diversity gradient across the seaway, with an increase in diversity from west to east. Favosites exhibited the greatest geographic distribution while Prismaephyllum was the most geographically restricted genus considered in this study. Heliophyllum, was the most abundant coral genus at the Falls of the Ohio and occurred in abundances twice as frequent as Favosites. However, when considered on a global scale, Heliophyllum exhibited a smaller geographic range. Through analyses of abundance distributions and geographic ranges, it may be possible to understand how biostrome builders vary through space according to the regional and global paleoenvironmental parameters of the Middle Devonian, thereby adding to our understanding of these ancient paleocommunities.

POSTER 27

Water quality implications for macroinvertebrate communities in two restored urban wetlands

Catherine Gomez / Faculty Sponsor: Martha Carlson Mazur

Situated in an anthropogenic environment, urban wetlands are susceptible to nutrient runoff and polluted storm water compared to wetlands in natural settings but can provide important benefits, such as biodiversity and nutrient cycling. In August 2017, two riparian wetlands with differential water sources were restored in Louisville, Kentucky. The wetlands are 60 meters apart; however, Wetland 1 receives primarily runoff, whereas Wetland 2 receives more groundwater, creating two different potential environments for macroinvertebrate communities to develop. Monthly water quality measurements such as conductivity, temperature, pH, nitrate, turbidity, and dissolved oxygen can provide information on urban influences and help predict biodiversity progression of each wetland. Alkalinity and orthophosphate were measured from water samples. Water-quality data was analyzed to predict expected macroinvertebrate abundance and diversity. The wetlands experienced a summertime hypoxic period

following restoration, reaching dissolved oxygen levels of 5.2 mg/L in Wetland 1 and 2.4 mg/L in Wetland 2. Warmer water temperatures, lack of cooler groundwater discharge, and increased respiration of algal biomass can account for the hypoxia. Mean dissolved oxygen levels in Wetland 2 were lower than Wetland 1 overall (7.9 vs. 9.4 mg/L, respectively), suggesting that a macroinvertebrate population more tolerant to lower oxygen levels may develop in Wetland 2. Placement of the wetlands in relation to the underlying hydrogeology can create differences in nutrient loading and conductivity. Based on lower dissolved oxygen levels and higher maximum conductivity in Wetland 2 of 1275 uS/cm vs. 1081 uS/cm in Wetland 1, we can predict that the macroinvertebrate population may be more pollutant tolerant in Wetland 2, thereby supporting a less diverse community. Macro-invertebrate collection from multiple sub-habitats and identification to family level test these predictions. A better understanding of the effects of water quality on macroinvertebrate communities in restored urban wetlands can guide expectations of biodiversity in restoration efforts.

POSTER 28

Studying Potential Fungal Connections Between Plants Growing in a Local Forest Soil

Lena Miles / Faculty Sponsor: David Robinson

There is increased curiosity among ecologists and soil scientists about the fungal connections that can form between plants growing adjacent to one other. Certain species of filamentous fungi can infect multiple plants in such a way that their hyphae allow for the passage of nutrients, water and chemical signals between plants. We are testing this possibility by growing Blue Lake Bush Beans (*Phaseolus vulgaris* L.) in pots of native soil that have either been sterilized (by autoclaving), or not. Soil samples were taken from a 5x5 plot in a natural wooded area at the Passionist Earth and Spirit Center. Plants were thinned to several per pot and grown to mature size. Then, we will test the idea that the plants are assisting one another through their fungal connections. One plant per pot will be 'challenged' in some way, such as limiting or preventing sunlight, or by removing leaves, while the other neighboring plants will be unaltered. We will examine the growth and development of the 'challenged' plant to see if they might be receiving water or nutrients or signaling molecules from the unchallenged neighboring plants growing in the same pot. We will compare the growth and development of the 'challenged' bean plants growing in sterilized vs. unsterilized soil.

POSTER 29

Effects of flow regime in water chemistry and soil of restored wetland

Suraj Neupane / Faculty Sponsor: Martha Carlson Mazur

Hydrology influences the structure and function of wetland ecosystems. Vegetation, landscape, and surrounding land use are important factors for urban wetland restoration process and influence the hydrology of the system effecting the water and soil quality of the wetlands. This research monitored the hydrologic changes in water quality and compared the soil properties between two urban wetland restoration sites (W1 and W2) in Louisville, KY. Hypotheses are: 1) water quality will improve with continued restoration, 2) flow regime will affect water chemistry and soil development, and 3) soil bulk density in the restored wetlands will reflect accumulation of organic sediments. Approximately 60 meters apart, W1 is supplied

by floodwater during rain events, whereas W2 is supplied primarily by groundwater. Water chemistry data were collected approximately once per month. Soil samples were collected from the wetlands and oven-dried at 105°C for 48 hours to estimate bulk density. The bulk densities of wetlands before and after restoration were 0.86 g/cm³ and 1.43 g/cm³, respectively, indicating an unexpected reduction in organic matter that could be due to scraping of surface soil while reconstructing the wetland or subsequent sedimentation due to flooding. The average specific conductance for W1 was 724.44 QS/cm and 873.53 QS/cm for W2. Similarly, average alkalinity value for W1 was 196.56 QS/cm and 249.50 QS/cm for W2. The result shows ground water from spring has played a role in the water chemistry. During rainfall, the hydrology of the restored system changes; the result is clearly seen with higher turbidity and conductance. This proves the flow regime changes the water quality. This research examined the nature of newly restored wetlands and affirmed that beneficial changes in newly restored wetlands is a long process. Monitoring of water quality and physical soil properties will be continued to understand hydrologic effects on urban wetland development.

EXERCISE SCIENCE

POSTER 30

Sources of Nutrition Information and Knowledge in Ultra-Runners

Nigel Ouslan / Faculty Sponsor: Sara Mahoney

PURPOSE: Ultra-marathon events (i.e., >42.2-km) continue to grow in popularity; however, little research exists on the typical dietary intake of ultramarathon participants, or the sources of information which influence their habits and beliefs. The objectives of this study were to characterize the acquisition of nutrition information among ultra-endurance athletes, and to determine the relationship between the use of different sources of information and nutritional knowledge (relative to current evidence-based recommendations). **METHODS:** Participants (n=196) were adults who had completed an ultramarathon at least once in the past 2 years. Measures included: a demographic questionnaire; the Sources of Nutrition Information (SONI) questionnaire, which included 7 major sources of nutrition information, as well as their credibility, accessibility, frequency, interest; and the General Nutrition Knowledge Questionnaire-Revised (GNKQ-R). Repeated measures ANOVA was used to analyze differences between items on the SONI scale. Spearman rank correlation was used to test for a relationship between sources of information and GNKQ-R score. **RESULTS:** 18% self-identified as vegan/vegetarian, 6% paleo/ketogenic, 20% traditional American diet, 54% “healthy” and 12% “other”. Peer reviewed literature was reported as the most frequently used (mean score=1.64, p<0.001), credible (3.02, p<0.001), and interesting (2.62, p=0.002). Social media was the most accessible (2.81, p<0.001), but the least credible (1.87, p<0.001). A modest, significant correlation (r=0.185, p = 0.015) exists between use of peer-reviewed literature and nutrition knowledge. **CONCLUSIONS:** Ultrarunners report high usage of peer-reviewed literature for nutrition information, which is related with improved nutritional knowledge. Because of its accessibility, social media may be a promising tool to provide nutrition information to this population.

MATHEMATICS

POSTER 31

The Expansion of Secondary Geometry Curriculum: Matrices as Transformations

Emily Barrett / Faculty Sponsor: William Fenton

The purpose of this research is to explore a potential future standard within Geometry curriculum for high schools based on the recent quick evolution of the curriculum, including local standards for Secondary Geometry. More specifically, we will examine the likelihood of motion being represented as matrices and will describe the process of creating these transformations, such as reflections, rotations, and translations. In addition to this, methods of teaching these concepts will also be described. Although this topic is currently seen in college courses for Modern Geometry, history has shown that as mathematics advances, high school students encounter more difficult concepts.

POSTER 32

Softball: The Game of Timing and Connection

Megan Bretz / Faculty Sponsor: Anne Raymond

The connection time between a bat and a ball may seem minuscule when watching a casual game of softball, but when the data is broken down, it's actually very extensive. Coaches, players, recruiters, and parents are constantly wondering, what was wrong with an individual's swing during an at-bat? Through the use of a multiple regression test, testing several variables against one another will provide the results of what happened in that at bat. Looking through large amounts of data and focusing on an early connection score (deg.), bat speed (mph), attack angle (deg.), vertical bat angle (deg.), and a blast factor, will enable such analysis to determine errors throughout an individual's swing. By running multiple regression and taking these variables into account, the answer will reveal if the statement "just wait" is efficient or if there is more that goes into the error within the hitter.

POSTER 33

Topology of DNA

Max Cartor / Faculty Sponsor: Gregory Kelsey

In this poster, I will be examining the relationship between the structure of DNA molecules and its relationship to the topologically based field of knot theory. In doing so, I will examine specific topoisomerase and their effects on cyclic and linear DNA molecules with respect to links and knots studied in knot theory. Use of tangles will be particularly helpful when describing the breaking of the topological structure of the DNA molecules by the topoisomerase.

POSTER 34

The Topology of the Unbased Visual Boundary of the Diestel Leader Graph

Max Cartor / Faculty Sponsor: Gregory Kelsey

We will examine the topology of the unbased visual boundary of the Diestel Leader graph. To do so, we will first establish a background on basic elements of topology, based and unbased visual boundaries, the Diestel Leader graph, and the lamplighter group. We then focus on utilizing geodesic rays to examine the topology of the unbased visual boundary. Manipulation of the starting position of geodesic rays in this space will show that the boundary has the trivial topology.

POSTER 35

Understanding the Mathematics of Music using the Fourier Transform

Abigail Finch / Faculty Sponsor: Jennifer Miller

Music is an interest many people partake in, whether they are listening to music accompanying a task or they are listening to music just to enjoy its sound. Despite the prevalence of this interest, most people do not know or realize the importance mathematics plays in creating music. Because sound waves can be represented as sin and cosine waves that have different frequencies and amplitudes, Fourier Series are used in music. Through the use of Fourier Transforms, a recording of music can be broken down into its specific notes and frequencies. Fourier Transforms are also able to distinguish the amount of times each frequency and note appears in the piece of music analyzed. The reasoning behind representing music in this way is because digital music can be compressed into a smaller amount of data by using the Fourier Transform.

POSTER 36

Toxin Effects on a Competitive Species

Bekkah Trachtenburg / Faculty Sponsor: Jennifer Miller

A competitive species model can show how two species that use the same resources interact with each other given the carrying capacity of their environment. When put into the same area one species will eventually go away while the other thrives, meaning there is not a stable coexistence solution for the two species. Using a system of differential equations, we build on this competitive species model to see if we could find a coexistence solution if we add an environmental toxin that affects only one of the species. We want the direct effect of the toxin to be focused in their rate of death. Once we set up our model for competitive species affected by a toxin, we then find the equilibria and their stability. We show that a stable coexistence solution is possible and we find an example of this.

MEDICAL LABORATORY SCIENCE

POSTER 37

Turnaround Time for ED Troponin Testing

Lindsey Baker / Faculty Sponsor: Karen Golemboski

When considering patient safety, it is important for the laboratory to analyze specimens and report results in a timely manner. To the clinician, timeliness may be the most important quality of laboratory testing. For the emergency department, an important benchmark is cardiac troponin turnaround times. In a local hospital, there was a concern that the turnaround times for troponin testing from the emergency department were prolonged, or greater than 30 minutes. The goal of this project was to decrease these turnaround times. A literature review was conducted in order to determine how to measure and shorten turnaround times. The troponin testing system was analyzed. The percentage of prolonged turnaround times was determined, as well as the percentage of each step in the process that was prolonged. It was determined that the step from receipt of the specimen to getting the specimen onto the instrument was where the process was being prolonged. In order to decrease turnaround times, the use of timers was implemented in the processing department of the laboratory to ensure timely movement of the specimen from the centrifuge. Further data were collected and analyzed to determine if the implementation made a difference in the turnaround time.

POSTER 38

Solving the Mystery of Death Crystals

Gabrielle Hawkins / Faculty Sponsor: Karen Golemboski

Death Crystals are a new and emerging inclusion seen in Wright's-stained peripheral blood slides. Death crystals are blue-green inclusions found inside neutrophils and monocytes. These inclusions are unique because their composition and cause is still unknown. Death crystals have been reported in association with elevated levels of aspartate aminotransferase (AST) and alanine aminotransferase (ALT), which are seen in liver failure, lactic acidosis, or tissue damage. When death crystals were first reported, they were thought to signal approaching death because patients who produced the crystals typically passed away within 24-72 hours of identification. There have been cases reported when the patients have recovered after having death crystals identified on their peripheral blood slides. The most current theory is that the mortality associated with death crystals depends on the severity of the increase in ALT and AST levels as well as the severity of lactic acidosis. The awareness of death crystals is increasing, and more cases are being reported. A 56-year-old female presented to the emergency room with shortness of breath. She had a history of multiple heart attacks, congestive heart failure, diabetes, stroke, and renal failure. Shortly after admission the patient coded and was put on manual ventilation. The lactic acid levels greatly increased in just a few hours. It was thought that the lactic acidosis was due to the patient coding. A complete blood count (CBC) was done, and death crystals were observed on the blood slide. The patient's results were compared with other cases that were reported in literature for having death crystals identified.

POSTER 39

Improper Collection of Microbiological Specimens

Meera Patel / Faculty Sponsor: Karen Golemboski

One of the main pre-analytical issues in the microbiology laboratory is proper specimen collection. Proper specimen collection is important to laboratory personnel because the quality of the specimen is directly related to the results the laboratory produces. Due to a high volume of questions from floor nurses regarding proper specimen collection, laboratory personnel decided to implement a training procedure. A literature review was conducted to determine best practices for improving specimen quality. In preparation for the project, data on improperly collected specimens were gathered, by microbiology processors, using a specimen problem log. However, this process revealed that many of the microbiological processors do not fill out the log regularly. A second method was used to determine the validity of data from the specimen problem log, and it was determined that there was no correlation between the specimen problem log and true number of improperly collected specimens. Therefore, the aim was changed to improving documentation in the microbiological laboratory for improperly collected specimens. Implementation of an electronic specimen problem log benefited laboratory personnel documentation of improperly collected specimens.

POSTER 40

Blood Culture Contamination

Katy Todd / Faculty Sponsor: Karen Golemboski

A local hospital had an ongoing issue with blood culture contamination collected in the emergency department. Blood culture contamination is a common issue in emergency departments across the country with the national benchmark for acceptable levels of blood culture contamination set at 3%. This facility was consistently above that benchmark. This particular facility had several contributing factors leading to the contamination problem. The emergency department has a high rate of nurse turnover meaning that nurses are often newly trained and unfamiliar with the facility's standard operating procedures for blood culture collection. The nurses also feel a sense of urgency with their patients. This sense of urgency can lead to rushing through the collection process which may lead to errors, such as improper cleaning of the collection site. A new sterile supply kit was implemented which included a waste tube to help eliminate several of the above factors. Contaminants which may remain on the skin enter the waste tube and not the following blood culture bottles. Data were gathered after implementation and then compared with data collected before implementation. Contamination rates decreased after implementation of the new procedure.

NURSING

POSTER 41

Preventing Ventilator-Associated Pneumonia and Ventilator-Associated Events with Bundles

Kimberly Acedillo / Faculty Sponsor: Kelly Ruppel

Problem: The increasing rate of ventilator-associated pneumonia (VAP) and ventilator-associated events (VAE) is a growing problem, especially within intensive care units due to increased needs of mechanical ventilation for immu-

nosuppressed patients. These conditions are associated with high rates of mortality and increased costs for organizations. The purpose of this evidence-based practice project was to examine ways to encourage consistent use of ventilator bundles in the South Intensive Care Unit (SICU) to reduce VAP and VAE rates.

Background: The implementation of ventilator bundles is an evidence-based approach to reduce the risks of VAP and VAE (Eom et al., 2014). Consistent implementation of ventilator bundles has been shown to decrease rates of VAP, average duration of mechanical ventilation and lengths of stay (Rello et al., 2013). The SICU upholds a protocol for ventilator bundle usage, yet growing rates of VAP and VAE have led to an initiative to increase staff compliance with ventilator interventions.

Method: A literature review was conducted to evaluate articles examining the impact of ventilator bundles on VAP and VAE rates. Supported by evidence, a ventilator bundle checklist was implemented as a resource to encourage consistent use of the ventilator interventions.

Results: Evaluation of the implementation will be conducted through surveys examining staff compliance with the checklist and ongoing review of the SICU's VAP and VAE rates. It is anticipated that the checklist will help increase staff compliance with the ventilator bundle and reduce VAP and VAE rates.

Conclusions: A limitation of this project was the time constraints preventing concrete evaluation of the implementation. Nevertheless, evidence supports the consistent use of ventilator bundles and resources to increase staff's compliance in decreasing VAP and VAE rates in patients. Recommendations for future research should focus on finding new methods to increase staff compliance and provide more education on ventilator bundle usage.

POSTER 42

Reducing Communication Breakdown In The Peri-Anesthesia Setting Through The Use Of Closed-Loop Communication Techniques

Lindsey Breeding / Faculty Sponsor: Beverley Bone

Poor communication practices continue to be a source of decreased efficiency and less than optimal patient outcomes in the acute care environment. Miscommunication between health care team members has been found to be a significant contributing factor in causing preventable disability and death (Wu, 2012). By promoting and practicing an evidence-based communication framework, healthcare management and staff reduce the risk for error and optimize efficient care delivery. In the perianesthesia environment, the interaction of multiple health care team members, time constraints, and increasing patient complexity calls for the use of clear and concise information delivery systems. This project was carried out in the perianesthesia department of a local community hospital, where management identified communication breakdown as a source of delays in patient care delivery and frustration amongst the health care team. The purpose of the project was to implement a tool or behavioral framework that could be used by all staff members to improve communication practices. Based on evidence provided by department management, a communication assessment survey was developed and distributed to staff for completion. As a result, closed loop communication, a behavioral framework that originated in military-radio transmissions and has been shown to improve accurate information reception and efficiency in task completion in trauma activations, was chosen as the communication framework. An educational flyer on the use of closed loop communication was developed and

posted on both perianesthesia units. Subsequently, this flyer became a mandatory read-and-sign document for all staff and was edited for use by other departments in the hospital. This project has the potential to improve staff efficiency and staff perception of intra- and interdepartmental communication, as well as positively impact patient outcomes in the perianesthesia area and beyond.

POSTER 43

Bedside Shift Report and Patient Satisfaction Related to Nursing Communication

Tenzin Dicky / Faculty Sponsor: Kelly Ruppel

The 6/7 tower units of Jewish Hospital implemented the Bedside Shift Report pilot project during the first week of February 2019. Evidence based practice researches indicate that bedside shift report improves nurse-patient communication, and thus increase patient satisfaction related to nursing communication. Per Hospital Consumer Assessment of Healthcare Providers and System (HCAHPS) surveys, the total patient satisfaction related to communication with nurses for the 6/7 tower unit were 70.5% and 70.7% in the last 90 days and December 2018, respectively. The purpose of this project was to determine if bedside shift report influence patient satisfaction score related to nursing communication. In addition to literature reviews, surveys were conducted on the unit. Two five question surveys, one week before and one week after the pilot project, regarding the nurses' perception and barrier toward bed side shift report were distributed to the nursing staff on the unit. 23 responses were collected for each survey; there are approximately 56 nurses on the unit. Patients on the unit were also surveyed one week post implementation using the HCAHPS survey questions focusing on nursing communications. 18 patient responses were collected. The collected data supports the evidence based practice researches which indicate that patient satisfaction increases with bedside shift report. There was an 12.6% increase in patient satisfaction with nursing communication from December 2018 to the 1-week post implementation survey. Post-implementation, there was an overall increase in nurses' perception of bedside shift report improving patient care quality and peer-to-peer communication. Since this survey was done in a very short-term period with only 41% of the nurse staff response, it was recommended that the unit performs another survey for the nurses and patients after 6 months and 1 year with larger sample size. HCAHPS score should be reviewed monthly for changes in patient satisfaction.

POSTER 44

Improving Patient Satisfaction Through Personalized Patient Care

Joanna Liu / Faculty Sponsor: Beverley Bone

Background: Caring is a fundamental concept of nursing, as well as an unchanged variable in nursing practice. Personalizing care is imperative to patient satisfaction because it provides specialized care to those in need. This is a topic of importance because patient satisfaction scores have been in the 4% range in October 2018 and has not increased since. Objective: The aim of this Capstone was to determine the effects of personalized patient care on patient satisfaction scores in the inpatient setting. During the evidence retrieval period, studies support personalized patient care because patient satisfaction scores increased when personalization of care was

implemented in the inpatient setting. Methods: A survey of 26 nurses was conducted on the 5 E/W cardiac telemetry unit to measure knowledge and attitudes towards personalized care. A literature review was conducted to find supporting evidence which resulted in 3 systematic reviews, 2 meta-analyses, and 2 research journals. An educational flier was created to increase knowledge about personalized care in response to nurse survey results. Results: Findings suggest that nurses felt they understand that personalized care is important for the patient's recovery and decreases stress/anxiety related to hospital stay. Also, that personalized care is important in safety to the patient and increases patient satisfaction upon discharge. Conclusion: Personalized care should be utilized in care every day and is imperative to incorporate in nursing care. Patient should be treated uniquely to cater to their specific needs related to their diagnoses.

POSTER 45

Improving Throughput with Discharge Compliance

Luis Olivas / Faculty Sponsor: Chris Webb

Optimal patient throughput is important to increase patient safety and the quality of care provided. In an effort to improve patient throughput, the University of Louisville Hospital transport department has implemented an electronic bed management system, along with a hospital wide discharge policy. Despite yielding positive results in metrics used to track throughput efficiency, discharge compliance hospital-wide remains low. The purpose of this study is to provide education and improve implementation of the discharge policy to a 70% compliance rate. Methods used to complete this project included a review of literature discussing recommendations to increase discharge compliance and a 3-questions survey of the staff on four similar units with low discharge compliance numbers. The survey was used to identify knowledge deficits, barriers to discharge compliance, and suggestions to improve implementation. Based on the results from the literature and the survey, an individualized, educational plan for the 4 units was created and implemented. Interventions included creating a Transport-Discharge FAQ sheet and the application of unit rounding and on-site training at the nurses' station. After 4 weeks of implementation, the discharge compliance rate increased from 37% to 45% on the 4 units and from 49% to 54% hospital wide. While the goal of 70% hospital-wide discharge was not met, increases were noted on the lowest performing units. Targeted interventions focusing on communication and educational strategies can serve as a foundation to improve discharge compliance and optimize throughput.

PHYSICS

POSTER 46

Exploration with Innovative Robotic Devices

Carlos Galindo and Sean Lawless / Faculty Sponsors: Akhtar Mahmood and M. Saleem

We will present several robotic devices that were built using microcontrollers, servos, motors, and various sensors for imaging in the Physics Department's Robotics Lab. Additionally, some of the parts for the robotic devices were made using a 3D printer in the Robotics Lab. One of our goals was to build semi-autonomous human-operated robotics with wireless technology. Some of the robotic devices can be used in search-and-rescue missions.

These robotic devices are - (i) an upgraded semi-autonomous Robotic-Spider (Hexapod). The Hexapod is composed of six legs that are powered by 18 servo-motors and is built with a Servo Controller and BotBoarduino, which has been programmed to move like an actual spider that can be operated by a PlayStation-2 controller; (ii) a Robotic-Crane built with Arduino-based MegaPi-Microcontroller that can pick-up small objects and move them to another location. It can be controlled wirelessly with smart phone through Bluetooth technology; (iii) Table-Top Robotic Grip-Hand built with servo controller board that has advanced inverse kinematics positioning control capabilities which can be controlled by a laptop; (iv) Bionic-Robot Hand built with Arduino and Veyron servo driver, where every finger can be controlled separately that can grab objects. All the finger actions can be controlled wirelessly; and (v) 3D-printed Gen 2-Physical Therapy Robotic Device to help move a patient's wrist that has been damaged from an accident by pulling their hand inward and outward.

PSYCHOLOGY

POSTER 47

Parenting and aggression: Is externalization a mediator?

Gina D'Amato / Faculty Sponsor: Jean Lamont

Current literature shows that authoritarian parenting style, or parenting characterized by verbal hostility, corporal punishment, and non-reasoning punitive strategies, is correlated with aggressive behavior. One reason for this may be that authoritarian parenting promotes poor coping strategies in self-conscious situations, or situations in which a person can be blamed for a negative event. One such coping strategy associated with authoritarian parenting is externalizing, or a defensive reaction to shameful or embarrassing events, and is characterized by placing the blame for these events on some external force that might remove the blame from the self. As externalizing blame is also associated with aggressive behavior, externalization in response to a self-conscious situation may mediate the relationship between authoritarian parenting and aggression. Two studies tested this idea. In study 1 (correlational), 176 undergraduate students completed a self-report survey about their parents' authoritarian parenting style as well as about their externalization-proneness and tendency to engage in aggressive behavior. As expected, significant correlation among authoritarian parenting, externalization, and aggression emerged, and externalization mediated the relationship between authoritarian parenting and aggression. In study 2 (quasiexperimental), undergraduates completed a self-report survey about authoritarian parenting and reported on their own state externalization and state aggression in response to a vignette describing a self-conscious situation. It is expected that externalization in response to the self-conscious vignette will again mediate the relationship between authoritarian parenting and aggressive responses to the vignette.

POSTER 48

The Framing of Recovery and Anorexia Nervosa Treatment Willingness

Gabby Davis / Faculty Sponsor: Jean Lamont

Anorexia nervosa (AN) is a serious eating disorder that can potentially have fatal consequences. Treatment for the disorder is accessible to most, and yet individuals with AN often choose not to pursue treatment. Advertisements regarding AN recovery

may be triggering to individuals with the disorder through graphic imagery or text. Additionally, these advertisements are frequently framed with a loss rather than a gain. Individuals with AN often develop a strong sense of identity with their disorder and are extremely reluctant to give it up. Consequently, these loss-framed advertisements only further dissuade individuals from pursuing treatment, as losing that sense of identity with their disorder would be detrimental to these individuals. However, because individuals with AN respond more negatively to losses than healthy controls, it was hypothesized that framing the advertisements with gains rather than losses would potentially increase treatment willingness in these individuals. Undergraduate students from Bellarmine University (N=75) were asked to fill out a measure of anorexic symptoms (Eating Attitudes Test) and were randomly assigned to view an advertisement for eating disorder treatment that was presented in either a gain or a loss frame. Participants then reported their attitudes toward the advertisement and how likely they would be to do the action the advertisement (i.e., seek treatment). It was hypothesized that individuals with higher levels of anorexic symptoms would be more likely to consider pursuing treatment upon viewing a gain frame as opposed to a loss frame. No interaction emerged between AN symptoms, condition, and attitudes about advertisements, nor did one emerge between AN symptoms, condition, and treatment willingness. An exploratory mediation demonstrated that regardless of AN symptoms, participants responded more favorably to the gain-framed advertisement and were more likely to pursue treatment after viewing the gain-framed advertisement compared to the loss-framed advertisement.

POSTER 49

Exploring Associations Between College Student Academic Achievement, Worry, Personality, and Parental Warmth and Control

Katherine Kaufling / Faculty Sponsor: Courtney Keim

This correlational study evaluates the relationships between academic achievement, worry, personality, and parental warmth and control. Results seek to add to the existing scientific literature surrounding what behaviors parents may or may not practice when raising their children and what connections these behaviors have to their children succeeding academically and/or experiencing worrisome thoughts when they're college-aged. Additionally, the role of student personality in parenting behaviors, academic achievement, and worry are evaluated. Multiple correlational hypotheses are offered and evaluated along with a moderation model (personality and worry as moderators of the relationship between parenting and academic achievement). 273 college students completed an online survey responding to items assessing their academic achievement (high school and college GPAs & ACT scores), general level of worry, personality (conscientiousness, neuroticism, love of learning, and achievement striving), and the warmth and control displayed by up to three caregivers. Preliminary correlational analyses project multiple significant results that both align with and diverge from researcher hypotheses. Complete results of this study may be helpful in informing the ways parents behave to increase the likelihood that their children develop into academically successful and mentally healthy individuals.

POSTER 50

Effects of Language in Music on Memory

Cat Terrell / Faculty Sponsor: Joy Jacobs-Lawson

A clear majority of college students listen to music while studying, which begs the question: does music have a detrimental effect on retention? Previous research on the effects of music on cognitive processes such as attention, memory, comprehension and information processing have produced a wide range of results, which is most likely due to the fact that variables such as type of test used, type of music used, individual experience with music, and other factors can affect the results of different studies. This thesis will focus on the effect of both instrumental and vocal music on performance on cognitive tests designed to test memory in order to gain more insight into whether the presence of language in music affects memory. This thesis is designed to test three hypotheses. The first is that vocal music in English will negatively impact performance on tests of both recall and recognition of a passage written in English compared to vocal music in Italian, instrumental music, and white noise. The second is that performance will be higher on recognition questions than on recall questions regardless of music condition. The third is that music type will have a more noticeable effect on performance with recall questions than on performance with recognition questions; there will be very little difference in performance among music conditions with recognition questions.

RADIATION THERAPY

POSTER 51

Dose Assessment and Protocol Review for Pediatric CT Simulation

Tyler Calhoun / Faculty Sponsor: Carol Scherbak

Pediatric patients are susceptible to greater radiation exposure risks making the development of a Computed Tomography (CT) simulation dose protocol essential. An evaluation of dose limiting techniques currently practiced in diagnostic CT were performed to construct CT simulation dose protocols for pediatric patients in a radiation therapy department. Criteria such as scanner parameters, imaging techniques, patient habitus and positioning, along with immobilization techniques were examined for their effects on dose. This study also analyzed current CT dose regulatory guidelines and quality assurance guidelines for CT scanners. Using these procedures and standards, strategies for creating optimal CT simulation dose protocols for pediatric patients were produced while still allowing for an effective scan.

POSTER 52

Quality Assurance of Immobilization Devices

Clayton Culver / Faculty Sponsor: Carol Scherbak

The creation of a quality assurance program for immobilization devices will improve safety, longevity, and functionality. The research examined three specific immobilization devices used in radiation therapy clinics, breast board, Vac-Lok bag, and thermoplastic masks. Procedures for clinical practice were developed using device manufacture guidelines and current problems with quality control. The protocol specifically addressed guidelines for cleaning, storing, and device inspection. These procedures are

vital now that accrediting bodies such as the American College of Radiology (ACR) are requiring documented quality assurance protocols for immobilization devices.

POSTER 53

Skin Dose: Is Skin Dose Affected By Beam Modifiers

Clay Johnson / Faculty Sponsor: Carol Scherbak

Beam modifiers including bolus, linac equipment, and extraneous materials may cause an increase in surface dose to the patient, therefore, these materials were tested. Patient treatment bolus included in the experiment was a sham cloth and 0.5 cm supra flab. Some examples of linac equipment tested involved the treatment couch, compression belt, and Exactrac overlay. The extraneous materials were a typical blanket for comfort and patient gown. To differentiate between the dose from low and high energy megavoltage beams, 6 MV and 18 MV were used on these materials. After irradiating each material with the same dose, 200 mu's, the surface dose was recorded by a Markus chamber. The readings of 18 MV showed to be more skin sparing compared to 6 MV but doses through some of the linac equipment were significant.

HONORS THESIS PRESENTATIONS SUNDAY, APRIL 7

Session I • 1:00-2:30 p.m. • Group A

1. Sebastian Kontic: “R&D in the Accounting Landscape” — Advisor: Dr. David Collins
2. Noah C. Braden: “Predictability of Mid-to-Long Term Price Direction Following Price Shocks Unassociated with Regularly Scheduled Earnings Calls in Domestic Equity Markets” — Advisor: Dr. Bradley Stevenson
3. Max Cartor: “The Topology of the Unbased Visual Boundary of the Diestel Leader Graph” — Advisor: Dr. Gregory Kelsey

Session I • 1:00-2:30 p.m. • Group B

1. Kandis M. Arlinghaus: “Impacts of Ultraviolet Light Exposure on the Activity of Antioxidant Enzymes in the Coelomocytes of the Sea Urchins *Lytechinus variegatus* and *Arbacia punctulate*” — Advisor: Dr. Roberta Challenger
2. Kennedy Erwin: “Impacts of pH Exposure on the Germination of the Freshwater Bryozoan *Pectinatella magnifica*” — Advisor: Dr. Roberta Challenger
3. Trevor M. Stantliff: “Investigations of the Mechanism of Action for Lung Cancer Cell Death by a 4-Trifluoromethoxy Substituted Chalcone Derivative” — Advisor: Dr. Amanda Krzysiak

Session I • 1:00-2:30 p.m. • Group C

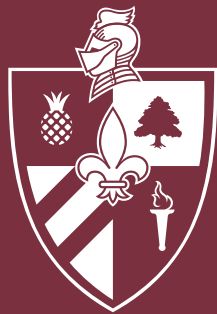
1. D. Richard Dickerson III: “The Scientific Phantom Problem: Planck’s Quantum in Light of Nietzschean Critiques” — Advisor: Dr. Pat Holt
2. Andrew Chandler: “A Rhetorical Analysis of Opening Statements in Trial: Reconsidering the Classical Canon of Invention” — Advisor: Dr. Ruth Wagoner
3. Caleb Elmore: “The Political Animal: On the Why, the How, and the Who of the City” — Advisor: Dr. Evanthia Speliotis

Session II • 2:45-4:15 p.m. • Group A

1. Cassidy Adams: “A Creative Study in Black and White: A Black and White Study of Familial Photographs During the 20th Century and their Relevance to Contemporary Life” — Advisor: Professor Caren Cunningham
2. Julia Madison King: “The Unique Identity of the Korean Sound” — Advisor: Dr. Timothy Glasscock
3. Cat Terrell: “The Effects of Language in Music on Memory” — Advisor: Dr. Joy Jacobs-Lawson

Session II • 2:45-4:15 p.m. • Group B

1. Eli Megibben: “‘We were just trying to, you know, survive’; Coming of Age as a Displaced Person and Narrative” — Advisor: Dr Fedja Buric
2. Gabby Davis: “The Framing of Recovery and Anorexia Nervosa Treatment Willingness” — Advisor: Dr. Jean Lamont
3. Katherine Kaufling: “Exploring Associations between Academic Achievement, Worry, Personality, and Parental Warmth and Control” — Advisor: Dr. Courtney Keim



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