ASPIRE 2021

A CELEBRATION OF THE

Arts,
Scholarship,
Performance,
Innovation &
Research
Excellence

APRIL 12 - 16

BRIDGEWATER COLLEGE

Message from the Research Resource Group:

Bridgewater College's commitment to the liberal arts is seen in a diverse curriculum and in opportunities for faculty to engage in scholarly work and mentor students in inspirational endeavors. Accordingly, ASPIRE was established to celebrate such student and faculty scholarship, creativity, and artistic excellence. This year, the ASPIRE events on campus are accessible remotely, face-to-face, and on virtual gallery posters.

The following is a compilation of the 2021 ASPIRE events. It includes brief synopses of student oral presentations, student poster presentations, and faculty oral presentations. We enjoyed organizing ASPIRE 2021 and hope you celebrate the participants' accomplishments by visiting some virtual or face-to-face events and checking out the ASPIRE 2021 website!

Sincerely,

Dr. Marcellina Hamilton, Chair
Dr. Stephen Baron
Dr. Curtis Bradley
Dr. Vimari Colón-León
Dr. Maria Lugo
Dr. Kevin Pallister
Dr. Alma Ramírez Trujillo

Schedule Overview

MONDAY, APRIL 12 THROUGH FRIDAY, APRIL 16

Virtual Gallery ..... Poster Presentations

TUESDAY, APRIL 13

4–6 p.m. ..... Boitnott Room/Zoom ..... Student Research Presentations
4–6 p.m. ..... Zoom ..... Student Research Presentations

WEDNESDAY, APRIL 14

4–5 p.m. ..... Boitnott Room/Zoom ..... Faculty Research Presentations

THURSDAY, APRIL 15

3–4:40 p.m. ..... Boitnott Room/Zoom ..... Student Research Presentations
3–4:40 p.m. ..... Zoom ..... Student Research Presentations
4–5 p.m. ..... Bowman 101/Zoom ..... Faculty Research Presentations

POSTER PRESENTATIONS

KELSI LISTMAN | Faculty Mentor: Dr. Erin Morris Miller | Research for: Honors project

THE SIGNIFICANCE OF A VIRAL POST ON SOCIAL MEDIA

The goal of this research project is to determine the extent of the impact that a social media influencer has on individuals' attitudes. Research will be done using Twitter data. This project will study the impact of a specific post by an influencer: on September 25, 2020, a video went viral on TikTok (another social media platform) of a man drinking a bottle of Ocean Spray cranberry juice while listening to "Dreams" by Fleetwood Mac. The study will include both qualitative and quantitative research surrounding tweets with the following hashtags: #cranberryjuice, #fleetwoodmac. The frequency of tweets using the hashtags will be considered, and a content analysis will be done using a general inductive approach.

JYAILAH FRIENDLY | Faculty Mentor: Dr. Ian McNeil | Research for: Honors project

USING SQUARE-WAVE VOLTAMMETRY TO INVESTIGATE DISPERSIVE ELECTRON KINETICS

Dye-sensitized solar cells (DSSCs) are presently being investigated as cheaper alternatives to modern photovoltaic cells because DSSCs operate largely on low-cost materials and are cheaply manufactured. Herein, the effects of applied voltage bias on the current output of DSSCs were studied to eventually characterize electron mobility within the devices. Devices were assembled using titanium dioxide (TiO2) as the semiconductor and then tested using cyclic-step chronoamperometry (CSCA) to assess trends in current upon administration of different variables—the presence of light, different electrolyte solutions, time under applied bias, and order of applied bias. Significant differences were observed between devices with lithium electrolyte solution and those without—smaller current observed versus larger current observed, respectively. Future work on this study should include exponential decay data processing of the current in the transition between the voltage being applied and it being turned off to assess the time it takes for electron flow to cease.

BRITNEY YOUNG | Faculty Mentor: Dr. Stephen Baron | Research for: Honors project

IDENTIFICATION OF MUTATIONS IN THE PHAZ GENE OF BALD MUTANTS OF STREPTOMYCES SP. SFB5A.

There is considerable interest in using biodegradable plastics to reduce plastic waste. Polyhydroxybutyrate (PHB) is a natural, biodegradable plastic that can be broken down by PHB depolymerases secreted by environmental bacteria. Wild type Streptomyces sp. SFB5A forms powdery colonies on agar media and synthesizes PHB depolymerase, but the "bald" mutant strain (bld4) forms shiny colonies and does not make the enzyme. The bld4 mutant could either have a defect in the promoter or coding regions of the PHB depolymerase gene (phaZ) or in a separate regulatory gene required for both morphogenesis and transcriptional activation of phaZ. Our goal was to assess the former possibility by amplifying phaZ from bld4 and the wild type using the polymerase chain reaction (PCR), visualizing PCR products by gel electrophoresis, and sequencing them. If any mutations are identified in bld4, they might help us understand how synthesis of PHB depolymerase is regulated.

KENNETH WILLIAMS AND DR. JANNE FLORY | Faculty Mentor: Dr. Janne Flory
Research for: TREB project

FUTURE IMPROVEMENTS OF DATA INTEGRATION MODELS

Integrated information processing has become part of organizational operations as different information sources of an organization are typically stored at different geographical locations. Organizations often needs specific information from amongst the dispersed information sources, and the integrated information processing is needed to produce the retrieval of this information. Collaborations and merging among different organizations require system interoperations in which requires integrated information processing. The demand for integrated information processing has increased making information processing a key to organizational decision making. This research aims to find potential solutions for database integration software to limit the amount of potentially lost data during the merging of two or more databases.

TYLER LYNN | Faculty Mentor: Dr. Barnabas Otoo

ASYMMETRIC HYDROBORATION-OXIDATION OF METHYLSTYRENE

Co-hydroboration-oxidation of methylstyrene and optically active limonene using borane dimethylsulfide has produced the resultant 2-phenylpropanol in up to a 90:10 enantiomeric ratio. The increased polarity of the diol by-product enables easier separation via column chromatography compared to other commonly used asymmetric hydroboration reagents. The enantiomeric ratio was determined by NMR analysis of the menthyl chloroformate derivative of the 2-phenylpropanol product.

YOUMNA MOAWAD | Faculty Mentor: Dr. Stephen F Baron | Research for: Honors project

RESTORING EXPRESSION OF THE POLYHYDROXYBUTYRATE (PHB) DEPOLYMERASE GENE IN A BALD MUTANT OF STREPTOMYCES SP. SFB5A

Polyhydroxybutyrate (PHB) is a biodegradable, plastic-like polymer produced by some bacteria and degraded by others. The filamentous bacterium Streptomyces sp. SFB5A degrades PHB for growth using an extracellular PHB depolymerase, encoded by the *phaZ* gene. A morphological mutant of this bacterium, *bld4*, cannot form aerial filaments and cannot produce PHB depolymerase, despite having the *phaZ* gene. The inability to synthesize PHB depolymerase may be due to a mutation in a gene encoding one of its transcriptional regulators. A gene (*lrp*) coding for a potential transcriptional regulator is located 2,700 base pairs upstream from phaZ. Our goal was to clone *lrp* from wild type Streptomyces sp. SFB5A into Escherichia coli and introduce it into bld4 to see if morphology and PHB depolymerase synthesis are restored. So far we have amplified *lrp* by PCR using designed primers, inserted it into a cloning vector (pIJ68), and introduced it into *Escherichia coli* by transformation.

POSTER PRESENTATIONS

HALEY N. OREBAUGH | Faculty Mentor: Dr. Stephen F Baron | Research for: Honors project

CLONING OF AN ENDOLYSIN GENE FROM BACTERIOPHAGE BROCK INTO *ESCHERICHIA COLI*

Endolysins are enzymes used by bacteriophages at the end of their replication cycle to degrade the peptidoglycan layer of their host bacterium from within the cell. This action weakens the integrity of the bacterium's cell wall, resulting in lysis and the release of the newly synthesized bacteriophages. Research suggests that endolysins could be used to fight bacterial infections in humans by targeting disease-causing bacteria without harming desirable bacteria or human cells. A bacteriophage specific to Streptomyces sp. SFB5A was previously isolated and its genome sequenced. Its genome contained two potential endolysin genes. Our goal is to clone and overexpress one of these genes into *Escherichia coli*. So far we isolated DNA from BRock and did agarose gel electrophoresis to assess the size and quality of the DNA. We also designed DNA primers for use in the polymerase chain reaction to amplify the endolysin gene of BRock for use in cloning.

JOSHUA M. SPROUSE | Faculty Mentor: Dr. Ed Lickey | Research for: TREB project

DETERMINING GENE FLOW BETWEEN BALDCYPRESS AND PONDCYPRESS

I surveyed seedlings grown from seeds extracted from the cones of baldcypress (Taxodium distichum) and pondcypress (Taxodium ascendens) trees to determine the potential for cross-pollination. Two parent trees were sampled from populations that are less than 1.5 miles apart near Walterboro, SC. A PCR-RFLP analysis was conducted of a single nucleotide polymorphism in the trnC-ycf6 intergenic spacer region of the chloroplast that was identified by Lickey (unpubl.) as a putative diagnostic character separating baldcypress and pondcypress. The haplotypes of 175 seedlings originating from the two baldcypress parents and 92 seedlings originating from the two pondcypress parents were compared to the haplotypes of each parent. Preliminary data confirms that chloroplasts are inherited through the pollen in Taxodium, and that baldcypress haplotypes can be found in some pondcypress seedlings and vice versa.

TYLER DEUTSCH AND MARY RUTH SHIFFLETT | Faculty Mentor: Dr. Barnabas Otoo
Research for: Honors project

QUALITATIVE MEASUREMENTS OF STABILITY OF ATP AT VARYING PH

ATP is a ubiquitous biological molecule known to be relatively stable in basic conditions. The pKa's of its three acidic protons have been computed to be 6.6, 3.0 and less than 0. To better understand variant pH effects of ATP's stability, 1mM solutions of ATP at pH ranging from 2 to 12 were prepared. Aliquots of these solutions were analyzed via UV-Vis spectroscopy. The results show a deviation from the normal absorption plot at pH less than 5, validating that ATP decomposes under acidic conditions.

KATHERINE GRAYBILL | Faculty Mentor: Dr. Kevin Pallister | Research for: Honors project

POLICY RESPONSES TO IMMIGRATION IN LATIN AMERICA

My topic is how Latin American countries respond to immigration. The project deals with different types of migration and how Latin American countries adopt policies in response to migration surges, as well as the impact the COVID-19 pandemic has had on migration in these countries.

LEXIA WERNER | Faculty Mentor: Prof. Sharon Martz | Research for: Course project

STRATEGIES FOR ENGLISH LANGUAGE LEARNERS IN LITERACY INSTRUCTION

With many schools managing state standards, teaching interests, and interactive research-based lesson plans, there are many needs to be met because not all students have the same learning abilities in the classroom. Many schools observe a growing population of English Language Learners in their environments due to the growing diversity in our society. These ELL students are at a decreased advantage when literacy instruction is involved in many school environments. ELL students are in need of more instruction and strategies to assist them in reading, writing, spelling, oral language, and other components of literacy. This poster explores the research-based strategies teachers can implement to help effectively teach ELL students in the classroom. The objective of this poster is to aid teachers and school staff to teach ELL students with equality and help boost achievement in their learning of literacy.

KYNAH WALSTON, MELIA TEIXEIRA, REBEKAH VAUGHAN, ALEXIA WILL, ERIN VOEGHTLY, KAYTIE PEREZ, KELSI LISTMAN | Faculty Mentor: Dr. Curtis Bradley | Research for: Martin Award

EXAMINING THE EFFECTS OF CAFFEINE AND SACCHARIN ON ACUTE ETHANOL INTAKE IN MALE C57BL/6J MICE

Caffeine is the most consumed psychoactive drug in the world yet animal research has been unable to establish caffeine as a reinforcer. However, caffeine functions as a reinforcement enhancer, potentiating motivation to obtain reinforcers. The combination of alcohol with caffeine has become an issue of public health concerns within the past decade. The goal of this study was to understand the reinforcement enhancing effects of caffeine on alcohol intake. Additionally, the potentiating effects of saccharin on alcohol consumption were observed. Eighteen male mice were trained to lever-press for one of 3 different solutions: ethanol alone (5%), ethanol (5%) + caffeine, and ethanol (5%) + saccharin (0.2%). Caffeine concentrations (1.25, 2.5, 5, and 7.5 mg/ml) were changed every five days to examine a dose-response relationship. Mice responded on a Progressive Ratio (PR) schedule of reinforcement during a one-hour session. Active lever presses, inactive lever presses, and reinforcers earned were calculated after each session.

KAYLA BOSWELL | Faculty Mentor: Dr. Tracy Deem | Research for: Honors project

DEVELOPMENT OF A PCR ASSAY TO DETECT PLASMIDS IN ANTIBIOTIC RESISTANT *E. COLI* IN THE NORTH RIVER

Antibiotic use in livestock is used to prevent and treat infections. However, overuse of these antibiotics has resulted in an increase in bacteria resistant to antibiotics. These bacteria pose a risk to human health because they end up in streams that collect run-off from farms. To test for antibiotic resistance in Rockingham County, we collected *E. coli* from the North River and looked for resistance using the Kirby-Bauer Method. Of the antibiotics tested, *E. coli* were resistant to tetracycline compared to lab strains of *E. coli.* To determine if resistance was carried on a plasmid, we isolated DNA from our *E. coli* samples and amplified the potential tetracycline-resistant gene using PCR-specific primers to Tet(B) and Tet(M).

STUDENT RESEARCH PRESENTATIONS

Tuesday, April 13

BOITNOTT ROOM/ZOOM

KYLEE LORIO | 4-4:20 P.M. | BOITNOTT ROOM/ZOOM

Faculty Mentor: Dr. Scott Cole | Research for: Honors project

THE SHAPE OF THINGS: A THEATRICAL EXAMINATION OF THE PROGRESSION OF EMOTIONAL MANIPULATION

The Shape of Things: A Theatrical Examination of the Progression of Emotional Manipulation is the theatrical performance of *The Shape of Things* by Neil LaBute. This presentation will include an overview of my process for selecting this play, a discussion of my rehearsal process, a review of the performance itself (we will not be watching it, but just discussing), my insights from my Kennedy Center response, a brief reflection of this production, and lastly, how this production has inspired my future research.

TITO ALCAZAR | 4:20-4:40 P.M. | BOITNOTT ROOM/ZOOM

Faculty Mentor: Dr. Scott Suter | Research for: Honors project

THE SIGNIFICANCE OF AMERICAN EPIC NOVELS

My presentation will explore the utilization and significance of a number of themes and techniques in the American epic novels *Blood Meridian* by Cormac McCarthy, *Moby Dick* by Herman Melville, and *Underworld* by Don DeLillo. These include the impossibility of redemption; innocence; violence and humanity's base instincts; the forging of America as a country and identity; isolation/solitude; the use of imagery and symbolism; and how these works feed off one another given their status as post-modernist works. The presentation will also make connections between the techniques employed in these literary works and the larger meanings their respective authors attempt to make about American society, history, culture, and identity.

CAILYN LEO | 4:40-5 P.M. | BOITNOTT ROOM/ZOOM

Faculty Mentor: Dr. Moshe Khurgel | Research for: Honors project; TREB project

SEX DETERMINATION IN AXOLOTLS USING PCR

Sex-typing axolotls is useful in determining the role of sex on their physiology, gene expression and genome content. The traditional method of sex-typing through visual observations is not always reliable in this species. A more efficient and reliable method to determining the sex of an axolotl has been devised recently, which utilizes end-point polymerase chain reaction (PCR) based assay. In this study, we attempted to design a modified approach to sex-typing by using real-time PCR (qPCR). DNA was extracted from a limb or tail clipping and then amplified using qPCR. The gene of interest is located on the female sex chromosome, W, since they are ZW heterozygotes while males are ZZ homozygotes. The control gene, E16E2, is specific to axolotls and was used to ensure the purity of sample DNA. The presence or absence of the sex gene was quantified via the detection of fluorescent probes on the amplified segments of DNA. After multiple trials, the control gene was detected in almost every sample and the presence or absence of the sex gene was noted. These data will be used to determine whether axolotls exhibit sexual dimorphism with respect to their rate of growth.

ASHLEY SELL | 5-5:20 P.M. | BOITNOTT ROOM/ZOOM

Faculty Mentor: Dr. Alice Trupe | Research for: Honors project

TO READ OR NOT TO READ: NAVIGATING YOUNG ADULT LITERATURE IN THE CLASSROOM IN THE AGE OF TRIGGER WARNINGS AND BANNED BOOKS

Most public school libraries or English classrooms celebrate Banned Books Week during the school year, featuring dozens of young adult novels that have been challenged or banned in public schools across the country. However, books aimed towards young readers are typically not optimized for educational use in the classroom. In this project, I will explore the benefits of using young adult literature in the classroom, while also investigating the obstacles that one might face in order to do so, i.e. censorship and sensitive subject matter. I also want to summarize and respond to an argument for the retention of classic literature in the classroom over the inclusion of young adult literature. Finally, the project will include annotated bibliography entries of selected novels in the young adult genre. In these annotations, I will summarize the benefits of using the specific novel in the classroom and the potential obstacles that may arise that might hinder its educational value.

ASHLEY SELL | 5:40-6 P.M. | BOITNOTT ROOM/ZOOM

Faculty Mentor: Dr. Yuka Kishida | Research for: Class project

NEGATIVE IMPACTS OF THE ONE-CHILD POLICY ON FAMILIES WITH TWO OR MORE CHILDREN AND ADOPTION IN CHINA: HOW THE STRICT BIRTH PLANNING POLICY FAILED CHILDREN AND THEIR FAMILIES

In 1979, China introduced a strict birth planning policy called the One-Child Policy in the hopes of reducing rapidly rising birth rates in the country. The implementation of this policy affected families across China very negatively, with an increase in child abandonment and orphaned children. In this project, I set out to analyze the negative effects of this policy on families in China despite the success of evening out the birth rate in the country.

GRACE FOTIS | 5:20-5:40 P.M. | BOITNOTT ROOM/ZOOM

Faculty Mentor: Kyle Kelleran | Research for: Honors project

HEALTH AND PHYSICAL LIMITATIONS DUE TO COMPLICATIONS WITH DIABETES

I completed a literature review on diabetes, diabetic neuropathy, sores, ulcers, and amputations and how, through this snowballing journey, physical therapy can aid an individual. Diabetes can impact the mortality and morbidity of an individual, and it alone can have lifelong effects upon the individual. These effects may include dependency upon medication, lifestyle modifications, and diet and physical activity guidelines. If their condition worsens, they could find themselves battling circulatory issues and neuropathy, thereby hindering their physical function. Many individuals with circulatory issues, diabetic neuropathy, and diabetic amyotrophy develop injuries on their feet like ulcers and sores. These make it painful to walk and physically limit the patient. If these ulcers and sores fail to be detected and treated or are difficult to heal, they may continue to impede the individual's physical wellbeing. The extreme, but all too common, result of these wounds is an amputation. Through each stage of this journey, physical therapist can work with the individual to treat musculoskeletal, circulatory, and nervous system issues and to teach them alternative ways to complete activities if they become physically limited by complications due to diabetes.

STUDENT RESEARCH PRESENTATIONS

JACOB HOWARD | 4-4:20 P.M. | ZOOM

Faculty Mentor: Dr. Verne Leininger | Research for: TREB project

A COMPENDIUM OF EXACT SUMS OF INFINITE SERIES

Infinite series is a fascinating branch of mathematics that is fundamental to calculus. This presentation focuses on research done over the summer on the convergence of infinite series. The intent of the research was to find and document the exact convergences of these series as the number of terms approaches infinity – something rarely explored in undergraduate mathematics. To do this, several approaches were implemented, including the use of Fourier Series, telescoping series, Fibonacci sequences, and differential equations. In addition, there were several instances where different results, and even techniques, could be combined in such a way that more sums were produced. Furthermore, generalizations of patterns were explored for the creation of formulas that would allow for the simple and quick computation of an unlimited number of sums using different variable inputs. In all, more than 200 exact convergences were found throughout the duration of the research. The goal of this presentation is to discuss the results, as well as the work that went into finding them.

DAREEN AWWAD | 4:20-4:40 P.M. | ZOOM

Faculty Mentor: Dr. Jason Ybarra | Research for: Martin Award, Honors project

NEURAL NETWORK ANALYSIS OF HANDWRITTEN ASTRONOMICAL RECORDS

Neural networks are computing systems consisting of a large number of related elements that mimic neurons in the human brain. Using algorithms, my neural networks were able to recognize hidden patterns and correlations in raw data, cluster and classify it, and by time it improved and learned. I developed a computer code implementing a neural network that learns to recognize handwritten digits from 17th century historical documents. This have a particular use in analysis of historical records of astronomical events allowing astronomers to better constrain models (Pizzetti & Ybarra 2020). The neural network analyzes a large number of handwritten digits, known as training examples, and then develops a system which can learn from those handwritten digits. The neural network improves its accuracy by learning more about handwriting. In other words, the more training examples there are, the more accurate our program is as it uses the examples to draw rules for recognizing handwritten digits (Nielsen 2015).

HEATHER RENEE GOOD | 4:40-5 P.M. | ZOOM

Faculty Mentor: Dr. Scott Suter | Research for: Honors project

FOLKLORE OF THE SHENANDOAH VALLEY

The Shenandoah Valley of Virginia has a long and storied history, which has resulted in the development of a rich folklore unique to the area. Stories and traditions have been passed down through generations, often by family and community members but also through the few texts that have been written on the subject. As a writer and local of the area, this cultural tradition has played a significant role in helping me to discover my own voice through looking at the voices that came before me.

For this project, I will focus on a study of items in the special collections holdings at Bridgewater College that pertain to folklore of the Shenandoah Valley, making a document that details said items and their cultural significance. I will take several visits to the special collections, read through several texts on folklore of the Valley, and interview several local individuals who are knowledgeable on the subject. Through this project, I hope to aid any future research of items in the special collections and ensure that the importance of these items and the culture they come from is not lost.

KAYLA CLINE | 5-5:20 P.M. | ZOOM

Faculty Mentor: Prof. Tom Rosengarth | Research for: Honors project

WOMEN IN ACCOUNTING

There is gender inequality at the equity partner level in public accounting firms. The number of female partners is much lower than male partners. This paper examines the three main reasons for this discrepancy. The reasons are the difficulty in finding an appropriate work-life balance, good formal and informal mentors, and the extra financial risk associated with being an equity partner. Next, comparisons to law firms and educators are made examining the reasons for any gender inequality in those industries. Finally, proposed solutions to the three main reasons for the gender inequality in public accounting are explored.

MCKENZIE MELVIN | 5:20-5:40 P.M. | ZOOM

Faculty Mentor: Dr. Kevin Pallister | Research for: Honors project

THE CLOCK IS TICKING: ARE THE FARC'S CHANCES FOR SURVIVAL IN COLOMBIA DWINDLING?

The latter half of the twentieth century in Latin America was characterized by the rise of insurgent guerilla organizations that challenged the established political systems throughout the region. Between 1964 and 1970, three such groups were organized in Colombia alone. Such organizations were ideologically leftist, and were focused on battling corrupt politicians, unfair government practices, and supporting the average, working-class citizen. Still, complicated relationships with the government and narcotraffickers repeatedly obscured and weakened the messages and goals of these groups. Tensions between insurgents, citizens, and government officials often culminated in violence that resulted in the deaths of innocent bystanders. This paper seeks to examine the question of the possible survival of the Fuerza Alternativa Revolucionaria del Común (FARC) in Colombia, the most recently demobilized insurgent group in Latin America, as a legitimate political party. I begin by reviewing the work of scholars of party-building and insurgent successor parties in post-conflict societies. I then conduct a thorough case study of the FARC as a political party, taking note of the institutional, organizational, domestic, and international challenges it faces in terms of its survival. Finally, I draw conclusions about whether or not the party is likely to survive into the future.

STUDENT POSTER PRESENTATIONS

ANASTASIYA KALYUK | 5:40-6 P.M. | ZOOM

Faculty Mentor: Dr. Sam Hamilton | Research for: TREB project

A FRAMEWORK FOR WRITING SELF-EFFICACY: STUDENTS' BELIEF IN THEIR OWN ABILITY TO SUCCEED IN A POSTSECONDARY WRITING CLASSROOM

In 2011, the Council of Writing Program Administrators (CWPA) published Framework for Success in Postsecondary, a position statement describing "the rhetorical and twenty-first century skills as well as habits of mind and experiences that are critical for college success" in a writing classroom. The statement identifies and defines eight writing-related habits of mind — curiosity, openness, engagement, creativity, persistence, responsibility, flexibility, and metacognition — the CWPA considers "ways of approaching learning that are both intellectual and practical...essential for success in college writing."

In my 2020 TREB-funded research project entitled "A Framework for Writing Self-Efficacy," I assessed students' own beliefs about their relative strengths and weaknesses — what social cognitive psychologist Albert Bandura identifies as self-efficacy — vis-à-vis the eight different Habits of Mind articulated in the position statement. In my presentation, I will discuss the results of this project related to three questions:

1. At what writing-related Habits of Mind do postsecondary writers believe they are strongest and weakest?
2. Why do postsecondary writers believe they are strong and weak at those Habits of Mind?
3. (How) Does a writing course affect postsecondary writers' Habits of Mind self-efficacy?

Wednesday, April 14

BOITNOTT ROOM/ZOOM

DR. TAMMY SHEEHY | 4-4:30 P.M. | BOITNOTT ROOM/ZOOM

Department: Health and Human Sciences

EXPLORING HIGH PERFORMANCE COACH EXPERIENCES OF SPORT PSYCHOLOGY CONSULTING FOR THEIR OWN PERFORMANCE

While many would argue that athletes are the 'performers' in sport, there is an increasing recognition of the coach as a 'performer' in their own right as well (Thewell, Weston, Greenlees, & Hutchings, 2008). High performance is a context where the expectations for success are greater but challenges to success are continually increasing and as a result, coaches face many of the same organizational, competitive, and personal stressors in the sporting environment that athletes do (Olusoga, Maynard, Butt, & Hays, 2010). Therefore, this study examined the experiences of eight high performance coaches who have utilized sport psychology consultants for their own performance enhancement needs. This study was conducted using a hermeneutic phenomenological methodology using semi-structured interview. Qualitative coding of the data was completed through thematic analysis. A number of these were elicited relating to reasons for engaging in personal sport psychology consulting (established trust, access through the team), ways that the sport psychology consultant provided support (facilitating self-awareness, enhancing performance, enhancing interactions), and barriers to use of a sport psychology consultant (lack of resources, stigma). Results of this study both support and expand on previous research related to coaches' perceptions of personal use of sport psychology.

DR. RYAN E. KEEBAUGH | 4:30-5 P.M. | BOITNOTT ROOM/ZOOM

Department: Music

MUSIC FOUND IN SILENCE

Every composer knows that the pre-creative silence is not empty but pregnant with possibility. It is presence as absence; absence as presence; which is precisely what music is. The umbilical cord between silence and music is the umbilical cord between heaven and earth. The Music of Silence is something to be approached with love and awe, that it might give birth to music. Only then might it be worthy of silence, rather than an intrusion upon it. My creative process and music have emerged only after I have been silent for quite some time. My presentation will be an in-depth discussion and demonstration on how I have engaged with silence and the sacred to produce my musical compositions.

Thursday, April 15

BOITNOTT ROOM/ZOOM

MARLEE CARROLL | 3-3:20 P.M. | BOITNOTT ROOM/ZOOM

Faculty Mentor: Dr. Yi Zhang | Research for: Honors project

ACCELERATING AHEAD OF TRENDS: HOW LEADERSHIP DECISION MAKING AT PELOTON ALLOWED THE COMPANY TO SUCCEED IN THE PANDEMIC

In this project, I will be working to assess how the decisions that the leaders of the Peloton company allowed them to grow and be successful amid the pandemic. I plan to explore how all the different factors came together to secure Peloton's spot as a successful company in 2020. These factors include business trends and how Peloton was able to predict them, how their values made them attractive to customers, and even how they reacted to challenges they faced. Many other companies had to adapt their strategies and struggled to continue to make profits when the pandemic hit, and consumers were forced to stay indoors. Peloton's products were able to fit into a niche that customers needed in these tough times. They even began to struggle to meet the high demands for their products.

ERIN FITZPATRICK | 3:20-3:40 P.M. | BOITNOTT ROOM/ZOOM

Faculty Mentor: Dr. Kevin Pallister | Research for: TREB Project

CAMPAIGN MESSAGING IN ARGENTINE PRESIDENTIAL ELECTIONS

Candidates inform voters of their policy initiatives, plans for office, and who they are as a candidate and leader during their campaign leading up to the election. They relay these messages through live public events, live addresses, campaign videos, and social media posts. Campaign videos and posts are carefully scripted and crafted to influence the citizens to vote for the candidate. However, this does not mean that all videos and posts are substantive. Politicians have a tendency to be bombastic and grandiose; they inflate their words to sound like they're saying a lot while actually saying very little. This is purposeful. This project analyzes campaign videos and posts made by the two front runner candidates in the two most recent presidential elections in Argentina. The two datasets include variables breaking down over two-hundred campaign videos and over eight-hundred tweets.

ERIN FITZPATRICK | 3:40-4 P.M. | BOITNOTT ROOM/ZOOM

Faculty Mentor: Dr. Bobbi Gentry | Research for: Honor's Project

SIMULATION OF A POLICY PROPOSAL TO THE STATE OF VIRGINIA

I am proposing that the Commonwealth of Virginia alter its code to require institutions of higher education to employ a certified mediator with training in conflict transformation and restorative justice practices, or to provide such training to an existing employee, to provide services to students, faculty and staff and to make an appropriation of $4.225 million to the Virginia Department of Education to fund this mandate. It is important that institutions with the main objective of fostering education see this goal through in all areas, including when responding to student conduct violations. Not only has it been found that the formal adjudication process, utilized by many institutions of higher education, favors one particular demographic group, but also that it does not successfully reinforce an institution's values. Restorative justice practices allow students to understand the value of community and a social contract, and meet the needs of a broader community.

GEMMA LEONARD | 4-4:20 P.M. | BOITNOTT ROOM/ZOOM

Faculty Mentor: Dr. Jill Lassiter | Research for: Honors project; TREB project

THE IMPACT OF SERVICE LEARNING ON THE SUCCESS OF UNDERGRADUATE STUDENTS IN HEALTH POSITIONS

Service learning is a pedagogical method that integrates classroom content and direct interaction with the surrounding community. Students who participate in service-learning courses are given the opportunity to apply the knowledge they develop in the classroom to real-world settings. This study explored the service-learning experiences of undergraduate students attending a small, liberal arts college in the mid-Atlantic region of the United States. These students were enrolled in a 300-level course within the health and exercise science discipline. They partnered with one of three local organizations and were tasked with implementing physically active games and programs into the community. One of the partner organizations worked with homeless individuals and the other two worked with disadvantaged youths. Students then participated in reflective assignments following the completion of the course. These reflections were the basis of qualitative analysis that was conducted for the purpose of determining what the students gleaned from their experience. Four themes were then established based on this analysis: communication skills, perspective taking, motivational skills, and resiliency. This study explores these themes and what implications they might have in understanding the influence that service learning has on professional development.

RACHEL PETTERSON | 4:20-4:40 P.M. | BOITNOTT ROOM/ZOOM

Faculty Mentor: Dr. Tammy Sheehy | Research for: Honors project

MOVING PAST THE BINARY: TRANSGENDER AND GENDER NON-CONFORMING STUDENTS EXPERIENCES OF AND PERSPECTIVES ON COLLEGE CAMPUS FITNESS CENTERS

Transgender and gender non-conforming (TGNC) people face various mental and physical health disparities. Despite this, spaces related to health and wellness are not always inclusive. Similarly, college campuses are often not as inclusive or accommodating as they should be. This study looks at the experiences of TGNC students at campus fitness centers. Through both quantitative and qualitative data gathered through an online survey, it aims to better understand the following: the presence of inclusive facilities; the perceived importance of facility variables; use of campus fitness facilities by TGNC students; what improvements they would like to see; and how any of these factors correlate with demographic and institutional variables. Ten students responded. As such, the data is not conclusive, but it is largely consistent with findings of similar studies. Both the quantitative and qualitative responses consistently suggest that gender-neutral bathrooms and changing rooms would improve TGNC students' experiences. The qualitative data also suggests that TGNC students are avoiding campus gyms due to feelings of discomfort, sometimes directly related to their gender identities and other times due to other factors. This study serves as a starting point for further research on how campus fitness centers can be more inclusive to TGNC students.

STUDENT RESEARCH PRESENTATIONS

ELIZABETH GAVER | 3-4 P.M. | ZOOM

Faculty Mentor: Dr. Yuka Kishida | Research for: Course project

'HOUSEHOLD MANAGERS': THE ISSUE OF WOMEN'S EMPLOYMENT IN CONTEMPORARY JAPAN

Despite modern Japan's evident economic success, persisting inequality between men and women is still apparent in the work field, furthered by societal expectations that drive women away from employment and overwork men. This presentation argues the causes of inequality for women in the work field, including societal expectations and the two-track system, as well as analyzes the effects on women's lifestyle and careers, including the wage gap and prevalence of non-standard employment. Furthermore, this presentation argues the increasingly detrimental effects of employment inequality on Japanese society as a whole, such as the declining fertility rate. Lastly, this paper will focus on domestic attempts by the state to combat this issue. This research is important, as the problem of inequality in employment is a worldwide phenomenon. Therefore, it is important to study its causes and effects in other states in order to best understand and develop possible solutions.

JOSHUA D. GIBSON | 3:20-3:40 P.M. | ZOOM

Faculty Mentor: Dr. Deva O'Neil and Dr. Jason Ybarra | Research for: Honor's Project

DYNAMICS OF A METEOR

As an object falls to Earth from space, its classification changes as it approaches the ground. These objects can contain a great amount of information regarding different stellar objects and areas of space. This project focuses on the meteor stage of the falling object, where the object is traveling through a planetary atmosphere and hitting the planet. This paper shows a simulation of possible flight paths of the meteor in regards to a dynamic atmosphere. This is accomplished by using a Jupyter Notebook to simulate a meteor's travel through an atmosphere.

DAN HANCOCK | 3:40-4 P.M. | ZOOM

Faculty Mentor: Dr. Deva O'Neil | Research for: Martin Award

AN ANALYTICAL APPROXIMATION OF GRAVITATIONAL WAVES

The goal of this project is to integrate pre-existing analytical models of gravitational waves into Python so that undergraduate students have access to a model gravitational waves that is straightforward and easy to understand. To facilitate this, we break the problem into two phases, the inspiral and the merger-ringdown. The inspiral phase is modeled using Post-Newtonian (PN) theory. The merger-ringdown phase utilizes an analytical model called the Implicit Rotating Source (IRS) that creates an analytical fit to data created by numerical relativity. To create the final waveform, we use two different matching techniques to combine the merger-ringdown and inspiral waveforms. Future research projects can use this template we have created to test the generated waveform with experimental data, create solutions for parameters such as non-zero eccentricity, and statistically determine the accuracy of the matching technique.

ANTON KOPTI | 4-4:20 P.M. | ZOOM

Faculty Mentor: Dr. Jason Ybarra | Research for: Martin Award

USING KING MODEL SIMULATIONS TO REFINE VIRIAL CLUSTER MASS ESTIMATES

Stars form when gas and dust in giant molecular clouds collapses into dense clumps through gravitational accretion. These stellar clusters are difficult to study because they are concealed by the dust in these clusters making it hard to collect sufficient spectroscopic data to determine cluster properties. To tackle this problem, I simulated star clusters using a spherically symmetric distribution called the King Model which approximates real clusters. Using this model, synthetic clusters are populated with stars. Data is then Monte Carlo sampled from these star clusters to simulate real observations. From these simulated observations we estimated cluster sizes and masses, and compared them to the model parameters of the distribution. This is then used to construct confidence interval tables.

HEIDI HULL | 4:20-4:40 P.M. | ZOOM

Faculty Mentor: Dr. Jenny Martin

SELF-REGULATION IN SECONDARY EDUCATION

Self-regulation is the process by which students improve their study abilities by intentionally preparing, monitoring their progress, learning from their experiences, and using what they learned to inform the way they study the next time. In education, self-regulation begins with students preparing by setting goals for a study session or educational activity. Next, students carefully observe their progress as they complete the activity. Once the activity is finished, students consider how they did, make note of what they did well, and decide what needs to be changed. This information should be used as a student plans for the next study session. Developing self-regulation has several benefits for students, including deeper understanding of the material studied, stronger academic performance, and greater planning skills that will serve students in future workplaces. Several skills contribute to the ability to self-regulate, such as self-assessment, metacognition, and goal setting. Teachers can model self-regulation for their students and support their development of this ability by providing rubrics and incorporating other elements of self-regulation into the school routine.

FACULTY RESEARCH PRESENTATIONS

Thursday, April 15

BOWMAN 101/ZOOM

DR. VERNE LEININGER | 4-4:30 P.M. | BOW 101/ZOOM

Department: Math and Computer Science

PAIR-WISE NONTRANSITIVE DICE

A set of dice is said to be nontransitive if for any die in the set there exists another die in the set which will "beat" it where we usually define "beat" as rolling a higher number more than half of the time. There are several well known sets of nontransitive dice. In this research we look at the following generalization. Can we construct a set of dice (at least 5) such that for any pair of dice chosen from the set there exists a remaining pair of dice which will "beat" the chosen pair? The presentation will discuss a specific family of dice sets which appear to have the desired property.

DR. CURTIS BRADLEY | 4:30-5 P.M. | BOW 101/ZOOM

Department: Psychology

INVESTIGATING THE REINFORCEMENT ENHANCING EFFECTS OF CAFFEINE ON SACCHARIN AND ETHANOL SELF-ADMINISTRATION IN MALE C57BL/6J MICE.

Caffeine is the most consumed psychoactive drug in the world yet animal research has been unable to establish caffeine as a reinforcer. However, caffeine functions as a reinforcement enhancer, potentiating motivation to obtain reinforcers. The combination of alcohol with caffeine has become an issue of public health concerns within the past decade. Alcohol is commonly consumed by humans but preclinical researchers have difficulty establishing self-administration in animals. Researchers often rely on genetic strains or sucrose-fading procedures to establish reliable alcohol self-administration. When combined with alcohol, caffeine diminishes the inebriating effects of alcohol and promotes increased rates of binge drinking. The goal of this study was to understand the parameters of gustatory reinforcers (saccharin) and caffeine's reinforcement enhancement on alcohol intake. Forty-two male mice were trained to lever-press for one of 7 different solutions: saccharin alone, caffeine alone, ethanol alone (5%), saccharin + caffeine, ethanol (5%) + caffeine, ethanol (5%) + saccharin (0.2%), and saccharin + ethanol + caffeine. Caffeine concentrations (1.25, 2.5, 5, and 7.5 mg/ml) were changed every five days to examine a dose-response relationship. Mice responded on a Progressive Ratio (PR) schedule of reinforcement during a one-hour session. Active lever presses, inactive lever presses, and reinforcers earned were calculated after each session.

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