4-11-2022

ASPIRE 2022 Program

Bridgewater College

ASPIRE 2022

A CELEBRATION OF THE

Arts,
Scholarship,
Performance,
Innovation &
Research
Excellence

APRIL 11 - 13

BRIDGEWATER COLLEGE

Message from members of the Research Resource Group:

Bridgewater College's commitment to the liberal arts means not only a diverse curriculum, but also opportunities for faculty to engage in scholarly work and to mentor students in inspirational endeavors. Accordingly, ASPIRE was established to celebrate such student and faculty scholarship, creativity, and artistic excellence.

The following is a compilation of the 2022 ASPIRE event. It includes brief synopses of (1) Student Oral Presentations, (2) Student Poster Presentations, and (3) Faculty Oral Presentations. We look forward to ASPIRE this year, and hope you celebrate the participants' accomplishments with us by visiting some of the events.

Sincerely,

Dr. Kevin Pallister, Chair
Dr. Stan Galloway
Dr. Bobbi Gentry
Dr. Timothy Kreps
Dr. Barnabas Otoo

Schedule Overview

MONDAY, APRIL 11

3:30-4:30 p.m. ..... McKinney 100 ..... Student Research Presentations

Hannah Barnett, "Psychosocial Outcomes of Orthopedic Injuries: An Analysis of the Relationship Between the Athlete and the Athletic Trainer"

Erin Dietz, "Coach and Athlete Perceptions of the Effects of the Menstrual Cycle on Female Athletic Performance"

Emily Schloss, "Interaction between Metabolic Rate and Limb Regeneration in Axolotls"

Jonathan Williams, "Chat Overlay Extension"

4-5 p.m. ..... FLC 217 .....Panel Discussion

Independence, Gender Roles, and Death in Latin American Poetry

Moderator: Matthew Wonderley

Presenters:

Katherine Menjivar Fuentes

Lexia Werner

Matthew Wonderley

TUESDAY, APRIL 12

3:15-4:30 p.m. ..... FLC 215..... Student Research Presentations

Macauley Calhoun, "Explaining the Fanaticism of the Imperial Japanese Military During the Pacific War"

Benjamin Chatterton, "The Low Countries at War: Responses of the Benelux Monarchs to Nazi Occupation"

Kylee Lorio, "Misogyny in Theatre: A Modern Examination of Sexism and Prejudice in Theatrical Works"

Savannah Scott, "Protesting for Peace: Women and the South Vietnamese Anti-War Movement"

4:45–5:45 p.m. ..... FLC 215..... Student Research Presentations

Samantha Hince, "Writing Center Resources"

Courtney Larrick, "Teaching Toolkit"

Lexia Werner, "Supporting Exceptional Learners through Evidence-based Practices in Social Emotional Learning and Academic Settings"

WEDNESDAY, APRIL 13

3:30-4:30 p.m. ..... FLC 215..... Creative Literary Arts Presentations

Samantha Brooks, "When I Die"

Dr. Stan Galloway, Poems for Ukraine

Sammie Herbst, "Everything She Won," "What I Do Not," & "I Know You Hate Me"

Logan Lotts, "Sorry, Can't, but XYZ"

Jude Salisbury, "Inhibition," "Elegy to Faith," and "In Motion"

Vashawn Sharp, "Pole," "Regret," and "To Learn"
David Sullivan, "Rubbernecking"

4:30-5:30 p.m..... McKinney 100..... Student Research Presentations
Matthew Gordon, "Statistical Comparison Between Observational Data and Simulated Gravitational Waves"
Tyler Lynn, "Synthesis and Transition Metal-Catalyzed Coupling of a-chloro-b-lactones"
Lane Phillips, "COVID-19 Pandemic Effects on Environment"

4:30-5:30 p.m..... FLC 215..... Faculty Research Presentations
Dr. Martin Kalb, "Environing Empire: Nature, Infrastructure, and the Making of German Southwest Africa"
Dr. Verne Leininger, "Chaucer's Chickens: A History of a Breed?"
Dr. Brandon Marsh, "Britons, Kashmir, and the End of Empire"
Dr. Kevin Pallister, "The Medium and the Message in Argentina's Presidential Campaigns"

5:30-6:30 p.m..... KCC Lobby ..... Student Poster Presentations
Posters will be on display in the KCC lobby throughout the week.

2022 Senior Art Majors Thesis Oral Presentations

April 26, 2022

Juan Romero.....Where We Are From
Ryanna Power.....College Chaos
Taylor Corbin.....Frame of Reference
Nina King.....Sustainable Upcycling
Anna Suter.....Mustang Dissected
Brittany Irwin.....Malformation
Jordan Davis.....Dear PWI: Black Experiences at Bridgewater
Adrielle Benner.....Websites Around the World: Graphic User Interface in Non-Western Design
Brooke DiCicco.....Echoes of Reality
Deborah Wakilongo.....Narratives in Glass
Elizabeth Leal-Cruz.....Imaginative Thinking
Alicia McCarthy.....Fighting My Battle
Tyler Tabor.....The JD Collection
Cassie Jordan.....Beautifully Banal
Noah Ross.....On the Fly: An App by Fly Fishermen...For Fly Fishermen
Christina Ludwig.....The Faces of Grief
Ashley Dupree.....Beyond the Door

HANNAH BARNETT | Faculty Mentor: Dr. Leah Washington | Research for: Honors project

PSYCHOSOCIAL OUTCOMES OF ORTHOPEDIC INJURIES: AN ANALYSIS OF THE RELATIONSHIP BETWEEN THE ATHLETE AND THE ATHLETIC TRAINER

MACAULEY CALHOUN | Faculty Mentor: Dr. Yuka Kishida| Research for: Honors project

EXPLAINING THE FANATICISM OF THE IMPERIAL JAPANESE MILITARY DURING THE PACIFIC WAR

My project – and presentation – sought to answer the following question(s): Why did the imperial Japanese military behave so grievously towards its adversaries and prisoners throughout the duration of the Pacific War? Why were Japanese soldiers themselves expected to engage in ritualistic suicide rather than capitulating? Why did Japan continue to fight a losing war following the Battle of Guadalcanal? In answering these respective questions, I discovered that nearly every stratum of Japanese society was corrupted by a hyper-militaristic elite, including government, mass media, cinema, bygone rites, and ancient codes of honor. If it were not for these perversions, it is not beyond the realm of distinct possibility that Japan would not have sought imperial expansionism, nor conflict with the United States. This author's thesis details the how, the why, and the when of the gradual degradation of Japanese society, replete with riveting stories of hardship – both American and Japanese. It is my express hope – instead of a dry and stereotypical presentation – to present a short-documentary detailing my subject, replete with commentary, imagery, and video footage.

BENJAMIN CHATTERTON | Faculty Mentor: Dr. Brandon Marsh | Research for: Honors project

THE LOW COUNTRIES AT WAR: RESPONSES OF THE BENELUX MONARCHS TO NAZI OCCUPATION

In May of 1940, Belgium, the Netherlands, and Luxembourg were quickly overrun by Nazi forces. While the Low Countries had each promised neutrality should a wider European war break out, Hitler and his generals dismissed these declarations due to their avaricious demand for territory and wider plans towards invasion of France. As such, the Low Countries were invaded in a surprise attack that saw them each capitulate within days despite resistance by their own militaries. In this chaos, the monarchies of Belgium (King Leopold III), the Netherlands (Queen Wilhelmina), and Luxembourg (Grand Duchess Charlotte) were each left with a difficult choice. On one hand, they had the opportunity to remain in their occupied countries alongside their subjects and soldiers, which was similar to the circumstances of the French government based in Vichy. On the other, the monarchs could have fled to the relative safety of Britain to manage their governments-in-exile more effectively and to encourage their countrymen to resist Axis aggression whenever possible through propaganda broadcasts. This project examines each of the Benelux monarch's responses to the occupations of their respective realms as well as their activities in exile or captivity.

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

COACH AND ATHLETE PERCEPTIONS OF THE EFFECTS OF THE MENSTRUAL CYCLE ON FEMALE ATHLETIC PERFORMANCE

The purpose of this study is to examine the knowledge of the effects of the menstrual cycle on female athletic performance from both athletes and their coaches at the NCAA Division III level. Recommendations for coaches based on the findings of the research will be provided. The study will investigate whether female athletes and their coaches are aware of the physiological and emotional effects of the menstrual cycle and how they are managed throughout the course of a sport season.

STUDENT ORAL PRESENTATIONS

MATTHEW GORDON | Faculty Mentor: Dr. Deva O'Neil | Research for: Honors Project

STATISTICAL COMPARISON BETWEEN OBSERVATIONAL DATA AND SIMULATED GRAVITATIONAL WAVES

My project uses Python programming to approximate the behavior of a gravitational wave. A gravitational wave results from "binary systems" - merging black holes or neutron stars. In the model, the masses of the black holes or neutron stars are used to determine the form of the gravitational wave. I am using data from an observed binary system that is posted on the Gravitational Wave Open Science Center (GWOSC) website. I will use statistical methods to compare the observed gravitational wave to the approximate gravitational wave that I modeled to see how closely they match up.

SAMANTHA HINCE | Faculty Mentor: Prof. Ashley Lauro | Honors Project

WRITING CENTER RESOURCES

This project facilitated the composition of a series of resources for the Bridgewater College Writing Center website, part of the MyBC online portal. The result was thirty resources on writing-related topics such as the writing process, including prewriting, drafting, and revising; citation styles and avoiding plagiarism; and grammar, mechanics, and style. These resources are available to Bridgewater College students, faculty, and staff. The primary purpose of these resources is to assist Writing Center tutors during tutoring sessions with students and to provide supplemental writing assistance for students. Project development was based on research into college writing centers and best practices for writing instruction in higher education. This process was completed in collaboration with the Writing Center Director, with the Forrer Learning Commons' Learning Services Librarian, and with the IT and Marketing departments.

COURTNEY LARRICK | Faculty Mentor: Dr. Jenny Martin | Research for: Honors project

TEACHING TOOLKIT

The idea for this project stems from my capstone project in Content Area Literacy. It was in this course that I made a Thematic Resource Kit. This kit included literacy strategies as well as texts that could be utilized in the classroom. For my honors project, I intend on expanding upon this concept. My project will be an educational toolkit that I can make use of throughout my teaching career. My project will include instructional strategies, texts, field trip ideas, a unit plan template and bulletin board ideas. It will be separated into primary and secondary categories. I will be gathering information and ideas while I substitute teach throughout this semester. My honors project will be housed on my WordPress site. This toolkit will help me become a better educator. My research will help me plan lessons when I student teach and start my teaching career as an art educator.

KYLEE LORIO | Faculty Mentor: Dr. Scott Cole | Research for: The Research Experience @ Bridgewater (TREB)

MISOGYNY IN THEATRE: A MODERN EXAMINATION OF SEXISM AND PREJUDICE IN THEATRICAL WORKS

To what extent does gender determine one's fate? When you enter a room, where do you stand? In a group, are you the first to talk or the last? How often do you use the word "just" in your emails? In Western culture, our perceived gender not only socializes us, but determines the bounds of our personal perception. Our gender shackles us to societal norms and perceived responsibilities, limiting the choices that we are allotted within our lifetimes. With a central focus on Neil LaBute's *Reasons to be Happy*, I will use Dolan's notion of resistant readership and Solga's notion of gender performity to illustrate the choices available to Greg in contrast to that of his women counterparts. I will then expand this analysis to various theatrical productions across various centuries, touching on the available options to Hedda in Henrick Ibsen's *Hedda Gabler* and to Teach in David Mamet's *American Buffalo*.

TYLER LYNN | Faculty Mentor: Dr. Barnabas Otoo | Honors Project

SYNTHESIS AND TRANSITION METAL-CATALYZED COUPLING OF A-CHLORO-B-LACTONES

B-lactones, similar to b-lactams, are a class of molecules with a wide range of functions, many of which are still being explored, including as antimicrobials and cholesterol-lowering drugs. Orlistat, for example, is a Food and Drug Administration (FDA)-approved b-lactone drug to treat obesity, as it inhibits fatty acid synthesis and has also been shown to have anti-tumor properties. Many b-lactone derivatives have been synthesized including a-Chloro-b-Lactone, and some have been used in Suzuki Coupling reactions to create other products, though not a-Chloro-b-Lactone. The ultimate focus of this project will be to synthesize a library of a-aryl- and a-alkyl-b-lactones for future medicinal testing. The synthesis will be achieved in three steps: 1) the boron-mediated aldolization of chloroacetic acid with selected aldehydes and ketones to obtain a-chloro-b-hydroxy acids, 2) lactonization of the 2-chloro-3-hydroxy-3-arylpropanoic acids using dicyclohexylcarbodiimide (DCC)6 or pyridine and tolylsulfonyl chloride reaction, and 3) transition metal-catalyzed coupling of alkyl- and arylboronic acids with the a-chloro-b-lactones to obtain the target lactones. Ultimately, we hope to develop a novel method for the Suzuki coupling of a-chloro-b-lactones.

LANE PHILLIPS | Faculty Mentor: Dr. Kenneth Overway | Honors Project

COVID-19 PANDEMIC EFFECTS ON ENVIRONMENT

The ongoing COVID-19 pandemic has claimed many lives and altered almost everyone's way of living in some way or another over the past two years. With these global changes, there are a few clear-cut effects on both global and regional environments in various negative and positive ways. These environmental effects are a direct result of COVID-19 policies as well as shifting societal norms throughout the pandemic. Some examples of this being a noticeable increase in air quality in cities that imposed lockdowns as well as a stark increase in plastic pollution as the demand for personal protective equipment (PPE) spiked worldwide.

STUDENT ORAL PRESENTATIONS

EMILY SCHLOSS | Faculty Mentor: Dr. Moshe Khurgel | Research for: Honors Project

INTERACTION BETWEEN METABOLIC RATE AND LIMB REGENERATION IN AXOLOTLS

This research project focused on analyzing the interactions between environmental temperature condition, metabolic rate, and rate of post-amputation limb regeneration. Shifts in basal metabolic rate were induced by housing adult axolotls at different water temperatures. The rate of metabolism at each temperature condition was estimated by measuring the rate of oxygen consumption and carbon dioxide output prior to limb amputation and at two different stages in the regenerative process. Significant differences in the rate of limb regeneration were observed in response to variable temperature conditions. The results of the interactions between all experimental variables will be discussed.

SAVANNAH SCOTT | Faculty Mentor: Dr. Yuka Kishida | Research for: Coursework

PROTESTING FOR PEACE: WOMEN AND THE SOUTH VIETNAMESE ANTI-WAR MOVEMENT

Like the American anti-war protests during the Vietnam War, a domestic anti-war effort led by women took hold in Vietnam during their civil war. Opposition to Vietnam's civil war developed due to the controversial strategies of the American military and the South Vietnamese government's repressive measures. The work of Vietnamese Buddhist women and the Women's Movement for the Right to Live reveal the active participation of women in Vietnam's anti-war movement. This paper argues how the South Vietnamese women used the anti-war movement to defend their nation and, in the process, became more politically involved. Sources from local Vietnamese pamphlets, Amnesty International, and an appeal to the U.S. Congress are used to support the claim of women's active involvement in the peace movement. The anti-war protests were inherently political, and examining South Vietnamese women's participation offers insights into their current political participation.

LEXIA WERNER | Faculty Mentor: Dr. Gwenn Jones | Research for: Honors Project

SUPPORTING EXCEPTIONAL LEARNERS THROUGH EVIDENCE-BASED PRACTICES IN SOCIAL EMOTIONAL LEARNING AND ACADEMIC SETTINGS

My honors project will be purposeful in researching the learning strategies that help all students and comparing and contrasting them to strategies that specifically help learners with learning differences and/or have special education plans. These exceptional learners have specialized accommodations or educational plans tailored towards their learning needs. I will research the teaching strategies that are used in the classroom environment from a standard general education standpoint and strategies that are used, specifically, with students that obtain learning differences. In addition, I will analyze this information by comparing and contrasting the groups of strategies with one another. In conclusion, my project will show the similarities and differences between general education strategies and strategies used exclusively with students that obtain learning differences. I will also include how the implementation of Social Emotional Learning standards help foster growth in the learning of students, especially ones that obtain learning difficulties.

JONATHAN WILLIAMS | Faculty Mentor: Dr. Eric McGregor | Research for: Honors Project

CHAT OVERLAY EXTENSION

To improve the process of chatting with one's friends while browsing the Internet, an extension for the Google Chrome browser was made that overlays a live chat onto the active web page of the user. The user can choose a display name and room code in the extension toolbar to be connected to their friends. Once connected, they can send messages back and forth in a chat that persists between web pages. The user can also move the chat in the case it obstructs content on the page. The extension was programmed in Javascript following Chrome's Manifest v3 guidelines and communicates with a server also developed with Javascript and taking advantage of the Node.js runtime. This project will be published on the Chrome Web Store and will be publicly available.

STUDENT POSTER PRESENTATIONS

JACOB HOWARD | Faculty Mentor: Dr. Robyn Puffenbarger | Research for: Honors Project

GENETIC TESTING FOR NON-MAJOR BIOLOGY STUDENTS

The aim of my honors project is to teach non-major biology students (BIOL-100) the concept of genetic testing and the importance of interpreting genetic results. I will do this by creating a lab manual and a PowerPoint presentation that helps students easily understand the material while also performing lab techniques that are crucial to scientific research. This is a two-week lab where students will test their own DNA and interpret the results using PCR and gel electrophoresis. In the lab the students cannot obtain real genetic results because the lab focuses on a portion of the genome that is not used to create proteins in the body; therefore, it is completely safe for laboratory usage. While performing the lab, I will present a presentation that shows what real genetic results can look like and why it is important for students to understand genetics at a general level. The main goal throughout this lab is to stress that the field of genetics is growing exponentially with new technology and the likelihood of everyone receiving genetic testing in their lifetime is high.

ANISSA BOYERS | Faculty Mentor: Dr. Stephen Baron | Research for: Coursework

PCR ANALYSIS OF TETRACYCLINE RESISTANCE GENES IN ENVIRONMENTAL *ESCHERICHIA COLI* STRAINS

Tetracycline is a commonly used broad spectrum antibiotic that targets the bacterial ribosome and inhibits protein synthesis. Bacterial resistance to tetracycline can occur via drug efflux from the cell, changes in the ribosomal binding site, or enzymatic modification of the drug. These mechanisms are driven by the expression of tet genes. These genes can be acquired in pathogenic and commensal *Escherichia coli*, which is a Gram negative, rod-shaped bacterium that is found in the intestinal tracts of animals. Our goal was to detect tetB and tetM genes in 14 environmental *E. coli* strains using polymerase chain reaction (PCR) and to determine the minimum inhibitory concentration (MIC) values of tetracycline in each strain.

TREVOR BROOKS | Faculty Mentor: Dr. Timothy Kreps | Research for: The Research Experience @ Bridgewater (TREB)

MAPPING THE URBAN HEAT ISLAND EFFECT OF HARRISONBURG AND BRIDGEWATER

The urban heat island effect occurs when an abundance of impermeable surfaces with low albedo are concentrated in an urban area. These surfaces absorb solar radiation and increases temperatures. This rise in temperatures is often not evenly distributed with lower socioeconomic areas being disproportionately affected. During the summer of 2021, a community wide effort was undertaken to map the urban heat islands of Bridgewater and Harrisonburg. This effort was done in collaboration with other member schools of VFIC and CAPA Strategies, which culminated in the largest single-day snapshot of temperatures in history. The culmination of the mapping has resulted in a coalition of interest groups and municipal officers who are attempting to introduce coherent policy to mitigate the UHI effect in the Harrisonburg and Bridgewater communities.

JONATHAN BRUBAKER AND BENJAMIN HANKS | Faculty Mentor: Dr. Ian McNeil | Research for: Honors project, Coursework

CYCLIC STEP CHRONOPOTENTIOMETRY OF DYE SENSITIZED SOLAR CELLS

Photoinjected electrons must diffuse through the dispersive energetic landscape of the available acceptor states in the semiconductor film. The availability of these acceptor states changes as photoinjected electrons occupy these sites and can further be altered by the presence of lithium ions in the electrolyte solution. This study offers a different perspective by performing chronopotentiometry where we characterize the time dependent changes in the potential when under intermittent current. By changing the Fermi level, the relative availability of acceptor sites in the semiconductor change, which may influence the electron diffusion kinetics. To explore these differences, the potential growth and decays after current is either applied or stopped is fit with a biexponential model. The lifetime values of devices with and without lithium in the electrolyte solution as well as devices under illumination or in the dark are compared.

BENJAMIN CHATTERTON | Faculty Mentor: Dr. Brandon Marsh | Research for: The Research Experience @ Bridgewater (TREB)

THE ANSONS: A VIRGINIA HOUSEHOLD'S RELATIONSHIP WITH THE BRITISH EMPIRE

Martinsville's Anson family, an aristocratic household with roots in Queen Victoria's court, maintained a series of notable correspondences during the World War I era. Primary source-based research was conducted on these archival documents in order to determine their contents and historical significance. Many different themes in the letters' content became apparent, including World War I, the Irish Civil War, religious life in Britain and Martinsville, local events in Southwest Virginia, the Ansons' elite social class, early 20th-century health and medicine, and British nationalism. This project, conducted under the auspices of The Research Experience @ Bridgewater (TREB) program, synthesized these materials and made their vast contents suitable for public consumption.

KYLIE CHISNELL | Faculty Mentor: Dr. Scott Cole | Research for: Honors Project

***DEATH OF A SALESMAN*: A THEATRICAL EXAMINATION OF THE "AMERICAN DREAM" ON THE HUMAN PSYCHE**

Willy Loman is a salesman who is nearing the end of his life. As his mind begins to deteriorate, the viewer experiences several memories, dreams, arguments, and conversations that Willy has had. The Loman family in the play is in a perpetual cycle of denial, confrontation, and contradictions. Willy is most notably difficulty on his eldest son, Biff, who does not seem to live up to Willy's expectations. The play tragically ends with Willy's suicide and funeral. This theatrical version of the play will focus on the problematic issues that arise from chasing the notion of the "American Dream." It will examine the stigma around the decline of Willy's mental health and explain how chasing the "American Dream" can make us blind to our own health.

STUDENT POSTER PRESENTATIONS

NATALIE ELLIS | Faculty Mentor: Dr. Moshe Khurgel | Research for: Honors Project

GROWTH AND DEVELOPMENT OF AXOLOTL LARVAE

Each time that a new spawn of fertilized axolotl eggs is deposited, it has been observed that as the larvae in that spawn grow, each individual reaches particular developmental milestones differently, despite similar genetic background and all animals being housed under the same conditions. We hypothesized that the metabolic rates of the individual larvae vary significantly such that the variation between growth timelines is observed. Individual larval growth is being tracked with periodic measurements of full body length and weight. The original spawn of larvae was housed as a community and monitored for individuals growing significantly larger than the others. Once noted, these individuals were separated into experimental groups such that each group is of approximately uniform size. The data will be analyzed at the commencement of the three month study to determine if a correlation was present between the metabolic activity and rate of growth between individuals.

KARA EPPARD AND RITCHIE MARSHALL | Faculty Mentor: Dr. Barnabas Otoo | Research for: Coursework

SYNTHESIS OF FLUOXETINE VIA ALDOL AND MITSUNOBU REACTIONS

In the organic laboratory, we are synthesizing fluoxetine. Fluoxetine, also known as Prozac, is a drug used to treat depression and various other mental health disorders. In our Organic Chemistry class, retrosynthesis was utilized to propose two possible routes for the synthesis of fluoxetine. My partner and I opted to use the aldol synthesis route to synthesize our product. Our synthesis begins with the aldol reaction of acetic acid with benzaldehyde. A protecting group is then installed to protect the oxygen as we conduct mitsunobu reaction to install an ether. After removing the protecting group, we will be utilizing amidation and a lithium aluminum hydride reduction to synthesize our product.

MICHAEL GOLINOWKSI | Faculty Mentor: Dr. Daniel Finseth | Research for: Honors Project

BUSINESS INVESTIGATION FOR GOLINOWSKI SPORTHORSES LLC.

Based on my honors project for this academic year, this Business Investigation for Golinowski Sporthorses LLC is not meant to prove profitability for a potential equine training and sales business in Virginia, but instead to use economic and business administration tools to evaluate multiple avenues such a business can take and decide whether or not a profitable business is possible. The theoretical business would be owned and run by myself and be located in Crozet, Culpeper or Warrenton, Va. Economics and financials for each location vary greatly and are thoroughly explored in this project.

BENJAMIN HANCOCK | Faculty Mentor: Dr. Ian McNeil | Research for: Honors Project

HYSTERESIS OF PHOTOCURRENT DECAY AND GROWTH IN DYE-SENSITIZED SOLAR CELLS UNDER INTERMITTENT LIGHT

Dye-sensitized solar cells provide a cheap alternative compared to solar arrays on the market; however, efficiency issues limit their economic viability. Research has shown photoinjected electrons could remain in an acceptor state and prevent the future injection of an electron, causing inefficiencies. Previous intermittent light studies on devices made with anthocyanin dye and TiO2 films revealed a hysteresis where the photocurrent kinetics post exposure to light depend on the length of time under illumination or in the dark. This study further investigates this hysteresis by exploring different combinations of on/off illumination times as well as the influence of lithium in the electrolyte solution by varying the concentration of lithium perchlorate used to make the devices. The resultant photocurrent decays are fit with a bi-exponential decay model. The lifetimes between the different on/off illumination times are compared as well as trends observed from the effect of the varying lithium electrolyte concentrations.

DANIEL HANCOCK | Faculty Mentor: Dr. Deva McNeil | Research for: Honors Project

PRESSURE PROFILES FROM IMPROVED NOISE QUANTIFICATION

We present pressure profiles of the galaxy cluster RX J1347.5-1145 determined by high resolution Sunyeav-Zel'dovich (SZ) observations from the MUSTANG-2 Bolometer on the Green Bank Telescope. We model the cluster using both spherical and elliptical pressure profiles. Furthermore, we analyze and modeled a shock generated from supersonic cluster mass. We introduce a change in technique from previous papers where we no longer assume the noise to be independent. To account for this change, we look at the covariance matrix of a noise map for each cluster and implement that into our model. We take both of these models and construct non-parametric fits to create electron pressure profiles. Then, we take these fits and compare them with data from the Archive of Chandra Cluster Entropy Profile Tables (ACCEPT). We have compared all three of these models within one sigma in order to test for agreement.

FLETCHER JACKSON | Faculty Mentor: Dr. Daniel Finseth | Research for: Honors Project

THE TRUTH IN SUSTAINABILITY

This project investigates whether the sustainable initiatives of businesses are implemented with the primary goal of monetary gains or the improvement of the environment. Relevant literature will provide background on the current relationship between corporations and the environment. Moral philosophy, legitimacy, and isomorphism will provide possible explanations for why businesses are transitioning to greener practices. The company Nike will be analyzed in depth as a case study to determine their motivation towards sustainability.

STUDENT POSTER PRESENTATIONS

OLIVIA KLOSTER | Faculty Mentor: Dr. Hale | Research for: Honors Project

THE IMPACT OF SOCIAL ISOLATION ON RETIREMENT COMMUNITY RESIDENTS AND EXERCISE AS AN INTERVENTION

Particularly during the lockdowns and social-distancing regulations due to the COVID-19 pandemic, many retirement communities limited the access residents had to each other as well as their families and friends. As with any age group, there are additional factors (e.g. bullying) that are prevalent in many retirement communities. This project seeks to research how social isolation and other factors impact the residents' well-being and examine how group exercise is a positive intervention to address this concern.

HEATHER KNOTT | Faculty Mentor: Dr. Stephen Baron | Research for: Honors Project

DEVELOPMENT OF AN ELECTROPORATION METHOD OF TRANSFORMATION FOR *STREPTOMYCES SP.* SFB5A

Attempting to create a method of getting DNA into *Streptomyces sp.* SFB5A using electroporation, or shocking the cells. Multiple avenues were explored, including changing the voltage of the shock and the growth stage of the cells.

BROOKE LOCASCIO | Faculty Mentor: Dr. Tamara Johnstone-Yellin | Research for: Honors Project

HYPOCRISY OF HUNTING: HOW THE IMPLEMENTATION OF THE 7TH PILLAR OF THE NORTH AMERICAN MODEL OF WILDLIFE FAILS TO SUPPORT WILDLIFE CONSERVATION

Democracy of Hunting, the seventh pillar of the North American Model of Wildlife Management, and the Pittman-Robertson Act support wildlife conservation based on access to hunting available to all. Although this pillar supports wildlife management in the United States financially, the implicit discrimination against underrepresented groups harms conservation efforts. Historically, African Americans, women, Native Americans, and immigrants were excluded from hunting, while hunting participation by white settlers was promoted. Today, financial and physical barriers exclude these groups from hunting. Current programs like workshops introducing college students to hunting may narrow the participation gap; however, societal barriers, like the exclusion of minorities from hunting spaces, are more difficult to combat. By acknowledging the hypocrisy of Democracy of Hunting, and through programs intended to improve equity in wildlife activities, we can dismantle these barriers to recreational participation.

YOUMNA MOAWAD | Faculty Mentor: Dr. Stephen Baron | Research for: Martin Project

EFFECTS OF INTRODUCING A LEUCINE-RESPONSIVE REGULATOR GENE INTO WILD TYPE AND BALD MUTANT STRAINS OF *STREPTOMYCES SP.* SFB5A ON POLYHYDROXYBUTYRATE DEGRADATION AND COLONY MORPHOLOGY

Polyhydroxyalkanoates (PHAs) are biodegradable polymers that can be substitutes for nonbiodegradable polymers, such as petroleum-based plastics. PHAs are degraded by PHA depolymerases, which are extracellular enzymes. *Streptomyces sp.* SFB5A produces a PHA depolymerase, and the enzyme is encoded by a phaZ gene. An lrp gene was found 2,700 bp upstream from phaZ and is suspected to be a transcriptional regulator, as well as a morphogenesis and secondary metabolism regulator. This lrp gene was isolated, amplified, and cloned in *E. coli* ET12567/pUZ8002 and extracted to make a recombinant plasmid, pIJ86-lrp. The plasmid was utilized in the intergeneric conjugation between *E. coli* ET12567/pUZ8002 + pIJ86 and WT and bld4 *Streptomyces sp.* SFB5A; however, the trials were unsuccessful.

YOUMNA MOAWAD | Faculty Mentor: Dr. Kenneth Overway | Research for: Coursework

IDENTIFICATION AND QUANTIFICATION OF ATRAZINE IN THE NORTH RIVER USING SPE AND HPLC

High-performance liquid chromatography (HPLC) is utilized for the separation, purification, and quantification of viscous and complex analyte mixtures. It is important in that it can analyze and detect low analyte concentrations, which can be useful in many industries, such as food and pharmaceutical industries, as well analyzing environmental samples. The purpose of this project was to identify and quantitate atrazine, an herbicide, in a water sample from the North River (Bridgewater, Va.) using solid-phase extraction (SPE) and HPLC.

LEISHA NISSLEY | Faculty Mentor: Dr. Jenny Martin | Research for: Honors Project

THE ULTIMATE ACADEMIC PLANNER

My project is research done on self-regulation and the use of planners as a tool to help students specifically self-regulate and find academic success through organization. The culmination of this research directly influenced the creation of a planner created with the BC community in mind and backed by student surveys and research.

GRACE RILEE | Faculty Mentor: Dr. Kenneth Overway | Research for: Honors Project

EXTRACTION AND PURIFICATION OF PPIX USING FPLC

Dye-sensitized solar cells (DSSC) offer an effective possibility for alternative energy; however, the porphyrin sensitizer can get rather expensive. Protoporphyrin IX (PPIX), a naturally occurring porphyrin, can be found in brown eggshells, and used as a sensitizer. PPIX is the ideal sensitizer for two reasons. (1) On the absorbance spectrum, PPIX and a typical porphyrin molecule both show similar spectra, allowing for easy comparison. (2) PPIX allows for direct attachment to the DSSC due to the carboxylic acid substituents on PPIX and the TiO2 of the DSSC. The goal of this research is two-fold. The first is to extract PPIX from brown eggshells. The second is to purify the extract using the Pharmacia FPLC. Hopefully, by the end of the project, I will have pure PPIX.

CAMRYN ROSENBERGER | Faculty Mentor: Dr. Tamara Johnstone-Yellin | Research for: Coursework

EFFECTS OF ON-CAMPUS ACTIVITY DURING A PANDEMIC ON THE OCCURRENCE OF BIRD-WINDOW COLLISIONS AT BRIDGEWATER COLLEGE

Each year, a projected one billion birds die in North America from "bird strikes," or collisions with windows (Hager et al. 2017). Most of these strikes occur in rural communities, such as the Bridgewater College campus in the Shenandoah Valley of Virginia. In collaboration with other Virginia colleges researching window collisions, we surveyed buildings on campus to record incidences of bird strikes. In addition to studying the heterogeneity of the landscape and buildings in relation to strike frequency, we also compared data from 2020 to 2021. We used this data to correlate the global COVID-19 pandemic in 2020 that decreased the number of faculty and students on campus to the increase of individuals back on campus in 2021.

STUDENT PROJECT PRESENTATIONS

HARRISON SENTER | Faculty Mentor: Dr. Stephen Baron | Research for: Honors Project

DISCOVERING THE ROLE OF REPEAT SEQUENCES IN REGULATION OF THE PHAZ GENE IN *STREPTOMYCES SP.* SFB5A

I worked with Dr. Baron to create recombinant plJ4083 plasmids. I then refined a method of protoplast preparation that may make protoplast transformation more successful. Several protoplast transformations were then attempted.

CASSIE TAYLOR | Faculty Mentor: Dr. Kenneth Overway | Research for: Coursework

ANALYSIS OF THE HEADSPACE GASES FORMED FROM THE FERMENTATION OF BARLEY

Volatile compounds contribute to the aromas that are associated with mixtures. The analysis of these gases can be completed using a gas chromatograph to provide a sort of fingerprint identification. The analysis of the volatile compounds for barley fermentation samples was completed by collecting the gas above the fermenting solution, the headspace gas, and injecting this gas into the gas chromatograph. These fermentation samples showed predominantly the formation of carbon dioxide for a significant length of time before finally ethanol was detected. A subsequent investigation of the limit of detection for ethanol was made. This analysis method was extended to a variety of household liquids including peppermint oil, almond extract, vanilla extract, Festivus beer, and red wine. Notable volatile compounds of each sample were not detected, so various types of sample preparation were completed in hopes of gaining a higher concentration sample of these volatile compounds.

JESSICA TOUVE | Faculty Mentor: Dr. Deva O'Neil | Research for: Honors Project

BAND PASS FILTER WITH APPLICATION TO GRAVITATIONAL WAVES

LIGO gravitational wave data was analyzed computationally using Fourier transforms and a band pass filter to show the merger ringdown effect. Along with the computational portion of this project, there is a physical component building an electronic band pass filter. The electronic band pass was contrasted with the computational band pass.

CHEYENNE VILLAROSA | Faculty Mentor: Dr. Tamara Johnstone-Yellin | Research for: Honors Project

CACHE LIKE A SQUIRREL: EFFECTS OF LONG-TERM STORAGE ON CRUDE FAT CONTENT OF *Q. PALUSTRIS* AND *Q. ALBA* ACORNS

Quercus palustris and *Quercus alba* acorns are a primary component in many wild animal diets, particularly during preparation for winter. As such, they provide a natural, easily gathered food staple for wildlife recovering in rehabilitation facilities. We examined whether collection and temperature-controlled storage methods differentially affect the nutritional deterioration of crude fat in acorns to assess both caching by wildlife and to provide recommendations to rehabilitators. We collected acorns from *Q. palustris* in 2020 (N=8) and *Q. alba* in 2017 (N=11) in Bridgewater, Va. Acorns were dried for 7 days using a fan or for 30 minutes in an oven at 93xC and then stored at room temperature hanging in onion bags, in the refrigerator, or in the freezer. We assayed fat content from all trees immediately after collection (baseline) and compared fat content after one month and six months of storage for both species and after 2 years of storage for *Q. alba* only. Storage at 4xC (refrigerator) resulted in germination of some *Q. alba* acorns and mold growth in both species. Although acorns from *Q. palustris* had significantly more fat than *Q. alba* acorns, individual trees varied widely, with greater variation among *Q palustris*. On average, drying, storage, and combination treatments resulted in greater losses in fat compared to baseline for *Q. alba* than *Q. palustris*, but not significantly. Our results suggest that acorns cached by species like squirrels (*Sciurus sp.*) do not vary significantly in fat content when recovered months later compared to acorns consumed directly from the trees. We recommend wildlife rehabilitators store acorns either in the freezer or at room temperature depending on their storage capabilities.

LEXIA WERNER | Faculty Mentor: Dr. Gwen Jones | Research for: Honors Project

SUPPORTING EXCEPTIONAL LEARNERS THROUGH EVIDENCE-BASED PRACTICES IN SOCIAL EMOTIONAL LEARNING AND ACADEMIC SETTINGS

My honors project will be purposeful in researching the learning strategies that help all students and comparing and contrasting them to strategies that specifically help learners with learning differences and/or have special education plans. These exceptional learners have specialized accommodations or educational plans tailored towards their learning needs. I will research the teaching strategies that are used in the classroom environment from a standard general education standpoint and strategies that are used, specifically, with students that obtain learning differences. In addition, I will analyze this information by comparing and contrasting the groups of strategies with one another. In conclusion, my project will show the similarities and differences between general education strategies and strategies used exclusively with students that obtain learning differences. I will also include how the implementation of Social Emotional Learning standards help foster growth in the learning of students, especially ones that obtain learning difficulties.

STUDENT PROJECT PRESENTATIONS

LAUREN WITMER | Faculty Mentor: Dr. Stephen Baron | Research for: Honors Project

DEFINING GENETIC ADAPTATIONS IN CLINICAL BACTERIAL ISOLATES FROM CYSTIC FIBROSIS

The goal of this study was to analyze longitudinal clinical isolates of *Staphylococcus aureus* and *Pseudomonas aeruginosa* for genetic adaptations in the cystic fibrosis environment. Whole genome sequencing was performed on the clinical isolates from two patients. Phylogenetic trees were constructed, and strains were subjected to multi-locus sequencing typing. Next, the genomes were analyzed for antibiotic resistance genes, and we found that isolates from persistent infections have more antibiotic resistance genes than the unrelated sporadic isolates. Using pangenomic and panallelomic tools, we determined the core and accessory genes and further identified rare alleles, thus delineating the novel genotypes that arose during the chronic infections in these patients. In summary, we developed a pipeline to identify pathways involved in adaptation during long-lasting coinfections in CF. Future studies will focus on deciphering the patterns in our bioinformatics data, and their functional consequences, to identify targets that can disrupt persistent infections.

STUDENT PANEL DISCUSSION

TOPIC: Independence, Gender Roles, and Death in Latin American Poetry

Students will present their original literary research completed for SPAN 402: Latin American Literature. Their work ranges from the influence of José Martí's poetry in the independence efforts of Cuba to the recurrence of themes such as death and women's liberation in early 20th-century Latin American poetry by women authors. Students' findings are drawn from literary analyses guided by various critical theory frameworks, such as feminist theory, psychoanalysis, and postcolonialism. All papers will be presented in English.

Position Papers:

Lexia Werner	"The Chaos of Life and Calmness of Death"
Katherine Menjivar Fuentes	"The Role of Women in the Poetry of Alfonsina Storni"
Matthew Wonderley	"José Martí and American Intersectionality"

Faculty Mentor: Dr. Grace Martin

CREATIVE LITERARY ARTS

SAMANTHA BROOKS | Faculty Mentor: Dr. Stan Galloway | Research for: Coursework

WHEN I DIE

A poem dealing with death and decomposition.

DR. STAN GALLOWAY

POEMS FOR UKRAINE

Poetry processing the current conflict between Ukraine and Russia.

SAMMIE HERBST | Faculty Mentor: Dr. Stan Galloway | Research for: Coursework

"EVERYTHING SHE WON," "WHAT I DO NOT," & "I KNOW YOU HATE ME"

Called "Deadly," it is a reiteration of three of the seven deadly sins: envy, pride, & wrath.

JUDE SALISBURY | Faculty Mentor: Dr. Stan Galloway | Research for: Coursework

"INHIBITION," "ELEGY TO FAITH," AND "IN MOTION"

A small trio of poems with a variety of style and topics ranging from college life to faith.

VASHAWN SHARP | Faculty Mentor: Dr. Stan Galloway | Research for: Coursework

"POLE," "REGRET," AND "TO LEARN"

Three poems exploring the mind of your not-so-average college student.

DAVID SULLIVAN | Faculty Mentor: Dr. Stan Galloway | Research for: Coursework

"RUBBERNECKING"

A story (poem) about road rage.

FACULTY RESEARCH PRESENTATIONS

DR. MARTIN KALB | Department: History and Political Science

ENVIRONING EMPIRE: NATURE, INFRASTRUCTURE, AND THE MAKING OF GERMAN SOUTHWEST AFRICA

German ambitions to transform colonial Southwest Africa (1884-1915) were futile and resulted in the widespread death and suffering of indigenous populations. For years colonists wrestled ocean waters, desert landscapes, and widespread aridity as they tried to reach inland in their effort to turn outwardly barren lands into a profitable white settler colony. This presentation, which introduces sections of a recently completed book project, outlines the development of the colony up to World War I. It reveals the importance of natural forces and the empire's everyday violence and deconstructs common settler narratives.

DR. VERNE LEININGER | Department: Math and Computer Science

CHAUCER'S CHICKENS: A HISTORY OF A BREED?

For over 150 years, an argument has raged about the breed of Chanticleer in Chaucer's "The Nun's Priest's Tale," a part of *The Canterbury Tales*. This has led to interesting claims, both in the past in books and today on the internet about the history of the Hamburg breed of chicken. This talk will examine some of these claims and try to make sense of the history of the Hamburg breed.

DR. BRANDON MARSH | Department: History and Political Science

BRITONS, KASHMIR, AND THE END OF EMPIRE

Based on documents held in the UK National Archives, the British Library, and Cambridge University, this presentation examines the role played by British Indian Civil Service (ICS) officers employed by the Pakistan Government during the opening phase of the in the Kashmir dispute (1947-49). Focusing on both well-known British ex-ICS, such as Sir George Cunningham, as well as more obscure civil servants, such as Paul Mainprice, the presentation explores their experiences, their views on Pakistan and the Kashmir question, and the nature of their relationships with the Commonwealth Relations Office and the British High Commission while they simultaneously carried out Pakistan's policies vis-à-vis India and the international community. Throughout this period, Pakistan employed over 70 high ranking British civil servants, and the crucible of the Kashmir dispute throws light on these individuals' impact on the development of the nascent Pakistani state, the expectations that British former ICS members had about the role they would play in the post-colonial polity, and the expectations and assumptions that officials in London had about the exercise and maintenance of British influence in the newly independent sub-continent.

FACULTY RESEARCH PRESENTATIONS

DR. KEVIN PALLISTER | Department: History and Political Science

THE MEDIUM AND THE MESSAGE IN ARGENTINA'S PRESIDENTIAL CAMPAIGNS

Do campaigns message to voters consistently across different media? And do competing candidates tend to converge over time on a single national style of campaign messaging? To address these questions, this article employs novel data from a content analysis of campaign spots and candidate tweets from the 2015 and 2019 presidential elections in Argentina. We find that the policy orientation of candidate messaging is similar across different media, with spots and tweets addressing specific issues in similar proportions. We also find that, consistent with the theory of success contagion, campaign messaging across candidates and election cycles varies along a wide range of variables as candidates have failed to converge on a similar campaigning style. Contrary to expectations drawn from prior research, we find that candidate tweets contain policy content and attacks on opponents just as often as do campaign spots.

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