Beloit College Student Research Symposium, April 18, 2024

10:00-11:00 & 12:15-1:15	Free Headshots brought to you by the Business & Entrepreneurship Career Channel. Dress to impress recruiters (at least from the shoulders up). Science Center second floor west walkway.
12:00-12:30	**Info Session** on the School of Media & Arts and the School of Environment & Sustainability. Learn about new opportunities for internships and credentials. Science Center Atrium.
12:30-1:00	Launch Party for these two new schools. If you would like to join the party for pizza, RSVP by clicking here by Monday April 15th.

Richardson Auditorium, Morse-Ingersoll Hall		
Moderator: Toby Altman, English		
9:10	Toby Altman	Opening remarks
9:15-9:40	Julia Weber	Mental Liberation, Life Writing, and Post-Colonial Literature: Tsitsi Dangarembga's *Nervous Conditions*
9:40-10:05	Grace Gilmore	Ling Ma's Severance and the Capitalist Zombie
10:05-10:30	Lydia WIlliams	Sex, Women, and Suicide: Rebellion from Patriarchal Power in Renaissance Theater
Moderator: Tamara Ketabgian, English		
10:40	Tamara Ketabgian	Opening remarks
10:45-12:00	Casey Barasch	A Gallant Gentleman: A Critical Analysis of Quincey Morris in Bram Stoker's *Dracula*
10:45-12:00	Niana Rooney	Marli's Typist: Infectious Creativity Inspired by *Dracula*
10:45-12:00	Sol Ulaszek, Maya Bowker, Bristan Fialek, Magali Gray	*The Draculacast*: A 'Contemporary' Dracula Podcast Adaptation
Moderator: Beth Dougherty, International Relations		
1:00	Beth Dougherty	Opening remarks
1:05-1:30	Saumyaa Gupta, Farah Tolu-Honary	Constructing a Cult of Personality - Investigating the Rise of Authoritarian Populism under Indian Prime Minister Narendra Modi
1:30-1:55	Camille Ledoux	Human Right Defender Portfolio: Activism in Russia, the Story of Yuri Dmitriev
Moderator: Pablo Toral, Environmental Studies & International Relations		
2:05	Pablo Toral	Opening remarks
2:10-2:35	Lucas Krueger	Damming Colonialism: Beavers, People, and the Past in Northern Minnesota
2:35-3:00	Veronica Kaluta, Ela Heywood, Carter Browne, Lucas Krueger	Navigating Environmental Justice: A Journey of Education, Advocacy, and Connection in the Boundary Waters Canoe Area
3:00-3:25	Bianca Perez	The Environment and its Connections to Public Health with a Critical Analysis of Race and Culture in the Southeastern United States
3:25-3:50	Martu Kollie	Cultivating Environmental Leadership: A Narrative of Growth and Impact at Beloit College

Room 150, Sanger Science Center		
Moderator: Sohaib Kiani, Computer Science		
9:10	Sohaib Kiani	Opening remarks
9:15-9:40	Yaksh Toyesh Ujoodha	Assessing Generative Models for Predicting Material Structures and Properties
9:40-10:05	Thanh Nguyen	Analyzing Climate Change with Advanced Machine Learning Techniques
10:05-10:30	Supratim Saha	Evaluating Coursera's Efficacy in Online Learning for Academic and Alumni Development
Moderator: Amy Tibbitts, Spanish		
10:40	Amy Tibbitts	Opening remarks
10:45-11:10	Natalia Ramirez-Vang	Success Abroad: Navigating Global Engagement as an Underrepresented Student
11:10-11:35	Josie Czuj	Exploring Environmental Justice in Ecuador
11:35-12:00	Brianna Paez	Linguistic and Cultural Growth Through an Immersive Study Abroad Program in Spain
Moderator: Matt Tedesco, Philosophy		
1:00	Matt Tedesco	Opening remarks
1:05-1:30	Mahala Berg	A Study of Shinto in Japan: Propaganda and Nationalism
1:30-1:55	Grayson Thobe	Humility as a Memory of Shame
Moderator: Disha Shende, Economics		
2:05	Disha Shende	Opening remarks
2:10-2:35	MukhammadAli Shavkatov, Julie Bach	Charting Your Finance Career Path: A Study of the Entry-Level Job Market
~~2:35-3:00~~	~~Sadeen Alsabbagh~~, ~~Prince Upadhyay~~	~~Data Scraping the Job Market: Sustainability~~
3:00-3:25	Shaira Manandhar, Katie Phan	Scraping and Analyzing Data on Entry-level Media Jobs: a Market Research Project
~~3:25-3:50~~	~~Supratim Saha~~	~~Decoding the Entry-Level Data Science Job Market~~

Room 249, Sanger Science Center		
Moderator: Greg Koutnik, Political Science		
9:10	Greg Koutnik	Opening remarks
9:15-9:40	Vu Anh Le	Supreme Court in Support of United States Environmental Federalism: Navigating through Constitutional Interpretations and Federal-State Relations
9:40-10:05	Isabella Acosta	A Look Behind Bars: The United States Prison System
10:05-10:30	Farah Tolu-Honary	Integration and Changes in the Middle East and Mediterranean: An Investigation into Diaspora Politics
Moderator: Jay Zambito, Geology		
10:40	Jay Zambito	Opening remarks
10:45-11:10	Vu Anh Le	Assessment of Radioisotopes in Water Samples from Nuclear Waste-infused Wells
11:10-11:35	Geneva Helland	Investigating the Utility of Environmental Proxies for TOC and Natural Gamma Radiation in Devonian Shale of the Illinois Basin
11:35-12:00	Isabel Johnson	Characterizing the Ellsworth Formation of the Michigan Basin using Lithostratigraphy and Chemostratigraphy
Moderator: Gana Ndiaye, Anthropology		
1:00	Gana Ndiaye	Opening remarks
1:05-1:30	Jo Simms, Eleanor Sperling Leech	Großes Gräberfeld: Osteology Research of a Late Roman Cemetery in Germany
1:30-1:55	Maij A Sprenger-Otto	Food Heritage and National Nostalgia: The Evolution of Latvian Food and Community-Making Practices in the United States
Moderator: Britt Scharringhausen, Physics		
2:05	Britt Scharringhausen	Opening remarks
2:10-2:35	Lucas Cho	Bridging Classroom Learning with Real-World Experience: The Journey of Securing an Internship and Applying Course Materials
2:35-3:00	Ethan Hill	Bridging Theory with Practice: A Journey through a Civil Engineering Internship Experience
3:00-3:25	Nerlyn Jafia Ramos, Taman Azad	The SCALE Conference: Expanding the Perspective of Art and Entrepreneur

Room 349, Sanger Science Center		
Moderator: Laura Parmentier, Chemistry		
8:45	Laura Parmentier	Opening remarks
8:50-9:15	Helena Harrison	Evaluation of Neoplasia Across Bears
9:15-9:40	Sofia Jeddeloh	Using Genetic Analyses to Elucidate the Life-Stage Specific Immunotoxic Effects of PCB-126 Exposure in Amphibians
9:40-10:05	Abril Lopez	Phage-assisted Platform for Discovery of Inhibitors for Amyloid Beta-42 Uppsala Aggregation
10:05-10:30	Helena Harrison	Development of Olfactory Test Battery to Detect Age-Related Changes in Untrained Dogs
Moderator: Tom Stojsavljevic, Mathematics & Computer Science		
10:40	Tom Stojsavljevic	Opening remarks
10:45-11:10	Madeline Champeny-Johns	Enhancing Actuarial Models for Disability Risk and Addressing Overlooked Variables
11:10-11:35	Maya Alexandria Betzler	A Statistical Analysis of Penalty Kicks in Soccer and Shot Velocity Optimization based on Shot Angle
11:35-12:00	Lalitheswaran Viswanathan, Vanshith Bhandari	EEG Brain Signals Emotion Classification
Moderator: Olga Ogurtsova, Russian		
1:00	Olga Ogurtsova	Opening remarks
1:05-1:30	Veeka Malanchuk	Window into Russia: How a Russian Novella Helped Me Find My Identity
1:30-1:55	Cynthia Rossbach	Undead Victorians: How Media Reflects That We Never Left Victorian Ideals
Moderator: Robin Zebroski, Cognitive Science		
2:05	Robin Zebroski	Opening remarks
2:10-2:35	Marianna Carus	Mental Imagery: Are the Lack of Visual and Auditory Imagery Associated?
2:35-3:00	Charlie Shriver	Using Cost/Benefit Analysis to Elevate Behavior to Cognition in Common Loons (*Gavia immer*)
3:00-3:25	Franccesca Mamani	Attitudes Toward Mental Illness: The Role of Identity in Latino Adolescents
3:25-3:50	Saumyaa Gupta	Analyzing Trust Levels in Authoritarian Regimes through the Lens of Maslow's Hierarchy of Needs

Abstracts

Sponsor: Gregory Koutnik

Room 249, Sanger Science Center, 9:40-10:05

Isabella Acosta '25

Sacramento, California

Majors: Political Science; Psychology
Minor: Law and Justice

A Look Behind Bars: The United States Prison System

In the United States prison system, individuals are left in dehumanizing conditions that do not adequately prepare them for societal reintegration. These current practices in the prisons have not been beneficial in reducing recidivism, demonstrating that the current system needs to change.

I discuss highlights of my internship at the Public Defender's Office in Janesville, where I had a behind-the-scenes look at what goes on in the Wisconsin jail system. Additionally, I speak on the psychological and political approaches to understanding why the prison population continues to rise. The high population rates stem from those with a family history related to prison, undiagnosed mental illness, or a lack of understanding of the law. From personal experience and extensive research, my goal is to advocate for and provide awareness of individuals who are susceptible to incarceration.

Sponsor: Disha Shende

~~Room 150, Sanger Science Center, 2:35-3:00~~

~~Sadeen Alsabbagh '24~~

Amman, Jordan

Majors: Computer Science; Data Science

~~Prince Upadhyay '26~~

Gujarat, India

Major: Data Science

~~Data Scraping the Job Market: Sustainability~~

In this project, we focus on gathering, managing, analyzing, and reporting job posting data specifically within the sustainability field, using Python as our primary tool. Our objective is to scrape job postings related to sustainability from a range of specialized job websites, employing web scraping libraries like BeautifulSoup and Scrapy to collect relevant data. Once obtained, we establish and maintain a relational database tailored to the sustainability sector, utilizing technologies such as SQLite or MySQL for efficient data storage and management.

With our sustainability-focused job data organized, we apply various processing and cleaning techniques to ensure the integrity and quality of the dataset. Through comprehensive exploratory data analysis (EDA) and statistical analysis, we aim to unearth significant trends, patterns, and insights pertinent to sustainability job markets, including emerging roles, required skills, geographical distribution, and industry sectors.

Our ultimate deliverable will be a detailed report documenting our methodology, key findings, and actionable insights derived from the analysis of sustainability job postings. By focusing on sustainability, this project will provide us with practical experience in navigating and understanding job opportunities within a critical field for addressing global environmental challenges.

Sponsor: Tamara Ketabgian

Richardson Auditorium, Morse-Ingersoll Hall, 10:45-12:00

Casey Barasch '26

Madison, Wisconsin

Majors: Education; Spanish; Creative Writing

A Gallant Gentleman: A Critical Analysis of Quincey Morris in Bram Stoker's *Dracula*

The character Quincey Morris in Bram Stoker's *Dracula* is enigmatic, laconic, an American from Texas. He plays a strange role in *Dracula;* he is rarely active in most of the story, but ends up sacrificing his life in a daring attempt to kill Dracula at the end of the novel. Or so it seems. But what if Quincey is not the "gallant gentleman" that the other characters believe him to be?

Because of the mystery surrounding Quincey Morris, and the gaps within the story, I decided to explore this character further in my short story, "A Gallant Gentleman." The piece focuses on the potential for Quincey Morris, *Dracula's* vampire-killer, to be a vampire himself, and on the implications of this change within the canon of the story. As part of the Symposium "Dracupanel," my presentation delves into the short story, the character Quincey Morris, and relevant themes and motifs in Stoker's *Dracula*.

Sponsor: Susan Furukawa

Room 150, Sanger Science Center, 1:05-1:30

Mahala Berg '24

Grand Rapids, Michigan

Majors: History; Japanese Language and Culture

A Study of Shinto in Japan: Propaganda and Nationalism

Japan, like most cultures or countries around the world, has had a complex relationship with religion. After western cultural practices began to enter the country following 250 years of isolation, the government instituted a revised version of Shinto as the state religion. Shinto was the practice that provided knowledge about topics such as the origins of the world, nature's relationship to humans, and the emperor's right to rule Japan. Its revival was intended to serve as a method to garner citizen support for the government, and eventually it even became a symbol of extreme nationalism during times of war.

This presentation will serve as an exploration of Shinto's teachings and how from the late 1860's until the end of World War II, the government changed Shinto's meaning in order to serve their own propaganda efforts.

Sponsor: Tom Stojsavljevic

Room 349, Sanger Science Center, 11:10-11:35

Maya Alexandria Betzler '25

Walla Walla, Washington

Majors: Mathematics; Business Economics

A Statistical Analysis of Penalty Kicks in Soccer and Shot Velocity Optimization based on Shot Angle

This research explores the patterns of soccer penalty kicks. When the goal is broken down into nine sectors, the popularity of each sector when shooting can be numerated allowing goalkeepers to predict the shooter's tendencies better. What was previously a sport with a lack of specific statistical analysis, this study intends to spark the beginning of an era in which soccer relies more heavily on numbers. The data is further broken down into left and right-footed shooters, so when a goalkeeper is trying to block a penalty kick, they can make an informed decision when choosing which side to dive towards. Notably, this study shows how foot preference does not provide a statistical advantage in success or failure.

I look at variables of success of the shot, the direction the goalie dove, on top of the foot it was kicked with. I looked at success rates, failure rates, save percentages, and missed penalty rates. In this statistical analysis, I found that sector 7 is the most popular amongst the shooters. I would advise goalkeepers to dive toward their right-handed side more than to their left as 36.2% of the total shots went here. Only one sector featured a 100% success rate.

Also included in the analysis is the optimization of the ball's trajectory towards the goal based on shot angle. The paper explains the building of this equation based on the x- and y-components. The equations use components of the projectile motion equations to express the final velocity in terms of launch angle. I then go through the general steps of optimization: taking the first derivative, setting it equal to zero, and plugging the value back into the original equation. I discuss the validity of the critical values and conclude that the best shot occurs when the shot angle is zero.

Sponsor: Robin Zebrowski

Room 349, Sanger Science Center, 2:10-2:35

Marianna Carus '24

Ottawa, Illinois

Majors: Cognitive Science; Psychology
Minor: Philosophy

Mental Imagery: Are the Lack of Visual and Auditory Imagery Associated?

In this presentation, I discuss aphantasia, the inability to form voluntary visual mental imagery, and anauralia, the inability to form voluntary auditory mental imagery. These types of mental imagery could include picturing someone's face or replaying a previous memory visually in one's head, or hearing one's thoughts or playing music in one's head without an external stimulus. Previous research has shown that those with aphantasia are more likely to have anauralia and vice versa.

To test these findings, I studied a sample of 50 adults from the United States who were fluent in English. Participants took the Vividness of Visual Imagery Questionnaire- Modified (VVIQ-M), the Bucknell Auditory Imagery Scale- Vividness (BAIS-V), and the Bucknell Auditory Imagery Scale- Control (BAIS-C) to determine the vividness and control that they had over their visual and auditory imagery. Using Pearson correlations, I share what I anticipated that the results would show and discuss what my findings mean.

Sponsor: Tom Stojsavljevic

Room 349, Sanger Science Center, 10:45-11:10

Madeline Champeny-Johns '24

Beloit, Wisconsin

Majors: Mathematics; Data Science

Enhancing Actuarial Models for Disability Risk and Addressing Overlooked Variables

This paper investigates the application of actuarial models in disability risk assessment, highlighting their inherent limitations and proposing enhancements to mitigate overlooked variables. Current models often neglect dynamic health conditions, socio-economic factors, and evolving medical treatments, adversely affecting the precision of disability risk predictions.

To address these gaps, this study integrates real-life disability data into the modeling process, aiming to provide a more realistic and accurate foundation for analysis. The proposed refinements use advanced statistical techniques and interdisciplinary collaboration to offer a more holistic perspective on disability risk. By incorporating empirical data, this research endeavors to empower actuaries and insurance professionals with improved decision-making tools, ultimately fostering a better understanding of the intricate landscape of disability insurance.

Sponsor: Katherine Harris

Room 249, Sanger Science Center, 2:10-2:35

Lucas Cho '25

Uijeongbu, Korea

Major: Computer Science
Minor: Mathematics

Bridging Classroom Learning with Real-World Experience: The Journey of Securing an Internship and Applying Course Materials

Based on my personal experience, I share the process of securing an internship and applying the knowledge learned in the classroom to a real industry setting. I cover networking, effective communication and strategies for growing in a professional environment in the IT industry, especially in web development. Through this, I aim to bridge the gap between academia and the real world and discuss how to effectively apply academic knowledge in practical scenarios. I share the insights I gained as I learned new things and grew through this experience and hope it will help other students take the first step towards success in their practice.

Sponsor: Joshua Moore

Room 150, Sanger Science Center, 11:10-11:35

Josie Czuj '25

Sedgwick, Maine

Majors: Critical Identity Studies; Environmental Studies

Exploring Environmental Justice in Ecuador

On August 20, 2023, Ecuador voted to stop drilling for oil in the Yasuní National Park, one of the most biodiverse regions on the planet and home to three indigenous Waorani groups. The vote is a historic win for global conservation, environmental policy making, and environmental justice, but it is not without complexities.

In this presentation, I discuss why I chose to study abroad at the Universidad San Francisco de Quito in Quito, Ecuador, and how my experiences in Ecuador were grounded in learning about environmental justice with a focus on the Yasuní referendum.

Sponsor: Michael Dango

Richardson Auditorium, Morse-Ingersoll Hall, 9:40-10:05

Grace Gilmore '24

Huntley, Illinois

Majors: Literary Studies; Sociology
Minor: Chinese

Ling Ma’s Severance and the Capitalist Zombie

Through an exploration of Marx’s theory of alienation, this presentation will explore how Ling Ma’s zombie-like disease which she describes in her novel, *Severance*, depicts the horrors of everyday working life. Marx uses the term “alienation” to describe the feeling of estrangement from human nature, society, and the product of labor, a consequence of social stratification wherein the majority of the laborers in society do not own the means of production. Ma expands on this concept through portraying a disease in which those afflicted repetitively and emotionlessly complete their daily tasks, sometimes including their work tasks, until they die, mirroring the emotional distance endemic of capitalism. Ma updates this concept by applying it to three different realms of labor in the 21st century: factory labor, the origin place of this disease, office labor, the job the main character has before the outbreak, and freelance labor, the last remaining workspace as the world becomes less and less functional.

Sponsor: Isaac Young

Room 349, Sanger Science Center, 3:25-3:50

Saumyaa Gupta '24

India

Majors: Political Science; Psychology

Analyzing Trust Levels in Authoritarian Regimes through the Lens of Maslow's Hierarchy of Needs

Authoritarian leaders in the Middle East and North Africa (MENA) region have long been characterized by their use of oppressive tactics to maintain power and control over their populations (Slater & Fenner, 2011). The erosion of political rights and civil liberties significantly influences how people perceive their leaders, impacts individuals' belief systems, and undermines their trust in governmental institutions (Dawoody, 2014).

Trust in government institutions is defined as "the public's perception of government, shaped by expectations of its operation" (Miller and Listhaug 1990, p. 358). This perception originates from the belief that leaders within these institutions are attuned to individuals' needs. Analyzing this concept highlights that a government's legitimacy hinges on the trust individuals place in its institutions. In recent years, there has been a growing recognition of the psychological dimensions of trust within authoritarian regimes.

Through the lens of Abraham Maslow's hierarchy of needs, this presentation seeks to highlight the interplay between individual experiences and institutional dynamics in shaping trust within MENA authoritarian regimes. Leveraging data from the World Values Survey, this project explores whether and how satisfaction of Maslow's needs is associated with citizens' trust in governmental institutions.

Sponsor: Beth Dougherty

Richardson Auditorium, Morse-Ingersoll Hall, 1:05-1:30

Saumyaa Gupta '24

India

Majors: Political Science; Psychology

Farah Tolu-Honary '24

Freeport, Illinois

Majors: International Relations; French

Constructing a Cult of Personality - Investigating the Rise of Authoritarian Populism under Indian Prime Minister Narendra Modi

In a global era of democratic backsliding and a corresponding rise of conservative populism, how do autocrats and aspiring autocrats construct a cult of personality? This presentation builds upon a month-long fieldwork in four Indian states: Gujarat, Punjab, Rajasthan, Uttar Pradesh, and the National Capital Region of Delhi. We investigate how the ruling Bharatiya Janata Party adopts unique strategies of propaganda dissemination to depict Modi as the "strong man" capable of protecting and reinvigorating India's "Hindu identity." To construct this cult of personality, we argue that the BJP strategy utilizes collective historical memory, religious rifts between Hindus and Muslims, and nationalist symbols. These strategies deepen in-group out-group divisions and breed nationalist and Islamophobic sentiments to appeal to Hindu voters and ensure continued electoral success.

Sponsor: Laura Parmentier
Dr. Tara M. Harrison, DVM, MPVM, DACZM, (NCSU College of Veterinary Medicine)

Room 349, Sanger Science Center, 8:50-9:15

Helena Harrison '25

Chapel Hill, North Carolina

Major: Biochemistry

Evaluation of Neoplasia Across Bears

Numerous species of bears are affected by neoplasia. The purpose of this study was to evaluate the prevalence of histologically confirmed neoplasia in bears reported in the literature and in the Exotic Species Cancer Research Alliance (ESCRA). Cases of neoplasia from the literature and ESCRA database were compared across age, sex, species, diagnosis, tumor behavior, treatment, and survival time. There were 42 cases of neoplasia in the literature. There were 24 cases of neoplasia found in ESCRA. Fifteen different bear species were reported in the literature, and eight were reported in the ESCRA database. The most commonly reported species with neoplasia in the literature were brown bears (*Ursus arctos*) and black bears (*Ursus americanus*) (37.9% and 13.8% of cases respectively). In ESCRA, 50% were North American black bears (*Ursus americanus*) and 12.5% were Eurasian brown bears (*Ursus arctos arctos*). There were 23 females and 19 males reported in the literature and 6 females, 10 males, 8 unknown sex reported in ESCRA.

Carcinomas were the most common neoplasia found in the literature and adenocarcinomas were the most common in ESCRA. Despite most bears being diagnosed at necropsy, surgery was the most common treatment that occurred. The average survival time post-diagnosis was eight months in the literature and 0.25 months in ESCRA. These results emphasize the importance of routine medical examinations as many bear cancer cases were diagnosed at death. Through continued collaboration with institutions, knowledge of neoplasia risk factors for specific bear species can help continue to improve their health and medical care.

Sponsor: Laura Parmentier
Dr. Freya Mowat, BVSc. Ph.D. (UW - Madison School of Veterinary Medici)

Room 349, Sanger Science Center, 10:05-10:30

Helena Harrison '25

Chapel Hill, North Carolina

Major: Biochemistry

Development of Olfactory Test Battery to Detect Age-Related Changes in Untrained Dogs

The purpose of my study was to create a protocol to test and assess olfactory function in untrained dogs. Dogs of various ages (n = 59) had olfaction assessed with up to 10 different odor pairs using a habituation-dishabituation method. Two masked reviewers evaluated video recordings post-hoc to determine interaction times. For each odor pair, dogs were assigned a pass or fail based on a defined dishabituation reaction to the novel odor. A subset of dogs (n = 40) returned for a second visit to evaluate test-retest reliability. Cohen’s kappa was performed to assess inter-rater reliability and test-retest reliability.

The results show Cohen’s kappa for interobserver reliability ranged from 0.28-0.87. Cohen’s kappa for test-retest reliability ranged from -0.19 to 0.37. Based on these outcomes, a battery was constructed, comprising the most reliable odor pairs. These pairs were lemon/mint, cotton candy/peanut butter and benzaldehyde/cinnamaldehyde. A Spearman’s rank did not reveal a significant association between dog age and pass/fail proportion for this test battery (r: -0.27, p: 0.20, n = 25). Median age for these dogs was 77 months (interquartile range 47-127).

Test-retest reliability of these tests was relatively low. Further cross-sectional and longitudinal studies

will need to be applied to assess if olfactory discrimination testing using this methodology can determine a decline in olfactory function in dogs as they age. Development of a successful test can be useful in understanding age-related olfactory changes in humans and can help improve overall health care of dogs.

Sponsor: James Zambito

Room 249, Sanger Science Center, 11:10-11:35

Geneva Helland '24

Beloit, Wisconsin

Major: Environmental Geology

Investigating the Utility of Environmental Proxies for TOC and Natural Gamma Radiation in Devonian Shale of the Illinois Basin

Widespread black shale deposition during the Devonian resulted in mass extinctions and provides unconventional reservoirs and hydrocarbon sources that a variety of analyses are conducted on, such as natural gamma radiation logs and total organic carbon (TOC). Since these analyses are collected with substantial time and monetary costs, developing proxies is a key goal. This study examines if pXRF elemental data can be used as a proxy for gamma logs and TOC by investigating their relationships with Mo, U, Th, and K. If correspondence is found, these proxies would be beneficial as pXRF analysis is both cost and time effective compared to TOC and gamma log methods.

This project utilizes samples of Devonian black shale from the KGS-IMMR L-16 core drilled in Monroe County, KY. The strata in the core were deposited on the eastern flank of the Illinois Basin on the western edge of the Cincinnati Arch. These samples were powdered and examined by the pXRF and loss on ignition techniques were used to measure TOC. Gamma radiation data was examined from a previously recorded gamma log.

Based on the data collected, Th, K, and Mo have limitations for uses as proxies for gamma logs and TOC; this seems to be related to the depositional environments. Th and K can be used as proxies in oxic to anoxic conditions (gray dolomite to black shale) as they displayed the best resemblance to gamma radiation and TOC in these conditions. Mo showed promise as a proxy in euxinic conditions (organic-rich dark black shales) as this environment results in Mo enrichment in marine sediment as organo-metallic complexes. Overall, U exhibited the best suitability as a proxy for gamma logs and TOC as a strong correspondence was found in not only anoxic to euxinic settings, but also oxic conditions.

Sponsor: Britt Scharringhausen

Room 249, Sanger Science Center, 2:35-3:00

Ethan Hill '24

Freeport, Illinois

Major: Physics

Bridging Theory with Practice: A Journey through a Civil Engineering Internship Experience

This presentation encapsulates the enriching journey of an internship experience in civil engineering, serving as a bridge between academic learning and practical application. Throughout the internship tenure, I delved into various facets of civil engineering, gaining hands-on experience in diverse projects spanning infrastructure development, structural analysis, and sustainable design. The presentation highlights the significance of the real-world application of theoretical knowledge, emphasizing the practical challenges encountered and the innovative solutions devised. Furthermore, it explores the collaborative nature of civil engineering projects, underscoring the importance of effective communication and teamwork in achieving project goals. Through this narrative, the presentation aims to inspire future students to dive into the field of civil engineering, offering insights into the dynamic and rewarding landscape of the profession while reflecting on the invaluable lessons learned and personal growth attained during the internship journey.

Sponsor: Tawnya Cary

Room 349, Sanger Science Center, 9:15-9:40

Sofia Jeddeloh '24

Nederland, Colorado

Majors: Biology; Cognitive Science

Using Genetic Analyses to Elucidate the Life-Stage Specific Immunotoxic Effects of PCB-126 Exposure in Amphibians

The global decline of amphibian populations can be attributed to many factors such as pathogenic microorganisms, environmental contaminants, temperature increases, and habitat destruction. One mechanism of interest is how environmental contaminants impact the immune system leading to an increase in disease susceptibility. Prior research exposing polychlorinated biphenyl-126 (PCB-126), a persistent organic pollutant historically used in coolants, lubricants, and electrical equipment, to northern leopard frogs found a decrease in innate and adaptive immune function in frogs exposed exclusively as tadpoles, but not as post-metamorphic frogs. This indicates that these frogs are most susceptible to the effects of immunotoxic compounds prior to the reconfiguration of the immune system that occurs during metamorphosis. In this study, we exposed *Xenopus laevis* to environmentally relevant levels of PCB-126 (0ng/L, 10ng/L, 25ng/L, 50ng/L) from NF stage 35 through pro-metamorphosis (NF 51-56). After 21 days, there were no significant differences in survival (means ranged from 95-98.8%), length (means ranged from 4.04-4.38cm), or development (means ranged from NF 53-55) among treatment groups. To better understand how PCB-126 causes immunotoxicity in tadpoles, we collected kidney, liver, and brain tissue for RNA extraction with the RNA being assessed for quality using a NanoDrop. These tissues will be analyzed to observe dysregulation in genes of interest involved in immune function (IL-1B and Caspase-9) using reverse transcription PCR (RT-PCR) to amplify cDNA. Results will provide relevant information to understanding life-stage specific toxicity of immunologic compounds present in the environment, and will inform our upcoming bioassay using the native northern leopard frog.

Sponsor: James Zambito

Room 249, Sanger Science Center, 11:35-12:00

Isabel Johnson '24

Austin, Texas

Major: Geology
Minor: Biology

Characterizing the Ellsworth Formation of the Michigan Basin using Lithostratigraphy and Chemostratigraphy

The Upper Devonian Ellsworth Formation of the Michigan Basin is an alternating green-gray silty shale of deltaic origin that overlies the basinal black shale of the Lachine Member of the Antrim Formation. In previous studies, the stratigraphic relationship of these units is highly variable; this is primarily because previous studies have focused on lithostratigraphy, and the delta that delivered the sediment that formed the Ellsworth Formation is poorly constrained regionally.

This study aimed to characterize the Ellsworth formation using elemental, mineralogical, lithologic, and microscopic data to better understand the variability of the formation across two cores: one on the edge of the Michigan Basin and the other in the deeper central part of the basin. This work will help to better divide, constrain, and understand the construction of the Ellsworth delta complex and the stratigraphic relationship between the Ellsworth and Lachine.

Elemental (pXRF) and mineralogical (XRD) analysis showed distinct differences between the two cores. The basinal core hosted higher levels of clay minerals and organic matter, whereas the core on the edge of the basin hosted higher levels of dolomite, quartz, and K-feldspar. Additionally, lithologic analysis indicated that the basinal core has a gradual transition from the Lachine into the Ellsworth Formation, whereas the core on the edge has a sharp transition. Microscopic analysis identified fossilized planktonic cysts of Tasmanites in abundance in the Ellsworth Formation, suggesting that the marine water was highly

stratified to preserve these soft-bodied organisms, and the Lachine potentially lacked stratification and was anoxic.

The combination of these analyses ultimately indicates that the Ellsworth delta prograded into the basin from the northwest, and water composition was transitioning from anoxic to stratified with productive surface waters and anoxic seabeds.

Sponsor: Pablo Toral

Richardson Auditorium, Morse-Ingersoll Hall, 2:35-3:00

Veronica Kaluta '26

Milwaukee, Wisconsin

Majors: Political Science; Critical Identities Studies

Ela Heywood '26

Providence, Rhode Island

Majors: International Relations; Critical Identities Studies
Minor: Biology

Carter Browne '25

Hornell, New York

Majors: Anthropology; Biology
Minor: Political Science

Lucas Krueger '24

Puget Sound Region, Washington

Major: Anthropology
Minors: History; Environmental Studies

Navigating Environmental Justice: A Journey of Education, Advocacy, and Connection in the Boundary Waters Canoe Area

Within a captivating corner of the world, amidst the beauty and challenges of the Boundary Waters Wilderness Canoe Area (BWCAW,) we embraced unfamiliar skills and encountered situations balancing on the edge of peril and humor. Guided by the learning philosophy of the wilderness field station, we delved into field research without realizing at first that the development of scientific methodological skill would also generate diverse aspects of personal growth and professional passion.

Through diverse applied field research methodologies and meaningful engagements with the local communities, we navigated the multifaceted landscape of environmental justice, highlighting issues of race, class, power, and sustainability within the region. Our time in the BWCAW not only enriched our understanding of historical struggles and contemporary environmental concerns but also fostered connections with the land, water, and each other.

This immersive academic and personal journey propelled us towards advocating for inclusive environmental activism and conservation, promoting awareness and respect for the interwoven relationships between communities, nature, and justice. Our presentation will explore this journey of academic and personal exploration and growth that has opened up our eyes to new academic horizons.

Sponsor: Pablo Toral

Richardson Auditorium, Morse-Ingersoll Hall, 3:25-3:50

Martu Kollie '24

Monrovia, Liberia

Majors: Environmental Studies; International Relations
Minor: Spanish

Cultivating Environmental Leadership: A Narrative of Growth and Impact at Beloit College

Throughout my academic journey at Beloit College, the Environmental Studies program became the cornerstone of my educational journey, nurturing a passion for environmental stewardship and sustainable development. This presentation builds on my participation in the Beloit Transportation Academy and serves as the basis for my Environmental Studies honors project. It chronicles my experiences and the transformative impact of the Environmental Studies program on my personal and professional growth. It also highlights how the program's comprehensive curriculum has offered me multifaceted skills and insights that have been instrumental in navigating academic challenges and securing competitive internships. These internships served as crucibles where I applied classroom learnings to real-world settings, fostering a deeper understanding of environmental issues and solutions.

My engagement in the Community Transportation Academy, facilitated by the 1000 Friends of Wisconsin, provided a unique platform to engage community members and explore the discourse around sustainable transportation initiatives. Drawing from the interdisciplinary nature of my education, I have engaged in research on urban planning, sustainable transportation, and pedestrian-friendly cities.

Reflecting on my journey, I have garnered invaluable insights and honed essential skills such as critical thinking, problem-solving, effective communication, and teamwork. My presentation offers a glimpse into my evolution as an environmental leader, empowered by the holistic education imparted at Beloit College. Join me as I share anecdotes, challenges, and triumphs, illustrating the impact of my educational journey on shaping my commitment to environmental stewardship and advocacy.

Sponsor: Pablo Toral

Richardson Auditorium, Morse-Ingersoll Hall, 2:10-2:35

Lucas Krueger '24

Puget Sound Region, Washington

Major: Anthropology
Minors: History; Environmental Studies

Damming Colonialism: Beavers, People, and the Past in Northern Minnesota

As friend, foe, or financial resource, human and beaver worlds are entwined. I focus my analysis on Northern Minnesota, where the fur trade entangled both human and beaver bodies in mutual damage. Informed by colonial ideologies and the legacies of the fur trade, ethological and naturalist literature from the 19th and early 20th centuries reflects a deep fascination with beavers: their architecture, their behavior, and how alien, and yet how human they seemed to be. In writing, people imagined beaver psychology and culture using the lenses of their own lives, and used their interpretations of beaver behavior to understand their own humanness.

Using literature such as Lewis Henry Morgan's *The American Beaver and His Works* (1868) and Enos Mills' 1913 *In Beaver World* as accounts of both human and beaver life, I describe beaver-human relationality in a settler-colonial context. With historic and contemporary materials from animal studies literature, Northern Minnesota, and my home in Western Washington, I describe how past legacies inform current ideologies about beavers. In doing so, I hope to highlight the shared histories and interconnections of human and animal worlds.

Sponsor: Mehmet Dik
Prof. Haruko Wainwright (Massachusetts Institute of Technology)

Room 249, Sanger Science Center, 10:45-11:10

Vu Anh Le '25

Hanoi, Vietnam

Majors: Mathematics; Political Science

Assessment of Radioisotopes in Water Samples from Nuclear Waste-infused Wells

Monitoring the treatment of radioactive waste around nuclear plants is an essential task, especially in the context of the difficulty in acquiring impartial information from government agencies and the limited evaluation resources available to the public. Addressing this need, my project introduces a cost-effective, spatially-oriented method for monitoring. It combines spatial data with water samples to track over time the presence of nuclear analytes, namely isotopes Iodine-129 and Strontium-90. The aim is to gain insights into the effectiveness of practices in diminishing radioactive waste concentrations and to provide predictive insights regarding the overall progress, based on time-series data.

The main tools utilized in this study are the Pylemn packages, developed by Dr. Wainwright's lab for local watershed monitoring, and satellite imagery freely provided by NASA. The primary research sites include over 70 wells at the Savannah River Site F-Area. This site, managed by the Department of Energy, is a Superfund area known for discharging spent nuclear fuel.

Sponsor: Gregory Koutnik

Room 249, Sanger Science Center, 9:15-9:40

Vu Anh Le '25

Hanoi, Vietnam

Majors: Mathematics; Political Science

Supreme Court in Support of United States Environmental Federalism: Navigating through Constitutional Interpretations and Federal-State Relations

Despite professing adherence to established precedents, the rulings of the United States Supreme Court justices (SCOTUS) often reflect their ideological leanings and political orientations.The recent appointment of Associate Justice Barrett has significantly shifted the ideological balance of the Court, leading to a 6-3 division that predominantly supports originalist interpretations of the Constitution over approaches based on moderate or moral reasoning. Since the 1960s, SCOTUS has been pivotal in critically reassessing federal environmental initiatives, as exemplified by cases like West Virginia v. EPA. This shift occurs amid an increasing divide between state and federal levels within the national political framework, raising serious concerns about the impact of judicial activism on the enactment of crucial progressive legislation, particularly in the realm of environmental protection under federal oversight.

Through an in-depth analysis of prominent Supreme Court decisions, this study showcases the capacity of certain constitutional interpretation modes, especially living constitution, to reconcile constitutional principles with evolving social and environmental values, thereby contributing to the wider conversation on environmental justice and the judiciary's role in environmental governance.

Sponsor: Beth Dougherty

Richardson Auditorium, Morse-Ingersoll Hall, 1:30-1:55

Camille Ledoux '25

Saint-Hyacinthe, Québec, Canada

Majors: Political Science; Environmental Studies
Minor: Law & Justice

Human Right Defender Portfolio: Activism in Russia, the Story of Yuri Dmitriev

Respect for human rights has been decreasing drastically in Russia in recent years due to a controlling nondemocratic government. According to its constitution, the Republic of Russia is "a democratic federal law-bound State with a republican form of government." However, in its 2023 "Freedom in the World" report, Freedom House rated Russia at 16/100 based on its many violations of political and civil liberties.

My research explores the different changes in the laws in Russia and how they restrict the ability of Russian citizens to exercise their human rights. In my presentation, I talk specifically about the freedoms of expression, belief, and assembly; the rule of law; and the independence of the judiciary. I use the work of Yuri Dmitriev, a historian who is fighting for the commemoration of victims from the Soviet Union

government in the gulags, as a case study to illustrate these abuses. I show the difficulties activists face in advocating for human rights defenders such as Dmitriev and share my proposal for a campaign to raise awareness of Dmitriev's case.

Sponsor: Lauren Kueffer

Room 349, Sanger Science Center, 9:40-10:05

Abril Lopez '24

Gurnee, Illinois

Major: Biochemistry
Minor: Health and Society

Phage-assisted Platform for Discovery of Inhibitors for Amyloid Beta-42 Uppsala Aggregation

Currently, 6.7 million Americans are diagnosed with Alzheimer's disease (AD), and by 2040 this value will double. Amyloid beta-42 (Aβ-42) aggregation pathway is linked to the pathogenesis of AD. The major truncation of six amino acids in Uppsala (AβUpp42△19-24) leads to the formation of small toxic oligomers that aggregate and fibrilize to deposit plaques primarily in the brain's temporal cortex. The deletion occurs closely to a cleavage site, which contributes to the cleavage of two other Uppsala species that contribute to the aggressive symptoms experienced by patients who developed early onset AD due to this mutant.

To better understand amyloid beta and its role in AD it is necessary to determine how a protein aggregates and what can be done during this aggregation pathway to inhibit oligomer formation or prevent the misfolding of amyloid beta. This project was conducted in the Wang lab at the chemistry department at the University of Wisconsin-Madison and aimed to discover cyclic peptide inhibitors for amyloid beta-42 Uppsala aggregation by performing phage-assisted non-continuous evolution (PANCE) to perform high-throughput selection on a phage-encoded cyclic peptide library. Phages carrying a diverse set of cyclic peptide sequences were utilized to infect bacterial E. coli cultures transformed with a genetic circuit which is the key to the strategy of selecting active inhibitors against amyloid beta-42 Uppsala aggregation. This presentation will discuss the split T7 RNA polymerase system used in this selection and other methods learned in a protein engineering and synthetic biology laboratory.

Sponsor: Olga Ogurtsova

Room 349, Sanger Science Center, 1:05-1:30

Veeka Malanchuk '24

Rome, Georgia

Majors: Russian; Spanish; Education

Window into Russia: How a Russian Novella Helped Me Find My Identity

This presentation focuses on the novella "Я есть, ты есть, он есть" by Viktoria Tokareva and its allusions and cultural references to the cultures and lifestyle of the Soviet Union. Tokareva's exploration of themes like social inequality, ideological conformity, and the quest for personal freedom reflects the complex realities of Soviet existence, inviting readers to contemplate the nuances of life under authoritarian rule while also celebrating the resilience and humanity of its protagonists.

I explore the political, social and cultural setting of the novella and connect it to historically accurate events and movements in the Soviet Union and how they make up today's Russian and post-soviet countries' societies, while also drawing parallels between American history and culture. As a first-generation Russian American, I discuss the allusions and vivid descriptions of everyday scenes used throughout this novella, which opened a window for me into the life in the Soviet Union and Russia, capturing the essence of the Soviet life, portraying the challenges, aspirations, and contradictions inherent in that society. This allowed me to learn more about my heritage and identity as well as understand the experiences and perspectives of my paternal family and connect with them.

Sponsor: Suzanne Cox

Room 349, Sanger Science Center, 3:00-3:25

Franccesca Mamani '24

Chicago, Illinois

Majors: Psychology; Studio Art

Attitudes Toward Mental Illness: The Role of Identity in Latino Adolescents

Identity is a concept that is typically prominent during adolescence and differs across ethnic or cultural groups. In the Latinx community, topics of machismo and ethnic identity are particularly important in contrast to Western cultural influences. One's social identities may be connected to one's attitudes towards mental health. Latinx adolescents experience increased rates of mental health challenges, such as depression and anxiety, compared to other cultural groups.

In this presentation, I discuss an ongoing quantitative study of the attitudes Latinx male adolescents have toward mental illness as related to three components of their identity: ethnic identity, masculine identity, and the "quiet ego" or self-identity. Preliminary results will be shared in an effort to allow for a better understanding of Latino adolescent identity and attitudes about mental health.

Sponsor: Disha Shende

Room 150, Sanger Science Center, 3:00-3:25

Shaira Manandhar '26

Kathmandu, Nepal

Majors: Data Science; Business Management

Katie Phan '26

Hanoi, Vietnam

Major: Quantitative Economics
Minor: Chinese

Scraping and Analyzing Data on Entry-level Media Jobs: a Market Research Project

In the vibrant and complex field of media jobs, recent graduates are presented with a broad spectrum of entry-level career opportunities. This study delves into the shifting trends, requirements, and competencies that shape the early career paths of individuals in the media field, with a special focus on three key sub-disciplines: media production, digital marketing, and content creation. Utilizing job market analytics, industry insights, and conversations with experienced professionals, this research aims to provide an in-depth exploration of the opportunities accessible to new graduates.

The study emphasizes trends in the media employment landscape, including patterns in hiring, anticipated salary ranges, and preferred geographic locations; profiles of skills, outlining essential capabilities, qualifications, and a blend of technical and soft skills; and guidance and perspectives from veteran media experts on what constitutes an ideal candidate.

Sponsor: Eyad Said

Room 150, Sanger Science Center, 9:40-10:05

Thanh Nguyen '24

Hanoi, Vietnam

Major: Computer Science

Analyzing Climate Change with Advanced Machine Learning Techniques

Climate change is exacerbating extreme weather events and altering atmospheric circulation in ways that challenge predictability. This project seeks to harness machine learning (ML) and data mining to better understand and forecast these shifts. I introduce a set of automated algorithms to detect distinct

atmospheric patterns, particularly 'cut-off lows' (COLs)—isolated low-pressure systems conducive to severe weather, 'closed lows' (CLs)—cyclonic features marked by closed isobars at a certain atmospheric level, and 'cut-off highs' (COHs)—anticyclonic systems detached from the main belt, which can lead to heatwaves or droughts. Additionally, I integrate a variety of deep learning techniques, such as Recurrent Neural Networks (RNN) and Convolutional Neural Networks (CNN), to delve into complex climatic data sets. The cornerstone of this research is the development of predictive models capable of forecasting future occurrences of these atmospheric phenomena, drawing upon both contemporary and historical data sets. It harnesses both contemporary and historical climate data, meticulously compiled from the years 2000, 2001, and 2002, to anchor the development of predictive models.

Sponsor: Gabriela Cerghedean

Room 150, Sanger Science Center, 11:35-12:00

Brianna Paez '24

Las Vegas, Nevada

Major: Biochemistry

Linguistic and Cultural Growth Through an Immersive Study Abroad Program in Spain

In the summer of 2022, I studied abroad in Alicante, Spain for two months through the Spanish Studies Abroad program. Spanish classes in the United States are often taught predominantly in English in order to help the students avoid misunderstandings, allowing them to avoid thinking critically about the language. The classes I attended in Spain required that I use different avenues of translation when confusion arose instead of resorting to using English. Throughout my time abroad, I lived with a host family who did not speak English, attended a class that was fully taught in Spanish, and challenged myself to speak only Spanish. Navigating this new country allowed me to gain independence and strengthen my adaptability, helping me improve my Spanish skills.

In this presentation I discuss the advantages of studying a foreign language through a fully immersive experience that allows for growth in understanding of not only the language but also the culture. I also examine how engaging with students from many different countries impacted how I view the world and allowed me to make connections with people from diverse backgrounds. This program helped me develop as a well-rounded student who is passionate about immersing herself in other cultures.

Sponsor: Rongal Watson
Dr.Mark Dugo (Johnson C. Smith University)

Richardson Auditorium, Morse-Ingersoll Hall, 3:00-3:25

Bianca Perez '24

Houston, Texas

Major: Health and Society

The Environment and its Connections to Public Health with a Critical Analysis of Race and Culture in the Southeastern United States

The environment is a social determinant of health with several layers to it, such as race, culture, and the Ecosystem Services Framework. Public health and the environment create a combination of underlying factors to be observed and analyzed. This research analyzes public health factors and the environment as a part of everyday life. We affect it, and it affects us. This connection has remained throughout time and fluctuates with our actions. Poverty, race, biodiversity, and health all have a cause-and-effect relationship with the environment. A lack of responsibility for this relationship would lead to negative consequences, explaining the discrepancies that can be seen throughout communities, food, animals (mussels), and the leading causes of death.

The study focuses on the Southeast region, with the states of North Carolina, South Carolina, and Texas as comparisons drawn from EJ screen community reports, watershed mapping, and direct observation and interaction with indigenous groups, environmentalists, and historians. The

unacknowledged historical connections to land have led to a gap in diversity among STEM (Science, Technology, Engineering, and Mathematics) careers such as environmentalism. Therefore, understanding if race plays a role in the relationship between public health and environmentalism can explain existing health disparities and the disproportionate Ecosystem Services Framework.

Sponsor: Joshua Moore

Room 150, Sanger Science Center, 10:45-11:10

Natalia Ramirez-Vang '24

Milwaukee, Wisconsin

Majors: Political Science; Anthropology
Minors: Spanish; Museum Studies

Success Abroad: Navigating Global Engagement as an Underrepresented Student

Global engagement, whether that be seeking international careers or studying abroad, exposes seemingly impossible obstacles to all, especially underrepresented and low-income students. Coming from one of those students, this talk provides a step by step developmental model for navigating futures in global engagement, while presenting the speaker's own experiences preparing for a life in both international careers and academics via Beloit College opportunities. This presentation highlights the college's interdisciplinary opportunities of summer study abroad, full semester study abroad, internships, and post-grad assistantships, as well as how students of all practices and backgrounds can be empowered to guide their own global experiences.

Sponsor: Susan Rowe

Room 249, Sanger Science Center, 3:00-3:25

Nerlyn Jafia Ramos '27

Chcihicastenango, Quiche, Guatemala

Major: Biochemistry
Minor: Health and Society

Taman Azad '27

Malda, West Bengal, India

Majors: Computer Science; Quantitative Economics
Minor: Mathematics

The SCALE Conference: Expanding the Perspective of Art and Entrepreneur

Attending the SCALE Conference in St. Louis, a joint venture by Saint Louis University, the University of Missouri-Kansas City, and Millikin University, was a transformative experience for our group. The conference encompassed a rich blend of workshops, panels, and discussions dedicated to the intersection of art, business, and technology. The agenda included a diverse range of topics, from the heart of business explored through the lens of music and entrepreneurship to the future of dance, the essentials of crafting a compelling elevator pitch, and the integration of AI in creative entrepreneurship. Each session offered invaluable insights into how artists and creative individuals can navigate the complexities of their industries, enhance their impact, and embrace innovation.

A highlight of our experience was the Business Pitch Competition, where Taman Azad'27, one of our group members, showcased his entrepreneurial acumen by clinching the first place. Additionally, he secured seed funding for his venture and was inducted as a mentee in Bayleaf's Consulting incubation program. This success not only celebrated our collective journey through the conference but also underscored the potential for Beloit College students to lead in business innovation.

Through engaging with experts across various fields, including music, dance, technology, and law, we were inspired to view our artistic endeavors from a new perspective, emphasizing sustainability,

community engagement, and the critical role of creativity in shaping the future. This conference has equipped us with the tools and knowledge to elevate our projects, making an indelible mark on our academic and professional paths.

Sponsor: Tamara Ketabgian

Richardson Auditorium, Morse-Ingersoll Hall, 10:45-12:00

Niana Rooney '25

Brooksville, Maine

Majors: Creative Writing; Studio Art

Marli's Typist: Infectious Creativity Inspired by *Dracula*

"Marli's Typist" is one of several projects forming the "Dracupanel"--a panel of creative student work inspired by Bram Stoker's *Dracula* and completed for Tamara Ketabgian's "Vampires and Victorians" literary studies class in the fall of 2023. My project is based on research on the novel's queer undertones, as well as technologies such as diaries and typewriters. In "Marli's Typist," I swapped the gender identities of the two main characters in the book's first few chapters (they were men) and leaned heavily into its subtext of same-sex desire. I also adapted Stoker's journal-entry style of writing in order to portray my characters in a much more feminist light. In this panel, I will read a portion of my creative work and discuss the key aspects of *Dracula* that I researched. At the end there will be a few minutes for questions and conversation!

Sponsor: Christopher Fink

Room 349, Sanger Science Center, 1:30-1:55

Cynthia Rossbach '24

Palatine, Illinois

Majors: Creative Writing; Literary Studies
Minor: CRIS

Undead Victorians: How Media Reflects That We Never Left Victorian Ideals

The Victorian era was one of many developments and social movements. Specifically, it is in this era that we see the rise of public and private spheres, workers' rights movements, the ideal of the Victorian mother, and growing critique of relations between workers and "masters."

Like a zombie or ghost just over our shoulder, these concepts and issues still persist into the modern day, through our popular media. For the sake of simplicity and time I will focus on one series which reflects this era both in style and in commentary, the video game "Resident Evil". "Resident Evil" comments on workers and their employers, the Victorian mother, and public and private spheres. In fact, the most recent entry in the series, "Resident Evil VIII Village," actively takes characters from Victorian literature and presents a modern reading of them. Through Neo-Victorian readings of these popular games, we can see just how many similarities we share with the Victorian era and how many of its problems still have yet to be resolved or even addressed in our society.

Sponsor: Disha Shende

~~**Room 150, Sanger Science Center, 3:25-3:50**~~

~~Supratim Saha '26~~

Dhaka, Bangladesh

Majors: Computer Science; Data Science
Minor: Marketing

~~Decoding the Entry-Level Data Science Job Market~~

This project embarks on a comprehensive exploration of the entry-level job market in the data science domain, integrating both quantitative analysis of job advertisements from prominent online job boards and qualitative insights gathered through interviews with data science professionals. The objective of this

study is to find the essential skills required, preferred locations and industries for employment, and salary expectations for individuals who will start their data science careers. By scraping and analyzing job listings, I aim to find the specific technical and soft skills that employers seek in entry-level candidates for the field of data science. Concurrently, in the qualitative component, I seek to enrich these findings with real-world perspectives on industry trends, challenges faced by newcomers, and advice for successfully navigating the job market through discussions with experienced data science professionals in the industry. This multifaceted approach not only aims to equip aspiring data scientists and analysts with a clear roadmap to entering the field but also serves to inform educators and employers about the current dynamics of the job market, highlighting areas of alignment and disconnect between academic preparation and professional expectations. Ultimately, this project endeavors to provide actionable insights that can help bridge the gap between newly graduated data science graduates and their first professional roles, thereby smoothing the transition from education to employment in this rapidly evolving field.

Sponsor: Jessica Fox-Wilson

Room 150, Sanger Science Center, 10:05-10:30

Supratim Saha '26

Dhaka, Bangladesh

Majors: Computer Science; Data Science
Minor: Marketing

Evaluating Coursera's Efficacy in Online Learning for Academic and Alumni Development

This study, conducted over the spring semester by Career Works, delves into the effectiveness of Coursera as a primary online learning platform for both current students and alumni. Coursera offers various certifications that can be done self paced. Beloit College is currently offering certifications from Google, Meta, Salesforce, and other organizations. As the student Certifications Coordinator overseeing this initiative, I aim to critically assess whether Coursera meets the evolving educational and professional development needs within our academic community or if alternative platforms should be considered. Through comprehensive data collection methods, including statistical analysis of student engagement, surveys, and focus groups, this research explores the impact and reception of Coursera on campus and in the alumni community.

Preliminary findings suggest a positive response from the user base, indicating Coursera's potential continuation as a valuable resource. However, unresolved questions about its long-term benefits and adaptability remain. In this presentation, I offer insights into the methodology of the investigation, share initial outcomes, and outline the future steps in the quest to optimize online professional development for our students and alumni. Attendees will gain a deeper understanding of the critical factors influencing platform selection and the strategic considerations involved in fostering an enriching learning environment through online education.

Sponsor: Disha Shende

Room 150, Sanger Science Center, 2:10-2:35

MukhammadAli Shavkatov '26

Andijan, Uzbekistan

Major: Quantitative Economics

Julie Bach '26

Ba Ria-Vung Tau, Vietnam

Major: Quantitative Economics

Charting Your Finance Career Path: A Study of the Entry-Level Job Market

With a dynamic and multifaceted landscape of entry-level finance jobs, recent graduates face diverse opportunities in the industry. In this research, we delve into the trends, demands, and skills requirements that shape the early stages of a finance professional's career with a focus on three critical sub-fields: investment banking, corporate finance, and portfolio management. By combining data analysis from job

scraping, industry insights, and expert interviews, we aim to provide a holistic view of the opportunities awaiting fresh graduates.

Some key areas of exploration include job market trends with hiring patterns, salary expectations, and geographical preferences; skill profiles with essential competencies, certifications, and both technical and soft skills; and insider perspectives and advice from professionals in the industry that contribute to a successful candidate.

Sponsor: Robin Zebrowski

Room 349, Sanger Science Center, 2:35-3:00

Charlie Shriver '24

Rockford, Illinois

Majors: Biology; Cognitive Science
Minors: Computer Science; Philosophy; Environmental Science

Using Cost/Benefit Analysis to Elevate Behavior to Cognition in Common Loons (*Gavia immer*)

In the ever burgeoning field of cognitive science, behavior and cognition are vastly different though they are both ways of explaining the actions of an individual organism. While behavior is more like an input/output machine simply using the environment as a cue to perform a certain action, cognition requires something more “under the hood” in the form of mental states or activity. Though cognition is, as yet, unobservable, its presence can still be defended, as this project intends to do.

During my summers in the Boundary Waters Canoe Area Wilderness, I spent a large quantity of time studying and observing common loons (*Gavia immer*). These large, aquatic birds are adept swimmers and caring parents, but are most famous for their haunting, wailing calls. There seemed to be a pattern in their behavior as I found myself correctly anticipating their actions. I realized that there was always a level of safety involved during flashy or noisy actions and that there had to be some kind of risk assessment at play. Risk assessment is not a novel concept to animal behavior, but, under a certain light, it indicates internal processing of environmental information and that this processing turns into judgement on what actions to take through analyzing costs and benefits. With the knowledge acquired through an extensive search of dozens of research papers, articles, and other literature on loons, I use the concept of cost/benefit analysis to re-evaluate observational data as cognitive rather than merely behavioral.

Sponsor: Leslie Williams

Room 249, Sanger Science Center, 1:05-1:30

Jo Simms '24

Lawrence, Kansas

Majors: Biology; Anthropology; Critical Identity Studies

Eleanor Sperling Leech '25

Chicago, Illinois

Major: Anthropology

Großes Gräberfeld: Osteology Research of a Late Roman Cemetery in Germany

This presentation provides an overview of ongoing bioarchaeological research on an excavated cemetery with over 1,400 graves in Regensburg, Germany. Radiocarbon dating indicates that the cemetery was in use between 100 and 700 CE, when Regensburg was transitioning from a Roman military base to an early medieval city. We, along with two other students, accompanied Professor Leslie Williams to Munich during the summer of 2023 to assist with preliminary analyses of the human remains from this site.

We worked at the Munich State Collection for Anthropology and Palaeoanatomy (SAPM), where all

human remains from the Regensburg excavations are stored. The bones of each individual we looked at were cataloged, evaluated for preservation, assessed for pathologies, and photographed for the database. We faced difficulties in our research, including severe damage to the bones, which made some of them arduous to assess. When much of the bone surface was deteriorated, we were often unable to observe if any lesions or abnormalities were present.

Despite the challenges, the work we did was rewarding, having reassembled and collected data on approximately 30 sets of remains. In this presentation, we will describe our work over the four weeks, highlighting the skeletal features we assessed and discussing the intersection of biology and anthropology in an osteological research setting.

Sponsors: Gana Ndiaye and Robert LaFleur

Room 249, Sanger Science Center, 1:30-1:55

Maij A Sprenger-Otto '24

Minneapolis, Minnesota

Majors: Anthropology; History
Minor: Political Science

Food Heritage and National Nostalgia: The Evolution of Latvian Food and Community-Making Practices in the United States

Over 36,130 Latvians were granted sponsorship to the United States following the dissolution of the World War II displaced persons camps in the late 1940s and early 1950s. They left largely because of Soviet occupation and created networks of Latvians within the United States embracing cultural identity through language, community, and education. Over time, the Latvian diaspora in the U.S. has evolved as the experience of members is diversified and newer generations begin to lead. Latvia regained independence in 1991, permitting a third wave of post-independence Latvians and a better exchange of experience between the U.S. diaspora and those in the homeland.

Drawing on fourteen semi-structured interviews, participant observation, and survey results conducted for my honor's thesis in anthropology, I explore how heritage preservation concerns and national nostalgia have shaped Latvian culinary practices in the United States. I discuss the ways that food fits into community structures and the changes and barriers to creating Latvian food. Food is a bridge toward sharing culture and creating community while embodying tensions regarding authenticity, tradition, and inclusion.

Sponsor: Matthew Tedesco

Room 150, Sanger Science Center, 1:30-1:55

Grayson Thobe '24

Crystal Lake, Illinois

Majors: Philosophy; Creative Writing

Humility as a Memory of Shame

Repentance rituals are put in place to teach us humility, but if learning it does not heal the rifts that conflict caused, what is it good for? Humility may be an admirable virtue to strive for, but there are less savory aspects that accompany it, especially within religious forms of remorse and forgiveness: shame and even self-hatred. Becoming humble may always involve internalizing shame, but the way we are taught how to do that can either lead to greater cohesion or deeper distrust within our communities. Humility is a loaded concept, and this presentation will start to unpack its many facets.

Sponsor: Julianne Angeli

Room 249, Sanger Science Center, 10:05-10:30

Farah Tolu-Honary '24

Freeport, Illinois

Majors: International Relations; French
Minor: African Studies

Integration and Changes in the Middle East and Mediterranean: An Investigation into Diaspora Politics

What is the Middle East? What is North Africa? How are our perceptions of these regions shifting? In this presentation, I discuss the increasingly important role of diaspora communities from these regions in shaping the political climates of their countries of origin. A state's diaspora encompasses both immigrants who have moved abroad and their descendants, forming a multi-generational community of individuals who live external to an origin state's borders.

Throughout the spring semester, I have been investigating and comparing the ways in which international and local media discuss Middle East and Mediterranean politics. Across North Africa, I am finding that local media platforms often report on diaspora politics as part of their domestic news. States with large diasporas must adopt emigration governance strategies to navigate the so-called "illiberal paradox," whereby governments must balance the threats that diasporas may pose to a regime's grip on power and the simultaneous economic benefits that migration offers. As a result, I argue that the increasing attention paid to politically active diasporas may provoke increased surveillance and even devolve into transnational repression.

Sponsor: Tom Stojsavljevic
Benjamin Afflerbach (University of Wisconsin - Madison)

Room 150, Sanger Science Center, 9:15-9:40

Yaksh Toyesh Ujoodha '25

Quatre Bornes, Mauritius

Majors: Data Science; Computer Science

Assessing Generative Models for Predicting Material Structures and Properties

One of the fundamental goals of materials science is to be able to understand and predict a potential material's properties without having to first synthesize it. Machine learning models can potentially give us this information by training on large datasets of properties and building up an understanding of the aspects of each material that impacting properties. This research had three main goals: predict material properties directly from structural inputs, propose new materials with targeted properties, and validate proposals using experimental or computational methods.

In this presentation, I cover several aspects of this experience. I address how I got this opportunity, the goals of the research, the CDVAE approach, understanding machine learning model training processes, the weekly meetings with my supervisor, collaboration with a team (soft skills), hard skills learned (bash scripting, debugging, ML training visualization, leveraging UW Madison's CHTC computing resources), what I would do differently, and what is next for this ongoing project.

Sponsor: Tamara Ketabgian

Richardson Auditorium, Morse-Ingersoll Hall, 10:45-12:00

Sol Ulaszek '26 — New Brighton, Minnesota
Major: Biochemistry

Maya Bowker '26 — Madison, Wisconsin
Major: Biochemistry
Minor: Studio Art

Bristan Fialek '26 — Crystal Lake, Illinois
Major: Cognitive Science

Magali Gray '24 — Klamath Falls, Oregon
Majors: Chinese Language and Culture; Education and Youth Studies

The Draculacast: A 'Contemporary' Dracula Podcast Adaptation

In adaptation of Bram Stoker's *Dracula*, *The Draculacast* explores parallels between the burgeoning Victorian technology of the phonograph and the transference of the soul. Forming part of the Symposium "Dracupanel," this collaborative project re-interprets Stoker's original protagonists through the updated media form of a modern audio podcast. *The Draculacast* creatively develops the motives and personality of Stoker's underwritten but complex female character Lucy Westenra, while providing a worldly context for a battle against otherworldly horror. As a site where shifting agency and mobility meet dubiously scientific medical procedures (as metaphors for polyamorous love), our *Dracula* audio drama expands on a story where proximity to plot begets influence--by giving characters a literal voice.

In this short panel discussion, the cast and writer/director will discuss their creation of *The Draculacast* over just a few short weeks and will share excerpts of their work.

Sponsor: Tom Stojsavljevic

Room 349, Sanger Science Center, 11:35-12:00

Lalitheswaran Viswanathan '25 — San Ramon, California
Major: Computer Science

Vanshith Bhandari '26 — Mangalore, India
Major: Computer Science

EEG Brain Signals Emotion Classification

This project explores the classification of EEG brainwave data for identifying emotional states. An EEG dataset consisting of brain signals from subjects shows analyzed scenes evoking different emotions. To capture the temporal dynamics of brain signals, a Long Short-Term Memory (LSTM) neural network was designed. The model was trained to classify EEG patterns into Positive, Negative, and Neutral emotional states.

The LSTM model exhibited promising results, and a detailed analysis of its performance is provided, including a confusion matrix for visualization. Additionally, several traditional machine learning classifiers (Naive Bayes, Support Vector Machines, Logistic Regression, and Random Forest) were implemented for comparison. These comparisons offer insights into the strengths and potential advantages of using deep learning approaches for EEG emotion classification.

This project demonstrates the potential of machine learning techniques, specifically deep learning, for

analyzing complex brainwave data. The results have potential implications in fields like brain-computer interfaces, affective computing, and potentially, the development of diagnostic tools for mental health conditions.

Sponsor: Tamara Ketabgian

Richardson Auditorium, Morse-Ingersoll Hall, 9:15-9:40

Julia Weber '27

Brooklyn Park, Minnesota

Majors: French Language and Culture; English: Creative Writing

Mental Liberation, Life Writing, and Post-Colonial Literature: Tsitsi Dangarembga's *Nervous Conditions*

My presentation focuses on the mental impacts of colonization and the way that literature can express and decompress that trauma. Educated colonized subjects often use life writing as a means to communicate their and their loved ones' mental states--whether suffering, disabled, or recovering. In many cases, however, this life writing also uses the same language as the colonizer. Focusing on Anglophone fiction, this talk explores whether writing in English can liberate postcolonial authors from what Ngũgĩ wa Thiong'o calls the "domination of [their] mental universe," or if it further imposes colonial control and culture.

I pursue this research with a focus on women and the added trauma they experience. The primary author I examine is Tsitsi Dangarembga, a Nigerian writer. Her novel *Nervous Conditions* (1988) and its two sequels provide a revolutionary perspective on the role of women within colonization and the psychological repercussions of Anglicization.

Sponsor: Toby Altman

Richardson Auditorium, Morse-Ingersoll Hall, 10:05-10:30

Lydia WIlliams '26

Chicago, Illinois

Majors: Literary Studies; Creative Writing
Minor: Philosophy

Sex, Women, and Suicide: Rebellion from Patriarchal Power in Renaissance Theater

Renaissance tragedies see the main male characters rebelling with violence towards an authority figure, usually also male. However, these plays hold another type of overshadowed rebellion; the self-inflicted violence used by female characters to escape patriarchy. I first examine two Renaissance-era plays, Thomas Kyd's The Spanish Tragedy's Bel Imperia, a duke's daughter and political pawn, and William Shakespeare's Hamlet's Ophelia, a Lady of the Danish Court entangled in an affair with the prince, and finally one 20th-century adaptation of Hamlet, Heiner Müller's Hamletmachine's Ophelia who endures sexual abuse. I identify examples of patriarchal control in all three. The prominent female characters are met with subjection from both men who wish to possess and use her as well as from men she loves and trusts. Male supremacy surrounds these characters to an inescapable extent. The only way they might fully escape is to commit suicide. A fit of violent madness frees these characters from only acting acceptably and provides them with the first and final decision that is truly theirs. Female self-imposed death is the highest and only sustainable form of rebellion from Renaissance theatre's stifling patriarchy.

OUR SINCERE THANKS

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Link to the online program