Beloit College Student Research Symposium, April 21, 2022

Wright Museum		
Moderator: Yvonne Wu and the InterArts Ensemble		
12:15-12:45 parade around campus	Lynden Blomberg, Graham Olen, Allison Overkamp, Ngoc Diep Bui, Ruari O'Naughton, Emilia Roman, Willie Funk, Anna Downing, Lilian Lopez	We Love To Celebrate
1:00-3:50 drop-by installation, hallway by Hollensteiner	Graham Olen, William Funk, Lynden Blomberg, Ruari O'Naughton, Chase Nelson	College Collage
1:00-3:50 drop-by installation, Logan Room	Chase Nelson, Eric Seo, Sam Gomoll, Emmet Morgan	Space Archaeologists
1:00-3:50 drop-by installation, patio north of museum	Allison OverKamp, Lilian Lopez, Anna Downing, Kyle Nguyen, Sam Gomoll	Paint, Dance, Music: An Interactive Performance
1:00-3:50 drop-by installation in the museum kitchen	Eric Seo, Peyton Scarpaci, Emilia Roman, Tzu Ting Lin, Emmet Morgan, Samuel Schachter, Ngoc Diep Bui	Overcooked and Overlooked: An artistic exploration of the senses
2:30 scheduled performance, drawing studio	Samuel Schachter, Peyton Scarpaci, Tzu Ting Lin, Kyle Nguyen	reprise: the show

Richardson Auditorium, Morse-Ingersoll Hall		
Moderator: Beth Dougherty, Political Science		
8:45	Beth Dougherty	Opening remarks
8:50-9:15	Martu Kollie	What is Statelessness?
9:15-9:40	Farah Tolu-Honory	Dual Citizenship Challenges in Zimbabwe: High Court v. Supreme Court Rulings
9:40-10:05	Deepakshi Bhardwaj, Saumyaa Gupta	Who Decides if I Don't Belong? A Case Study of the U.K.
Moderator: Beth Dougherty, Political Science		
10:15	Beth Dougherty	Opening remarks
10:20-10:45	Farah Tolu-Honory	Peacekeeper or Conflict Driver? The Case of Multinational Force II in Lebanon
10:45-11:10	Saumyaa Gupta	"War has been forced on us": India's response to the 1971 East Pakistan Genocide
11:10-11:35	Kyle Thompson-Taylor	"Kill Everyone Over Ten": American Atrocities in the Philippines (1899-1913)
11:35-12:00	Natalia Ramirez-Vang	The Mayan Genocide and Guatemala's 36-Year Civil War
Moderator: Pablo Toral, Political Science		
1:00	Pablo Toral	Opening remarks
1:05-1:30	Amy Ward	Interdisciplinary and Experiential Learning for a Greener World: How Beloit College Prepared Me for a Professional Career in Renewable Energy
1:30-1:55	Max Simeck	Moscow Comes Home: An Introduction to the Russo-Ukrainian War
1:55-2:20	Elena Patilliet	What Foreign Policy Goal is Israel Pursuing with the Signing of the Abraham Accords?
Moderator: Ron Watson, Political Science		
2:30	Ron Watson	Opening remarks
2:35-3:00	Branda Joseph	The Healthcare System in La Réunion
3:00-3:25	Nguyen Huynh	Time to Heat Up for Climate: A Research Project on Youth Activism in Vietnam
3:25-3:50	Syd Clark	Recycling Redevelopment: Sustainable Changes to Waste Collection at Beloit College

Room 150, Sanger Science Center		
Moderator: Alexis Grosofsky, Psychology		
8:45	Alexis Grosofsky	Opening remarks
8:50-9:15	Swaroop Poudel	Influence of Messaging Styles and Personality on Charitable Giving
9:15-9:40	Emma Davis	Effect of Sibling Relationships on Future Friendship Satisfaction
9:40-10:05	Drew Freitag, Jake Rudolph, Tommy Murray	Psychological Tools to Reach Peak Peformance
Moderator: Lauren Herald, Critical Identity Studies		
10:15	Lauren Herald	Opening remarks
10:20-10:45	Margaret Baugh	Becoming Less Queer: How the AIDS Epidemic Affected Queerness and Normativity within the LGBT Movement
10:45-11:10	Charline Davis-Alicea	Gender Performance in Classical Ballet
11:10-11:35	Rosie Pasqualini	Lay Theories of Gender and the Dramaturgical Perspective
11:35-12:00	Kelli Badgley	How We Understand Dreams: Interpretations and Their Impact on Emotional States
Moderator: Sonya Johnson, Critical Identity Studies		
1:00	Sonya Johnson	Opening remarks
1:05-1:30	Gatter Tran	Flaunting, F***ing, Feuding, and Feeling: Vulnerability in Popular US Music Lyrics
1:30-1:55	Serban Zaha	Ancient Rome in Games: How *Expeditions: Rome* Brings Roman Culture to Modern Audiences
1:55-2:20	Emily Rose Fulcher	Creative Placemaking: Remembering and Reimaging C-haus as a Space through Collaborative Art
Moderator: Ellen Joyce, History		
2:30	Ellen Joyce	Opening remarks
2:35-3:00	Ezekiel Veitch	The Body as Waste Land: Consumption and Abjection in *Our Mutual Friend*
3:00-3:25	Paige Clark	Damnation, Decay and the Deceased: A Reflection on the Danse Macabre
3:25-3:50	Dung Pham	Franklin Boggs - The Arts of a Gruesome History

Room 249, Sanger Science Center		
Moderator: Charles Westerberg, Sociology		
8:45	Charles Westerberg	Opening remarks
8:50-9:15	Jacob Sligar	Do Student Athletes Eat Enough?
9:15-9:40	Aaron Holzmueller	Part of the Team: How Social Structures and Individual Experiences Shape the Choices of Athletes with Disabilities
9:40-10:05	Rhiannon Keen	Undergraduates' Knowledge of Physical, Social and Psychological Wellness
Moderator: Taylor Arhar, Chemistry		
10:15	Taylor Arhar	Opening remarks
10:20-10:45	Grace Scott	Detection of Atrazine in Surface Water of Native Frog Habitats in Avon Bottoms, WI Using Gas Chromatography and ELISA
10:45-11:10	Keelin Norman-Klatt	Expression and Purification of the *E. coli* Chaperone Protein CbpA
11:10-11:35	Michelle Stevens	Using Quagga Mussel Shells to Remove Heavy Metal Ions from Contaminated Water
11:35-12:00	Onix Roige Diez	Developing Chemical Demonstrations
Moderator: Amy Briggs, Biology		
1:00	Amy Briggs	Opening remarks
1:05-1:30	Ericka Corral	Improving Introductory STEM Courses at Beloit College: Calculus 1
1:30-1:55	Branda Joseph	How Do Students Learn Biology?
1:55-2:20	Ocean Clevette	Increasing Accessibility to Introductory Geology Courses using Virtual Field Experiences
Moderator: James Rougvie, Geology		
2:30	James Rougvie	Opening remarks
2:35-3:00	Emily Clinkscales	Interface-coupled dissolution-precipitation mechanisms in K feldspar replacements produced by low T K-metasomatism; Creede, CO and Socorro, NM.
3:00-3:25	Madeline Holicky	Assessing Land Use Changes Using the Legacy Sediments in Shenandoah Valley, Virgina
3:25-3:50	Martina Pulido	Assessing Geochemical Characteristics of Dam Impounded Waters in the Chesapeake Bay Watershed of Virginia

Room 349, Sanger Science Center		
Moderator: Mehmet Dik, Mathematics and Computer Science		
8:45	Mehmet Dik	Opening remarks
8:50-9:15	Auras Bhadra Khanal	Comparative Analysis of First and Second Order Gradient Descent Methods for Optimization
9:15-9:40	Phuc (Jerry) Ngo	Psychological Experiments on CLIP: Could a Machine Learning Model Capture Human Cognition?
9:40-10:05	Phuc (Jerry) Ngo	StyleWav: Guiding Image Synthesis Using Audio
Moderator: Mehmet Dik, Mathematics and Computer Science		
10:15	Mehmet Dik	Opening remarks
10:20-10:45	Julien A de Channes de Jouvancourt	Dice, Dice, Baby: A Statistical Analysis of Exploding Dice
10:45-11:10	Yujiang Pu	The Development of Decomposition Methods
11:10-11:35	River Pham	The Deadly Ice Cream: A Case Study on Spurious Regression
Moderator: Tom Stojsavljevic, Mathematics and Computer Science		
1:00	Tom Stojsavljevic	Opening remarks
1:05-1:30	Phuc (Jerry) Ngo	The Effect Of Data Augmentation on Deep Representations
1:30-1:55	Nico Petroccione	Implementation of the Lorenz System on Weather Forecasting
1:55-2:20	Brandon Scott Joly	FIFA/Coca-Cola World Rankings on the Predictability of the Men's and Women's FIFA World Cup: A Comparative Analysis
Moderator: Ben Stucky, Mathematics and Computer Science		
2:30	Ben Stucky	Opening remarks
2:35-3:00	Lifeng Wang	Modeling the spread of contagious disease using differential equations
3:00-3:25	Nico Petroccionne, Ericka Corral, Elizabeth Kelly, Ke (Duke) Ding, Mengyan Li	Predicting Location of Target Populations: A Mathematical Modeling Approach for Placement of Mobile Medical Units in Walworth County Wisconsin
3:25-3:50	River Pham, Phuc (Jerry) Ngo	The Road with Adverbs

Wood Room, Mayer Hall (second floor)		
Moderator: Ellie Anderbyrne, Strategic Research and Assessment		
8:45	Ellie Anderbyrne	Opening remarks
8:50-9:15	Caden Anderson	20 Questions Survey-Career Readiness
9:15-9:40	Sadeen Alsabbagh	The Sense of Belonging in Beloit College
9:40-10:05	Sahil Rizal	Beloit's Becoming Better Progress: An Analysis of Honors Day Recipients
Moderator: Brian Morello, CELEB		
10:40	Brian Morello	Opening remarks
10:45-11:10	Max Simeck	How to Kill a 5 Billion Dollar Franchise: The Life and Death of Halo
11:10-11:35	James Wicker	Laser Powder Bed Fusion Cobalt Chrome Hinged Wedding Bands: Tailored Alloys
Moderator: Diep Phan, Economics and Business		
1:00	Diep Phan	Opening remarks
1:05-1:30	Lan Vy Mai, Deepakshi Bhardwaj	Impacts of Climate Change on Migration
1:30-1:55	Cameron James Alonso, Kathryn Linton	The Effect Migrants Have on Native-born Student Test Scores
1:55-2:20	Umang Garg	Access to high-skilled Immigrant Labor and Innovation: How does the win rate in H1-B Visa Lottery affect Patenting at State-level?
Moderator: Carol Wickersham, Sociology		
2:30	Carol Wickersham	Opening remarks
2:35-3:00	Jessi Nguyen	High-stake Assessment for College Admission and Its Efficiency in Vietnam, China and South Korea
3:00-3:25	Mezekerta Tesfay	Red Table Talk: Everything You Need to Know About Law School
3:25-3:50	Christiane Umutoni	Career Prep and Navigating Internships

Abstracts

Sponsor: Diep Phan

Wood Room, Mayer Hall (second floor), 1:30-1:55

Cameron James Alonso '22

Houston, Texas

Majors: Business Economics; Sociology

Kathryn Linton '22

Alameda, California

Major: Economics
Minor: Computer Science

The Effect Migrants Have on Native-born Student Test Scores

Migration is and continues to be prevalent worldwide, especially in the U.S. Immigrants come to America for better opportunities to find work, for better living conditions, and to escape their troubled country. Additionally, many parents decide to move their families to America for better education, in which parents divide their time between working and motivating their children. Migrants are a subset of immigrants; they often move within or between countries while working in agriculture and fishing industries. The benefits of having migrants in school include that schools tend to receive more income and that the native students can interact with their migrant peers. However, the cons of migrants in school are that their native peers tend to be pushed out, and the parents of the native students tend to lose support for public institutions. Migrants also pose another potential con, specific to their circumstances, of needing more assistance than other immigrants due to how often their parents move for work.

Parents want to know how the increase in immigrants in schools impacts their children. As migration continues to grow, especially here in the United States, it is essential to ask how migration affects native students here in the United States and, specifically, how native student test scores are affected by migrants. The first major complicating factor in answering is this native flight, which is the phenomenon where native students are pulled out of public schools and put into private schools when the share of immigrants increases in their school district. The other major factor to account for is the tendency of migrants to be distributed non-randomly among schools, resulting in clustering effects. This means that impact measured across multiple schools can have bias unless these trends are accounted for, as Figlio and Giuliano (2021) mentioned.

Sponsors: Ellenor Anderbyrne and Mehmet Dik

Wood Room, Mayer Hall (second floor), 9:15-9:40

Sadeen Alsabbagh '24

Amman, Jordan

Major: Computer Science, Data Science, and Physics

The Sense of Belonging in Beloit College

A sense of belonging involves more than simply being acquainted with other people. It is centered on gaining acceptance, attention, and support from members of the group as well as providing the same attention to other members. In a research study titled the Sense of Belonging at Beloit College carried out as part of my work in the Institutional Research, Assessment, and Planning (IRAP) Office, I analyzed the demographics of how certain social groups feel toward the Beloit College community and whether those social groups have a sense of Belonging over the range of six-year period. The data have been collected from the annual 20 Questions on the Student Experience conducted by Beloit College over the past 6 years. For the past 3 years, the survey has asked five questions that overlap with the sense of belonging:1) A professor or staff person made them excited about learning; 2) A professor or staff person cares about them as people; 3) A professor or staff person challenges them; 4) They have had a mentor who encouraged them to pursue their goals and dreams; 5) They feel a sense of belonging to this campus. I examine the data for differences between demographic groups each year: All students,

International Students, First-generation college students, Students with disabilities, Black or African American, and Latino/a. Analyzing demographics over the years shows how students' responses change from freshman through senior year. In this presentation, certain trends will be demonstrated through these statistics over time.

Sponsor: Ellenor Anderbyrne

Wood Room, Mayer Hall (second floor), 8:50-9:15

Caden Anderson '23

Westmont, Illinois

Majors: Economics; Sociology

20 Questions Survey-Career Readiness

My presentation will focus on the career readiness of students, with data from the annual 20 Questions Survey on the Student Experience conducted by Beloit College over the past 6 years. For the past 3 years, the survey has asked five questions that coincide with career readiness, and I will focus on three of them: 1) students having had the opportunity to apply classroom learning to a job or internship, 2) students feeling that Beloit College prepared them for the next steps of career, and 3) students feeling prepared to find and apply for jobs.

I analyze the data for differences between demographics and year in school, as well as how students' responses change from freshman through senior years. An extension of this core research project will compare students' responses in the survey with their attendance at Career Accelerator to see if there is any correlation between attending the events and feeling career-ready. In this presentation, I will show certain trends in these statistics over time.

Sponsors: Kristin Bonnie and Chris Johnson

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

Kelli Badgley '22

Lindenhurst, Illinois

Majors: Dance; Psychology

How We Understand Dreams: Interpretations and Their Impact on Emotional States

It's well-known that the mind and body are connected. But just how connected are our emotional states with our dreaming experience? While Freud long ago identified ways in which our dreams provide meaning to our lives and emotional states, psychologists continue to explore the functions and meanings of the content of dreams. For example, recent biological and neurological evidence further support foundational ideas of the dreamer and the dreaming experience, and that dreams impact our emotional states while awake and are influenced by our emotional states to shape our dreaming experience, in particular.

For my senior thesis in Psychology, I have been researching and writing about how emotional states during waking hours impact our dreams in order to gain an understanding of the interaction between these conscious and unconscious states. While what kind of "state" sleep is, is highly debated, there are clear connections between how dreams represent our thoughts and emotions. I have taken a theoretical approach that explores how we understand the meaning and significance of dreams and their relationship to a person's emotions or desires. I also describe a newer perspective that delves into neuroimaging that provides clarity on what areas of the brain are active during REM.

As an extension of this research, I have choreographed an evening-length dance that explores what a night's sleep might look like and what the dreaming experience might be. This dance stems from my psychological research to present a movement showcase of my research on dreams. Using movement and writing exercises that prompted the dancers to reflect upon their sleep, dreaming, and emotional

experiences, the dance allowed further exploration of mind-body connectivity. I'll show video clips from this dance, which premiered on April 16, 2022, to illustrate what I've learned about how people experience the connection between emotions and dreams.

Sponsor: Lauren Herold

Room 150, Sanger Science Center, 10:20-10:45

Margaret Baugh '22

St. Louis, Missouri

Majors: History; Critical Identities Studies

Becoming Less Queer: How the AIDS Epidemic Affected Queerness and Normativity within the LGBT Movement

In the 1990s, a new definition of queer emerged. In academia, this took the form of queer theory, which focused on discussing how identity is socially constructed and normalized. Queer politics focused on fighting identity norms through nonconformity. From its very onset, queer politics heavily overlapped with the LGBT community, with radical organizations such as Queer Nation and the AIDS Coalition to Unleash Power (ACT UP) emerging from the LGBT community. At the same time that queer theory and politics were emerging, the LGBT community was a decade into the Acquired Immunodeficiency Syndrome (AIDS) epidemic. AIDS, which is caused by untreated Human Immunodeficiency Virus (HIV), killed hundreds of thousands of Americans in the 1980s and 1990s. The majority of those who contracted HIV and died were gay and bisexual men.

In attempts to save their quickly dying community, some groups took radical approaches, like covering a senator's house with a giant condom, while other groups took less disruptive strategies, like focusing on safe sex campaigns and calling for legal protections, such as domestic partnerships and inclusion in the Americans with Disabilities Act. I analyzed gay newspapers from St. Louis and New York, published from 1981 to 1991, in order to gauge the popularity and success of some of these approaches. Ultimately, I argue that the AIDS epidemic caused a large portion of the LGBT community to become less queer and more normative.

Sponsor: Beth Dougherty

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

Deepakshi Bhardwaj '22

New Delhi, India

Majors: International Relations; Business Economics

Saumyaa Gupta '24

Gujarat, India

Majors: Political Science; Psychology
Minors: Law and Justice; Philosophy

Who Decides if I Don't Belong? A Case Study of the U.K.

The United Nations describes a stateless person as "someone who is not considered as a national by any State under the operation of its law and is thus someone without any nationality or citizenship anywhere." The UK is known for arbitrarily stripping the citizenship of its people. From 2016 to 2017 alone, there was a 642.86% increase in the number of Britons losing their citizenship. The reasons for these incidents lie in the legal framework around this issue. The UK citizenship law allows the arbitrary stripping of citizenship status if that action is deemed as "conducive to the public good." This means that the targeted individual engaged in conduct not in the public interest, including involvement in terrorism, espionage, serious organized crime, war crimes, or unacceptable behavior. Reviewing the Shamima Begum case and the Hilal Al-Jedda case, we argue that the existing loopholes in the British legal system provide grounds for the arbitrary stripping of citizenship which renders people stateless. Our presentation will deconstruct the legal developments and timeline as they pertain to the citizenship laws, in particular to

the British Nationality Act. We will be engaging in a conversation around administrative oversight, lack of judicial purview, and concentration of powers with the executive. Finally, we will discuss some possible solutions to this issue.

Sponsor: Yvonne Wu

Wright Museum, 12:15-12:45 parade around campus

Lynden Blomberg '23 — Grand Marais, Minnesota
Major: Music
Minor: Studio Art

Graham Olen '23 — Menomonee Falls, Wisconsin
Majors: Creative Writing; Sociology
Minor: Music

Allison Overkamp '25 — St. Peters, Missouri
Major: Undecided

Ngoc Diep Bui '25 — Vinh Phuc, Vietnam
Major: Undecided

Ruari O'Naughton '22 — Milwaukee, Wisconsin
Majors: Environmental Science; Music

Emilia Roman '23 — Chicago, Illinois
Majors: Music; Psychology

Willie Funk '24 — Minneapolis, Minnesota
Major: Undecided

Anna Downing '22 — Alpine, Texas
Majors: Environmental Biology; Studio Art

Lilian Lopez '23 — Los Angeles, California
Major: Psychology
Minors: Dance; Music

We Love To Celebrate

We are a small DIY parade blending multiple mediums into a singular, rambunctious performance. Expect an off-kilter marching band of singers, musicians and dancers, in which costumes, banners and floats abound. We will take campus by storm using sheer enthusiasm as our propellant. Prepare! Prepare!

Sponsor: Ellen Joyce

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

Paige Clark '23 — Fort Wayne
Majors: History; Anthropology
Minor: French

Damnation, Decay and the Deceased: A Reflection on the Danse Macabre

This presentation focuses on Guyot Marchant's depiction of the danse macabre within his 1485 publication of Pierre le Rouge's woodcut prints. More specifically, it argues that the Marchant prints were

designed to inspire repentance by focusing on the grotesque reality of death rather than abstract and unusual descriptions of punishment, which differs from past depictions of the afterlife. The Marchant prints challenge concepts of social hierarchy, affirm negative concepts of the body, and demand repentance through fear. By emphasizing sin as all encompassing, incorporating the viewer into the art, and identifying decay as a product of sin, the Guyot Marchant depictions of the afterlife and his plea for repentance differs from those of the past by using bodily horror and a promise of confrontation of personal sin as a consequence for the misdeeds done during life.

Sponsors: Sonya Maria Johnson and Pablo Toral
Bob Oehler (Beloit College)

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

Syd Clark '22

Ventura, California

Majors: International Relations; Environmental Justice and Citizenship
Minor: Critical Identity Studies

Recycling Redevelopment: Sustainable Changes to Waste Collection at Beloit College

Have you heard the rumor that Beloit College doesn't recycle? Most of our recycling does not make it to the plant because food and trash contaminate the entire load. Students and staff are not familiar with the nuances of waste management or with how COVID-19 has further distanced the Facilities Department from the greater campus community. The current disposal system endangers housekeepers' health, takes hours out of their work day, and generates minimal recycling due to contamination. A new approach to recycling is warranted.

In Fall 2022, Beloit College will introduce a new approach to recycling. A cornerstone of this approach is an education campaign to teach every member of our community about safe and effective recycling, so that they can take out their own trash and recycling to receptacles located throughout campus. This infrastructural change will decrease the risk of occupational injury for housekeepers, heighten student awareness around waste metabolism, and build potential for interpersonal relationships between Facilities and Beloit College as a whole.

Utilizing my long-term employment with the Facilities Department and position as a Sustainability Channel Assistant, I examine the weaknesses of our old approach, the strengths of the new one, and explain my own role in crafting the new strategy. The research conducted for this presentation is informed by my academic experience as an international relations and environmental studies double major, CRIS minor.

Sponsor: James Zambito

Room 249, Sanger Science Center, 1:55-2:20

Ocean Clevette '22

Ashland, Wisconsin

Majors: Environmental Geology; Education and Youth Studies

Increasing Accessibility to Introductory Geology Courses using Virtual Field Experiences

In response to the COVID-19 global pandemic, educators and schools all around the world were forced to adapt their curriculum and teaching practices to accommodate students in remote locations through online instruction. These accommodations addressed not only concerns about safety surrounding COVID-19, but also other ongoing accessibility issues within the field, such as travel constraints and creating equitable experiences for students with mobility impairments. Research on innovative uses of technology resources has shown that online and alternative field experiences can be useful tools to address these issues. Informed by this research, an existing glacial geology exercise used in introductory geology courses at Beloit College was enhanced to accommodate a wider range of students. The existing physical

field trip was supplemented with an interactive Google Earth tour, as well as annotated photo and video guides. These data were used to compile a collection of best practices for accessibility to field experiences and incorporating virtual learning opportunities. These best practices, which balance field experiences and accessibility efforts, are being used to create an additional exercise about local sedimentary geology that focuses on building field skills of observation at the landscape, outcrop, and hand sample scales.

Sponsor: James Rougvie
Tirzah Abbott (Northwestern University)

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

Emily Clinkscales '22

Coos Bay, Oregon

Major: Environmental Geology
Minor: English

Interface-coupled dissolution-precipitation mechanisms in K feldspar replacements produced by low T K-metasomatism; Creede, CO and Socorro, NM.

The secondary alteration process of low-temperature K-metasomatism is a widespread occurrence within Earth's crust and results in the replacement of igneous feldspars in a low-temperature environment, often through the coupling of dissolution and precipitation at fluid-mineral interfaces. Studies of different minerals have observed the presence of crystallographic controls (identical crystallographic orientation between original and parent minerals) and the generation of both nano- and micro-scale porosity in these replacements, while few have investigated the origin of patchy zones in replacement minerals.

In igneous ash-flow tuffs from Creede, CO, and Socorro, NM, sanidine and plagioclase (relatively K-poor feldspars) are replaced by adularia (K-rich feldspar) through naturally occurring, low-temperature K-metasomatism. The replacements generally take place at temperatures less than 150 °C and at model depths less than 2 km. In this study, I focused on identifying crystallographic controls and the generation of porosity to confirm interface-coupled dissolution-precipitation as the primary replacement mechanism and investigated the cause of observed patchy zoning in the replacements.

Scanning electron microscopy (SEM) was used to image porosity on thin sections and perform correlative energy dispersive X-ray spectroscopy (EDS) and electron backscatter diffraction (EBSD) for compositional and crystallographic analysis. Micro- and nano-scale porosity and fractures are observed in adularia replacements, ranging from a few nm to more than 100 μm in diameter. Patches of replacement zoning exhibit differences in Ba composition and little variation in crystallographic orientation. Partially replaced samples demonstrate identical orientation of parent and product minerals. This suggests that patchy zoning is caused by evolving fluid composition through time and confirms interface-coupled dissolution-precipitation as the replacement process.

Understanding these mechanisms and their involvement in crustal fluid flow and element transport can deepen our understanding of the implications of such widely various processes as crustal deformation, element transport and redistribution, environmental remediation and weathering.

Sponsor: Ben Stucky

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

Ericka Corral '22

Chicago, Illinois

Major: Computer Science
Minor: Japanese

Improving Introductory STEM Courses at Beloit College: Calculus 1

During the COVID-19 pandemic, the MATH 110 (Calculus) course was taught in an online format. Under the guidance of Professor Ben Stucky, we will examine the benefits of online learning aids and expand on existing in-person learning aids throughout the project. This project aims to identify elements that will contribute to student learning, increased engagement, and a sense of belonging when returning to in-person learning. This project will feature elements of repetition and recalling, active, and aware learning. The online resources chosen for this project are Desmos, YouTube videos, and publicly available worksheets. These resources are collected considering different learning styles while also promoting active learning and awareness of the material.

Sponsor: Gregory Buchanan

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

Emma Davis '22

Tucson, Arizona

Majors: Psychology; Creative Writing

Effect of Sibling Relationships on Future Friendship Satisfaction

Sibling and friendships are two critical and meaningful relationships an individual may experience across the life span. These relationships are crucial to the development of social, cognitive, and emotional skills that are necessary for daily functioning and well-being. This study looks at the effect of sibling relationships on future friendship satisfaction. Specifically, this study aims to understand how affection and hostility between siblings will influence closeness and acceptance in friendships later on. The Sibling Relationship Questionnaire (Furman & Buhrmester, 1985) and Friendship Quality Scale (Thien, 2012) were utilized to collect data from college students aged 18-22 years.

Past research has focused predominantly on the relationship between parents and children, while there has been a smaller focus on the family structure as a whole and the other relationships that occur within the family. It is evident that parents have a large role in the child's development, but less is known about the role of siblings and friends in the development process. This research will give greater insight into the potential relationship between siblings and friends.

Sponsor: Lauren Herold

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

Charline Davis-Alicea '22

Warrington, Pennsylvania

Major: Dance
Minor: CRIS

Gender Performance in Classical Ballet

Classical ballet's origins most commonly point to Catherine de Medici's 15th-century court dances. Over its six-century lifespan, ballet has been a site for representing dominant notions of gender performance onstage. As dominant notions of gender performance shifted, so too did the parameters for balletic gendered representation. For example, up until the 18th-century, men were the only people suitable for dancing on stage, so men would also perform women's roles in drag. Later, male balletic performance was considered emasculating; In some instances, women would dress and perform as men onstage. The romantic era saw androgynous characters and costuming that aimed to evade gender altogether in favor of a myth of ethereal neutrality. At the threshold between one era of balletic gendering to the next, what was once considered proper gendering became deviant and was swiftly re-disciplined. These radical shifts in gender performance highlight the shifting nature of gender constructs and put into question ballet's investment in regarding gender as a natural phenomenon. Throughout my research, I have developed an interest in presenting previously acceptable forms of gender disciplining onstage that would now be considered deviant, highlighting histories of drag on the balletic stage. I will use the modern stage as a site to recontextualize already-existing histories of gender deviance across ballet's six-century history. In this way, I will be using ballet's own history to question its current investment in binary constructions of

gender. In my essay, I argue that although ballet has been used as a site for representing dominant gendered constructs, the radical shifts in gender performance throughout ballet's history serve as a site to examine gender's shapeshifting nature.

I would like this form of subversion to happen in conversation with another question: What does it mean for minoritarian subjects to have embodied balletic disciplining? And what could it look like for classically trained dancers to develop an awareness of the "master's tools" of embodiment, and use this awareness to "dismantle" and create new embodied possibilities?

Sponsor: Mehmet Dik

Room 349, Sanger Science Center, 10:20-10:45

Julien A de Channes de Jouvancourt '22 Petaluma, California

Majors: Physics; Mathematics

Dice, Dice, Baby: A Statistical Analysis of Exploding Dice

Exploding dice is a method for rolling dice where whenever the largest number on a die is rolled, an additional die is rolled and added to the original sum, again adding another die if the new die rolled its highest value. This type of roll appears most often in board games and role-playing games and a useful tool when playing these types of games is knowing what the probability distribution of a dice roll is. To find a distribution for exploding dice when considering the number of dice initially rolled, how many sides a die has, and how many additional dice are rolled when a die "explodes," Catalan numbers and negative binomial distributions can be used to find all the possible combinations of dice rolled and their "explosions" and in turn the probability of rolling some number with a throw of exploding dice.

Sponsor: Gregory Buchanan

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

Drew Freitag '22 Beloit, Wisconsin

Major: Psychology

Jake Rudolph '24 Crystal Lake, Illinois

Majors: Math; Education

Tommy Murray '24 Rockton, Illinois

Major: Biology

Psychological Tools to Reach Peak Peformance

The field of positive psychology developed in order to help people reach their maximum potential and not just be satisfied with simply doing okay. In this presentation we will focus on how three different techniques taken from positive clinical psychology can be used across a variety of domains. So while we will focus on applying these techniques to athletic training and competition, they are broadly applicable in school and the workplace. The first technique includes the use of meditation and visualization to overcome stress and blocks in performance. When practiced, such skills are immediately available in stressful situations. The second technique is a behavioral technique used to generate mastery experiences while avoiding helplessness inducing ones. When we experience mastery, we are less likely to give up when challenged. The final technique combines both of the other skill sets into a cognitive-behavioral technique used in problem solving. Although clunky at first (what does it mean to "state the problem"?) we will demonstrate how this tool can be applied on and off the field.

Sponsor: Sonya Maria Johnson

Room 150, Sanger Science Center, 1:55-2:20

Emily Rose Fulcher '22

Columbia, Missouri

Majors: Critical Identity Studies; Political Science

Creative Placemaking: Remembering and Reimaging C-haus as a Space through Collaborative Art

This art installation, co-curated by Julia Hwang 22' and Emily Fulcher 22', brings the Beloit College community together to generate collective memories and visions of our student activity space of Coughy Haus, known affectionately as C-Haus, by generations of Beloiters. This current project is inspired by the C-Haus archival work begun by Sarah Grisum '21, Julia Hwang 22', Ben Katz '21, and Olivia Potter '21. Hwang and Fulcher now continue this collaborative memory-making project through an art installation that celebrates and presents contested histories of C-Haus through the mediums of archival documents (posters, menus, articles, pictures) in tandem with new polaroid photos from the reopening. The long pause our campus community had from C-Haus due to COVID means that half of our student body has only experienced C-Haus through upper-level students' lore. The current installation reintroduces C-Haus through its cultural relevance and aesthetic to newer generations of Beloiters. A significant feature of the installation is current students' writings that envision C-Haus as a space wherein Beloiters practice placemaking that centers multi-dimensional experiences. In this way, C-Haus becomes an example of what it means to create an inclusive space, reflective of the labor of love and co-creation that emerges from Beloit's mission of anti-racism, equity, and inclusion.

Sponsor: Diep Phan

Wood Room, Mayer Hall (second floor), 1:55-2:20

Umang Garg '22

New Delhi, India

Major: Quantitative Economics

Access to high-skilled Immigrant Labor and Innovation: How does the win rate in H1-B Visa Lottery affect Patenting at State-level?

The percentage of "smart and highly motivated" individuals born in the United States is the same as anywhere else, but their percentage in the US's workforce is much higher. It is the ability of the United States to attract, absorb, and reward talent that puts it at the forefront of innovation. Despite this, immigration remains a topic of intense debate among policymakers and voters.

The prime source of high-skilled immigrant workers in the United States is the H-1B visa program. Every year the United States government runs a lottery to award these visas. The win rate in the lottery provides an exogenous variable to study the impact of high-skilled immigrant workers on innovation outcomes for firms. The study uses this variation in lottery outcomes to gauge how access to high-skilled immigrant workers affects patenting. The number of patents filed in the state in a given year is used as a quantitative measure for its innovation activity.

This research aims to contribute to the existing literature on the economic impacts of high-skilled immigration and to help formulate sound immigration policies.

Sponsor: Beth Dougherty

Richardson Auditorium, Morse-Ingersoll Hall, 10:45-11:10

Saumyaa Gupta '24

Ahmedabad, India

Majors: Political Science; Psychology
Minors: Law and Justice; Philosophy

"War has been forced on us": India's response to the 1971 East Pakistan Genocide

On December 4, 1971, India unleashed the full weight of its military against the Pakistan Armed Forces (PAF), which had committed acts of genocide against the Hindu Bengali population in East Pakistan (Bangladesh) while trying to suppress Bangladesh's independence movement. This paper examines the impetus behind India's military intervention during the 1971 East Pakistan genocide. By assessing the internal factors influencing Indian Prime Minister Indira Gandhi's government, it argues that India's decision to intervene was highly driven by its self-interest in the region and only secondarily by its empathy for the humanitarian situation in Bangladesh. The paper asserts that after the PAF launched a preemptive strike on the western borders of India on December 3, 1971, India resorted to military action against Pakistan to prove its dominance in South Asia; protect its internal stability and preserve its democracy; and reduce the economic burden caused by the influx of 10 million refugees into Indian territory. Gandhi strategically assessed the PAF's direct act of aggression towards India and responded by supporting Bangladesh's independence movement to directly challenge Pakistan. India's central relationship with Pakistan was therefore pivotal in ending the genocide against the Hindu Bengalis and resulted in the creation of Bangladesh - The land of Bengal.

Sponsor: James Rougvie

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

Madeline Holicky '22

Golden Valley, Minnesota

Major: Environmental Geology
Minor: Spanish

Assessing Land Use Changes Using the Legacy Sediments in Shenandoah Valley, Virgina

Dams have been used historically in Virginia to create hydroelectric power, for navigation, and to power mills. Although most have been removed in recent decades, in 1860 there were at least thirty operating mills and ten navigation dam structures along major waterways in Rockbridge County, VA. Emplacement of dams causes a decrease in stream velocity and buildup of legacy sediments behind the structure. These legacy sediments archive land use activities such as agriculture, timbering, and development since colonial times. By analyzing the legacy sediments and impounded waters, the land-use history of the area can be better understood.

From behind the removed dams, sediment was collected and analyzed using geochemical proxies. These proxies include carbon and nitrogen isotopes, trace metals such as manganese, lead, and iron, and the amount of total carbon. Geochemical proxies from two locations along the Maury River, Jordan's Point and Polecat Hollow, show correlation with shifts in land plant species and historical land-use changes such as mining and industrialization. Overall, this study aims to explain how human impact through land-use changes can be cataloged within the legacy sediments and how those changes can affect sediment for hundreds of years after industrialization and the evolution of agriculture.

Sponsor: Charles Westerberg

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

Aaron Holzmueller '22

Evanston, Illinois

Major: Sociology
Minor: Political Science

Part of the Team: How Social Structures and Individual Experiences Shape the Choices of Athletes with Disabilities

Sports and extracurricular activities are an important part of the high school and college experience. Young people with physical disabilities, however, are far less likely to be included in these activities, particularly on school sanctioned sports teams. In this project, the ways in which the experiences of young people with disabilities influence their decisions to participate in inclusive and segregated sports activities were examined. In-depth interviews were conducted with a sample of 15 people (8 athletes with disabilities and 7 coaches/administrators). Findings revealed five important themes from the athletes (inclusion; mix and match teams; influence of coach; elements of team and microaggressions) and two from coaches/administrators (inclusion/equity and role of the athlete). Spontaneous mentions of microaggressions were made exclusively by female athletes, and many athletes endorsed the importance of both segregated and integrated teams to their athletic experience. State sanctioned events for athletes with disabilities, where they existed, were powerful factors for positive experiences on integrated school teams, both for coaches and for athletes. The findings are discussed in terms of their importance for sociological theory, as well as for directions of future research in this area.

Sponsor: Pablo Toral

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

Nguyen Huynh '22

Ho Chi Minh City, Vietnam

Majors: Environmental Justice and Citizenship; Quantitative Economics

Time to Heat Up for Climate: A Research Project on Youth Activism in Vietnam

From changes in temperatures and weather patterns to extreme climatic events and biodiversity losses, these are all telltale signs that climate change is already well underway. As the Earth plunges into an era defined by rampaging climate change effects, it is today's young people and future generations who will have to live in these uncertain times. As exemplified by Greta Thunberg's popular Friday for the Future (FFF) international movements, global youths have taken great strides in mobilizing and demanding accountability for climate change, showing successes in influencing both direct and indirect corrective action.

However, much less is known about the youth climate movement in Vietnam, despite the country's particularly high vulnerability to climate change impacts. After moving back to Vietnam due to the COVID-19 pandemic, I got involved in the Vietnamese youth climate movement during my junior year and learned about their increasing presence within the Vietnamese youth community.

This presentation is based on my Environmental Studies capstone project, which analyzes the rise and the strategies of Vietnam's youth climate activism. My research methodology is called participant observation and includes data collected from ten in-depth interviews conducted with some of Vietnam's youth climate leaders. My presentation will detail their motivation, including challenges and opportunities, in promoting climate action for youths in Vietnam.

Sponsor: Tom Stojsavljevic

Room 349, Sanger Science Center, 1:55-2:20

Brandon Scott Joly '23

Seymour, Wisconsin

Majors: Mathematics; Education and Youth Studies; Spanish Language and Culture

FIFA/Coca-Cola World Rankings on the Predictability of the Men's and Women's FIFA World Cup: A Comparative Analysis

Since 1992, the International Federation of Association Football (FIFA) has been ranking senior men's national soccer teams based on a variety of criteria. In 2003, FIFA extended the FIFA/Coca-Cola World Rankings into ranking senior women's national soccer teams. The FIFA/Coca-Cola World Ranking just before the 1994 FIFA World Cup USA, 1998 FIFA World Cup France, 2002 FIFA World Cup Korea/Japan, 2006 FIFA World Cup Germany, 2010 FIFA World Cup South Africa, 2014 FIFA World Cup Brazil, 2018 FIFA World Cup Russia, 2003 FIFA World Cup USA, 2007 FIFA World Cup China, 2011 FIFA World Cup Germany, 2015 FIFA World Cup Canada, and the 2019 FIFA World Cup France were considered and the final results of those FIFA World Cups were considered based on two different methods of displaying the teams finish and were analyzed. Of the top 16 teams in each of the Men's FIFA World Cups, 74.1% of those teams advanced to the Round of 16. Meanwhile, 83.9% of the top 12 teams in each of the Women's FIFA World Cups advanced to the Round of 16 or Quarterfinals. The Pearson correlation coefficient was found between the Pre-tournament rankings, and the final results from both methods were considered. The Women's World Cups had higher correlation coefficient values for both methods than the Men's World Cups. In addition, the Women's World Cups had higher t-values and z-scores than did Men's World Cup when they were tested for independence and association between the Pre-Tournament rankings and final results from both methods. These findings indicated that the Women's World Cups were more predictable than Men's World Cups based on the FIFA/Coca-Cola World Rankings.

Sponsor: Amy Briggs

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

Branda Joseph '22

Port-au-Prince, Haiti

Majors: Public Health; French Language and Culture
Minor: Biology

How Do Students Learn Biology?

Last summer, I conducted a research project with Dr. Briggs on How Do Students Learn Biology? The goal of this study was to design an effective way for students to learn biology concepts. Additionally, this study's main focus was to establish how professors can teach more scientifically. The Scientific Teaching book was used as a primary source to obtain information on how instructors can improve their teaching to the students.

Dr. Briggs and I composed a biology introductory materials database containing ninety classroom resources, including videos, laboratory exercises, worksheets, small-group projects, in-class activities, out-of-class homework, and assessment rubrics. Each item is tagged with the type of material, source, Core Concepts, and Core Competencies it addresses, whether it has any blatant accessibility issues, whether instructions are included, and student learning goals.

Sponsor: Rongal Watson

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

Branda Joseph '22

Port-au-Prince, Haiti

Majors: Public Health; French Language and Culture
Minor: Biology

The Healthcare System in La Réunion

La Réunion is proudly recognized to have an outstanding healthcare system due to French colonization. This research aimed to identify and explore La Réunion's healthcare system with a primary focus on comparing it against the French healthcare system, known to be one of the best in the world. Specifically, this study highlighted the different benefits that the French healthcare system proposes to its citizens, and how they apply sometimes differently on La Réunion. Journal articles and the French government page were mainly utilized to obtain the data and details for comparison, together with individual personal experiences with healthcare on the island.

Sponsor: Kristin Bonnie

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

Rhiannon Keen '22

Brodhead, Wisconsin

Majors: Psychology; Creative Writing

Undergraduates' Knowledge of Physical, Social and Psychological Wellness

Wellness has become increasingly important among all age groups. Recently, the CDC introduced a wellness system, "Whole School, Whole Community, Whole Child (WSCC)," in order to introduce 10 components of wellness into school systems from kindergarten through 12th grade. This model offers a student-centered approach and emphasizes the interconnectedness and importance of an alliance between schools, communities, public health, and health care sectors. The WSCC seeks to be an all-encompassing wellness model that can be prevalent in every part of a student's life. While the WSCC offers a great framework for current K-12 students, where does that leave students who just missed out on this program?

The purpose of my study was to examine undergraduates' knowledge of several wellness topics. I aimed to gather information regarding where or from whom participants learned about each topic. Beloit College students were invited to complete a survey about three components of the WSCC model: social/emotional climate; counseling, psychological, and social services; and physical education. Students also provided information regarding where their knowledge from each topic came from (e.g. family, school, cultural values), and how well they thought they did in each section.

I predict students will have greater knowledge of and be more confident about physical wellness. Demographic factors, such as gender identity and school setting, may also affect knowledge and confidence in each section. I predict that a combination of mostly public schooling in the U.S. would result in students with greater knowledge and confidence about physical education than other combinations. With respect to social/emotional climate, and counseling psychological and social services, I predict that knowledge will largely come from sources outside of school. If my predictions are supported, I suggest that information regarding wellness should be readily accessible on campuses.

Sponsor: Mehmet Dik

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

Auras Bhadra Khanal '23

Kathmandu, Nepal

Majors: Computer Science; Mathematics

Comparative Analysis of First and Second Order Gradient Descent Methods for Optimization

In Neural Networks, the process of finding the best set of parameters that results in minimum loss faces several obstacles, the most notable being the efficiency and rate of convergence to the minima of the loss function. Such optimization efficiency is imperative to reduce the use of computational resources and time when training Neural Network models. This presentation reviews and compares the intuition and efficiency

of existing optimization algorithms such as Adagrad, Adam and NAG that implement first order derivatives and compares their performance with Newtonian methods that utilize second order derivatives for convergence.

Sponsor: Beth Dougherty

Richardson Auditorium, Morse-Ingersoll Hall, 8:50-9:15

Martu Kollie '23

Monrovia, Liberia

Majors: International Relations; Environmental Studies
Minor: Spanish

What is Statelessness?

Did you know that over 10 million people worldwide are stateless (without nationality)? These stateless people are often denied access to quality education, security, good healthcare, and employment. They may be unable to get married or own a house. This session is an opportunity to learn about the meaning and causes of statelessness. First, I will share a 4-minute video I created that discusses what it means to be stateless, identifies the causes of statelessness, and provides solutions for addressing the issue of statelessness in the world. The second part of the presentation focuses on a case study of the Netherlands, where the Dutch Nationality Act has set the framework for statelessness in the country.

Sponsor: Diep Phan

Wood Room, Mayer Hall (second floor), 1:05-1:30

Lan Vy Mai '22

An Giang, Vietnam

Majors: Quantitative Economics; Anthropology

Deepakshi Bhardwaj '22

New Delhi, India

Majors: International Relations; Business Economics

Impacts of Climate Change on Migration

Climate change means “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods." As climate change keeps on gaining traction, we will witness a larger frequency of extreme weather events or disasters. A disaster is a “serious disruption of the functioning of a community or a society at any scale due to hazardous events interacting with conditions of exposure, vulnerability, and capacity, leading to one or more of the following: human, material, economic and environmental losses, and impacts.’’ The most pressing issue for leaders worldwide is that of mass migration that will be a result of climate change. In 2018, the World Bank estimated that three regions (Latin America, sub-Saharan Africa, and Southeast Asia) will generate 143 million more climate migrants by 2050.

Our work explores the relationship between climate change and internal displacement, using panel data of 117 countries for the period of 2011 to 2019. Employing random-effects model, this paper examines the overall impact of climate change, proxied by extreme weather events on internal migration using a unique dataset. The independent variables are the Global Climate Risk Index (CRI) constructed by the Germanwatch, and the exposure rate component of the World Risk Index constructed by Bündnis Entwicklung Hilft. Other control variables from the World Bank include the country’s land area, employment in agriculture as a percentage of total employment, GDP per capita, forest area as a percentage of land area, population density, and agricultural area. The Climate Risk Index is negatively associated with the internal displacement rate. In contrast, the exposure rate to weather-related events is positively correlated with the internal displacement rate.

Sponsor: Yvonne Wu

Wright Museum, 1:00-3:50 drop-by installation, Logan Room

Chase Nelson '24 — Houston, Texas
Majors: Studio Art; Psychology

Eric Seo '25 — Woodridge, Illinois
Major: Undeclared

Sam Gomoll '24 — Sun Prairie, Wisconsin
Major: Music

Emmet Morgan '25 — Downers Grove, Illinois
Major: Undeclared

Space Archaeologists

"Space Archaeologists" is a multimedia experience in which participants are able to use sight, hearing, and touch to guide them through a yet-to-be-completed story. This experience is meant to replicate and artistically represent being a "space archaeologist" in the distant future. Visitors uncover a mixture of archaeological findings and found documentation of planetary pioneering endeavors by the Human Race. Participants are invited to evaluate the evidence and hypothesize about the outcomes from a rather particular expedition by a ship that has since been lost to time.

Sponsor: Mehmet Dik
Aleksander Madry (MIT)

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

Phuc (Jerry) Ngo '23 — Can Tho, Vietnam
Majors: Computer Science; Math

The Effect Of Data Augmentation on Deep Representations

Data augmentation is a simple and common technique that increases the model's robustness to class-preserving transformations. However, our understanding of how data augmentation affects deep representations is limited. In this work, we attempt to study this further and hypothesize two mechanisms that could happen. The earlier layers of the model could map augmented inputs to similar representations to the standard inputs counterpart. Or, the model could use an entirely different set of prediction rules to classify augmented samples. To test the hypothesis, we trained standard and augmented models to analyze the similarity between their predictions and representations. Our results suggest data augmentation has a range of behavior on deep representations. Depending on the severity of the augmentation, models can vary between learning invariance or learning entirely separate augmented subpopulations.

Sponsor: Mehmet Dik
Phillip Isola (MIT)

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

Phuc (Jerry) Ngo '23 — Can Tho, Vietnam
Majors: Computer Science; Math

Psychological Experiments on CLIP: Could a Machine Learning Model Capture Human Cognition?

Color and shape have a great impact on human behavior. They influence our decisions and interpretation, which affects a wide range of activities such as perceiving the environment around us, our

buying habits or the way we communicate. Recent development in machine learning has enabled multimodal capabilities in many models. Specifically, after training with a lot of raw data, Contrastive Language-Image Pre-training (CLIP) model has been shown to possess multimodal neurons which recognize different forms and abstractions of the same concept. In this work, we show that CLIP could also capture human cognitive concepts like color and shape symbolism. We determine the effect by measuring CLIP's response to varied input stimuli in the form of images and shapes. The results we have obtained show high correlations with similar psycho-visual experiments from the cognitive science literature.

Sponsor: Mehmet Dik
Phillip Isola (MIT)

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

Phuc (Jerry) Ngo '23

Majors: Computer Science; Math

Can Tho, Vietnam

StyleWav: Guiding Image Synthesis Using Audio

Recent works in multimodality systems have enabled image generations with instruction from another domain. Specifically, Contrastive Language-Image Pre-training (CLIP) allows multiple downstream tasks such as image synthesis, 3D object generation, and style transfer using text. However, the audio-image generation has not been much explored. In this work, we introduce StyleWav, an algorithm that uses audio representation from Wav2CLIP to guide the generated image using StyleGAN. We use synthesized images as a concrete benchmark for the transferred knowledge from the distillation process from CLIP to the audio domain. For further application, the model's code is public at: https://github.com/Jerry2001/StyleWav.

Sponsor: Jingjing Lou

Wood Room, Mayer Hall (second floor), 2:35-3:00

Jessi Nguyen '22

Majors: Education and Youth Studies; International Relations
Minor: Asian Studies

Phan Thiet, Vietnam

High-stake Assessment for College Admission and Its Efficiency in Vietnam, China and South Korea

The National High School Examination (NHSE) is now regarded as one of the most important, if not the most important, exams for many Vietnamese senior students. It is a high-stake standardized national test administered once a year to evaluate students' eligibility to finish high school and pursue post-secondary education. Prior to 2015, Vietnamese students completed their 12 years of study by taking two distinct and consecutive exams: the high school graduation test and the college admission exam. Since 2015, the Ministry of Education and Training (MOET) has been reforming the assessment by adjusting the high school graduation and college admission tests on an annual basis. The most significant change thus far has been the consolidation of the high school graduation and college admission tests into one single exam — the 2-in-1 NHSE. The inefficiency of 2-in-1 NHSE has been reflected in the quick birth of independent extra entrance tests administrated by colleges and universities, usually called competency examination. Consequently, it means that Vietnamese students both involuntarily take the NHSE to get a high school diploma and voluntarily take extra ones to get admission to their desired schools. In my paper, I reviewed literature on 1) the overall success and failures of the current NHSE test, 2) the strengths and drawbacks of alternative independent tests in college admission, and 3) lessons for Vietnamese educators and policymakers to learn from China and South Korea, whose educational systems are also driven by examination and use assessment as a key determinant in college admission.

Sponsor: Taylor Arhar

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

Keelin Norman-Klatt '22

Altoona, Wisconsin

Major: Biochemistry

Expression and Purification of the *E. coli* Chaperone Protein CbpA

As antibiotic resistance increases among bacteria over time, it is critical that new antibiotics are continuing to be developed. One potential target for new classes of antibiotics are bacterial chaperone proteins like CpbA. As a chaperone, CpbA engages in various protein-protein interactions, some of which may be able to be disrupted by a future class of antibiotics. The goal of our current research is to express CpbA protein so that it can be further studied in future research. We first sought to amplify two different plasmids, each of which contained a gene for a different section of CpbA, through a bacterial transformation with competent DH5-α *E. coli* cells. The plasmids were then isolated and purified through a mini-prep procedure in order to either be sequenced or utilized in other future procedures. In the future, a company outside of Beloit College will sequence our purified plasmids in order to confirm the genetic information they are thought to contain. Then, at Beloit College, the CbpA protein will be expressed in competent BL21 *E. coli* cells through another bacterial transformation. Transcription and translation of the specific CbpA protein will be induced with the addition of IPTG (Isopropyl ß-D-1-thiogalactopyranoside), a molecular biology reagent. The protein will then be purified from the cells in order to further study how CpbA interacts with other proteins in *E. coli*. Characterizing these interactions is a vital step in designing a drug that can disrupt protein function.

Sponsor: Yvonne Wu

Wright Museum, 1:00-3:50 drop-by installation, hallway by Hollensteiner

Graham Olen '23

Menomonee Falls, Wisconsin

Majors: Creative writing; Sociology
Minor: Music

William Funk '24

Minneapolis, Minnesota

Major: History

Lynden Blomberg '23

Grand Marais, Minnesota

Major: Music
Minor: Studio Art

Ruari O'Naughton '22

Milwaukee, Wisconsin

Majors: Music; Environmental Biology

Chase Nelson '24

Houston, Texas

Majors: Studio Art; Psychology

College Collage

Art is something that connects each and every one of us, whether we know and acknowledge it or not. A lot of folks think of art in the context of galleries and museums, and as something that is always premeditated and cerebral. We want to challenge those notions with our piece, "College Collage." This collage is made up of pre-made elements, including absent-minded doodles ripped from class notes and song lyrics that have personal meaning. We want to emphasize that art can be found in unlikely places, and in finding this unlikely art, we can find connection with each other in our nervous habits and casual hobbies. We also want to frame art as something that is constantly in progress and collaborative, and that not having an end goal can sometimes be the goal itself. Leaving your mind open to change and new ideas can vastly expand the way you view art and the pleasure you receive from the artistic process.

We invite viewers to leave their own doodles or lyrics as they please, wherever there is open space remaining. If a viewer would like to add onto an existing drawing in the collage and create a little story, they are more than welcome. If a viewer just wants to leave a random silly doodle, or a song lyric that's been stuck in their head, they are welcome to do this as well. We don't want to ascribe rules to what this piece should end up looking like by the time this is all over, and not knowing how the piece will turn out adds to the beauty and the fun of the collage itself. We want this to be a collage of human experience that transcends typical artistic conventions.

Sponsor: Yvonne Wu

Wright Museum, 1:00-3:50 drop-by installation, patio north of museum

Allison OverKamp '25 — St Peters, Missouri
Major: Undeclared

Lilian Lopez '23 — Los Angeles, California
Major: Psychology
Minors: Music; Dance

Anna Downing '22 — Alpine, Texas
Majors: Environmental Biology; Studio Art

Kyle Nguyen '23 — Hanoi, Vietnam
Major: Data Science

Sam Gomoll '24 — Sun Prairie, Wisconsin
Major: Music

Paint, Dance, Music: An Interactive Performance

Paint, Dance, and Music is an interactive music/dance piece that will result in a vibrant and colorful collaborative 2D painting. With a music track designed by the artists playing during the installation, audience members are urged to express themselves freely on the canvas dance floor. Each participant will have access to containers of washable paint that they can dip their feet into so that they leave a trail of movement behind them.

Whatever color or path across the paper someone wants to take is entirely up to them. They are encouraged to act on whatever feels right with the music or in the moment. By the end of the symposium, dozens of overlapping colored footprints will reveal a story of people expressing themselves and moving freely.

Sponsor: Isaac Young

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

Rosie Pasqualini — Kansas City, Missouri
Majors: Cognitive Science; Philosophy

Lay Theories of Gender and the Dramaturgical Perspective

The dramaturgical perspective (DP) frames life's many social roles and identities as performances in the larger "play" of society. For example, a person working in customer service may feel that their "customer service self" is performative and separate from who they really are. The present research explores the relationship between the dramaturgical perspective, gender-conformity threats, and our concepts of gender. Prior research suggests that the DP can serve as a defense mechanism against threatening information (e.g., viewing being a student as a "performance" can reduce the threat of having failed a test). Thus, we examine whether a threat to one's gender conformity might lead us to see our social roles,

including gender, as performances. We hypothesized that a threat to gender conformity would lead to more constructionist and performative views of social roles, particularly gender. In an experiment, we induced a threat to (vs. affirmed) participants' gender conformity. We then measured participants' endorsement of the DP and their perceptions of gender as being more biologically vs. culturally based. The threat caused participants to view their own gender as being socially constructed and social roles as more performative. This research has implications for our evolving concepts of gender and gender identity.

Sponsor: Pablo Toral

Richardson Auditorium, Morse-Ingersoll Hall, 1:55-2:20

Elena Patilliet '23

Beloit, Wisconsin

Major: International Relations

What Foreign Policy Goal is Israel Pursuing with the Signing of the Abraham Accords?

On September 15, 2020, a significant historic step took place in the long quest for peace in one of the most war-prone regions of the world, the Middle East. The Abraham Accords, named in honor of Abraham, the patriarch of Judaism, Christianity, and Islam, are a set of bilateral diplomatic treaties signed between the State of Israel, the United Arab Emirates, and the Kingdom of Bahrain, mediated by the United States. What foreign policy goal is Israel pursuing with the signing of these accords?

On the surface, the Accords are aimed at mutual foreign policy goals of the parties involved, such as strengthening peace, mutual understanding, and coexistence, after a century-long animosity between the Arab world and Israel. I argue that the Abraham Accords are intended to serve as the catalyst for a new strategic regional security alliance to meet deeper foreign policy goals of the parties, most importantly, to face the common existential threat posed by Iran and its proxies. As such, the Accords embody the victory of state security and interests over religion, ideology, Pan-Arab-Nationalism, and Palestinian statehood. This analysis is informed by the school of realism, which holds among its principles that states' highest goal is survival in a self-help environment, that international affairs take place in a state of anarchy, with no higher power to maintain the peace between states, and that power is the fundamental feature of international politics. This presentation is based on my senior thesis project.

Sponsors: Mehmet Dik and Tom Stojsavljevic

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

Nico Petroccione '22

Pesaro, Italy

Majors: Mathematics; Quantitative Economics
Minor: French

Implementation of the Lorenz System on Weather Forecasting

Accurate models for weather forecasting are vital tools that inform much of our daily lives and routines and are vastly significant in understanding how our environment is changing. A major difficulty that occurs when using dynamical systems to model atmospheric convection - a tool by which we understand weather pattern formation - is the presence of chaotic dynamics. These systems are ones which present sensitive dependence on initial conditions (SDIC) and exhibit behavior which appears to be random, but is in fact deterministic. A classic model used to study atmospheric convection is the Lorenz system introduced by Edward N. Lorenz. This model is a system of three nonlinear ordinary differential equations with SDIC and is noted for the famed Lorenz attractor. Here we present an overview of the classic Lorenz model with numerical simulations that will show the Lorenz attractor and the coexistence of both stable and chaotic dynamics. We will then consider a modified Lorenz system with forcing terms to study the time the system spends in the chaotic state. We conclude with a general discussion of the generalized Lorenz model (GLM) and the rise in probabilistic models in weather forecasting.

Sponsor: Ben Stucky

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

Nico Petroccionne '22

Pesaro, Italy

Majors: Mathematics; Quantitative Economics
Minor: French

Ericka Corral '22

Chicago, Illinois

Major: Computer Science
Minor: Japanese

Elizabeth Kelly '23

Chicago, Illinois

Majors: Computer Science; Data Science

Ke (Duke) Ding '22

Hohhot, China

Major: Environmental Justice and Citizenship
Minor: Mathematics

Mengyan Li '22

China

Majors: Mathematics; Sociology
Minor: Physics

Predicting Location of Target Populations: A Mathematical Modeling Approach for Placement of Mobile Medical Units in Walworth County Wisconsin

We identified three locations in Walworth County to provide free mobile health care to the most vulnerable populations in those areas. Vulnerable populations are identified as low income and high medical needs. Social determinants of health factors to consider include primary language, education level, food and housing status, transportation, environment safety, and other barriers. We input different variables and used a linear equation to find three municipalities that have the greatest need when changing the weight of different variables.

Sponsor: Daniel Youd

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

River Pham '23

Danang, Vietnam

Major: Quantitative Economics
Minor: Chinese

Phuc (Jerry) Ngo '22

Can Tho, Vietnam

Majors: Computer Science; Math

The Road with Adverbs

Adverbs ending in -ly make up a significant proportion of written literature. However, their usage is debatable as many famous authors speculate the nuance and value that adverbs add. In this study, we attempt to answer whether -ly adverbs are needed by identifying their frequency in books in different ranges of popularity; Note: we define a book's popularity by the number of times it has been downloaded from the Project Gutenberg website. The respective data is scraped from the Gutenberg Project using natural language processing. Our results suggest there might be a negative association between adverbs usage and the number of downloads. Thus we believe the fewer -ly adverbs used, the better.

Sponsor: Mehmet Dik

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

River Pham '23

Danang, Vietnam

Major: Quantitative Economics
Minor: Chinese

The Deadly Ice Cream: A Case Study on Spurious Regression

In applied econometric work, there has not yet been an established norm to check for autocorrelated errors, even when the available evidence strongly suggests their presence. One classic example is the said positive correlation between the drowned case and ice cream consumption. The truth is, the heatwave during the summer is the hidden confounding variable. This is a case of spurious regression, where some statistically significant coefficients are often obtained in regression analysis when the dependent and independent variables are mutually independent random walks. This problem is even bigger in data where autocorrelation is a characteristic of the dataset, such as time series and weather-related data.

Sponsor: Susan Furukawa

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

Dung Pham '22

Ho Chi Minh city, Vietnam

Majors: Japanese Language and Culture; Business Economics

Franklin Boggs - The Arts of a Gruesome History

War has always been considered to be the most destructive part of humanity. Yet, it is still an interchangeable episode of history that we may never forget. Throughout the course of war, people have used various ways to capture the scenes of war to pass it to the younger generation for educational purposes, including handwritten notes, photographs, as well as arts. Wartime arts were meant to investigate not only the artistic responses to war, but also to the meaning of violence itself.

In order to understand this, I chose to research the artworks of one of the most representative wartime artists during World War II, Franklin Boggs (1914 - 2009), who was also an artist-in-residence and professor at Beloit College. In my research, I am looking at four paintings named Jungle - Ally of the Enemy, Race Against Death, End of a Busy Day, and Night Evacuation, which were parts of his South Pacific arts collection during 1944 - 1945. These works were published in Abbott Laboratories company organ of What's New magazine vol.95 (September 1945), and were directly connected to the war between Japan and America.

These paintings are a strong evidence of the "dirty businesses" of war, while at the same time, provide a significant historical record of this period. Therefore, by choosing these works for my research project, I would like to convey a strong Anti-war message towards humanity, and also to show respect to this wonderful late artist of Beloit College.

Sponsor: Alexis Grosofsky

Room 150, Sanger Science Center, 8:50-9:15

Swaroop Poudel '22

Lalitpur, Nepal

Majors: Psychology; Business Economics
Minor: Computer Science

Influence of Messaging Styles and Personality on Charitable Giving

Charitable organizations allow for the circulation of wealth in the form of services and resources in underserved communities and distribute wealth to the people who need it the most. Despite their well-intentioned motivations to serve for the betterment of communities and nations, they frequently report a

lack of resources to serve their communities (Nonprofit Finance Fund, 2015). Over two-thirds of all donations to charities and nonprofit organizations in the US come from individuals (Giving USA, 2018). Therefore, these organizations rely heavily on individuals to make donations. Individuals make these donation decisions based on internal factors like their personality and beliefs or external factors like the amount of money they have or persuasion. Understanding these factors can increase community support and promote pro-social behavior. I investigated the influence of personality, messaging, and the amount of money someone has (fictitious money between 60-180 dollars) on people's donation attitudes. Participants on Amazon Mechanical Turk (N = 524) filled out the Ten Item Personality Index, followed by declaring how much they would donate to a charity based on a poster they observed ("Be a good person," "Express Support," or "Make a difference"). There was no main effect of messaging or fictitious amount on donation amount and there was no interaction between them. However, we observed that individuals high in extraversion had small but significantly higher levels of giving.

Sponsor: Mehmet Dik

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

Yujiang Pu '22

Panzhihua, China

Majors: Math; Physics
Minors: Computer science; Philosophy

The Development of Decomposition Methods

Solving systems of linear equations is an age-old problem, and it is still one of the key research topics in many scientific and engineering fields nowadays. Gaussian Elimination is a widely-used method that applies to the situation where there are many unknowns; and based on the idea of Gaussian Elimination, LU decomposition was introduced in 1938, which efficiently decreases the time complexity for the machine to calculate the result of large systems of linear equations. We will go through the development of LU decomposition, and analyze how it makes the machine more efficient and makes our life easier.

Sponsor: James Rougvie

Room 249, Sanger Science Center, 3:25-3:50

Martina Pulido '22

San Diego, California

Major: Environmental Geology

Assessing Geochemical Characteristics of Dam Impounded Waters in the Chesapeake Bay Watershed of Virginia

At high concentrations, Manganese (Mn) and phosphorus (P) are detrimental to human health and aquatic systems. Children that are chronically exposed to Mn^{2+} are more likely to develop learning impairments. Increased phosphorus leads to eutrophication, creating anoxic water conditions ideal for Mn^{2+} solubility, fish kills, and algal blooms. Oxidation state in seasonally stratified reservoirs behind dams allows certain metals to become soluble, accumulate in the water column, and be released to downstream rivers through dam discharge. Additionally, dam removal can remobilize and release soluble metal contaminants from impounded sediments to water systems. The dam tailrace transports and accumulates the remobilized sediments, impounded waters, and soluble metals, allowing the downstream water and ecosystems to become polluted. Could dam reservoirs of the Chesapeake Bay Watershed in Virginia create an increased risk of heavy metal contamination due to water stratification and contaminant mobilization? Aqueous geochemistry was assessed to determine the ideal conditions for heavy metal contaminations in stratified reservoirs. The Maury River in Rockbridge County, Virginia (VA), is located in the Chesapeake Bay Watershed. It holds approximately 10 dams; this study focuses on six demolished and operating structures. Analysis of benthic water shows that as oxygen decreases with depth, $[Mn^{2+}]$ increases, indicating that stratified impounded water produces reducing conditions for $[Mn^{2+}]$. Geochemical analysis shows that phosphate exceeds EPA health standards at 2 sites, and $[Mn^{2+}]$ exceeds standards at 5 sites. Future work will include an analysis of pH, alkalinity, and specific conductivity against water depth, and Ion Chromatography Analysis.

Sponsor: Beth Dougherty

Richardson Auditorium, Morse-Ingersoll Hall, 11:35-12:00

Natalia Ramirez-Vang '24

Milwaukee, Wisconsin

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

The Mayan Genocide and Guatemala's 36-Year Civil War

From 1960-1996, the communities of Guatemala were polarized in a civil war stemming from centuries of racism and inequality that culminated in genocide. The Mayan community, victims of this discrimination, protested in the 1950s on behalf of their rights. The Guatemalan government and army met these protests with violence as the Mayans were then identified as "insurgents." Counterinsurgency tactics implemented by the army included raiding Mayan villages, killing community leaders, abductions, torture, disappearances, arbitrary executions, and other human rights abuses that spread terror among the Mayan community. The conflict is most notorious for the horrors in 1982-83 under the presidency of Efrain Rios Montt, who had the support of United States President Ronald Reagan. During the 36-year civil war, over 200,000 Guatemalans were killed and over 1 million Guatemalans were displaced. I will discuss the causes and consequences of the civil war and Mayan genocide, including the roles of the United States and United Nations and the 1994 Commission for Historical Clarification.

Sponsor: Ellenor Anderbyrne

Wood Room, Mayer Hall (second floor), 9:40-10:05

Sahil Rizal '22

Kathmandu, Nepal

Major: Quantitative Economics
Minor: Mathematics

Beloit's Becoming Better Progress: An Analysis of Honors Day Recipients

Beloit College has long been committed to the ideals of equity and inclusion. The college recently adopted a Becoming Better plan which is the college's roadmap to centering anti-racism and equity at Beloit. This plan shows the college's commitment to providing an equitable environment for Black and minority students. Consequently, this commitment should provide minority students with an environment to excel in their academic pursuits. As the college evaluates its success with the Becoming Better plan, it will analyze many different datasets to understand changes in outcomes for Black students. In my work with the Institutional Research, Assessment, and Planning Office, I undertake one such analysis.

In my research project, I analyze the demographics of Honors Day prize recipients. The Honors Day Convocation is an annual event held to honor outstanding Beloit College students and their accomplishments. One of the ways an improvement in the academic environment for Black and minority students would be revealed would be Black and other minority students receiving an increasing number of Honors Day prizes over time. A greater proportion of minority students receiving these awards might indicate an increasingly equitable academic environment at Beloit. My presentation shares the findings from my analysis of Honors Day prize recipients from 2017 to 2021.

Sponsor: George Lisensky

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

Onix Roige Diez '23

Solsona, Catalonia, Spain

Majors: Environmental Chemistry; Engineering
Minors: Math; Physics

Developing Chemical Demonstrations

During the summer of 2021 I participated in a four-week curricular development project in Beloit's Chemistry Department. The purpose of the project was to increase curricular flexibility and enhance in-person active learning. We produced 209 learning objects by testing, modifying, performing, and filming videos of pre-labs, labs, data, chemical demos, models, and answer keys. In addition, we collected past materials and organized a total of 373 learning objects into an online archive sorted by atomic/molecular, macroscopic, and symbolic representations. These materials are being used in current classes.

Sponsor: Yiheng Wu

Wright Museum, 2:30 scheduled performance, drawing studio

Samuel Schachter '23 — Brooklyn, New York
Major: Music

Peyton Scarpaci '23 — Madison, Wisconsin
Major: Music

Tzu Ting Lin '24 — Tainan, Taiwan
Majors: Environmental Communication; Art
Minor: Music

Kyle Nguyen '23 — Hanoi, Vietnam
Major: Data Science

reprise: the show

Curated by Sammy Schachter, this fashion show is a collaboration among four artists centered around the theme of "retro-futurism"—the repurposing of past representations of the future. The line of clothes are one-of-a-kind pieces involving a patchwork of second-hand apparel and the Maker Lab's heat press designs by Sammy Schachter and Tzu Ting Lin. All of the fabrics incorporated were thrifted to promote sustainability. The music is all original works from Peyton Scarpaci and Kyle Nguyen that incorporate soul and jazz samples. We want the audience to take away how fascinating some people from twenty to thirty years ago thought the future would look like.

Sponsor: Tawnya Cary

Room 249, Sanger Science Center, 10:20-10:45

Grace Scott '22 — Kettering, Ohio
Major: Biochemistry

Detection of Atrazine in Surface Water of Native Frog Habitats in Avon Bottoms, WI Using Gas Chromatography and ELISA

Previous research in this lab found decreased levels of immunity in frogs sampled in the Avon Bottoms State Natural Area (ABSNA) of southern Wisconsin. This area is surrounded by agricultural fields, and we hypothesized that increased agricultural influence, as determined by ArcGIS, increased the presence of agricultural contaminants in frog habitats and, therefore, could alter frog immune responses. However, lowered immunity was not linked to phosphorus and nitrogen concentrations. In response, the objective of this study was to detect and quantify atrazine in these same habitats. Atrazine is a commonly used herbicide in agricultural fields and is known to have adverse side effects on amphibians. We collected surface water from six sites within the ABSNA. EPA Method 619 was executed to isolate atrazine using liquid-liquid extraction with dichloromethane, then isolated in hexane through rotary evaporation. The samples were analyzed through an enzyme-linked immunosorbent assay (ELISA) and gas chromatography. Atrazine was detected at varying levels (15.8 - 4380.0 µg/L) across all sampling

locations. Increased atrazine concentrations were not found to be dependent on agricultural influence. At all detected concentrations, atrazine has been shown to have a negative effect on amphibian physiology. These findings warrant further research to determine whether atrazine can alter amphibian immunity.

Sponsor: Yvonne Wu

Wright Museum, 1:00-3:50 drop-by installation in the museum kitchen

Eric Seo '25 — Woodridge, Illinois
Major: Undeclared

Peyton Scarpaci '23 — Madison, Wisconsin
Major: Music
Minor: Philosophy

Emilia Roman '23 — Chicago, Illinois
Majors: Psychology; Music

Tzu Ting Lin '24 — Tainan, Taiwan
Majors: Environmental communication; Art; Music
Minor: Japanese

Emmet Morgan '25 — Downers Grove, Illinois
Major: Undeclared

Samuel Schachter '23 — Brooklyn, New York
Major: Music

Ngoc Diep Bui '25 — Vinh Phuc, Vietnam
Major: Undecided

Overcooked and Overlooked: An artistic exploration of the senses

An expressive collaboration of artistic installations to evoke an experience of all 5 senses. The installation encourages viewers to reconsider the way they perceive the kitchen environment while exploring the relationship between the senses within the arts.

Sponsor: Brian Morello

Wood Room, Mayer Hall (second floor), 10:45-11:10

Max Simeck — Lake Forest, Illinois
Major: International Relations

How to Kill a 5 Billion Dollar Franchise: The Life and Death of Halo

If you look up "Halo" on google, you will be told that Halo is a science fiction media franchise originally created by Bungie studios, now maintained by 343 Industries. And while that definition is technically true, it fails to answer why Halo matters, or who it matters to.

So then, why is Halo meaningful? Why should you care about it?

I believe the Halo franchise is worth talking about for three reasons:

1. It should be the textbook example of games as a social catalyst.

2. It reveals an enormous investment opportunity in the realm of social gaming.

3. The Halo franchise under 343 Industries is quite possibly the worst-managed franchise in history, regardless of medium or genre, and studying their failure should be mandatory for anybody who will be inheriting an already successful property.

During my talk, I intend to explain these points, and expand them into a larger discussion of the history and appeal of the Halo franchise, what its essence was, why it was initially so popular and beloved, why it has fallen so flat in recent years, and why the next person to recapture its spirit will make a fortune.

Sponsor: Pablo Toral

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

Max Simeck

Lake Forest, Illinois

Major: International Relations
Minor: Japanese

Moscow Comes Home: An Introduction to the Russo-Ukrainian War

On February 24, Russian troops crossed the border into Ukraine and began what Russia's President Vladimir Putin called a "special military operation" to seek the "demilitarization and denazification" of Ukraine. The combat has been intense, causing destruction and displacement on a scale we have not seen in Europe since WWII. But what caused the Russian invasion?

My presentation will argue that there are two "causes": the proximate cause and the "ultimate" cause. The proximate cause is Putin's vision of the role of Ukraine in Russia's history, collective identity, and geopolitics, all of which informed the original goal of the invasion, which was regime change in Kyiv. The "ultimate" cause is Russian culture, which fosters autocracy and aspires to empire, thus explaining why the Russian people accepted Putin's autocracy and imperialist dreams.

I will also discuss the changing goals of the invasion. While the original goal was a quick regime change, Putin seems to have realized that is impossible. His new goals are likely an occupation of the Donbass, a possible land bridge to Crimea, or an attempt to severely destabilize the rest of Ukraine so that it will never be capable of joining NATO or the EU. The analysis for my presentation is informed by the research that I have conducted through my international relations major in my political science and history courses.

Sponsor: Taylor Arhar

Room 249, Sanger Science Center, 8:50-9:15

Jacob Sligar '22

San Jose, California

Major: Biochemistry

Do Student Athletes Eat Enough?

Nutrition is an important everyday aspect for individuals to function, especially for Beloit College Baseball Players, where there has been no research study designed to analyze the food options present at Beloit. This project is an evaluation of Beloit College Baseball Players to determine if the College offers enough healthy and well rounded options to feed their Student-Athletes to perform and succeed at the highest level possible. I surveyed Student-Athletes and had them record what they ate and answer questions about the food options on campus.

Sponsor: Rongping Deng

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

Michelle Stevens '23

Canby, Oregon

Major: Environmental Biology
Minor: Geology

Using Quagga Mussel Shells to Remove Heavy Metal Ions from Contaminated Water

An invasive species to the Great Lakes, Quagga mussels outcompete native species because of their tolerance levels and feeding preferences. Alive, the mollusks undergo bioaccumulation; deceased, the calcium carbonate rich shells may be utilized as a proper biowaste with heavy metal sorption capacities. Quagga mussel shells were crushed into ranged grain sizes between 125 to 250 micrometers, and, under the subjection of heavy metal contaminated water solutions, the maximum Pb ion sorption capacity and uptake rate were evaluated to be 39.4 mg/g and 6.1 mg/min (from 2 - 4 minutes in one fine grain control test trial) from a 207.11 Pb mg/L water solution. Mineralogical and chemical characteristics of the transformed shell grains were investigated to study metal ion sorption and interaction mechanisms under the instrumentation of AAS, SEM, XRD, FT-IR and pXRF. This study affirms the capabilities of natural sustainable heavy metal removal from water by using mollusk shell powder as a biosorbent, enabling a future possibility of less intensive water quality control and sanitation.

Sponsor: Carol Wickersham

Wood Room, Mayer Hall (second floor), 3:00-3:25

Mezekerta Tesfay '22

Grinnell, Iowa

Major: Sociology
Minor: Political Science

Red Table Talk: Everything You Need to Know About Law School

Drawing from questions directly formed by the Beloit College community, current, and former law students will come together to discuss what the admissions process and reality of law school are like.

Over the past few months, I carried out Beloit College student focus groups meant to get at the heart of what undergrad students are wondering about law school. I then recruited former and current law students and presented these questions to them along with other research on law school, to figure out the answers to our student body's question and demystify the mystery that is law school.

The result is this Red Table Talk that harbors this critical information and will be archived for future student use! I hope you will come join in and listen to what these awesome people have to say.

Sponsor: Beth Dougherty

Richardson Auditorium, Morse-Ingersoll Hall, 11:10-11:35

Kyle Thompson-Taylor '22

Maineville, Ohio

Major: Political Science
Minor: Music

"Kill Everyone Over Ten": American Atrocities in the Philippines (1899-1913)

CONTENT WARNING: This presentation includes depictions of death, illustrations depicting torture & execution, and discussions of torture, mass-killing, sexual violence, white supremacy, and racial violence.

From 1899 to 1913, the United States killed an unknown number of Filipino combatants and civilians in a war of colonial expansion. During the U.S.'s conquest of the Philippines, American soldiers tortured and executed prisoners of war, raped and murdered civilians, destroyed countless villages and food-stores,

and forced the relocation of thousands of Filipinos, leading to rampant disease and malnutrition. The official death toll is widely disputed, but estimates for the number of Filipino civilians killed during the conflict and subsequent epidemics range from 200,000 to over 1 million.

Despite having profound impacts on both the Philippines and the U.S., the Philippine-American War (1899-1902) and the subsequent decade of conflicts and insurgencies are often overlooked in U.S. history. This presentation will examine the immediate and historical causes of the conflict, the impact of white supremacy on the escalation of violence, and the long-term impacts on the Philippines and the U.S. caused by this period of conflict. It will conclude with a discussion about the importance of studying and highlighting this often overlooked period of history.

Sponsor: Beth Dougherty

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

Farah Tolu-Honory '24

Freeport, Illinois

Major: Political Science
Minors: French; African Studies

Dual Citizenship Challenges in Zimbabwe: High Court v. Supreme Court Rulings

Descendants of migrant laborers living in Zimbabwe were rendered stateless due to the Zimbabwean government's interpretation of its citizenship laws that banned dual citizenship. Individuals with ties to foreign countries were blocked from accessing their Zimbabwean citizenship on the grounds that they must first renounce their potential claim to a foreign citizenship. Between 2000 and 2006, Zimbabwean courts were inundated with legal challenges to the government's interpretation of its dual citizenship laws. After reviewing High Court and Supreme Court decisions, I found that the High Court continuously ruled in a way that protected citizenship rights. However, I also found that the High Court's attempts to protect individuals' citizenship rights were largely unsuccessful. I offer three explanations for this outcome: the conflicting Supreme Court judgment handed down in Registrar General of Citizenship v. Todd, the Registrar General's refusal to comply with the High Court's rulings, and the failure of the legislature to synchronize dual citizenship laws with the 2013 constitution until 2019. My findings indicate that the High Court of Zimbabwe was able to retain some independence in Mugabe-era Zimbabwe, despite being purged and packed with Mugabe loyalists.

Sponsor: Beth Dougherty

Richardson Auditorium, Morse-Ingersoll Hall, 10:20-10:45

Farah Tolu-Honory '24

Freeport, Illinois

Major: Political Science
Minors: French; African Studies

Peacekeeper or Conflict Driver? The Case of Multinational Force II in Lebanon

In 1982, approximately 3,000 Palestinian refugees living in the Israeli-occupied Sabra and Shatila refugee camps of West Beirut, Lebanon were murdered by a militia of the far-right Phalangist party. Following the massacre, the US deployed Multinational Force II to the city to act as a peacekeeping force. However, after reviewing the force's mandate, I argue that its ambiguity suggests that the US had ulterior motives for sending the Multinational Force back to Lebanon. Additionally, the force's participation in combat indicates that it jeopardized its role as a neutral peacekeeper by becoming a player in the Lebanese civil war. Instead of US-led Multinational Force II, I propose that the United Nations peacekeeping force that was operating in the south of the country should have been expanded so that UN peacekeepers could have operated in West Beirut. My findings indicate that it was the US's guilt after the massacre, its relationship with Israel, and Cold War-era politics that motivated the US to deploy Multinational Force II to Lebanon, rather than a desire to protect the civilian population in Lebanon.

Sponsor: Michael Dango

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

Gatter Tran '22

Hanoi, Vietnam

Major: Media Studies
Minors: Spanish; Journalism

Flaunting, F***ing, Feuding, and Feeling: Vulnerability in Popular US Music Lyrics

Feminist scholars have argued that the “American dream” promotes an ideology that citizens must be autonomous and independent, as evidenced by wealth, status, and state of mind. On the flipside, vulnerability and dependency, traits often considered “feminine” in American culture, are frowned upon. However, through feminist scholarly articles, I argue that vulnerability is considered a strength, a stepping stone to be “autonomous.” I make this argument by considering how autonomy and vulnerability are expressed in contemporary US popular music, with music as a universal language to communicate individual thoughts.

By looking at the top 50 songs of the Billboard Year-end chart of the five most recent years, 2017-2021, I perform a close reading to see whether vulnerability is portrayed or viewed differently based on sex, gender, age group, race, or even through the music genre of the artists. In my study, I define and code four types of vulnerability: socioeconomic (money or material possessions); sexual (bodily desire and experience); violence (threats of physical abuse); and emotional (in control of one’s feelings).

I find that, on the whole, men perform socioeconomic autonomy more than women, but within men, white men are more likely to perform emotional vulnerability than men of color. This suggests that men in American society are more pressured to perform what feminist theorist Martha Fineman calls the “autonomy myth” by being able to provide for themselves without familial or public assistance. However, white men, who have more historical privilege and status compared to men of color, do not have to overcompensate as much and have the ability to perform emotional vulnerability. This project hopes to show the multifaceted meaning of vulnerability and change the common sentiment toward the word by providing a deeper context behind the most well-received songs in America to see what prompts artists to be vulnerable.

Sponsor: Kristin Bonnie

Wood Room, Mayer Hall (second floor), 3:25-3:50

Christiane Umutoni '22

Kigali, Rwanda

Major: Computer Science
Minor: Cognitive Science

Career Prep and Navigating Internships

In the past four years at Beloit, I was able to gain valuable experiences both in and outside the classroom. As a computer science major, I set out to narrow down my career path by exploring different aspects of the field. And the foundational knowledge that I gained from my classes played a significant role in helping me develop my problem-solving skills, while Beloit’s liberal arts in practice model prepared me to translate those skills from the classroom to industry internship positions.

During the summer of 2020, I worked as a Technical Sales Intern at Cisco. It was my first time learning about technical sales roles. I have learned that customer success is achieved well when teams of engineers and sales teams work together to make sure the customers are satisfied by the products and services the company provides. One of the big projects I worked on while in this role was the competitor analysis project. I researched and studied our competitors’ sales to our customers and compared their sales with ours, and evaluated how we can use those research findings to improve future sales.

Another internship experience was during the summer of 2021. I worked as an IT intern for an

enablement team in the IT department of CUNA Mutual Group. This is a team that supports other teams in the IT department and out of the department to do their day-to-day work through creating functionalities and APIs that help them work well. One project I worked on was to create a reusable API template that converts files formats. It was a great learning experience given that I never worked on such projects before.

In my presentation, I will talk about those experiences; the nature of the work, some of the challenges that I faced especially early on, and how I overcame them. I will also share with you what I came to learn about networking and creating meaningful/professional connections, and the crucial role they played in helping me find those opportunities.

Sponsor: Tamara Ketabgian

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

Ezekiel Veitch '22

Rockford, Illinois

Majors: Literary Studies; Media Studies

The Body as Waste Land: Consumption and Abjection in *Our Mutual Friend*

For my English Capstone I studied *Our Mutual Friend* (1864-65) by Charles Dickens through the lens of "Victorian garbage" in relation to the body and consumption. My presentation will explore how Dickens illustrates Victorian London and the bodies within it as sites of abjection that are purified and contaminated through dis/ordered consumption of matter in the form of dust.

In *Our Mutual Friend* matter-consumption permeates the body-as-border between subject and object, threatening to disintegrate the identity, system, and order of London and its inhabitants. I will examine the ways in which consumption "abjects" the body into a wasteland of dust: for “in the sweat of thy face shalt thou eat bread, till thou return unto the ground; for out of it wast thou taken: for dust thou art, and unto dust shalt thou return".

Sponsor: Ben Stucky

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

Lifeng Wang '23

Qingdao, China

Major: Mathematics and Computer Science

Modeling the spread of contagious disease using differential equations

The original intention of this paper is to analyze the spread of contagious diseases mathematically by using some mathematical models and differential equations. The last two years of COVID-19 have caused the greatest disruption to the world economy since World War II. In this context, we decided to study the models of such contagious diseases and find ways to detect contagious diseases early, control them, and calculate the speed of contagious diseases. We hope that through this series of studies, the damage to the world caused by similar contagious diseases in the future can be greatly reduced. In order to make our research more convincing, the research process will cite some authoritative studies, and use accurate modeling software and computing software to calculate our results.

Sponsor: Pablo Toral

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

Amy Ward '22

Golden Valley, Minnesota

Majors: French; Environmental Studies: Justice and Citizenship

Interdisciplinary and Experiential Learning for a Greener World: How Beloit College Prepared Me for a Professional Career in Renewable Energy

Over the past four years, I have been able to refine my academic and professional goals by pursuing a major in environmental studies. Through a variety of courses ranging from environmental geology, to energy economics, environmental justice, and French language and culture, I developed an interdisciplinary education that gave me a holistic understanding of sustainability.

In addition to my coursework, I pursued various experiential learning opportunities, studying energy politics in Washington, D.C. and Madison, conducting applied field research to learn about environmental racism in the Boundary Waters Canoe Area Wilderness, and interning for a national law organization that advocates for clean energy.

I built on these experiences to develop an environmental studies honors project on the Beloit College campus during my senior year. I led sustainability efforts on several fronts. As one of the student leaders of Green Fund, I solicited proposals for energy-efficiency projects, such as the replacement of heating and cooling infrastructure in several college buildings. I also worked with the sustainability channel to organize and promote environmental and sustainability education on campus, such as earth week.

I will conclude by discussing how my courses and experiential learning opportunities have helped me gain cultural competency and become an effective communicator and critical thinker, preparing me for my next steps out of Beloit, entering a professional career in the clean energy industry.

Sponsor: Brian Morello

Wood Room, Mayer Hall (second floor), 11:10-11:35

James Wicker

Scottsdale, Arizona

Majors: Physics; Economics
Minor: Mathematics

Laser Powder Bed Fusion Cobalt Chrome Hinged Wedding Bands: Tailored Alloys

Tailored Alloys strives for funding R&D for Laser Powder Bed Fusion technology in the Additive Manufacturing field (Metal 3D Printing). Laser Powder Bed Fusion (LPBF) was founded in 1995 by using a laser to melt metal powders together to form a solid part layer by layer.

Tailored Alloys focuses on R&D, but has a niche hinged wedding band. Our Cobalt Chrome Hinged Wedding Bands (printed on a LPBF Machine) bypasses your knuckle to fit perfectly to your finger. We have recently just released a Black Band as we saw the demand for it come to play. TA is also producing a smaller band size that is scheduled to be release starting in the summer for a full set of wedding bands.

Currently, Tailored Alloys has received millions of dollars for research in LPBF and accumilated over 50k in revenue over the past two years from the consumer sector. I work daily in both departments as I put my physics and economics degrees to the test.

Sponsor: Lisl Walsh

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

Serban Zaha '24

Roscoe, Illinois

Major: Ancient Mediterranean Studies

Ancient Rome in Games: How *Expeditions: Rome* Brings Roman Culture to Modern Audiences

The video game, *Expeditions: Rome*, allows modern audiences an introductory look and conception of Roman culture through means and terms that are familiar. Historical inaccuracies are certainly present in the game, but its approach belies a concern not with a strict recapturing of the world of the mid-first

century BCE, but with giving the player the experience of a Caesar-like character during the end of the Roman Republic.

The game allows the player to take the place of Caesar beginning with the Third Mithridatic War. Crucially, the player character is created entirely by the player, picking gender, appearance, and so forth, as well as responses to decisions and situations, both small and grave. Fundamentally, the game follows a similar gameplay philosophy of choices and consequences evident in a great number of other RPGs.

The brilliance of the game, however, lies in its translation of the morals, culture, politics, and military thinking of Rome into modern translations while maintaining the veneer of Ancient Rome. Even more so, the very medium of a video game works toward emphasizing a Roman way of thinking about life. It becomes necessary to think of the lives of others as objects - resources to be used. The role of slaves in Rome, and of their proliferation as tutors, companions, and items, receives particular attention. Along with that, the role and power of women, and their perception in Roman society is also explored, especially if the player creates a female character.

These things are wrapped, along with more, in the nearly fantastic politics and military achievement of the time, along with the player's version of the defining rivalry between Caesar and Pompey. This rivalry propels the player through their exploration of the world and its elements, and forms the backdrop to their decisions and immersion.

OUR SINCERE THANKS

Thank you to all those who advanced the work of our students through their time and educational expertise, and by funding through a variety of opportunities designated for research support.

Link to the online program