# Welcome

Welcome to Scholarship Sewanee, our campus-wide celebration of student scholarship and creative works. The mission statement of the Undergraduate Research Initiative is:

*To enhance student engagement, critical thinking, and problem solving through meaningful intellectual student-faculty interaction, every student and faculty member will have the opportunity to engage in collaborative research or creative work in a vibrant and encouraging environment supported by the University as a whole.*

Scholarship Sewanee is a critical part of this mission. It provides an outlet for students to share their outstanding work with the larger academic community in an open and supportive environment. This day of celebration also serves as an opportunity for members of the wider community to recognize both the students and faculty mentors for their commitment to the ideals of scholarship and learning, their desire to make both new knowledge and a positive impact. In many ways, scholarly work is not complete until it is shared with others; hence, your decision to join in our celebration makes the scholarly process whole. Thank you for coming and we hope you have an insightful and enjoyable experience.

Events such as this symposium are only possible through the contributions of numerous generous benefactors. The following people and groups are gratefully acknowledged for their continuing support of Scholarship Sewanee:

The late Dr. Walter E. Nance (C '54) and the late Mayna Avent Nance
The Office of the Dean of the College
Jacob McGhee
Library and Information Technology Services
Facilities Management
Print Services
Sewanee Catering
Taylor Tunstall and The Order of the Gown
Jenny Ramos
Makayla Williams
The Student Presenters
The Faculty Mentors

**Thank You!**

**McCrady Lecture**
1:00 p.m., Friday, April 26
Blackman Auditorium
Brief reception to follow

**Dr. Anne Gulick**

Associate Professor of English Language and Literature
University of South Carolina

## Students, Global Literature, and the Idea of the University

In the final pages of Nigerian novelist Helon Habila's 2002 *Measuring Time*, the protagonist attends a pageant that recounts his village history from the moment of colonial conquest up through the present. The performers, also the playwrights, are all women, none of whom have attended university, but who are nonetheless recognized as full-fledged historians, telling a story of collective survival in a way that foregrounds the singularity of their knowledge: "*We know something you didn't know, something you couldn't know*," the protagonist imagines them communicating to their audience.

In this talk, I draw on Habila's novel and other materials from my own research area—African literature—in order to probe the value of knowledge we gain from crisis, instability and experience. We often think of college as removed from "the real world." But a global pandemic, social movements driven by young people, and the financial burdens that a university education entails in the 2020s trouble the assumption that town and gown, real world and campus, surviving and analyzing, are easily separable from each other. Drawing on literature as well as Linda Tuhiwai Smith, Édouard Glissant, and other "decolonial" theorists from the twentieth and twenty-first century, this talk invites students to explore the range and meaning of their *own* intellectual experiences in a

tumultuous era: what do *we* know that others don't and couldn't? And how might that knowledge help us imagine the goal of research and the university differently?

## Previous McCrady Lecturers

2023 - Dr. Jeremy Wolfe, Harvard Medical School
2022 - Dr. Brandon Ogbunu, Yale University
2021 - Dr. Katharine Wilkinson, The All We Can Save Project
2019 - Dr. Erika Milam, Princeton University (25th Anniversary speaker)
2019 - Dr. Ramesh Srinivasan, Digital Cultures Lab, UCLA
2018 - Dr. Karen Till, Maynooth University, Kildare, Ireland
2017 - Dr. Linda Mayes, Director of the Yale Child Study Center
2016 - Dr. Dale Peterson, Author and Biographer to Jane Goodall
2015 - Dr. Jeffery Lovich, U.S. Geological Survey and Northern Arizona University
2014 - Dr. Paul Bartrop, Florida Gulf Coast University
2013 - Dr. Rebecca Burwell, Brown University

Funding for the McCrady Lecture is provided by a generous gift from the late Dr. Walter E. Nance (C '54) and his wife, the late Mayna Avent Nance, in recognition of Dr. Edward McCrady, Jr.

# Friday, April 26, 2024

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|---|---|
| 8:00 - 10:00 a.m. | • Oral Session A (Economics)<br>Spencer Hall 164 |
| 8:00 - 10:00 a.m. | • Oral Session B (International & Global Studies)<br>Spencer Hall 151 |
| 9:00 - 10:00 a.m. | • Oral Session C (Chemistry)<br>Woods Lab 123 |
| 9:00 - 12:00 p.m. | • Oral Session D (Art History)<br>Torian Room |
| 9:00 a.m. - 12:10 p.m. | • Oral Session E (Psychology & Philosophy)<br>Spencer Hall 262 |
| 9:30 a.m. - 10:00 a. m. | • Oral Session F (Music)<br>Guerry Auditorium |
| 10:00 a.m. - 12:00 p.m. | • Oral Session G (Art)<br>Convocation Hall |
| 10:00 - 11:20 p.m. | • Oral Session H (Biology)<br>Blackman Auditorium |
| 10:15 a.m. - 12:15 p.m. | • Oral Session I (Economics & Finance)<br>Spencer Hall 164 |
| 10:15 a.m. - 11:45 p.m. | • Oral Session J (English)<br>Spencer Hall 151 |
| 10:30 am - 12:00 p.m. | • Oral Session K (Neuroscience)<br>Spencer Hall 172 |
| 11:00 a.m. - 1:00 p.m. | • Oral Session L (Environment & Sustainability, International & Global Studies and Anthropology)<br>Woods Lab 340 |

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| 11:30 a.m. - 1:00 p.m. | • Oral Session M (History)<br>McGriff Alumni House |
| 1:00 - 1:50 p.m. | • McCrady Lecture (Dr. Anne Gulick)<br>Blackman Auditorium |
| 1:30 - 4:30 p.m. | • Oral Session N (Art History)<br>Torian Room |
| 2:30 - 4:30 p.m. | • Oral Session O (English & Medieval Studies)<br>Spencer Hall 262 |
| 2:30 - 4:30 p.m. | • Oral Session P (Politics)<br>Spencer 164 |
| 2:30 - 4:30 p.m. | • Oral Session Q (International & Global Studies)<br>Spencer Hall 151 |
| 2:00 - 3:30 p.m. | • Poster Session 1<br>Spencer Hall (Harris Commons) |
| 3:45 - 5:15 p.m. | • Poster Session 2<br>Spencer Hall (Harris Commons) |

**Session A: Economics (Spencer Hall 164)**

8:00 a.m. **The Impact of Economic Freedom on Happiness**
Jacob Herron
Faculty Mentors: Aaron A. Elrod (Economics) and Marc St-Pierre (Economics)

8:30 a.m. **The Effect of Weather on Mental Health in the United States**
Nadia Hobeika
Faculty Mentor: Bradley Sturgill (Economics)

9:00 a.m. **Art as an Investment: How the Stock Market Affects Art Auction Sales**
Georgia Ranson
Faculty Mentor: Marc St-Pierre (Economics)

9:30 a.m. **Impact of Financial Literacy on Personal Investment Decisions**
Mian Ahmad Shah
Faculty Mentor: Bradley Sturgill (Economics)

**Session B: International and Global Studies (Spencer Hall 151)**

8:00 a.m. **Understanding the Implementation of Indigenous Rights under Extractive Nation States in Latin America: A Comparative Study of Ecuador and Bolivia**
Elena Hamann
Faculty Mentors: Nick Roberts (International & Global Studies) and Lisa Burner (Spanish)

8:30 a.m. **Will China Ultimately Have Influence in Latin America?: Examining the Economic Benefits and Questionable Growing Allyship**
Debanhi Guerrero
Faculty Mentors: Nicholas Roberts (International and Global Studies and Mila Dragojevic (Politics)

9:00 a.m. **Nuclear Anxiety: A Catalyst of Cold War Counterculture and Transnationalism**
Nicholas Bailey
Faculty Mentors: Nicholas Roberts (International & Global Studies) and Liesl Allingham (German and German Studies)

9:30 a.m. **Current and Colonial Views on Desertification and Environmental Politics in Algeria and Tunisia**
Elizabeth Rutledge
Faculty Mentors: Nicholas Roberts and Diana Hatchett (International & Global Studies)

**Session C: Chemistry (Woods Lab 123)**

9:00 a.m. **Synthesis, Characterization, and Reactivity of Di-Indazole Platinum Complex Derivatives with Possible Pharmaceutical Applications**
Yuliia Humeniuk
Faculty Mentor: Robert E. Bachman (Chemistry)

9:30 a.m. **Microwave-assisted Synthesis of Imidazole-based N-Heterocyclic Carbenes (NHC) Ligands for Cobalt (II) Catalyzed Transfer Hydrogenation of Ketones**
Channita Keuk
Faculty Mentor: Evan E. Joslin (Chemistry)

**Session D: Art History (Torian Room)**

9:00 a.m. **Hannah Höch: A Kitchen Knife and a Needle and Thread**
Olivia Stafford
Faculty Mentor: Jeffrey Thompson (Art History)

9:45 a.m. **Threads of Empathy: Cultural Representation, Humanization, and the Franciscan Mission in Ambrogio Lorenzetti's *Martyrdom* Fresco**
Charles Bond
Faculty Mentor: Leslie Todd (Art History)

10:30 a.m. **Reimagining Childhood: Mary Cassatt's Artistic Vision in Nineteenth Century France**
Mary Cathryn Dixson
Faculty Mentor: Alison Miller (Art History)

11:15 a.m. **Challenging a Historical Narrative: Examining Indigenous Agency within the Complexities of the Colonial Past***
Haven Sydney
Faculty Mentor: Leslie Todd (Art History)

**Session E: Psychology and Philosophy (Spencer 262)**

9:00 a.m. **Exploration, Perception, and Visualization of Substance Abuse Disorder Among Rural Counties***
Laura Botros
Faculty Mentors: Christopher Silver (Psychology) and Kate Cammack (Psychology & Neuroscience)

9:30 a.m. **Application of a New Ethogram to Study Nonverbal Mother-Infant Interactions in the Context of Substance Us**
Victor Esparza and Jin Young Shin (Yale School of Medicine, Child Study Center)
Faculty Mentors: Amanda M. Dettmer (Yale School of Medicine, Child Study Center), Helena Rutherford (Yale School of Medicine, Child Study Center)
Sewanee Faculty Sponsor: Helen Bateman (Psychology)

10:00 a.m. **A Review of Expressive Writing Interventions, Part 3: Positive Outcomes**
Victor Esparza
Faculty Mentor: Sherry Hamby (Psychology)

10:30 a.m. Break

10:40 a.m. **Authenticity, Transformation, and The Sense of Agency In Narrative Identity**
Matthew Schaublin and Gavin Goodwin
Faculty Mentors: C. Albert Bardi (Psychology) and Christopher Silver (Psychology)

11:10 a.m. **On the Nature of Authenticity**
Matthew Schaublin
Faculty Mentors: Andrew Moser (Philosophy), Mark Hopwood (Philosophy) and James Peters (Philosophy)

11:40 a.m. **Dialogic Research through Podcasting to Promote Inclusivity, Belonging, Self-Discovery, and Storytelling***
Makayla Williams
Faculty Mentor: Kathryn Morgan (Psychology)

**Session F: Music (Guerry Auditorium)**

9:30 a.m. **Comparing Baroque and Contemporary Settings of the *Twenty-Four Italian Songs and Arias*: The Songs of Judith Cloud**
Ellanna Swope
Faculty Mentor: Kerry Ginger (Music)

**Session G: Art (Convocation Hall)**

10:00 a.m. **Gellyfish**
Timothy Cook
Faculty Mentor: Pradip Malde (Art)

10:30 a.m. **Home Beyond the Horizon***
George Meng
Faculty Mentor: Pradip Malde (Art)

11:00 a.m. **Reflection of Memories**
Calley Doyle
Faculty Mentor: Pradip Malde (Art)

**Session H: Biology (Blackman Auditorium)**

10:00 a.m. **Diesel Particulate Matter Induces Toxicity within *C. elegans* in a Manner Distinct from Proteotoxicity***
Jeremiah Studivant
Faculty Mentor: Elise Kikis

10:20 a.m. **Effects of Small Dams: A Review of Literature and Experimental Study**
Molly Almon, Angus Pritchard, Joshua Alvarez, and Shawna M. Fix
Faculty Mentors: Kristen K. Cecala (Biology) and Christopher M. Van de Ven (Geographic Information System)

10:40 a.m. **Examining the Impacts of Regenerative Agriculture on Soil Carbon: A Community-Based Participatory Study**
Paige Graf
Faculty Mentor: Deborah McGrath (Biology)

11:00 a.m. **Genetic Diversity in the Widespread Cave Spider *Phanetta subterranea***
Kathryn Kennedy
Faculty Mentor: Kirk Zigler (Biology)

**Session I: Economics and Finance**
**(Spencer Hall 164)**

10:15 a.m. **Unlocking Economic Potential? Exploring the Impact of Foreign Direct Investment on Growth in African Nations**
Saverio Annunziata
Faculty Mentor: Bradley Sturgill (Economics)

10:45 a.m. **Effect of Population Density and Income on Housing Prices in Developing and Developed Economies**
Pratham Singhal
Faculty Mentor: Marc St-Pierre (Economics)

11:15 a.m. **Presentation withdrawn**

11:45 a.m. **Riding the Bull: A Different Approach to Value Investing**
George Cheynet
Faculty Mentor: Huarui Jing (Finance)

12:15 p.m. **Betting on Growth: Integrating High Beta Stocks in Emerging Sectors to Beat the Market**
Charles Tropauer
Faculty Mentor: Huarui Jing

**Session J: English (Spencer 151)**

10:15 a.m. **Femininity as an Agent of Destruction**
Kate Jones
Faculty Mentor: Matt Irvin (English)

10:45 a.m. **Paternalism to Paternity: The Modern Southern Gentleman in the American South**
Richard Alan Waters
Faculty Mentor: John Grammer (English)

11:15 a.m. **The Hound and the Bull: How Is the *Táin Bó Cuailnge* Representative of the Irish Iron Age?**
Finn Vickrey
Faculty Mentor: Matthew Irvin

**Session K: Neuroscience (Spencer 172)**

10:30 a.m. **Racial/Ethnic Groups Moderate Correlations Between Parenting and Child Irritability**
Yi Voon Lim, Nellia Bellaert (Service de Psychologie Cognitive et Neuropsychologie, Université de Mons;), Julie Zhu (Yale School of Medicine), and Nabihah Ahsan (Yale University)
Faculty Mentor: Wan-Ling Tseng (Yale Child Study Center; Yale School of Medicine)
Sewanee Faculty Sponsor: Chris Shelley (Biology & Neuroscience)

10:45 p.m. **Novel Molecular Mechanisms of How Axons Select Their Targets in the Zebrafish Lateral Line**
Abdalrahman Najjar, Gaurav Shrestha (Laboratory of Sensory Neuroscience, The Rockefeller University), and Nicolas Velez Laboratory of Sensory Neuroscience, The Rockefeller University
Faculty Mentor: A. James Hudspeth (Laboratory of Sensory Neuroscience, The Rockefeller University)
Sewanee Faculty Sponsor: Kate Cammack (Neuroscience & Psychology)

11:00 a.m. **Optimizing DNA Transfection and Patch-Clamping Methodology for Hydra Na+ Channel Electrophysiological Recordings**
Madison Reid
Faculty Mentor: Christopher Shelley (Biology & Neuroscience)

11:15 a.m. **Changes in Movement Velocity in Response to Food are Indicative of Behavioral Changes in *L. clathrata* Sea Stars**
Ellie Vincent and Jadon Fetrow
Faculty Mentor: Christopher Shelley (Biology & Neuroscience)

11:30 a.m. **EEG Markers of the Flow State**
Sierra Brandts
Faculty Mentor: Christopher Shelley (Biology & Neuroscience)

11:45 a.m. **Drugs of Abuse and the Brain-Gut Connection**
Kelly Walker, AbdAlrahman Najjar, Anna Püsök, Yana Van den Abbeele, and Revie Atkinson
Faculty Mentor: Kate Cammack (Neuroscience & Psychology)

**Session L: Environment & Sustainability, International & Global Studies and Anthropology (Woods 340)**

11:00 a.m. **Having Your Cake and Eating it Too?: An Economic Analysis of the RGGI Cap and Trade System**
Rex Hallow
Faculty Mentors: Aaron Elrod (Economics) and Patrick Gauding (Politics)

11:30 a.m. **How do civil society organizations work with Cambodian fisher communities to respond to hydropower development on the Mekong River?***
Tuyen Le
Faculty Mentors: Amy Patterson (Politics) and Eric Keen Ezell (Environmental Studies)

12:00 p.m. **The Impact of Foreign Intervention and Utility Consensus on Transboundary River Under Climate Stress—A Comparative Case Study on Mekong and Rhine River***
Tuyen Le
Faculty Mentors: Nicholas Roberts (International & Global Studies) and Kristen Cecala (Biology)

12:30 p.m. **A Reconstruction of Place on the Kennerly School in St. Mark's at Sewanee, Tennessee***
Melody Ottinger
Faculty Mentors: Diana Hatchett and Sarah Sherwood (Anthropology)

**Session M: History**
**McGriff Alumni House**

11:30 a.m. **Holocaust Memory in the Federal Republic of Germany: 1945-1989**
Rebecca Cole
Faculty Mentor: Andrea Mansker (History)

12:00 p.m. **The Outing System at Carlisle Indian Industrial School**
Cole Baker
Faculty Mentor: Stuart Marshall (History)

12:30 p.m. **Racial Anxieties in the 1721 Boston Inoculation Controversy: Political and Domestic Fear**
Calley Doyle
Faculty Mentor: Kelly Whitmer (History)

**Sesson N: Art History (Torian Room)**

1:30 p.m. **Richard Hamilton's Early British Pop Art: The British Assimilation of American Popular Culture and Identity**
Adeline Smith
Faculty Mentor: Jeffrey Thompson (Art History)

2:15 p.m. **Boxing with Bellows**
Delainey Becks
Faculty Mentor: Leslie Todd (Art History)

3:00 p.m. **The Apex of a Career: Matisse and the Chapelle du Rosaire**
Sarah Crosby McKay
Faculty Mentor: Jeffrey Thompson (Art History)

3:45. p.m. **Nara Goes Viral: How Web 2.0 Catapulted Yoshitomo Nara to Global Fame**
Celeste Maddux
Faculty Mentor: Alison Miller (Art History)

**Session O: English & Medieval Studies (Spencer 262)**

2:30 p.m. **"His Sybaritic Privacy": How Mr. Compson Lost His Body in *Absalom, Absalom!***
Meridith Frazee
Faculty Mentor: Heidi Siegrist (English)

3:00 p.m. **Revealing the Flesh: Transgression, Transformation, and Sacrifice in "The Physician's Tale"**
Laura Jane Kemper
Faculty Mentor: Matthew Irvin (English)

3:30 p.m. **From Definition to Salvation: The Desires of Etiology and Allegory in *Piers Plowman***
Sebastian Hobday
Faculty Mentor: Stephanie Batkie (English)

4:00 p.m. **“From Europe Before the Civil War:” Medieval Honor in the American South**
Elizabeth Baker
Faculty Mentor: Stephanie Batkie

**Session P: Politics (Spencer 164)**

2:30 p.m. ***Going Off the Books*: An Analysis of the Illegal Arms Trade with Terrorist Organizations in Colombia**
William Cady
Faculty Mentor: Rae Manacsa (Politics)

3:00 p.m. **Losing G-d’s War: The Paradox of Catholicism in the Argentine National Identity and Contemporary Progressive Social Politics**
Molly Jirgal
Faculty Mentor: Mila Dragojevic (Politics) and Sid Simpson (Politics)

3:30 p.m. **Framing Refugees in Merkel’s Germany: Examining How German NGOs Effectively Promoted Asylum Rights**
Silas McClung
Faculty Mentors: Rodelio Manacsa (Politics) and Abby Colbert (Politics)

4:00 p.m. **Sacrificing Sanctuary: Prioritizing National Security over Human Security in U.S. Asylum Law**
Adri Silva
Faculty Mentor: Mila Dragojevic (Politics) and Abby Colbert (Politics)

**Session Q: International & Global Studies (Spencer 151)**

2:30 p.m. **Comparative Analysis of India and China’s Economic Development: Strategies and Sustainability**
Jadelyn Mitchell
Faculty Mentors: Emmanuel Asiedu-Acquah (International & Global Studies) and Kartik Misra (Economics)

3:00 p.m. **Doing More Harm Than Good? U.S. Foreign Aid and the Loss of Indigenous Culture in Guatemala**
Jessie Atkinson
Faculty Mentor: Emmanuel Asiedu-Acquah (International & Global Studies)

3:30 p.m. **Beyond Borders: Austria's Post-Iron Curtain Migration Evolution**
Adelai Brewer
Faculty Mentors: Emmanuel Asiedu-Acquah (International and Global Studies) and Chiedozie Uhuegbu (German & German Studies)

4:00 p.m. **Signified Germanness: The German Nation and Ausländerpolitik**
Adrena Walton
Faculty Mentors: Nicholas Roberts (International and Global Studies) and Chiedozie Uhuegbu (German & German Studies)

## Poster sessions are in Spencer Hall (Harris Commons).

## SESSION 1 (2:00 p.m. – 3:30 p.m.)
## SESSION 2 (3:45 p.m. – 5:15 p.m.)

# AFRICAN AND AFRICAN AMERICAN STUDIES

**American Deception Behind Eugenics** (2:00 Poster Session, Position 1)
Lilly Boston
Faculty Mentor: Andrew Maginn (History)

# ANTHROPOLOGY

**Ostrich Eggshell Bead Documentation with the Late Prehistory of West Turkana Project: A Reflection on My REU Experience** (2:00 Poster Session, Position 2)
Grace Parkhill
Faculty Mentor: Martin Knoll (Earth & Environmental Systems)

# BIOLOGY

**Effects of Hydrologic Variability on the Development of *Lithobates sphenocephalus*** (3:45 Poster Session, Position 1)
Konstantinos Andriotis
Faculty Mentor: Kevin L. Fouts (Environmental Stewardship & Sustainability) and Kristen K. Cecala (Biology)

**Exposure to Nano-Gold Particles, but Not Diesel Particulate Matter, Exacerbates Protein Misfolding in *C. elegans*** (3:45 Poster Session, Position 2)
Mc Noriel Baldonado and Jeremiah Studivant
Faculty Mentor: Elise Kikis

**Comparison of Two Gears for Measuring Abundance of Triangleclaw Crayfish in Headwater Streams on the Domain of the University of the South** (3:45 Poster Session, Position 3)
Marley Barton
Faculty Mentor: Grady Wells (Biology)

**The Effects of Color on Foraging: Birds Response to Different Colored Bird Feeders** (3:45 Poster Session, Position 4)
Sydney Beall
Faculty Mentor: Katie McGhee (Biology)

**Determining the Role of APETALA Genes in Saffron Flower Development** (3:45 Poster Session, Position 5)
Charles Brooks, Eglesiana Pierra Mutavu, Elzie Elmore, Glory Dada, Keegan Congleton, and VC Lehmann
Faculty Mentor: Kevin Rodriguez

**Fight or Flight: Does the Perceived Presence of Two Competitors at Bird Feeders Affect Foraging Behaviors?** (3:45 Poster Session, Position 6)
Riley Carswell
Faculty Mentor: Katie E. McGhee (Biology)

**Elevation Does Not Predict Density Dependent Population Dynamics in *Valeriana edulis*** (3:45 Poster Session, Position 7)
Ben Davis
Faculty Mentors: Tom Powell (Environment & Sustainability) and Will Petry (North Carolina State University, Plant and Microbial Biology)

**Understanding the Importance of a Conserved Proline in the N-terminus of Nonstructural Protein (nsp9) of the Coronavirus MHV-A59** (3:45 Poster Session, Position 8)
Carolyn Gardner
Faculty Mentor: Everett C. Smith (Biology)

**Does Partner Body Size Affect Association Patterns in a Territorial Fish?** (3:45 Poster Session, Position 9)
Jeffrey Guerra and Fischer Flowers
Faculty Mentor: Katie E. McGhee (Biology)

**Do Ants Show a Foraging Preference for Artificial vs Natural Sugar?** (3:45 Poster Session, Position 10)
Faith Humphrey
Faculty Mentor: Katie E. McGhee (Biology)

**Exploring the Regulatory Mechanisms of the OAS-RNase L and PKR Pathways in RNA Sensing** (3:45 Poster Session, Position 11)
Channita Keuk
Faculty Mentors: Ruilin Zhang and John Karijolich (Department of Pathology, Microbiology, & Immunology at Vanderbilt University)
Sewanee Faculty Sponsor: Alyssa Summers (Biology)

**Is Shoaling Behavior Affected by the Complexity of the Environment?** (3:45 Poster Session, Position 12)
Virginia Claire Lehmann
Faculty Mentor: Katie E. McGhee (Biology)

**Circadian Regulation of Macrophage Activity in Zebrafish** (3:45 Poster Session, Position 13)
Sarah Livingston
Faculty Mentors: Brittney Covington (Vanderbilt University, Molecular Physiology and Biophysics) and Wenbiao Chen (Vanderbilt University, Molecular Physiology and Biophysics)
Sewanee Faculty Sponsor: Alyssa Summers (Biology)

**The Biomechanics of the Feeding System in Primates** (3:45 Poster Session, Position 14)
Amy Martin
Faculty Mentor: Pepe Iriarte-Diaz (Biology)

**Do Watershed Conditions or Local Climate Play a Larger Role in Determining Regional Stream Salamander Distributions?** (3:45 Poster Session, Position 15)
James S. McGrory, Brian J. Halstead, and John C. Maerz
Kristen K. Cecala

**Examining the Effect of Mountain Laurel (*Kalmia latifolia*) Cover and Deer Herbivory on Chestnut Oak (*Quercus montana*) Seedling Establishment** (3:45 Poster Session, Position 16)
Nneka Okolo
Faculty Mentor: Jonathan Evans (Biology)

**Do Larval Salamanders React Differently to Chemical vs Visual Cues of Predatory Crayfish?** (3:45 Poster Session, Position 17)
Autumn Sims
Faculty Mentor: Katie E. McGhee (Biology)

**Detecting Rodent Associated Haemoplasmas in the Greater Kruger National Park** (3:45 Poster Session, Position 18)
Meredith Tjepkema, Ariana Rivera-Corona (Cornell University), and Charlotte Donnelly (University of Nottingham)
Faculty Mentor: Elise A. Kikis (Biology)

**Exposure to Microplastic Nanoparticles Increases Protein Aggregation and Toxicity in *C. elegans*** (3:45 Poster Session, Position 19)
Hannah Womble, Hannah Talbott, and Laine Prince
Faculty Mentor: Elise Kikis (Biology)

**The Significance of Conserved Residues within the N-terminus of nsp9 in Human Coronavirus 229E Modeled in MHV-A59** (3:45 Poster Session, Position 20)
Ryan D. Xavier
Faculty Mentor: Everett C. Smith (Biology)

**Do Salamander Larvae Prefer to Avoid or Associate with Others?** (3:45 Poster Session, Position 21)
Jasmin Zelaya
Faculty Mentor: Katie E. McGhee (Biology)

**Investigating the Role of Trained Immunity in Tet2 -/- and Tet2 -/- RIPK1 D/+ Bone Marrow Cells** (3:45 Poster Session, Position 22)
Kaiwen Zheng
Faculty Mentors: Sandra Zinkel (Vanderbilt University Medical Center, Department of Hematology), Alyssa Jarabek (Vanderbilt University Medical Center, Department of Molecular Pathology, and Immunology)
Sewanee Faculty Sponsor: Alyssa Summers

## CHEMISTRY

**Developing a New Synthetic Methodology for the Preparation of Heteroleptic Acetylacetonate Complexes** (3:45 Poster Session, Position 23)
Mohamed Abdelsalam, Brian Gulick, and Erica Rivers
Faculty Mentor: Robert E. Bachman (Chemistry)

**Synthesis, Characterization, and Reactivity of Di-Indazole Platinum Complex Derivatives with Possible Pharmaceutical Applications** (3:45 Poster Session, Position 24)
Yuliia Humeniuk
Faculty Mentor: Robert E. Bachman (Chemistry)

**Synthesis, Purification, and Characterization of MSA & EDTA Carbon Quantum Dots** (3:45 Poster Session, Position 25)
Rayna Nemcek
Faculty Mentor: Deon Miles (Chemistry)

**Development of New Di-Indazole Chelate Ligands and Their Metal Complexes** (3:45 Poster Session, Position 26)
Oleksii Pidlypenets and Abbie Kleckley
Faculty Mentor: Robert E. Bachman

**Synthesis and Reactivity of Imidazole N-Heterocyclic Carbene (NHC)-Based Co (II) Catalysts in Transfer Hydrogenation of Ketones** (3:45 Poster Session, Position 27)
Anna Lanning Wright, Sarah Livingston, and Channita Keuk
Faculty Mentor: Evan Joslin (Chemistry)

## CIVIC AND GLOBAL LEADERSHIP

**Service Abroad, a Participatory Study of Student Experiences of Civic Engagement in Ecuador*** (2:00 Poster Session, Position 3)
Laura A. Botros
Mentors: Lauren A. Goodpaster (Director of Outreach & Service-Away Programs) , Audra Ryes, T'24, and Christopher F. Silver (Psychology)

**Understanding TISA: Educators' Perceptions of New Tennessee Public Education Reforms*** (2:00 Poster Session, Position 4)
Stewart Miller
Faculty Mentor: Christopher Silver (Psychology)

## CLASSICAL LANGUAGES

**From Scavenger Hunt to Scholarly Resource: Constructing a Database of Latin and Greek Inscriptions in Sewanee** (2:00 Poster Session, Position 5)
Jose T. Diaz and Michael P. Kolcun II
Faculty Mentor: Christopher M. McDonough (Classical Languages)

# ECONOMICS

**The Effect of Legalized Cannabis Use on Driving Under the Influence Arrests** (2:00 Poster Session, Position 6)
JT Carter, Hudson Hefner, and Strom Huber
Faculty Mentor: Marc St-Pierre (Economics)

**Hidden Curricula within College Economics and Finance Programs*** (3:45 Poster Session, Position 75)
Tyler Cozzie, Carter Cole, and Childers Winn
Faculty Mentor: Kate Cammack (Psychology)

**NIL's Effect on Athletic Department Revenue** (2:00 Poster Session, Position 7)
Zach Crain, Jake Perrot, and Andrew Perun
Faculty Mentor: Marc St-Pierre (Economics)

**How Do the Number of Casinos Affect a County's GDP** (2:00 Poster Session, Position 8)
Aiden Donoho, Jo Cantrell, and Austin Crowley
Faculty Mentor: Bradley Sturgill (Economics)

**The Effect of Urban Tree Canopy Cover on Air Pollution** (2:00 Poster Session, Position 9)
David Edge and Emily Tindal
Faculty Mentor: Marc St-Pierre (Economics)

**The Effect of Immigrant Discrimination on Wages in the United States** (2:00 Poster Session, Position 10)
Sarah Gehres and Quynh Truong
Faculty Mentors: Marc St-Pierre (Economics) and Tao Song (Economics)

**The Effect of Education on Sleep** (2:00 Poster Session, Position 11)
Jaxson Harbour and Katherine Petty
Faculty Mentor: Bradley Sturgill (Economics)

**The Effect of Economic Growth on Commercial Property Valuation** (2:00 Poster Session, Position 12)
Edvard Hussell and Robert Sherrill
Faculty Mentor: Bradley Sturgill (Economics)

**Effect of Foreign Investment on Economic Growth in Developing Countries** (2:00 Poster Session, Position 13)
Ahmad Ijaz and Roberto Ferrey
Faculty Mentor: Bradley Sturgis (Economics)

**The Housing Divide: A Comprehensive Analysis of Income Inequality and Its Consequences on Affordable Housing in the United States Counties** (2:00 Poster Session, Position 14)
Ellie Johnson, Tim Cook, and Fernando Totti
Faculty Mentor: Marc St-Pierre (Economics)

**An Analysis on the Effects of Air Pollution on Adult Asthma Cases Across the U.S.** (2:00 Poster Session, Position 15)
Grayson Maddox, Jack Curtis, and Chad Farler
Faculty Mentor: Bradley Sturgill (Economics)

**The Effect of COVID-19 on Excessive Drinking** (2:00 Poster Session, Position 16)
Sheppard McVey, Caroline Cobb, and Martha Milek
Faculty Mentor: Bradley Sturgill (Economics)

**The Effects of State Regulations and Consumer Demographics on Marijuana Revenue in Legalized States** (2:00 Poster Session, Position 17)
Hailee Rains and Evangeline Bournias
Faculty Mentor: Marc St-Pierre (Economics)

**The Effects of Minimum Wage Increases on California's Total Employment** (2:00 Poster Session, Position 18)
Jack Reams and Douglas Clements
Faculty Mentor: Bradley Sturgill (Economics)

**Viticulture and Climate: How Will Wines and Wallets Be Affected by Climate Change** (2:00 Poster Session, Position 19)
Hawkins Schnabel and Katherine Popp
Faculty Mentors: Marc St-Pierre and Aaron Elrod (Economics)

**The Effect of NCAA Division I College Football on Housing Prices (2000 - 2020)** (2:00 Poster Session, Position 20)
Brennan Singer and Hunter Jones
Faculty Mentor: Bradley Sturgill (Economics)

**Exploring the Effect of Food Deserts on Obesity** (2:00 Poster Session, Position 21)
Ryan Stafford and Theo Becker
Faculty Mentor: Marc St-Pierre (Economics)

**The Effect of Urban Tree Canopy Cover on Air Pollution** (2:00 Poster Session, Position 22)
Emily Tindal and David Edge
Faculty Mentor: Marc St-Pierre (Economics)

**Effect of Innovation on Economic Growth Rates** (2:00 Poster Session, Position 59)
Hamza Zia, Decorian Bowers, and Yuqin Wang
Faculty Mentors: Bradley Sturgill (Economics) and Marc St-Pierre (Economics)

## ENVIRONMENTAL STUDIES

**Analyzing the Shift in Livelihood in the Amboseli Ecosystem as a Result of Climate and Drought** (3:45 Poster Session, Position 28)
Greta Bonomo
Faculty Mentor: Richard Kiaka (School for Field Studies, Kimana, Kenya)
Sewanee Faculty Sponsor: Jennifer Michael (English/Environmental Arts and Humanities)

**Increased Breaching by Humpback Whales During Storms** (3:45 Poster Session, Position 29)
Violet Giglio
Faculty Mentor: Eric Ezell (Environmental Studies)

## FINANCE

**Short-Term Investing Strategies: Navigating Market Optimism, Leveraging Price Momentum, and Earnings Growth** (2:00 Poster Session, Position 23)
Temi Adejumobi and Addison Baugh
Faculty Mentor: Huarui Jing (Finance)

**Beat the Benchmark: Leveraging Large-Cap Technology Stocks in an AI-Centric Portfolio to Outperform the Invesco S&P 500 Equal Weight Tech ETF (RSPT)** (2:00 Poster Session, Position 24)
Isabella Francois and Mary Lewis Tunno
Faculty Mentor: Huarui Jing

**Inelastic Investing: Building Economic Resiliency Through a Healthcare-Centric Portfolio** (2:00 Poster Session, Position 25)
Sophia Fucci and George Mabry
Faculty Mentor: Huarui Jing (Finance)

**Optimizing the Sharpe Ratio: Managing Systematic Risk and Macroeconomic Trends for an Artificial Intelligence Portfolio** (2:00 Poster Session, Position 26)
Payne Gridley and Jack Roode
Faculty Mentor: Huarui Jing (Finance)

**Quarterly Quest: Navigating the 2024 Q1 Business Cycle and Seasonal Stock Selection amid Uncertain Macro-Economic Indicators** (2:00 Poster Session, Position 27)
Greg Ix and Phelps Thomas
Faculty Mentor: Huarui Jing (Finance)

**Capitalizing off AI and Tech Infrastructure Growth** (2:00 Poster Session, Position 28)
Maximillian Kezar and Olivia McBurnett
Faculty Mentor: Huarui Jing

**Stability Amidst Market Trends and Economic Fluctuations: Leveraging High Demand and Unique Competitive Advantages** (2:00 Poster Session, Position 29)
Cole Perusek and Mason Ware
Faculty Mentor: Huarui Jing

**Beating the S&P 500: A Portfolio Analysis Using Sector-Based Investing While Maximizing the Sharpe Ratio** (2:00 Poster Session, Position 30)
Jack Selner, Noah Maloy, and Mason Doherty
Faculty Mentor: Huarui Jing

# FORESTRY

**Attenuation of Juglone in Soil Near Black Walnut (*Juglans nigra*) Trees Growing in Cumberland Plateau Coves** (3:45 Poster Session, Position 31)
Annie Kennedy
Faculty Mentors: Thomas Powell (Earth and Environmental Systems) and Bethel Seballos (Chemistry)

# GEOLOGY

**Modeling Bedrock River Erosion Using a Stream Table** (3:45 Poster Session, Position 32)
Pat Evans
Faculty Mentor: Maxwell P. Dahlquist

**Melanterite ($FeSO_4 \cdot 7H_2O$) Under Pressure: Implications for Icy Satellite Water Storage** (3:45 Poster Session, Position 33)
Brian Gulick, Mate Garai, Lilly Daniels, Audrey Burch, CS Shushok
Faculty Mentor: Lily Thompson (Earth & Environmental Systems)

**Shark Teeth from the Mississippian Pennington Formation, Depot Branch, Sewanee, Tennessee** (3:45 Poster Session, Position 34)
Chloe Suzanne Sims
Faculty Mentor: Martin Knoll (Earth & Environmental Systems)

**Numerical Modeling of Tidal Channel Dynamics on Kiawah Island, SC** (3:45 Poster Session, Position 35)
Jackson Y. Speary
Faculty Mentors: Maxwell P. Dahlquist (Earth & Environmental Systems) and Kristen K. Cecala (Biology)

# GERMAN AND GERMAN STUDIES

**Post-War Reconstruction in Germany: Lessons for Post-Conflict Societies** (2:00 Poster Session, Position 31)
Kamilla Haidaienko
Faculty Mentor: Liesl Allingham (German and German Studies)

## MEDICAL AND HEALTH PROGRAMS

**The Relationship Between Parental Wellbeing, (as Measured by Parental Stress, Depressive Symptoms, and Early Relational Trauma) Caregiving Confidence and Competence** (3:45 Poster Session, Position 36)
Kylea Michael and Karen Hanson
Mentros: Soyon Kim (Yale School of Medicine), Amy Meyers (Yale School of Medicine), Jeanette Radawich (Yale School of Medicine), Heather Simon (Yale School of Medicine), Michelle St. Pierre (Yale School of Medicine), and Heather Bonitz Moore (Yale School of Medicine)
Sewanee Faculty Sponsor: Kate Cammack (Psychology and Neuroscience)

## MUSIC

**Why That Piece?: Analyzing and Assessing Soprano Oratorio Repertoire from the Pedagogical Perspective** (2:00 Poster Session, Position 32)
Kate Dossel
Faculty Mentor: Kerry Ginger (Music)

**Creating a Queer-Friendly Rubric for Vocal Pedagogy*** (2:00 Poster Session, Position 33)
Victor Esparza
Faculty Mentor: Kerry Ginger (Music)

**Repertoire Selection from the Other Side: Informing Musical Educators on How to Better Choose Repertoire for Their Students** (2:00 Poster Session, Position 34)
Shelton Griffith and Eliza Warnock
Faculty Mentor: Kerry Ginger (Music)

**Jazz Standards: Standards for Voice Students and Teachers** (2:00 Poster Session, Position 35)
AJ Jacobs
Faculty Mentor: Kerry Ginger (Music)

**How to Know What Song Is Right for Each Voice** (2:00 Poster Session, Position 36)
Ruthie Rhodes
Faculty Mentor: Kerry Ginger (Music)

**How to Choose Repertoire for Students Studying Voice** (2:00 Poster Session, Position 37)
Gabriel Rice
Faculty Mentor: Kerry Ginger (Music)

**Removing the Inherent Canon Bias from the Assignation of Italian Art Song: The Twenty-First Century Songs of Judith Cloud** (2:00 Poster Session, Position 38)
Ellanna Swope
Faculty Mentor: Kerry Ginger (Music)

## NATURAL RESOURCES AND THE ENVIRONMENT

**Release of Stem Water of Four Rocky Mountain Subalpine Forest Tree Species** (3:45 Poster Session, Position 37)
Meridith Frazee, Lara Kueppers (University of California Berkeley, Energy and Resources Group), Nishita Dashpute (University of California Berkeley, Forestry Department), and Mary Thomas Powell (Colgate University, Biology Department)
Faculty Mentor: Thomas Powell (Earth and Environmental Systems)

## NEUROSCIENCE

**The Role of Brain-Derived Neurotrophic Factor in Drug Preference** (3:45 Poster Session, Position 38)
Laura Botros
Faculty Mentor: Kate Cammack (Neuroscience & Psychology)

**Methods of Drug Administration in *L. clathrata*** (3:45 Poster Session, Position 39)
Jackson Deneka and Yi Voon Lim
Faculty Mentor: Chris Shelley (Biology & Neuroscience)

**Movement Velocity and Leading Arm Preference Can Quantify *L. clathrata* Sea Star Behavior** (3:45 Poster Session, Position 40)
Jadon Fetrow, Charlotte Montague, Ellie Vincent, and Allison Bizub
Faculty Mentor: Christopher Shelley (Neuroscience & Biology)

**Impact of Prenatal Per- and Poly-Fluoroalkyl (PFAS) Exposure on Child Cognition: Evidence from an Early Caregiving Intervention** (3:45 Poster Session, Position 41)
Martha Goldsmith, Adam Lombroso (Yale Child Study Center, Department of Obstetrics Gynecology & Reproductive Sciences), Hung Pham (Yale Child Study Center, Department of Obstetrics Gynecology & Reproductive Sciences)
Faculty Mentors: Krystall Pollitt (Yale Institute for Global Health), Jane Fisher (Monash University), Kieran O'Donnell (Yale Child Study Center, Department of Obstetrics Gynecology & Reproductive Sciences)
Sewanee Faculty Sponsor: Linda Mayes (Psychology)

# PHYSICS

**Design and Construction of a Low-Cost Raman Microscope for Undergraduate Experiments With Graphene** (3:45 Poster Session, Position 42)
Máté Garai
Faculty Mentor: Randoph Peterson (Physics)

**Millikan Oil Drop: Electrostatics in Motion** (3:45 Poster Session, Position 43)
Brad Matthys
Faculty Mentors: Randolph Peterson, Michael Coffey, Doug Barlow (Physics)

**Manipulation of Argon Plasma Under Controlled Environments** (3:45 Poster Session, Position 44)
Jose Osa
Faculty Mentor: Douglas Barlow (Physics)

**Quantum Entanglement and the Understanding of Non-Locality** (3:45 Poster Session, Position 45) Eric Stewart
Faculty Mentor: Randolph Peterson (Physics)

# POLITICS

**Struggles Plaguing the Abortion Movement in America, and How to Make A Difference*** (2:00 Poster Session, Position 39)
LA Smith
Faculty Mentor: Sid Simpson (Politics)

# PSYCHOLOGY

**Self-Regulation and Learning in Elementary Education*** (3:45 Poster Session, Position 46)
Caroline Alessio and Madeline DuBois
Faculty Mentor: Kathryn Morgan (Psychology)

**Exploring Perceived Influencing Factors on Sewanee's University Administration** (3:45 Poster Session, Position 47)
Brynn Anderson, Elizabeth Edens, Elizabeth Fletcher, Martha Goldsmith, and Margaret Mentz
Faculty Mentor: Chris Silver (Psychology)

**Motivations for Substance Use amongst STEM and Non-STEM Majors: Implications for Stress Coping and Belonging*** (3:45 Poster Session, Position 64)
Laura Botros, Samuel Grace, and Enistin Moon Gomes
Faculty Mentor: Kate Cammack (Psychology & Neuroscience)

**Sewanee Students' Perceptions about Different STEM Majors and Post-Graduate Potential*** (3:45 Poster Session, Position 65)
Blake Bouldin, Russ Marr, and Jack Merril
Faculty Mentor: Kate Cammack (Psychology and Neuroscience)

**Why Many STEM Students Feel Like an Imposter, and How This Can Change*** (3:45 Poster Session, Position 66)
Will Brookby, Langdon Aronson, and Harrison Mabry
Faculty Mentor: Kristen Cecala

**Sense of Belonging in Greek Life Organizations** (3:45 Poster Session, Position 48)
Emma Burns, Ashley Crosby, Elly O'Brien, and Tamara Rodriguez
Faculty Mentor: Terri Fisher (Psychology)

**University of the South Residential Experience: University Housing Conditions' Relationship to Student Satisfaction** (3:45 Poster Session, Position 49)
Emma Caldwell, Louise Ferguson, Emma Lively, Will Pucek, Gennessee Torres, and Cate Yappen
Faculty Mentor: Chris Silver (Psychology)

**HSTEM: Imposter Syndrome in Sewanee*** (3:45 Poster Session, Position 67)
Ansley Carpenter, Max Moorman, Kathryn Kennedy, and Quinn Wicklund
Faculty Mentor: Kristen Cecala (Biology)

**Gender Discrepancies Within Sewanee STEM departments: Potential Role of Implicit Biases and Implications for University Hiring and Retention Practices*** (3:45 Poster Session, Position 68)
Lilly Daniels, Virginia Fox, and Brenna Riseling
Faculty Mentor: Kate Cammack (Psychology & Neuroscience)

**Gender Segregation on Campus** (3:45 Poster Session, Position 56)
Hannah Rose Eason, Selena Piercy, Dagem Samuel, and Vivine Kampire
Faculty Mentor: Terri Fisher (Psychology)

**Application of a New Ethogram to Study Nonverbal Mother-Infant Interactions in the Context of Substance Use** (3:45 Poster Session, Position 57)
Victor Esparza
Faculty Mentors: Jin Young Shin (Yale School of Medicine, Child Study Center), Amanda M. Dettmer (Yale School of Medicine, Child Study Center), Helena Rutherford (Yale School of Medicine, Child Study Center)
Sewanee Faculty Sponsor: Helen Bateman (Psychology)

**The True Colors Assessment Against Established Facets of Personality** (3:45 Poster Session, Position 58)
Joshua P. Fairhead and Maggie J. Barker
Faculty Mentor: Christopher Silver (Psychology)

**HSTEM: Expanding our Understanding of the Influence of an Advisor's Gender on Women's Success in STEM*** (3:45 Poster Session, Position 72)
Jillian Hall, Abby Armstrong, Autumn Sims, and Tatum Fortney
Faculty Mentor: Kristen Cecala (Biology)

**Stimulants at Sewanee*** (3:45 Poster Session, Position 59)
Sally Herrington, Jessie Salisbury, Abby Burns, Baker Wilkins, Aylssa Fair, and Selena Piercy
Faculty Mentor: Chris Silver (Psychology)

**A Scoping Review of Resilience in Australian Aboriginal & Torres Strait Islander Communities** (3:45 Poster Session, Position 60)
Camilla Kalthoff
Faculty Mentor: Sherry Hamby (Psychology)

**The Phenomenon of Personality Shift: The Influence of Language on Bilingual Individuals** (3:45 Poster Session, Position 62)
Miu Kazama
Faculty Mentors: Christopher Silver (Psychology) and Teri Terigele (Psychology)

**What Is the Role of DEI Initiatives in STEM Education at Sewanee, and How Are They Implemented Most Effectively? *** (3:45 Poster Session, Position 73)
Tuyen Le, and Mate Garai
Faculty Mentor: Kristen Cecala (Biology)

**Enhancing Health Equity in Grundy County, Tennessee Through Community Design Charrettes*** (3:45 Poster Session, Position 63)
Mya Lopez, Caroline Alessio, Lindsey Ahrndt, Madeline DuBois, Madeline Thornburg, and Ellie Vincent
Faculty Mentor: Kathryn Morgan (Psychology)

**The Correlations Among Religion, Art, and Emotion: An Exploration of Secular and Religious Art on Emotional Responses** (3:45 Poster Session, Position 50)
Madison Loud
Faculty Mentor: Christopher Silver (Psychology)

**HSTEM: The Role of Professor Mindset and Actions on Student Persistence in STEM*** (3:45 Poster Session, Position 69)
Andrew McDonough, Atticus Kowalski, and Cody Baerlocher
Faculty Mentor: Kristen Cecala (Biology)

**The Effects of Parenting on College Age Religiosity** (3:45 Poster Session, Position 51)
Hope Murphy
Faculty Mentor: Christopher Silver (Psychology)

**A Scoping Review of Resilience Among ICU Nurses** (3:45 Poster Session, Position 52) Selena Piercy
Faculty Mentor: Sherry Hamby (Psychology)

**HSTEM: How Belonging in STEM Can Contribute to the Leaky Pipeline at Sewanee*** (3:45 Poster Session, Position 70)
Charlotte Proctor, Mary Elizabeth Jackson, and Claire Sanders
Faculty Mentor: Kristen Cecala

**The Relationship between Imposter Syndrome on STEM Major Declaration*** (3:45 Poster Session, Position 71)
Maria Rojas, Morgan Canty, and Kelly Walker
Faculty Mentor: Kate Cammack (Psychology & Neuroscience)

**The Impact of Parental Influence on Young Adults' Community Engagement: A Qualitative Study*** (3:45 Poster Session, Position 53)
Maria Rojas and Annie Beth Clark
Faculty Mentor: Kathryn Morgan (Psychology)

**A Scoping Review of Resilience Among Youth Experiencing or At-Risk for Schizophrenia** (3:45 Poster Session, Position 54)
Matthew Schaublin
Faculty Mentor: Sherry Hamby (Psychology)

**Female Representation in Video Games Over Time** (3:45 Poster Session, Position 55) Rose Sykes, Cat Ruen, and Andrew Cobb
Faculty Mentor: Teri Terigele (Psychology)

**Is There a Gender Difference Within Personality Traits and Conflict Management Styles?** (3:45 Poster Session, Position 61)
Brooklyn Taylor, Arden Laster, Jazmin Sevillano, Camilla Kalthoff
Faculty Mentor: Terri Fisher (Psychology)

**Intersecting Identities: The Relationship between Greek Life and STEM Disciplines*** (3:45 Poster Session, Position 74)
Carlton Ward, Levitt Mosely, and Henry Kovan
Faculty Mentor: Kate Cammack (Psychology & Neuroscience)

## RELIGIOUS STUDIES

**Theosophy: A Spiritual Journey** (2:00 Poster Session, Position 40)
Bella Boswell and Elizabeth Outlaw
Faculty Mentor: Kati Curts (Religious Studies)

**Issues of Sexual Assault within the Jehovah's Witnesses** (2:00 Poster Session, Position 41)
Anna Brooks and Beylie Ivanhoe
Faculty Mentor Kati Curts (Religious Studies)

**He Said, He Said: Confusion Behind the Radical Faeries** (3:45 Poster Session, Position 76)
Rowan Carter, Morgan Phares, and Hailee Rains
Faculty Mentor: Kati Curts (Religious Studies)

**Communion Cracker Calorie Counting: A Cultural Understanding of Religious and Diet Culture Power Dynamics in the United States** (2:00 Poster Session, Position 42)
Annie Beth Clark
Faculty Mentor: Eric Thurman (Religious Studies)

**Sexual Freeness and the International Spread of Raelism** (2:00 Poster Session, Position 43)
Brendan Downes
Faculty Mentor: Kati Curts (Religious Studies)

**Unveiling the Masonic Sisterhood: Women's Involvement in Freemasonry** (2:00 Poster Session, Position 44)
Virginia Echols
Faculty Mentor: Kati Curts (Religious Studies)

**Religious Issues within the Supreme Court: Jehovah's Witnesses and the Law** (2:00 Poster Session, Position 45)
Ellie Friedman, Sheppard McVey, and Sally Kennedy
Faculty Mentor: Kati Curts (Religious Studies)

**Satan versus the Law: How the Satanic Temple is Fighting for Freedom of and Freedom from Religion** (2:00 Poster Session, Position 46)
Camille Greening
Faculty Mentor: Kati Curts (Religious Studies)

**Rastafari: How Jamaican Belief Systems Evolved African-American Culture** (2:00 Poster Session, Position 47)
CiCi Hardin, Will Snead, and Jack Cook
Faculty Mentor: Kati Curts (Religious Studies)

**An Examination of Heaven's Gate** (2:00 Poster Session, Position 48)
Hurt and Hope Murphy
Faculty Mentor: Kati Curts (Religious Studies)

**The Commodification of Vodou: How Popular Culture Warped a Religion** (2:00 Poster Session, Position 49)
Jasper Jones, Reagan Nash, and Arthur West
Faculty Mentor: Kati Curts (Religious Studies)

**Legal Considerations of Christian Science Beliefs and Healthcare Delivery** (2:00 Poster Session, Position 50)
Briana LaSanta
Faculty Mentor: Kati Curts (Religious Studies)

**Heaven's Gate** (2:00 Poster Session, Position 51)
Alice Martin and Adele Cassidy
Faculty Mentor: Kati Curts (Religious Studies)

**Heaven's Gate Religious Group: How Initial Self Selection Encourages Future Adherence to Group/Leader Ideology** (2:00 Poster Session, Position 52)
Frances McKay and Willa Pocklington
Faculty Mentor: Kati Curts (Religious Studies)

**Oneida Perfectionists** (2:00 Poster Session, Position 53)
Zoe Napier
Faculty Mentor: Kati Curts (Religious Studies)

**"So Much Things to Say": American Perception of Rastafarianism, Pre- and Post-Marley** (2:00 Poster Session, Position 54)
Shelby Phillips
Faculty Mentor: Kati Curts (Religious Studies)

**The Role of Education in Seventh-Day Adventist Identity Formation** (2:00 Poster Session, Position 55)
Kaila Seger and Melody Ottinger
Faculty Mentor: Kati Curts (Religious Studies)

**Problematizing Vodou's Cultish Classification** (2:00 Poster Session, Position 56)
Olivia Stafford and Amelia Gauthreaux
Faculty Mentor: Kati Curts (Religious Studies)

**Expression and Reception: The Gendering of the Publick Universal Friend** (2:00 Poster Session, Position 57)
Rachel Williams and Emma Lively
Faculty Mentor: Kati Curts (Religious Studies)

**A Look into Oneida Perfectionism** (2:00 Poster Session, Position 58)
Jackson Young
Faculty Mentor: Kati Curts (Religious Studies)

## WATERSHED SCIENCE

**Release of Microplastics from a Turf Athletic Field into a First-Order Watershed and Karst System** (3:45 Poster Session, Position 30)

Julia Eberly, Shelton Griffith, Annie Kennedy, Andrew Krese, Mary Louise LeMieux, Mitch Maloney, Grace Olson, Natalie Raines, and Jackson Speary
Faculty Mentor: Martin Knoll (Earth & Environmental Systems)

*Research designated with an asterisk reflects selection as a Student Projects in Activism, Research, and Creativity (SPARC) designation, which is for projects that embrace citizenship and actively engage in meaningful activism. This is a concept developed by Taylor Tunstall, C'25, DEI chair of the Order of the Gown. The encouragement of such SPARC projects is supported by the Order of the Gown, the Office of Civic Engagement, and the Office of Undergraduate Research and Scholarship.

# AFRICAN AND AFRICAN AMERICAN STUDIES

### American Deception Behind Eugenics (Poster)

Lilly Boston
Faculty Mentor: Andrew Maginn (History)

The term “eugenics” has been prevalent in America since the 1800s, and it was initially used as an attempt to “breed out” unwanted medical defects. However, the rise in racial tensions among blacks and whites during the twentieth century prompted this genetic elimination to target the black race. It was no longer for defects like epilepsy, but instead utilized to enlist racial castration, specifically throughout thF Southern states. This can be seen most notably in North Carolina, as eugenics was integrated into nearly every portion of a citizen’s life. For example, eugenics was implemented in biological research, legislation, and public information documents. Naturally, such an expansive eugenic focus caused thousands of black Americans to be forcibly sterilized by 1977. America’s eugenics movement is still relevant today, as reproductive rights are constantly being threatened; however, most of the publics’ knowledge of current eugenics stems from the details exposed by the sterilization survivors. While this work will help illuminate the bioethics in North Carolina, it will also highlight survivor Elaine Riddick, as her story depicts the eugenic immorality in practice. Today, Riddick plays a large role in the resurfacing of manipulation throughout the eugenics movement as a victim advocate. These ideas will be visually displayed with eugenic propaganda, sterilization consent forms, interview transcriptions, and Riddick’s current contributions to public history. Through her activism, Riddick has been influential in prompting reparations for the victims in North Carolina. Her unflinching presence in the media today makes the horrors of eugenics in the United States unignorable. Elaine Riddick undoubtedly serves as the first step in uncovering the history of Eugenics across America.

# ANTHROPOLOGY

### A Reconstruction of Place on the Kennerly School in St. Mark's at Sewanee, Tennessee (Oral Presentation)

Melody Ottinger
Faculty Mentors: Diana Hatchett and Sarah Sherwood (Anthropology)

The study of archaeology has helped bring clarity to consider and understand how a landscape has been used over time, but it hasn't been used for the site where the Kennerly School is located. My presentation will address this considerable lacuna by focusing on the artifact assemblage collected at the Kennerly School site. Specifically, I look at the artifact distribution found at the site to analyze them alongside the surviving archived writings discussing the landscape. I also use a theoretical framework of how the sense and use of place can be reconstructed through the use of archaeology. I argue that the use of these methods in tandem with the previous work done on the Kennerly School and the St. Mark's community will provide a more complete view of the landscape and how it has been used throughout time, spanning from approximately 1949 into the present. This project reveals how the St. Mark's community made use of this landscape throughout this time frame, and how this can be seen in the archaeological record.

### Ostrich Eggshell Bead Documentation with the Late Prehistory of West Turkana Project: A Reflection on My REU Experience (Poster)

Grace Parkhill
Faculty Mentor: Martin Knoll (Earth & Environmental Systems)

The Late Prehistory of West Turkana (LPWT) Project, established in 2007, documents the archaeological history of West Turkana, Kenya, from 20,000 years ago to the present. In the summer of 2023, I was hired by the project through the National Science Foundation Research Experience for Undergraduates program (NSF REU). In-country work conducted by the LPWT team in the summer of 2023 centered on community engagement, excavation at Nakwaperit, and lab artifact analysis at the Turkana Basin Institute (TBI), with my work as an REU student concentrated on documenting ostrich eggshell (OES) beads. Investigating OES beads with strontium isotope analysis and bead size statistics can lend insight into social and physical exchange in the Turkana Basin at the end of the African Humid Period. Because sampling for strontium isotope analysis is currently destructive, beads were thoroughly measured and photographed to digitally preserve their likeness post-sampling. This detailed cataloging work, alongside strategies for community engagement, are a manifestation of a greater movement on the global scale within archaeology to facilitate good ethics that fundamentally support local communities and mitigate the destructive nature of the field.

# ART

## Gellyfish (Oral Presentation)

Timothy Cook
Faculty Mentor: Pradip Malde (Art)

Constantly moving cities, houses, and schools while growing up is a frustrating experience. Frequent exposure to different surroundings, and new friends has its benefits as well as its drawbacks. It can be easy to feel as if you are shifting along with a tide, shifting elevations—washing from place to place. If you move too frequently, it can seem as if the world is moving around you. Moving to and from different places such swamplands, plateaus, mountains, deserts, coasts and urban environments instills preferences in certain environments. While observing coastal zones such as living or visiting near a beach may be a polarizing experience for some, they often may be one of the most desired. Through experiences of constantly moving, it may be difficult to escape a feeling of nostalgia for these coasts. The beach may even be considered home. This series explores the polarizing effects natural landscapes have on different people whether that is desire or fear. In this series, impermanent and organic spaces are modeled and abstracted with permanent materials. Through conscious, subconscious, and unconscious imagination and creation, this body of work draws on personal experiences constantly moving to surroundings while growing up while having accessibility and inaccessibility to coastal zones. Manipulating light gels and jellyfish, polarization, and movement, these sculptures express a longing for the fluid condition which is the beach.

## Reflection of Memories (Oral Presentation)

Calley Doyle
Faculty Mentor: Pradip Malde (Art)

This presentation will discuss my body of work, *Reflection of Memories*, within the broader context of the senior art show: *Longing and Belonging*. It will follow the presentations of George Meng and Timothy Cook and discuss similarities between all of our work as art majors. My body of work that I will be discussing, *Reflection of Memories*, explores the intersections between history and art. It is often considered that when history and art intersect, the results are propaganda. *Reflection of Memories* subverts that argument in that history relies on evidence while art as a creative endeavor comes from the immediate experience of being alive. In this sense, history and art seem diametrically opposed to each other. This body of work collapses time and makes the continuum of history immediately visible. By making histories accessible, they can be preserved in their multitude of forms. This presentation will explain the strategies used to collapse time, including portraiture, collages, collection, and curation. Using portraits from different years, this body of work condenses different versions of identity into the same space. The collection of old objects also communicates the passing of time throughout an individual's life. Not only does this body of work collect these portraits and old items, but it also

purposefully curates them. By curating appearance and inner thoughts, these works serve as pieces of historical evidence. As a result, they also function as preserved moments in time to be rediscovered in the future. Using these motifs, the works take advantage of the creative freedom welcomed in art to document history in a variety of forms.

## Home Beyond the Horizon (Oral Presentation)

George Meng
Faculty Mentor: Pradip Malde (Art)

A sense of not belonging can result from forced displacement, being on the edge of identity norms, socioeconomic marginalization, multicultural experiences, and so on. The experience of not belonging can also generate disorientation. *Home Beyond the Horizon* tackles the sense of belonging and ensuing disorientation. By blurring boundaries and exploring the definitions of home, photographic prints are presented to create an ambiguity that mimics the feeling of displacement. From images of landscapes, still life, animals, and motifs such as quietness, splitting, center-focusing, and repetition of geometric shapes, the collection resonates with the experience of longing and belonging. Furthermore, this work argues for the idea that a space/place/location cannot be a home without the presence of people. When going through multicultural transitions, a commonly felt experience is the loss and blurring of identity. The root causes of this experience include conflicting social norms, disparity in cultural traditions, and disconnection from family and friends. Meanwhile, many side effects ensue, and disorientation is one that often comes up. Visual disorientation, however, can be generated by shifting the positions and distances of objects in space. Through the photographic lens, images can be arranged in ways that the human eyes cannot perceive, causing visual discourse. Photography is frequently used to document, describe, and provide evidence, but it can also be a poetic manifestation of feelings and experiences, such as longing and belonging. This kind of belonging manifests in the work of Masao Yamamoto, Hiroshi Sugimoto, and Lois Conner, such as the body *Small Things in Silence* and *Time Exposed*. These bodies of work share similarities in terms of tonal values, compositions, and the general quietness of the photos. In terms of the medium and creative choices for *Home Beyond the Horizon*, the more traditional silver gelatin printing process was used to create a body of 20 prints.

# ART HISTORY

### Boxing with Bellows (Oral Presentation)

Delainey Becks
Faculty Mentor: Leslie Todd (Art History)

The early twentieth century saw an exciting shift in the culture surrounding boxing. For centuries prior, the sport was thought of as uncivilized. The New York boxing portraits by George Bellows, namely *Stag at Sharkey's*, 1909 and Thomas Eakins' 1898 Philadelphia portrait of boxer Billy Smith titled *Salutat* shows a shift in the way that boxing was evolving in America from its early arrival a century prior. Bellows employs a gritty, raw approach when depicting the sport, establishing movement through his brushstrokes and dark smokey color palette while Eakins chooses a more earthen palette focused on moments of rest. The two artists show how the underground world of boxing in nineteenth- to twentieth-century America evolves from that of showmanship to that of brutal pugilism and back again with Bellows' 1924 *Dempsey and Firpo* portrait. The two artists worked at the same time in similar regions of the country and depicted the same sport but with completely different approaches. This paper examines how Bellows and Eakins utilizing a social art historical approach to address how the two well-known artists chose to differently depict the sport with respect to composition, color, treatment of the paint, and subjects chosen.

### Threads of Empathy: Cultural Representation, Humanization, and the Franciscan Mission in Ambrogio Lorenzetti's *Martyrdom* Fresco (Oral Presentation)

Charles Bond
Faculty Mentor: Leslie Todd (Art History)

Ambrogio Lorenzetti's *Martyrdom of the Franciscans* fresco, currently housed in the San Francesco basilica in Siena, Italy, presents a harrowing scene that serves a unique purpose in its original context. This essay contends that the painting constructs a feeling of alterity through its portrayal of non-Italian clothing styles while simultaneously evoking empathy towards the depicted foreigners by imbuing them with profound humanity. By contextualizing the artwork within the socio-political milieu of its time, elucidating Franciscan values, and juxtaposing it with contemporaneous works, this essay endeavors to unveil the nuanced layers of meaning embedded within Lorenzetti's masterpiece. Set against the backdrop of medieval Italy, a time marked by cultural diversity and religious fervor, the *Martyrdom of the Franciscans* fresco emerges as a testament to the complex interplay between identity and empathy. The Franciscan order, with its emphasis on poverty, humility, and compassion, serves as a moral compass guiding both the narrative and the viewer's interpretation. Lorenzetti's deliberate choice to depict the foreigners in attire distinct from the prevailing Italian fashion serves to underscore their "otherness," inviting contemplation on themes of mission and evangelism. The artist's astute

attention to facial expressions humanizes the foreigners, compelling the viewer to confront their shared humanity. This juxtaposition of the familiar and the foreign prompts a profound emotional response, fostering a sense of sympathy and connection with the "other." In this way, Lorenzetti challenges perceptions of identity and fosters a broader worldview. Crucially, a comparative analysis with contemporaneous works such as Giotto's frescoes of St. Francis and the Sultan reveals the nuanced approaches employed by artists of the period in navigating themes of cultural encounter and empathy. Ambrogio Lorenzetti's *Martyrdom of the Franciscans* fresco serves as a poignant meditation on the complex intersection of identity and empathy in medieval Franciscan art. Through its evocative imagery and nuanced storytelling, the artwork challenges viewers to confront their preconceptions and cultivate the call to serve humanity, no matter one's place of origin or past sins.

## Reimagining Childhood: Mary Cassatt's Artistic Vision in Nineteenth Century France (Oral Presentation)

Mary Cathryn Dixson
Faculty Mentor: Alison Miller (Art History)

Mary Cassatt, an American Impressionist artist, is celebrated for her insightful portrayals of women and children in late nineteenth century France. While she is often recognized as the "painter of mother and child," her perceptive depictions of children alone are frequently overlooked. Particularly noteworthy are her Impressionist paintings of children between 1878 and 1886, where Cassatt introduced radical interpretations of childhood on canvas, diverging from the traditional model of child portraiture. Amongst the Impressionist group, the depiction of children radiated throughout the movement. Cassatt's representations of children afforded the child a truthful and honest disposition rather than the poised and proper version of the child depicted by her Impressionist contemporaries. Cassatt and the Impressionists approached the subject of childhood in a way specific to the bourgeois, mirroring the conversations surrounding children and childrearing practices of French middle-class culture in the late nineteenth century. My thesis contends that Cassatt was not promoting the middle-class ideal but echoing the changing attitudes and perceptions of the child amidst the proliferation of childrearing techniques and methods in nineteenth century French middle-class culture. Cassatt's portrayal of children during her Impressionist years serves as a reflection of her artistic skills, understood as equivocal, to observe and convey truth and naturality, authorizing Cassatt's images of children to reflect the modern conceptual foundation of childhood in the nineteenth-century French culture. By engaging with the contemporary discourse of her time, Cassatt offers a unique perspective on childhood, informed by her upbringing, independence, and personal beliefs on autonomy and self-agency.

## Nara Goes Viral: How Web 2.0 Catapulted Yoshitomo Nara to Global Fame (Oral Presentation)

Celeste Maddux
Faculty Mentor: Alison Miller (Art History)

As technology has advanced over time, its role in art accessibility has become clearer with the development of Web 2.0 and its multidirectional characteristics benefiting artists and audiences. One such artist is Yoshitomo Nara, a Japanese artist who capitalized off of a new digital age in many ways, one of which being better connections to his avid fanbase across the globe. Through his use of emerging social media platforms and fan-based blogs, Nara took advantage of the Web 2.0 outcomes to garner more attention and create deeper relationships with his audiences. In addition to Nara's utilization of web platforms to stay in touch with his younger fanbase, Nara's iconic visual characteristics are well suited to translating from physical material to online formats. Due to the aesthetics Nara frequented, the artist's pieces were further promoted via the internet mainly because of the visuals that Nara ultimately became most recognized for. Finally, this paper presents the effect that commercializing and collectibles had on Nara's work in the context of Web 2.0. Playing into Superflat aesthetics and combining low and high forms of art, Nara's pieces have been presented in both their original canvas formats and in less expensive toys or figurines for audiences to purchase. Ultimately, this paper will argue the effects of Web 2.0 on Yoshitomo Nara's art in the context of his own agency within online platforms and the role the internet played in increasing accessibility of art to audiences around the world.

## The Apex of a Career: Matisse and the Chapelle du Rosaire (Oral Presentation)

Sarah Crosby McKay
Faculty Mentor: Jeffrey Thompson (Art History)

Henri Matisse, a renowned French artist known for his work with color, built a chapel for a convent in Vence, France, to express his gratitude for one of the nuns' personal care. The nuns at Foyer-Lacordaire were initially confined to a garage as their chapel space. With the help of close friends and colleagues, Matisse produced a small rectangular building with minimalist decoration on its exterior and astounding, simple masterpieces in the interior with tiled murals and stained glass. The work of building the chapel and its interior decoration took place between 1947 and 1951. Matisse, who for most of his life proclaimed a distant relationship with the Catholic faith, produced a spiritual space so moving that most of its visitors cry upon entry. The chapel showcases the many phases of his lengthy artistic career, with elements from his early time as the leader of the Fauves, his experiments in sculpture, and even the later cut-outs he produced during the last decade of his life. Beyond this, we see a man who, despite being a self-proclaimed atheist for so long, not only confronted the story of Christ but also discovered a way to express the universality of the faith. Through tumultuous brush strokes, vibrant colored glass, and intensive time and effort, Matisse created what he called the ultimate masterpiece of his career. The chapel

also shows an artist, who, at the end of his life, chose to transform the imagery of Christianity through his unique vision.

### Richard Hamilton's Early British Pop Art: The British Assimilation of American Popular Culture and Identity (Oral Presentation)

Adeline Smith
Faculty Mentor: Jeffrey Thompson (Art History)

"Richard Hamilton's Early British Pop Art: The British Assimilation of American Popular Culture and Identity" is a paper that explains the ways in which American popular culture imposed itself on the lives of post-war British citizens in the 1950s and early 1960s, providing them escape from the trauma left in the aftermath of the Second World War. Through the adoption of American consumerist practices and subsequent visual culture, British citizens embraced the mass-produced nature of American popular culture. America's cultural imperialism, as well as Britain's assimilation, is manifested in the artwork of Richard Hamilton (1922-2011). Richard Hamilton is a pivotal figure within my argument, as well as Pop Art altogether; known to be the "Father of Pop," Hamilton's artworks and the themes within his earlier oeuvre set precedent for Pop Art as both a movement and a lifestyle. The lull in British cultural content drove Hamilton to base his early Pop works on the ethos of a country he had never visited. The cultural implications within Richard Hamilton's work exceeds the visual realm. His work provides a commentary on the societal and economic atmosphere of 1950s and early 1960s Britain and America, as well as the profound intersectionality between these two powerful nations. In the time of Pop Art's beginnings, the British experience was war, and its consequences: housing shortages, rations, and overall economic depletion. This opened the door for American cultural colonization, encouraged and promoted by the art of Richard Hamilton.

### Hannah Höch: A Kitchen Knife and a Needle and Thread (Oral Presentation)

Olivia Stafford
Faculty Mentor: Jeffrey Thompson (Art History)

Hannah Höch was an artist during the Berlin Dada movement and started the medium of photomontage, a collage-like format that used mass media images to create an often political statement. While in the Dada group, she created *Schnitt mit dem Küchenmesser durch die letzte Weimarer Bierbauchkulturepoche Deutschlands* (*Cut with the Kitchen Knife Dada through the Last Weimar Beer Belly Cultural Epoch of Germany*) in 1920 which has historically been held up as the quintessential assertion of Dada beliefs. However it is her later works that deal with textile production that are a more fuller representation of her feminism. While working at Ullstein Factory, Höch created textile and clothing designs that were then published across Germany. During the depression in Germany after the first World War, these clothing patterns allowed

women to save money by creating one size clothes instead of purchasing expensive custom made clothing. Through her work at Ullstein and her experience as a woman, she realized the gendered delineation between art and craft. Höch used the medium of photomontage to create abstract works out of these textile patterns and in turn, created a new language to speak to women through symbols of housework. By creating these works, Höch argued that textile and sewing were subjects worthy of artistic expression and therefore should be accepted as a true art form, not just a "women's art."

### Challenging a Historical Narrative: Examining Indigenous Agency within the Complexities of the Colonial Past (Oral Presentation)

Haven Sydney
Faculty Mentor: Leslie Todd (Art History)

Indigenous perspectives of the Latin American colonial period have long been subjugated by the prevailing colonial narrative. This history, interpreted through manuscripts, religious imagery, and architecture, often overlooks the Indigenous presence within visual culture, resulting in a limited historical account from the perspective of the colonizing forces. This presentation re-examines the colonial period, placing significance of the Indigenous perspective, and focuses on an atypical depiction of the foundation of Tenochtitlan, present day Mexico City, within the Tovar Codex (c.1582-1586). This research pushes back against the dismissive notion of accidental alteration of the foundation image, as the iconography is well known and has been preserved within visual culture, even displayed on the contemporary Mexican Flag. The possible meanings of this altered image are speculated based upon many interacting factors, and are supported through a comparative examination of Indigenous autonomy across other forms of visual culture. Ultimately, this presentation aims to disrupt the widely accepted colonial narrative through an exhaustive analysis of visual culture along with the practice of critical fabulation, additionally intending to demonstrate the benefits of critical fabulation in the study of historical narratives constructed within imbalanced social and political power structures.

# BIOLOGY

### Effects of Small Dams: A Review of Literature and Experimental Study (Oral Presentation)

Molly Almon, Angus Pritchard, Joshua Alvarez, and Shawna M. Fix
Faculty Mentors: Kristen K. Cecala (Biology) and Christopher M. Van de Ven (Geographic Information System)

Small dams (5m in height or less) are found abundantly across the world due to limited or absent regulation and a variety of uses. Though often thought to have less of an impact downstream because of their size, they can acutely alter downstream habitat, and their frequency suggests that these impacts could accumulate to have larger effects. Small dams change abiotic dynamics like flow, water temperature, pH, geomorphology, chemical and nutrient transportation, and oxygenation based on their operation. The biotic communities respond to these shifts by altering behaviors and population dynamics around the physical structure of the dam. We investigated the frequency with which streams on the southern Cumberland Plateau in Tennessee are impacted, compiled a review of literature to identify key questions about the environmental impacts of small dams, and conducted an experimental study to quantify the effects of habitat modifications due to small dams on the body condition of two lotic fish species of the southeastern U.S.—a benthic species, *Nothonotus rufilineatus* (redline darter) and a limnetic species, *Nocomis micropogon* (river chub) using body index. Large ex-situ indoor stream mesocosms were used to replicate the flow and substrate conditions in normal stream conditions and conditions below a small dam. We observed species-specific differences in responses to conditions to mimic habitat downstream of a small dam. *Nothonotus rufilineatus* performed best with low flow and complex substrate. In contrast, *N. micropogon* performed similarly in all treatment levels but had the poorest performance with simple substrate and normal flow. We may infer that substrate may be the limiting factor for both species because of the way it interacts with flow. Although small dams typically cause negative downstream change, their presence can also have positive environmental impacts, and we sought to identify characteristics that benefit or degrade the surrounding ecosystems. More research needs to be done to address the variations of small dams and propel regulation/monitoring. This includes research into the effects on specific species and regions, assessing different types of small dams, and cumulative effects on the biota.

## Effects of Hydrologic Variability on the Development of *Lithobates sphenocephalus* (Poster)

Konstantinos Andriotis
Faculty Mentor: Kevin L. Fouts (Environmental Stewardship & Sustainability)
and Kristen K. Cecala (Biology)

Organisms use environmental cues to make phenotypic changes that maximize fitness. As humans manipulate the environment, environmental variation can become so extreme that it exceeds the range of conditions to which the organism can respond effectively. As humans affect climate and modify rivers, hydrologic conditions become increasingly variable. Organisms, like anurans, that require water for their early life stages seek to maximize size at metamorphosis while facing the risks of predation, competition, and pond drying. This study investigates the impact of hydroperiod variation on the survival and development of Southern Leopard Frogs (*Lithobates sphenocephalus*) in ex-situ pond mesocosms. We manipulated mesocosm water levels to simulate different rates of pond volume fluctuations and examined their impact on tadpole survival, time to metamorphosis, and morphology. We did not find an effect of hydrologic variability on larval development, survival, time to metamorphosis, or morphology. Anurans may not be able to respond to habitat variability that occurs at temporal scales of days to weeks as in this study, or their response to environmental fluctuations may be conditional on additional factors. Alternatively, our treatments with low water levels may not have changed the benthic area or resource availability and, thus, may have had little impact on growth. This work emphasizes the complexities of frog responses to hydrologic variability and the importance of considering several interacting elements when measuring phenotypic plasticity in changing contexts.

## Exposure to Nano-Gold Particles, but Not Diesel Particulate Matter, Exacerbates Protein Misfolding in *C. elegans* (Poster)

Mc Noriel Baldonado and Jeremiah Studivant
Faculty Mentor: Elise Kikis

The failure to maintain a healthy proteome, often referred to as the collapse of proteostasis, is a hallmark of aging and of many neurodegenerative diseases including Alzheimer's disease (AD) and Huntington's disease (HD). The proteostasis collapse is characterized by the excessive misfolding of proteins, which can occur during conditions of generalized protein damage or when disease-associated mutations are present that compromise the folding of specific proteins. HD is a neurodegenerative disorder caused by a mutation in the huntingtin gene encoding additional repeats of the amino acid glutamine. The resultant mutant protein containing a polyglutamine expansion is prone to misfolding. Although aging and genetic risk factors are known to exacerbate proteostasis decline, we still know relatively little about the effect that environmental risk factors have on proteostasis. We aimed to elucidate the effect that nano-gold

and diesel particulate matter (dPM) has on proteostasis. To monitor proteostasis collapse, we utilized a HD-associated metastable polyglutamine repeat attached to a yellow fluorescence protein (polyQ35::YFP), as a sensor of the protein folding environment in the model organism *C. elegans*. We found that the nano-gold intensifies the aggregation of polyQ35::YFP within the body wall muscle cells suggesting that nano-gold disrupts the protein folding environment of the cell. Additionally, a marked decrease in mobility post-exposure is indicative of aggregates being proteotoxic. In contrast, we found that dPM exposure was toxic in a manner that was independent of proteostasis decline. In fact, dPM suppressed polyQ35::YFP aggregation.

### Comparison of Two Gears for Measuring Abundance of Triangleclaw Crayfish in Headwater Streams on the Domain of the University of the South (Poster)

Marley Barton
Faculty Mentor: Grady Wells (Biology)

*Cambarus sphenoides* (Triangleclaw Crayfish) is endemic to the Cumberland Plateau of Kentucky and Tennessee. There is a paucity of ecological and life history information about this crayfish species. The lack of basic biological information guides the need for an effective and efficient sampling gear for Triangleclaw Crayfish. In this study, we compared kick seining and electrofishing methods in four 100-m reaches in four streams on the Domain: Abbo's Alley, Barnes Branch, Depot Creek, and an unnamed tributary of Mud Creek. We observed higher catch rates from the backpack electrofishing unit. Sampling for crayfishes with a backpack electrofishing unit is the best method, based on our results, for rocky, shallow headwater streams on the Cumberland Plateau ecoregion.

### The Effects of Color on Foraging: Birds Response to Different Colored Bird Feeders (Poster)

Sydney Beall
Faculty Mentor: Katie McGhee (Biology)

Many animals have preferences for certain colors. These preferences can manifest in different aspects of their lives with foraging, mate selection, and habitat choice being a few. Birds on Sewanee's campus were tested on foraging choice with blue and yellow colored bird feeders. Birds were found to spend more time at the blue feeders over a 15 minute period along with having more total foragers at the blue feeders compared to the yellow. Further studies exploring how vibrance and contrast in color may affect foraging behavior would be beneficial to better understand other elements of color preference in foraging.

## Determining the Role of APETALA Genes in Saffron Flower Development (Poster)

Charles Brooks, Eglesiana Pierra Mutavu, Elzie Elmore, Glory Dada, Keegan Congleton, and VC Lehmann
Faculty Mentor: Kevin Rodriguez

Saffron, renowned for its culinary, medicinal, and industrial applications, faces challenges in its cultivation due to labor-intensive harvesting methods and limitations in breeding strategies. Leveraging insights from floral identity gene studies in other species, this study aims to enhance saffron yield through genetic manipulation. Three potential APETALA genes, which have been shown in other species to be critical to flower development, have been found in Saffron; however, their functional significance has not been determined. Alignment of APETALA genes from various plant species provided insights into conserved regions, aiding in the development of RNAi and CRISPR-CAS9-based strategies for gene silencing and mutation, respectively. The RNAi system is being developed to employ an inducible two-component system that targets the three punitive AP1 genes simultaneously, allowing for a controlled analysis of gene silencing. Conversely, the CRISPR-CAS9 system utilizes guide RNAs to specifically target individual APETALA genes, resulting in permanent loss-of-function mutants. This study showcases the potential of molecular techniques to enhance saffron production by targeting key regulatory genes involved in floral development, providing a novel avenue for improving saffron cultivation and addressing challenges associated with agriculture: water shortages, arable land scarcity, and a growing population.

## Fight or Flight: Does the Perceived Presence of Two Competitors at Bird Feeders Affect Foraging Behaviors? (Poster)

Riley Carswell
Faculty Mentor: Katie E. McGhee (Biology)

Competition plays a major role in social interactions between animals, and foraging behaviors can be strongly affected by competition due to unequal sharing and access to food. In this study, laminated photographs of either a tufted titmouse, *Baeolophus bicolor*, or a white-breasted nuthatch, *Sitta carolinensis*, were attached to feeders and used to visually represent the presence of a competitor. I chose to use two different species of competitors to determine if the identity of a competitor plays a significant role in foraging behavior. The number of foragers and species identities were documented before and after these photographs were attached to feeders. The competitor species on the attached photograph did not affect how quickly the first forager arrived but it did affect what species arrived. Additionally, the presence of the photograph of either species deterred subsequent foraging as the number of foragers never returned to baseline levels (without a photograph attached). Species identities in competitive settings are an important determinant in the decisions of others when attempting to access pivotal resources such as food.

The traits of each species and what makes them stronger or weaker competitors would be interesting to explore.

### Elevation Does Not Predict Density Dependent Population Dynamics in *Valeriana edulis* (Poster)

Ben Davis
Faculty Mentors: Tom Powell (Environment & Sustainability) and Will Petry (North Carolina State University, Plant and Microbial Biology)

Density dependence—the impact of neighbors on the survival, growth, or reproduction of individuals—strongly impacts the size and dynamics of populations. However, it is unknown how the effects of density dependence vary across species ranges, which will be integral knowledge in the face of climate change and shifting populations. We sought to determine whether density dependence varies systematically across a species elevation range in the long-lived perennial plant *Valeriana edulis* (valerian). We assessed density dependence three ways across the species elevation range. First, we measured natural population density. Second, we quantified the impact of neighbor density on individuals' survival, growth, flowering, and seed production. Third, we combined the measures of density dependent individual performance into a demographic model and projected the population's carrying capacity. There was no significant relationship between observed population density and elevation. However, density dependence impacted multiple parts of the plant life cycle: size-specific survival and flowering probabilities of individual plants decreased with increasing numbers of neighbors. Finally, integrating the impacts of density across the full life cycle revealed that there was no significant relationship between elevation and model-projected carrying capacity. Taken together, these results suggest that density dependence has idiosyncratic effects on population dynamics across a species' range.

### Understanding the Importance of a Conserved Proline in the N-terminus of Nonstructural Protein (nsp9) of the Coronavirus MHV-A59 (Poster)

Carolyn Gardner
Faculty Mentor: Everett C. Smith (Biology)

Coronaviruses (CoVs) are a family of single-stranded, positive-sense RNA viruses that infect a wide range of vertebrate hosts. The murine coronavirus Mouse Hepatitis Virus strain A59 (MHV-A59) is a surrogate model of human and infectious CoV that can safely be used in the lab. Nonstructural protein 9 (nsp) is a small non-enzymatic protein encoded by all coronaviruses that binds RNA. Nsp9 is also a substrate for the nidovirus RdRp-associated nucleotidyltransferase (NiRAN) domain of the viral RNA-dependent RNA polymerase nsp12. NiRAN transfers nucleotide monophosphates to the terminal asparagine (N) of nsp9, likely to assist in viral RNA

capping and the priming of RNA synthesis. Despite these advances in understanding, little is known about the structural requirements of the N-terminal region of nsp9 for nucleotidylation. A conserved proline at position six of nsp9 (P6), and this residue might be important in NiRAN binding by delineating this region apart from the rest of the protein. To examine the importance of P6, we engineered viruses containing either P6A or P6G and one virus that had N1A, as a control, since this mutation allows for virus replication. Yeast-based transformation-associated recombination was used to assemble virus genomes, and P0 and P1 stocks were generated following transfection of HEK-293T cells with assembled plasmids. Compared to WT at the same time point, P6A had smaller plaques with less frequency, indicating reduced fitness and replication kinetics due to the presence of these mutations. P6G mutations resulted in larger plaques suggesting increased fitness and replication kinetics. When the first asparagine was mutated to alanine, plaque sizes were comparable to WT eluding to similar replication kinetics and fitness. Together, these data indicate that P6 is not obligately required for replication, however, the smaller plaque size of P6A and lower P1 titers could indicate diminished replication and less efficient nucleotidylation. Future studies will examine the RNA synthesis and replication kinetics of these viruses.

## Examining the Impacts of Regenerative Agriculture on Soil Carbon: A Community-Based Participatory Study (Oral Presentation)

Paige Graf
Faculty Mentor: Deborah McGrath (Biology)

Innovative farmers in the southeastern Cumberland Plateau region are stewarding their lands using regenerative practices, such as improved cover cropping and rotational grazing. These practices have been shown to increase and sequester soil carbon, offering an important tool for mitigating climate change caused by rising atmospheric $CO_2$ concentrations. In partnership with the Southeast Tennessee Young Farmers (SeTNYF) Coalition, we initiated a pilot project to examine the impact of rotational grazing and cover cropping on soil carbon on seven local small farms. We employed a community-based participatory approach to design the research around the needs of the local community and to ensure that farmers were consulted at every step. We compared soil carbon at two depths (0-15 and 15-30 cm) between parcels managed with regenerative practices (rotational grazing or cover cropping) and adjacent non-regenerative plots on seven farms. Using the sampling protocol employed by the Soil Inventory Project, we sampled at a minimum density of 3 samples per acre, although on some farms we sampled more, for a total of 406 samples. We hypothesized that soils under rotational grazing or cover crops would have higher organic carbon than adjacent non-regeneratively managed land. Despite the fact that farms had been rotationally grazed for at least five years, we found no significant difference in soil carbon between rotational grazing and adjacent plots. Only on one farm did we find significantly higher carbon under soils that had been cover cropped. Our interviews with farmers suggested that the sampling density may not have been high enough to detect changes in carbon resulting from highly localized regenerative practices, especially given the inherent

heterogeneity of soils, compounded by differing land use histories. More research on other factors influencing soil is crucial for future carbon studies to better understand the environmental benefits of regenerative agriculture. While we found no effect of rotational grazing on soil in this study, these data provide a baseline for continued research on small farms which has been enhanced through our use of the community-based participatory approach.

## Does Partner Body Size Affect Association Patterns in a Territorial Fish? (Poster)

Jeffrey Guerra and Fischer Flowers
Faculty Mentor: Katie E. McGhee (Biology)

An individual's body size plays an important role in shaping social interactions across various species. In many cases, larger individuals assert dominance over smaller individuals, particularly in contexts of territorial disputes and aggression. In species that are aggressive, individuals might avoid larger individuals and prefer to associate with individuals that are closer to their own size. In this study, we investigated the influence of body size on social interactions in the mangrove rivulus, a self-fertilizing hermaphroditic fish with distinct genetic lineages. Our experimental design involved exposing focal individuals to both larger and smaller partners simultaneously, allowing us to observe and quantify their association behavior with each partner. In contrast to other studies, our results did not reveal a significant influence of partner size on the behavior of focal individuals. However, our analysis revealed that particular genetic lineages and larger individuals were more likely to approach partners overall. This study suggests that body size alone may not dictate social behavior within this species. Further exploration into differences among genetic lineages in their aggressive interactions and territorial behaviors would be interesting avenues for future research.

## Do Ants Show a Foraging Preference for Artificial vs Natural Sugar? (Poster)

Faith Humphrey
Faculty Mentor: Katie E. McGhee (Biology)

Foraging is necessary for living organisms, and it involves searching and collecting food to survive in the environment. In recent years, human influence has expanded, and anthropogenic effects are influencing the foraging behavior of specific species. Because of anthropogenic effects, species have expanded their foraging area and changed their dietary preferences. Pavement ants (*Tertramorium caesoitum*) were examined to answer the question of whether ants make optimal choices and can distinguish between natural sugar which has a higher caloric value or artificial sweetener with zero calories. To conduct this experiment, I gave ant nests a choice between either natural sugar or artificial sugar and recorded the number of foragers over time. The nests of ants were observed across the domain of the University of the South, and I found that although both samples attracted equal numbers of ants in the beginning, over time the

natural sugar attracted more foragers compared to the artificial sweetener. This suggests that the ants are able to make optimal foraging decisions instead of decisions just based on sweetness. Humans are giving animals lots of new choices, and ants are able to make optimal choices and not be tricked in urban places.

### Genetic Diversity in the Widespread Cave Spider *Phanetta subterranea* (Oral Presentation)

Kathryn Kennedy
Faculty Mentor: Kirk Zigler (Biology)

Due to the isolated nature of cave habitats, most cave-obligate species (troglobionts) have small species ranges and exhibit significant genetic differentiation between populations over small distances. The cave-obligate linyphiid spider *Phanetta subterranea* is a notable exception to this pattern: it has one of the largest species ranges (with observations from a dozen states in the eastern United States) of any troglobiont in North America, and has been reported from more counties and more caves than any other North American troglobiont. We examined the genetic diversity in *P. subterranea* via DNA barcoding, sampling 43 individuals representing seven states and 34 counties. We found extremely limited genetic differentiation across the species' range. Haplotypes were shared across states, the maximum genetic divergence observed between any two individuals was 2.2%, and the mean genetic divergence for all pairwise comparisons between samples was 0.6%. We found no evidence of cryptic genetic diversity in the species. Our observation of minimal genetic diversity across such a broad species range raises the question of how these cave-obligate spiders have managed to disperse so extensively.

### Exploring the Regulatory Mechanisms of the OAS-RNase L and PKR Pathways in RNA Sensing (Poster)

Channita Keuk
Faculty Mentors: Ruilin Zhang and John Karijolich (Department of Pathology, Microbiology, & Immunology at Vanderbilt University)
Sewanee Faculty Sponsor: Alyssa Summers (Biology)

As dsRNAs are the hallmark of viral infections, RNA sensing becomes an important component of host innate immunity. Two dsRNA-sensing pathways are the oligoadenylate synthetase (OAS)-RNase L pathway and the protein kinase R (PKR) pathway. Given the potency of their activation, both pathways are not only highly regulated through cellular mechanisms but also heavily antagonized by viruses. To test whether regulation of the OAS/RNase L pathway occurs at the post translational level, RNase L wildtype and K684R mutant plasmids were generated, and the effect of acetylation of RNase L at residue 684 on RNase L activation was evaluated via bioanalyzer assays. One mechanism that the vaccinia virus (VacV) utilizes to induce host

shut-off is the hypophosphorylation of serine/arginine-rich (SR) proteins which are essential to the host alternative RNA splicing machinery. To explore whether defects in splicing generates ligands for PKR activation, another scope of my project investigates the effect of SR inhibition on PKR activation. Completion of this project will enhance our mechanistic understanding of RNase L and PKR activation for RNA sensing.

### Is Shoaling Behavior Affected by the Complexity of the Environment? (Poster)

Virginia Claire Lehmann
Faculty Mentor: Katie E. McGhee (Biology)

The environments fish live in can affect their behavior patterns. Here, I examined the effect of environmental complexity on the shoaling behavior of fish. To test this, fish were placed in alternating sparse and complex environments and the time spent near an isolated conspecific fish was recorded. In a sparse environment, fish did spend more time around the conspecific fish than they did in a complex environment, but it was not statistically significant. This study contributes to the further understanding of why fish choose to associate with others and what could cause them to change their behavior patterns.

### Circadian Regulation of Macrophage Activity in Zebrafish (Poster)

Sarah Livingston
Faculty Mentors: Brittney Covington (Vanderbilt University, Molecular Physiology and Biophysics) and Wenbiao Chen (Vanderbilt University, Molecular Physiology and Biophysics)
Sewanee Faculty Sponsor: Alyssa Summers (Biology)

Type 2 diabetes (T2D) has substantially increased in the United States. The major risk factor for T2D is obesity results from overnutrition. Obesity causes insulin resistance, which stresses the insulin-producing beta cells in the pancreatic islets, leading to beta cell dysfunction and loss and insulin insufficiency. Another risk factor for T2D is circadian (around 24 hours) rhythm (CR) disruption. Shift workers have increased risk for T2D. How overnutrition, insulin resistance, and CR disruption cause beta cell death is incompletely understood and is currently an active area of study. The Chen laboratory has developed a zebrafish model in which insulin resistance and overnutrition induces beta cell death. Intriguingly, beta cell loss occurs during 1AM-4 AM after interacting with inflammatory macrophages and shifting CR alters the cell death timing accordingly. We hypothesize that beta cell death results from increased beta cell vulnerability and heightened macrophage activity during the inactive period. This summer project aims to determine whether systemic macrophage activity oscillates in a CR pattern.

## The Biomechanics of the Feeding System in Primates (Poster)

Amy Martin
Faculty Mentor: Pepe Iriarte-Diaz (Biology)

The evolution of complex dentitions in mammals was a major innovation that facilitated the expansion into new dietary niches, which imposed selection for tight form-function relationships in the feeding apparatus. Evolutionary changes in the configuration of the masticatory system often reflect competing selective demands such as the need to produce appropriate gapes while having to generate sufficient biting forces. In mammals, the feeding apparatus is a lever system in which the bite force at a given tooth is the result of the forces generated by the masticatory muscles, which create a torque around the mandible joint, divided by the outlever, the distance between the joint and the biting point. If all other variables are kept constant, the outlever will be shortest in the most posterior tooth, and thus the ultimate molar is expected to apply the greatest bite force among all teeth. We refer to this as the "unconstrained model." A more refined model of the feeding system defined three bite force regions based on a constrained bite force model that takes into account the potential for dislocation of the mandible at more posterior bite points. Under this "constrained model," bite force would be greatest somewhere along the intermediate molars and then decrease in the more posterior region of the mandible. The goal of this study is to evaluate the biomechanics of the feeding system of primates based on the "constrained model" and use comparative methods to investigate the relationship between bite force patterns, and tooth and mandible morphology to observe evolutionary relationships between primates based on their masticatory diversity. We use virtual models of the cranium and mandible of more than 80 species of primates encompassing a diversity of sizes, diets, and clades. We will use these models to map the three major masticatory muscles (masseter, temporalis, and medial pterygoid) to determine for every species if the muscle resultant force falls outside the triangle of support, an indication that a dislocation force is forced is generated. We will use these results to see if our data are consistent with the simplified lever model utilized in the past.

## Do Watershed Conditions or Local Climate Play a Larger Role in Determining Regional Stream Salamander Distributions? (Poster)

James S. McGrory, Brian J. Halstead, and John C. Maerz
Kristen K. Cecala

Understanding how organisms are being affected by anthropogenic change requires a grasp of the underlying heterogeneity in environmental conditions and how they interact with human-induced change. Stream amphibians are responsive to physical context (e.g. elevation and watershed size), land use, and climate change, yet all three of these factors occur simultaneously and may have synergistic or antagonistic effects. We used a landscape occupancy study to evaluate these interactions and determine if one plays a larger role in dictating variability in stream occupancy, as well as if stream-salamander species or life stages exhibit similar

responses. We observed that land use change had a stronger association with salamander occupancy than climate or physical context, while life stages and species responded to different variables. It was observed that variations in precipitation had no association with salamander occupancy. The adult life stage of most aquatic species exhibited a negative association with temperature. The climate variability observed in the watershed was larger than expected for the near future suggesting that local mechanisms (e.g., behavior, physiological plasticity, or local adaptation) may improve salamander resilience to climate change and exhibit a larger influence than global climate change. Despite multiple pressing threats to environmental stability, our results support the continued preservation of forested corridors to conserve stream populations.

### Examining the Effect of Mountain Laurel (*Kalmia latifolia*) Cover and Deer Herbivory on Chestnut Oak (*Quercus montana*) Seedling Establishment (Poster)

Nneka Okolo
Faculty Mentor: Jonathan Evans (Biology)

Seedling establishment in oak populations can be limited by a number of biotic factors, including herbivory and negative plant-soil feedbacks. Previous studies in our lab have demonstrated that the establishment of chestnut oak (*Quercus montana*) seedlings in upland Plateau forests is inhibited by the presence of mountain laurel in the understory and by the consumption of acorns by deer in the winter. The large food reserve associated with chestnut oak acorns, which make them attractive to deer, also allows seedlings to be less impacted by resource competition such as shading by mountain laurel. However, mountain laurel and chestnut oak are associated with two different types of mycorrhizal fungal associates found in the soil and we hypothesize that the ericoid mycorrhizae associated with mountain laurel may directly inhibit chestnut oak seedlings by being pathogenic to them or indirectly by suppressing the abundance of the ectomycorrhizal fungi that the seedlings will increasingly depend upon as they get older. We employed a blocked, multifactorial experimental design in the field to tease apart the effect of mountain laurel cover and deer herbivory on chestnut oak seedling establishment on the Domain. Each block consisted of four treatment combinations, where arrays of 25 acorns were placed on the ground inside and outside of mountain laurel cover and with and without a mesh covering. There were 20 blocks distributed across the study site in an upland forest dominated by chestnut oak located above Shakerag Hollow on the Sewanee Domain. Acorns were collected and placed out in October prior to leaf fall and then left undisturbed until the spring of 2024 so the seeds could establish roots. In early April 2024 the number of germinated seedlings in each treatment combination was counted and compared. This poster presents these initial results. This experiment will continue for three years as part of a larger USDA-funded collaborative project with Dr. Sarah Neumann's lab at Tennessee State University, where we are conducting a study of plant-soil feedbacks in upland forests of the Cumberland Plateau.

## Do Larval Salamanders React Differently to Chemical vs Visual Cues of Predatory Crayfish? (Poster)

Autumn Sims
Faculty Mentor: Katie E. McGhee (Biology)

Prey survival hinges on effective predator identification and avoidance, prompting diverse anti-predator strategies. This study explores larval Southern Two-lined salamanders' (*Eurycea wilderae*) responses to visual and chemical cues from the Triangle Claw crayfish (*Cambarus sphenoides*). Forty trials were conducted, exposing salamanders to either visual or chemical cues of crayfish in controlled tank environments. Contrary to expectations, salamanders did not differentiate risk levels but recognized the crayfish threat, spending time in the safe zone consistently. The study suggests an equal acknowledgment of risk regardless of cue type, prompting questions about visual and chemical cues' interplay in predator assessment. The findings align with size-dependent threat studies, emphasizing the importance of combining cue types for effective risk perception. Habitat variability, particularly sedimentation, can significantly influence cue assessment, highlighting potential anthropogenic limitations. Overall, the study underscores the intricate nature of predator-prey interactions, urging broader investigations into cue perception influenced by environmental conditions.

## Diesel Particulate Matter Induces Toxicity within *C. elegans* in a Manner Distinct from Proteotoxicity (Oral Presentation)

Jeremiah Studivant
Faculty Mentor: Elise Kikis

Neurodegenerative diseases are characterized by their age-dependent failure of the proteostasis network (PN)—a critical regulator of protein folding, trafficking, and degradation—leading to an inability to maintain protein homeostasis (proteostasis) and eventually resulting in accelerated loss of neurons. Huntington's disease (HD) is a neurodegenerative disorder caused by a mutation within the huntingtin gene, encoding excessively multiple glutamine repeats (polyQ). This polyQ expansion is prone to misfolding, perturbing proteostasis. While significant advances have been achieved in understanding risk factors for neurodegenerative diseases, the impact of ambient pollutants on their progression represents a novel and emerging area of concern. Despite the global prevalence of pollutant exposure, our understanding of its effect on the progression of neurodegenerative diseases is limited. Previous work has demonstrated that nanoparticulate matter (nPM) exacerbates proteostasis failure, increasing proteotoxicity in *C. elegans*. Yet, the variable composition of nPM, influenced by factors such as collection time and geographic location, can result in inconsistent bioactivity assessments. Therefore, we began focusing on the effect of a more refined particle, specifically, investigating the effect of commercially available diesel particulate

matter (dPM) on proteostasis. To examine proteostasis integrity we employed *C. elegans* models expressing a polyQ sequence of 0 or 35 glutamine residues, fused to a yellow fluorescent protein (YFP), as a sensor of the protein folding environment. We found that dPM induces cellular toxicity in a manner that is independent of polyQ aggregation. Identifying the effect dPM has on proteostasis offers new insight into how nano pollutants may influence the progression of neurodegenerative diseases.

### Detecting Rodent Associated Haemoplasmas in the Greater Kruger National Park (Poster)

Meredith Tjepkema, Ariana Rivera-Corona (Cornell University), and Charlotte Donnelly (University of Nottingham)
Faculty Mentor: Elise A. Kikis (Biology)

Obligate erythrocytic pathogens, also known as Hemotropic mycoplasmas or Haemoplasmas, constitute a group of epicellular bacterias that adhere to the red blood cells of host organisms. They are known to be causative agents of infectious anemia in various mammalian species. Multiple methods of cultivation for these pathogens such as in vitro culture, blood smears, and DNA hybridisation have been attempted, yet inaccurate. There is a gap in the knowledge of less invasive methods of collection that are efficient in detecting Haemoplasmas. Consequently, this pilot study aims to research the occurrence of haemoplasma in the blood of two types of *Mastomys* species, *Mastomys coucha* and *Mastomys natalensis*, that is collected using FTA cards via a minimally invasive procedure of tail pricks. Synanthropic species such as rodents live in close association with and have adapted to living at the interface of various species such as humans, livestock, and wildlife. Due to the large association rodents have to other host species of haemoplasmas, they serve as a critical vector to other research relating to this pathogen. As a result, it is imperative to find effective systematic sampling methods for this pathogen, using non-invasive techniques. In past studies, haemoplasma presence has been detected through kidney samples, spleen samples, and buccal swabs that have resulted in euthanasia of the rodent sample. The blood collected via FTA cards and tail pricks allowed for successful detection of haemotropic mycoplasmas within the blood of various species of mice. Thus, this pilot study has successfully identified a method to detect haemoplasmas through a minimally invasive procedure. The haemoplasma-specific PCR ran from the collected blood samples indicated the presence of haemotropic mycoplasmas in *Mastomys* individuals at every sampling site. Haemoplasmas are likely spread through ectoparasites such as fleas, ticks, and lice as well as through direct interactions with infected hosts. Communities located in anthropogenic edge areas, especially rural, with roaming livestock and working animals are at a higher risk of pathogenic exposure due to interaction with infected hosts. Haemoplasma trends observed through studies of other rodents support this emerging danger to anthropogenic-edge communities.

## Exposure to Microplastic Nanoparticles Increases Protein Aggregation and Toxicity in *C. elegans* (Poster)

Hannah Womble, Hannah Talbott, and Laine Prince
Faculty Mentor: Elise Kikis (Biology)

Proteostasis, the ability to maintain a healthy proteome, is required for cellular function. Normal aging and age-related neurodegenerative diseases, such as Alzheimer's and Huntington's disease, are characterized by a decline in the ability of cells to maintain their proteins in a healthy folded state, resulting in an increase in misfolded and aggregated proteins. This disease-associated protein misfolding is exacerbated in genetic backgrounds with an overabundance of metastable proteins or genetic backgrounds harboring specific genetic risk factors. Although genetic risk factors for neurodegenerative disease have been widely studied in recent years, we know comparatively little about how the environment affects the progression of neurodegenerative disease. It has been shown that exposure to nano-sized particulate air pollution (nPM) can trigger the accumulation of misfolded and oligomerized AD-associated amyloid beta in mice. Likewise, people chronically exposed to high levels of particulate air pollution have an increased likelihood of developing AD. To determine whether microplastics likewise affect the protein folding environment, we exposed *C. elegans* to commercially available nanostyrene and to microrubber particles obtained from the Sewanee soccer turf. To assay for an impaired ability to maintain proteostasis, we used a metastable HD-associated protein fused to YFP as a sensor. As proteostasis collapses, this sensor misfolds and localizes to distinct fluorescent foci. We found that polystyrene nanoparticles increase sensor protein aggregation and toxicity with little effect on the ratio of monomers to high molecular weight, oligomeric, species. Together, our data point to microplastics contributing to proteostasis decline in a manner that could be relevant to neurodegenerative disease progression.

## The Significance of Conserved Residues within the N-terminus of nsp9 in Human Coronavirus 229E Modeled in MHV-A59 (Poster)

Ryan D. Xavier
Faculty Mentor: Everett C. Smith (Biology)

Nonstructural protein 9 (nsp9) is an RNA-binding protein encoded by all coronaviruses and is a substrate for the nidovirus RdRp-associated nucleotidyltransferase (NiRAN) domain of nsp12, the viral RNA-dependent RNA polymerase (RdRp). The NiRAN domain of nsp12 transfers nucleotide monophosphates (NMPylates) to the N-terminal asparagine (N) of nsp9, UTP in particular. Mutations within the first three N-terminal amino acids (NNE) of human coronavirus 229E (HCoV-229E) nsp9 differentially affect virus replication, likely through a defect in viral RNA synthesis. The N2 residue is the only invariable residue among Coronaviridae nsp9 homologs, and no mutations at this position have been recovered in any coronavirus. Thus, while the importance of this position is clear, the mechanism(s) underlying its importance is not. We are interested in further exploring the significance of the N-terminus of nsp9, specifically the

first two residues, in viral replication. Due to murine coronavirus' robustness to mutations, our engineered coronavirus was modeled in MHV-A59 in hopes to recover previously unrecoverable mutations. Using yeast-based transformation-associated recombination, the following coronavirus mutants were constructed: N1S, N1Q, N2Q, NN12QQ. Following plasmid generation, HEK293T cells were transfected with the plasmid and virus was collected. The NN12QQ mutant was unrecoverable. However, mutant P1 titers were similar to WT. P1 N1S and N1Q mutants show slightly smaller plaques than WT, while the N2Q mutant has a significant reduction in plaque size. A reduction in plaque size is correlated to a reduction in replicative fitness. Compared to previous findings, the N1S and N1Q mutants' similarity to WT is not unexpected. However, mutations in the second N-terminus residue have not previously been recovered, likely due to the invariability of this residue in nsp9 homologs in the Coronaviridae family. Together our data indicate that viruses containing mutations at N2 are recoverable, albeit likely have reduced replication and fitness. This mutant will be an important tool for understanding the significance of the N-terminus of nsp9 as well as its implications in replication kinetics which could inform the development of future therapeutics.

### Do Salamander Larvae Prefer to Avoid or Associate with Others? (Poster)

Jasmin Zelaya
Faculty Mentor: Katie E. McGhee (Biology)

Living in groups can provide individuals with a variety of benefits, such as increased mating opportunities and increased vigilance against predators. However, living in a group can also be costly, by increasing competition for resources and making individuals more vulnerable to predation or disease. In this study, I examined whether salamander larvae are attracted to the presence of conspecifics. I assessed their grouping behavior by measuring their response to a mirror-image of themselves (as a proxy for a conspecific nearby). I found that larval salamanders were not attracted to their mirror image. It is possible that larval salamanders are not attracted to a conspecific, or alternatively, they may not perceive the mirror image as a conspecific. Examining how the interaction of chemical and visual cues of conspecifics affect grouping behavior would be worthwhile in the future.

### Investigating the Role of Trained Immunity in Tet2 -/- and Tet2 -/- RIPK1 D/+ Bone Marrow Cells (Poster)

Kaiwen Zheng
Faculty Mentors: Sandra Zinkel (Vanderbilt University Medical Center, Department of Hematology), Alyssa Jarabek (Vanderbilt University Medical Center, Department of Molecular Pathology, and Immunology)
Sewanee Faculty Sponsor: Alyssa Summers

Myelodysplastic syndromes (MDS) are a group of hematopoietic diseases characterized by clonal hematopoiesis, cytopenia, and dysplastic morphology. Inactivating mutations in the Tet2 gene are present in 25% of patients with MDS, but also in healthy individuals over the age of 70, indicating that Tet2 loss is not sufficient to cause disease. Innate immune activation can promote disease progression in the setting of Tet2 loss. Our preliminary data demonstrate that increased innate immune inflammation in Tet2-deficient macrophages could be improved by inhibiting RIPK1, the major kinase driving inflammatory necroptotic cell death. We hypothesize that Tet2 loss impacts the long-term response of the innate immune system to stimulation by pathogens, known as trained immunity. Trained immunity arms the innate immune system to elicit a more robust response upon additional exposure of pathogens. Here we investigate the response of wild-type, Tet2-/-, or Tet2-/- RIPK1D/+ bone marrow derived macrophages (BMDMs) to inflammatory stimuli. We quantified cytokine production via qRT-PCR in β-glucan (a fungal cell wall component) or monophosphoryl lipid A (MPLA, a less toxic derivative of lipopolysaccharide, or LPS) pretreated macrophages, which induces a trained immune response. We also stimulated total bone marrow cells with phorbol-12-myristate-13-acetate (PMA) or LPS and quantified cytosolic and mitochondrial ROS production by flow cytometry. We find decreased TNF cytokine expression in β-glucan and MPLA-trained cells upon LPS stimulation and changes in cytosolic and mitochondrial ROS production across various treatments and genotypes. Overall, our results suggests that Tet2 and RIPK1 may play important roles in inflammatory responses via ROS production.

## CHEMISTRY

### Developing a New Synthetic Methodology for the Preparation of Heteroleptic Acetylacetonate Complexes (Poster)

Mohamed Abdelsalam, Brian Gulick, and Erica Rivers
Faculty Mentor: Robert E. Bachman (Chemistry)

In prior work heteroleptic complexes of cobalt acetylacetonate (acac) complexes $[Co(acac)_{3-x}(acac^*)_x]$ were generated via the use of the appropriate molar equivalents of two

targeted ligands. This approach was partially successful generating the desired heteroleptic systems as it led to mixtures containing all four possible resulting complexes ($0 < x < 3$). To avoid the generation of mixtures, a new approach is being developed using the recently reported synthesis and detailed characterization of $[Co(acac)_2]$ type materials—$[Co(acac)_2(H_2O)]$ or $Co_4(acac)_8$. The precursor $[Co(acac)_2]$ complex was mixed with several new acetylacetonate ligands including curcurmin, a main component of turmeric. In this presentation, we will discuss the synthetic approaches tested and the spectral characterization of the new heteroleptic complexes that were prepared.

### Synthesis, Characterization, and Reactivity of Di-Indazole Platinum Complex Derivatives with Possible Pharmaceutical Applications (Oral Presentation & Poster)

Yuliia Humeniuk
Faculty Mentor: Robert E. Bachman (Chemistry)

In 1978, the FDA marked a milestone with the clinical approval of Cisplatin, the pioneering metal-based anticancer chemotherapeutic. Its effectiveness sparked great interest in understanding its behavior and developing new platinum pharmaceuticals. Platinum(II) complexes dominate a majority of drug discovery research to date; however, platinum(IV) complexes have also begun to be explored in the belief that they will allow new therapy avenues with fewer side effects, acting as potential prodrugs. This exploration extends beyond platinum, delving into various metal systems, such as ruthenium. Inspired by the ruthenium anticancer complex (KP1019) and the scarcity of metal complexes featuring indazole, we explore the chemistry of platinum-indazole complexes. In recent years, our group yielded a library of new bisindazole Pt(IV) and Pt(II) complexes, enriching the landscape of potential anti-cancer agents. These complexes have been characterized via spectroscopy and crystallography, and the initial experiments suggest at least one new compound interacts with a DNA model.

### Microwave-assisted Synthesis of Imidazole-based N-Heterocyclic Carbenes (NHC) Ligands for Cobalt (II) Catalyzed Transfer Hydrogenation of Ketones (Oral Presentation)

Channita Keuk
Faculty Mentor: Evan E. Joslin (Chemistry)

Alcohols are one of the most common organic compounds used in the synthesis of perfumes and sweeteners. They are also the basic building blocks in many organic chemical reactions. Hydrogenation of ketones to their respective alcohol products requires high temperatures and hydrogen gas, which can be dangerous. Transfer hydrogenation, which uses organometallics catalysis and a hydrogen donor, provides an alternative synthetic route. We focused on the use of first-row transition metals for transfer hydrogenation due to their earth abundance in nature and

cost-effectiveness. Various NHC ligands were synthesized via a microwave reactor to generate a series of NHC ligands with varying electronic profiles. Following the ligand synthesis, a series of NHC cobalt (II) complexes were synthesized and tested for catalytic ketone transfer hydrogenation. Nuclear magnetic resonance was used to characterize the uncoordinated NHC ligands and mass spectrometry was used to characterize the metal complexes.

### Synthesis, Purification, and Characterization of MSA & EDTA Carbon Quantum Dots (Poster)

Rayna Nemcek
Faculty Mentor: Deon Miles (Chemistry)

Carbon quantum dots (CQDs) are carbon-based nanoparticles that are typically synthesized from citric acid (primary carbon source). In our research, we use alternative carbon sources, namely water-soluble thiols and polycarboxylic acids. For this project, mercaptosuccinic acid (MSA) and ethylenediaminetetraacetic acid (EDTA) were used as the primary carbon sources. After their synthesis in a conventional microwave, these CQDs were thoroughly purified through centrifugation, fluorescent flash chromatography, and dialysis. Fluorescent flash chromatography displayed two distinguished fractions of our MSA-CQD samples: green, and blue in color, and one fraction of our EDTA-CQD sample which was blue in color. The purified CQDs were then analyzed using UV-visible and fluorescence spectroscopy to observe their structural and functional properties. The analysis of these nanomaterials determined their stability which can be applicable for their use as future biological and chemical sensors. Heavy metal ion sensing was performed using Pb(II), with fluorescent quenching observed with the addition of this metal ion. The quantum yield of the CQD fractions was also analyzed.

### Development of New Di-Indazole Chelate Ligands and Their Metal Complexes (Poster)

Oleksii Pidlypenets and Abbie Kleckley
Faculty Mentor: Robert E. Bachman

Platinum-based drugs have been used in anti-cancer chemotherapy for almost half a century, giving rise to a line of Platinum (Pt) complexes. The main disadvantages of these pharmaceuticals were their strong side effects, while those less toxic to healthy cells were also less potent against tumor cells. The main approach to reduce the toxicity of the Pt-drugs but preserve their therapeutic effect was to complexate the Pt atom to various organic ligands. Our research focuses on the development of new indazole ligands for Pt complexes with potential anti-cancer properties. Complexes of indazole are relatively uncommon; as such, we have been preparing and characterizing indazole complexes of Pt. Work that has generated interesting reactivity, including both photolytic reductive-elimination processes and an unexpected relative

lability of the indazole ligands. To potentially minimize the observed lability, we have developed multiple synthetic routes to di-indazole frameworks capable of metal chelation. We will present the new routes, the characterization of the resulting new ligands, and initial metal complex formation studies.

### Synthesis and Reactivity of Imidazole N-Heterocyclic Carbene (NHC)-Based Co (II) Catalysts in Transfer Hydrogenation of Ketones (Poster)

Anna Lanning Wright, Sarah Livingston, and Channita Keuk
Faculty Mentor: Evan Joslin (Chemistry)

Alcohols serve as fundamental components in numerous chemical reactions. The products synthesized from alcohols have applications in a variety of commercial products, including perfumes and sweeteners. Traditional methods for reducing ketones to their corresponding alcohol products use $H_2$ gas at high temperatures which can be dangerous and expensive. In contrast, using cobalt, an abundant and inexpensive metal, as a catalyst offers a more environmentally friendly and inexpensive alternative. However, research on cobalt(II) as transfer hydrogenation catalysts remains limited. A variety of imidazole-based N-heterocyclic carbene (NHC) pincer ligands were synthesized utilizing microwave conditions and characterized through NMR spectroscopy. The NHC ligands were coordinated to $CoCl_2$ to form a series of cobalt(II) NHC complexes, and transfer hydrogenation reactions of ketones were performed to determine the catalytic activity of the complexes. Initial findings suggest that these cobalt(II) catalysts are efficient and versatile transfer hydrogenation catalysts.

## CIVIC AND GLOBAL LEADERSHIP

### Service Abroad, a Participatory Study of Student Experiences of Civic Engagement in Ecuador (Poster)

Laura A. Botros
Mentors: Lauren A. Goodpaster (Director of Outreach & Service-Away Programs) , Audra Ryes, T’24, and Christopher F. Silver (Psychology)

Through the Office of Civic Engagement, Sewanee students participate in outreach trips and service-away programs as an opportunity to learn about students’ own values and identities in the context of other cultures. During the 2024 spring break, students participated in a service abroad experience in Ecuador hosted and partially funded by the Office of Civic Engagement (OCE). Our host while in Ecuador was Education Equals Hope (E=H), a Christian program that provides

funding for micro-scholarships for children in Ecuador to attend school. As part of that experience, the Department of Psychology partnered with OCE to conduct a qualitative pilot study exploring the reflective experiences students had during their experience. Participants participated in programming on topics such as providing opportunities for Ecuadorian students, Ecuadorian culture, and the role of religion in organizing and addressing economic disparity. Ten students participated in the research interviews as part of the pilot regarding their experiences and reflections. Participants reported on themes of building relationships, cultural comparisons, what was learned, faith and belief, and transformation.

### Understanding TISA: Educators' Perceptions of New Tennessee Public Education Reforms (Poster)

Stewart Miller
Faculty Mentor: Christopher Silver (Psychology)

When Tennessee Governor Bill Lee signed the Tennessee Investment in Student Achievement into law with the starting year of 2023-2024, the state touted this new funding reform as a means to increase per-capita funding in Tennessee public schools and address gaps in resources between urban and rural school districts. This study aims to evaluate whether or not TISA has begun to fulfill its promise by interviewing public educators from across Southeastern Tennessee and understanding their perceptions of TISA's efficacy and what it means for the future of Tennessee rural public education. This study consists of seven one-time interviews of approximately forty minutes in length to generate qualitative research derived themes. The generated data was analyzed with emergent thematic coding through the lens of social constructivism. The study has found that among the interviewed public educators in Southeast Tennessee, knowledge of TISA and its structure is limited, especially regarding TISA's "Outcomes Based Funding," the promised pay raise for public educators, and how TISA will differ from the state's previous funding model, the Basic Education Program (or BEP). The study found that these same educators had mixed emotions regarding what they believe will be TISA's true impact, with most being skeptical that the funding reforms will significantly alter the Tennessee public education landscape. Additionally, this study seeks to use the generated data and subsequent analysis to find and implement potential solutions to address these gaps in knowledge and fiscal support for rural public educators.

# CLASSICAL LANGUAGES

### From Scavenger Hunt to Scholarly Resource: Constructing a Database of Latin and Greek Inscriptions in Sewanee (Poster)

Jose T. Diaz and Michael P. Kolcun II
Faculty Mentor: Christopher M. McDonough (Classical Languages)

The University of the South—colloquially known as Sewanee, after the name of the small Tennessee town in which it is located—boasts a long tradition of engagement with Classics, both inside and outside the classroom. From epitaphs in the university cemetery, to honorary dedications in Convocation Hall, to quotations in the chapel and from Virgil in a fraternity house, an extensive number of inscriptions in Greek and Latin is to be found all around campus. As can be imagined, one comes across these *disiecta membra* in a rather haphazard way. The purpose of the project is to collect and catalogue this assortment of inscribed texts into an online database, with the goal of transforming what has been something of a local scavenger hunt into a legitimate scholarly resource of epigraphical material. To a certain extent, this work has been underway for some time: in 1972, a graduating Classics major named Forest Dillon published a small pamphlet entitled “Latin and Greek as Used at Sewanee” in which a number of these older inscriptions were assembled and translated. Our project consists not just in digitizing the substance of Dillon’s work for Sewanee and supplementing it with newer inscriptions, but also in adding high-resolution pictures as well as explanatory material and further commentary. During the summer of 2023, the collection of this vast number of individual efforts was overhauled and remodeled as an accessible digital resource. Finally, we plan to outline some larger ambitions for this digital humanities project, both as a way of illuminating the use of Greek and Latin in our local setting as well as providing a template for the online display of inscriptions as found on other college campuses. We hope to raise larger questions about the uses to which such Classical inscriptions in American academic culture have been put, and how they communicate exclusivity, in both negative and positive senses of the word. With these ambitions in mind, we see our database as elevating the consideration of local epigraphy from the level of idiosyncratic curiosity to a tool for investigating a particular area of Classical reception.

# ECONOMICS

### Unlocking Economic Potential? Exploring the Impact of Foreign Direct Investment on Growth in African Nations (Oral Presentation)

Saverio Annunziata
Faculty Mentor: Bradley Sturgill (Economics)

Despite the present consensus on the importance of foreign direct investment (FDI) in driving economic growth, quantitative results regarding its impact on developing economies remain unclear. To address this issue, this paper adopts an empirical approach grounded in economic growth theory, examining the relationship between GDP per worker growth and FDI. The paper's design centers on a cross-sectional analysis of cases across the African continent, providing a diverse environment for analysis. World Bank economic indicators, including FDI, trade, infrastructure, domestic investment, and human capital are analyzed through a regression model to assess their effect on GDP per worker. Factors such as initial GDP levels and domestic investment demonstrate statistical significance in this analysis. For instance, a higher initial GDP per worker level correlates with slower expected GDP per worker growth, while an increase in domestic investment is associated with increased economic growth. This work provides hypotheses on FDI's role in economic development. These findings have potential implications for policy and investment strategies. They quantitatively demonstrate the necessity for an approach to economic development that focuses on initial economic conditions and domestic investment, rather than exclusive reliance on FDI.

### The Effect of Legalized Cannabis Use on Driving Under the Influence Arrests (Poster)

JT Carter, Hudson Hefner, and Strom Huber
Faculty Mentor: Marc St-Pierre (Economics)

Although the laws of the United States regarding road safety remain in place to protect its people, there is little change in the law in response to the uptick in the legalization status of recreational and medical marijuana over the last 20 years. Previous studies vary in terms of results as different methods have yielded these studies to present different findings in their conclusions regarding the relationship between cannabis and arrests of driving under the influence (DUI). This study utilizes panel data to determine the effects of these legalization statuses of cannabis in comparison to states that are yet to legalize medical or recreational cannabis. Our research relies on the statistics of arrests pertaining to DUIs from 2000 to 2022. The implications of this study could be a step in the right direction, in terms of road safety, for states refusing to budge on the legalization status of cannabis. Our findings could provide incentive for these states to keep their roads safe for the future.

## Hidden Curricula within College Economics and Finance Programs (Poster)

Tyler Cozzie, Carter Cole, and Childers Winn
Faculty Mentor: Kate Cammack (Psychology)

STEM refers to the fields of Science, Technology, Engineering, and Mathematics. The STEM pipeline refers to the individuals who persist within STEM disciplines over time (Riegle-Crumb et al., 2019; Rosenzweig 2021). Unfortunately, this pipeline is "leakier" for individuals with certain social identities (e.g., first-generation, people of color, women) than others (e.g., white, cis-gendered). One factor that contributes to these STEM pipeline issues relates to social privilege, or a set of advantages or entitlements that benefit individuals of certain social identities. Students with social privilege are often more knowledgeable about "hidden curricula" within STEM, which are unspoken "rules" about how to succeed in STEM disciplines (e.g., attending office hours; knowing how/where to find internships). Additionally, students often encounter meaningful experiences that shape their interest in pursuing STEM prior to college (Vanmeter-Adams et al., 2017). Our HSTEM team will be working to identify hidden curricula within Economics and Finance programs on college campuses. By raising awareness about the negative impacts of hidden curricula amongst students with majoritarian identities, it might help level the playing field and allow more people to remain in the STEM pipeline, thus diversifying scientific teams in important ways.

## NIL's Effect on Athletic Department Revenue (Poster)

Zach Crain, Jake Perrot, and Andrew Perun
Faculty Mentor: Marc St-Pierre (Economics)

The National Collegiate Athletic Association (NCAA) passing Senate Bill 206 allowing for student-athlete compensation through their Name, Image, and Likeness (NIL) is shaping a new landscape for the future of collegiate athletics. However, we do not know much about how the newly passed bill by the NCAA regarding NIL for student-athletes impacts the individual athletes' respective athletic department revenue generation. Using recent data from top college football and basketball teams, we use the Ordinary Least Squares method to regress athletic department revenue on athletes annual NIL valuation and social media following. The results prove that there is a direct relationship between NIL and athletic department revenue generation. The coefficient being .135 means that a one percent increase in NIL results in an athletic department revenue generation increase by .135% holding all else equal. The results support the idea that NIL positively impacts an athletic department revenue.

## How Casino Establishments Affect Median Household Income (Poster)

Aidan Donoho, Jo Cantrell, and Austin Crowley
Faculty Mentor: Bradley Sturgill (Economics)

The issue of median household income in the United States holds significant value for counties seeking self-improvement. This information is vital as it affects job employment, economic activity, and tourism within the county. This study examines whether median household income is impacted in counties having a casino. The research design focuses on counties where casinos are present, utilizing a panel data set relying on county employment, annual payroll, number of casino establishments, and high school graduation rate, which we analyze to regress median household income with these variables. Research shows that the high school graduation rate has a positive impact on median household income. At the same time, the number of casino establishments within a county does not affect median household income. However, these research findings have broader implications. They indicate that casinos do not significantly affect median household income.

## The Effect of Urban Tree Canopy Cover on Air Pollution (Poster)

David Edge and Emily Tindal
Faculty Mentor: Marc St-Pierre (Economics)

The role of green spaces in our cities has a direct impact on a citizen's health and quality of life. Trees are known to play a role in the production of the air we breathe, the goal of this study is to assess the significance of this idea in relation to pollution. This study aims to assess the effect of tree canopy cover on CO, PM10, PM2.5, O3, and NO2 levels in urban environments. Air pollutants spark the creation of a plethora of unnecessary problems, including increased health risks and environmental harm. The goal of our research is to determine if increasing the space allowed for tree growth in cities could be the solution to reversing pollutant spread. We aim to determine the impact of tree canopy coverage on the level of air pollution found in urban environments. We approached this problem by accumulating data from 50 different U.S. cities between 2013-2022. We collected panel data on air pollutant types CO, PM10, PM2.5, O3, and NO2, percentage of tree canopy coverage, education level, GDP, population, and average travel time to work, analyzing regression functions for each pollutant type with these variables. Our results show a negative correlation between tree canopy coverage and air pollutants. We found tree canopy coverage to be a statistically significant factor in relation to the levels of PM10, O3, and NO2. As the level of tree canopy coverage increases, these three dependent variables were found to decrease. Though this is a preliminary study, further research should be done on this topic to fully understand the role our environment plays in helping combat pollution. The reduction of air pollutants is important to help humans live healthier lives and separate themselves from the potential health risks it causes.

## The Effect of Immigrant Discrimination on Wages in the United States (Poster)

Sarah Gehres and Quynh Truong
Faculty Mentors: Marc St-Pierre (Economics) and Tao Song (Economics)

In the United States, workplace discrimination on the basis of immigrant status is reflected in multiple ways. Although abundant research has been conducted on these forms of discrimination, this research seeks to empirically test the effect of workplace discrimination on the earnings of immigrant employees, which is important to highlight, mitigate, and ultimately reduce the barriers to fair workplace practices faced by immigrants. We approach the problem from the perspective of wage discrepancies. Our research design focuses on cases of employees with similar education levels and occupations and relies on pooled-cross section data from the American Community Surveys (ACS) and U.S. Census data over the years 1980 to 2020, which we analyze by comparing the wages of immigrants to nonimmigrants in the same fields. Results show that immigrant discrimination creates wage disparities by lowering the wages of immigrant workers regardless of an individual's education level or marital status. However, results interestingly show that at the same English proficiency levels, wages are expected to be higher for immigrants in comparison to non-immigrants. These results have broader implications of informing policies aimed at creating equitable and inclusive work environments for immigrants.

## The Effect of Education on Sleep (Poster)

Jaxson Harbour and Katherine Petty
Faculty Mentor: Bradley Sturgill (Economics)

Sleep is an underestimated component of one's lifestyle yet crucial in order to maintain overall well-being. Our study actively helps to understand the relationship between education and sleep, specifically how one's education levels affect their amount of sleep per night. The extensive literature includes studies that discuss demographics and sleep patterns. Data from the National Health Interview Survey (NHIS) that we accessed through the Integrated Public Use Microdata Series (IPUMS) website from years 2002-2022 has allowed us to incorporate factors such as age, race, number of kids, sex, family income, marital status, and employment status into our model. IPUMS presents pooled cross-sectional data with variables presented in a dta format, which allows for statistical analysis using Stata. Findings show an increase in education correlates to shorter sleep durations, influenced by factors such as work-related stress and health. From our regression analysis, we found that individuals who classified themselves as never married obtained an additional 0.32 hours of sleep per night, which was more than any other category in the data. In contrast, employed individuals obtained a decrease of about 0.33 hours of sleep per night, which was the largest decrease of any variable in the regression. Additionally, all the variables in the regression were found to be statistically significant at the 10% and 5% level except for those who identify as Asian and individuals who received a middle school education.

## The Impact of Economic Freedom on Happiness (Oral Presentation)

Jacob Herron
Faculty Mentors: Aaron A. Elrod (Economics) and Marc St-Pierre (Economics)

I explore the cross-country differences in economic freedom to examine the link between the magnitude of economic freedom and subjective well-being. Using the World Happiness Report's happiness dataset, the evidence suggests countries with a higher level of economic freedom, encompassed by The Heritage Foundation's measurements of rule of law, government size, regulatory efficiency, and openness of markets, have significantly higher self-rated measurements of well-being. After controlling for happiness covariates such as income, unemployment, healthcare, and wealth inequality with a fixed effect model, the effect of economic freedom on cross-national happiness is statistically significant. Furthermore, panel data analysis reveals that different types of economic freedom are associated with varying increases or decreases in subjective well-being despite general economic freedom having a positive effect. Variations in coefficients among economic freedom subcategories suggest that some freedoms may need to be diminished or further expanded.

## The Effect of Weather on Mental Health in the United States (Oral Presentation)

Nadia Hobeika
Faculty Mentor: Bradley Sturgill (Economics)

Mental health is on the rise as one of the most important issues around the world, especially in the United States. The decline of mental health handicaps the daily functions of many people, and the reasons behind mental health issues vary greatly. There is insufficient research, however, about the effect of weather on mental health, yet society often associates different weather forecasts with positive and negative moods. I approach this issue by estimating the effects of temperature and precipitation on self-reported mentally unhealthy days. My research uses 11 years of county-level data in the United States, and I analyze the effects of weather on mental health using a pooled OLS regression and a panel regression with fixed effects. Results show a positive correlation between temperature and mentally unhealthy days and a negative correlation between precipitation and mentally unhealthy days, and both relationships are curvilinear. When a dummy variable estimating the level of ruralness in a county is added, an increase in temperature is associated with improved mental health for urban populations and decreased mental health for rural populations. The observed negative relationship between precipitation and mentally unhealthy days stands with or without the dummy variable. Though there are many variables that affect mental health, the implications of the effects we observe prove the underlying power of weather and the lack of control we have regarding the state of our mental health.

## The Effect of Economic Growth on Commercial Property Valuation (Poster)

Edvard Hussell and Robert Sherrill
Faculty Mentor: Bradley Sturgill (Economics)

Although the valuation of commercial property is recognized as an important economic indicator, a more in-depth connection between economic growth factors and it are less explored. This study addresses this concern as it specifically explores the impact of metropolitan economic growth on commercial property prices. We conducted an econometric analysis of the top twenty-five U.S. metropolitan statistical areas using a robust regression model. The research is based on the most comprehensive datasets available and correlates with robust standard errors to correct for heteroscedasticity. The results have shown that our hypothesis was correct and there is statistically significant evidence of economic growth impacting commercial property valuation.

## Effect of Foreign Investment on Economic Growth in Developing Countries (Poster)

Ahmad Ijaz and Roberto Ferrey
Faculty Mentor: Bradley Sturgis (Economics)

This paper addresses the impact of Foreign Direct Investment (FDI) on the economic growth of developing countries, analyzing data for 27 countries, including Bolivia, Guatemala, India, Indonesia, Nicaragua, Pakistan, Venezuela, among others. The paper explores this relationship with a number of covariates, such as investment gaps, institutional quality, employment opportunities, and population growth. Existing literature reveals numerous perspectives on FDI's impact. Alfaro et al. (2016) and Borensztein et al. (2017) state that FDI inflow can stimulate economic growth, provided that it is dependent upon the financial markets and human capital development of host countries. Sylwester (2006) and Foster-McGregor et al. (2017), with a more conservative perspective, add that the results are uneven and depend on the financial quality and governance system of the host country. Durham (2014) and Eapen (2012) focus on sector-specific impacts of FDI, expressing that manufacturing sectors experience more significant benefits compared to non-manufacturing sectors. Our conceptual framework observes the role of FDI in bridging investment gaps, enhancing labor markets, and improving institutional quality and governance. Our empirical model uses data from the period 2002 to 2021, where panel regression models are fitted to determine the effects of FDI on the economic growth for the selected countries. The model utilizes numerous variables representing investment, savings rate, unemployment, and institutional quality to provide an understanding of FDI's impact on economic development. Our paper aims to contribute to the existing literature on the benefits and challenges of FDI for developing countries, mainly to understand the variables that portray the effectiveness of FDI in promoting the economic growth of these countries through panel regression analysis.

## The Housing Divide: A Comprehensive Analysis of Income Inequality and Its Consequences on Affordable Housing in the United States Counties (Poster)

Ellie Johnson, Tim Cook, and Fernando Totti
Faculty Mentor: Marc St-Pierre (Economics)

American counties have experienced an increase in rents and a rise in income inequality over the past decade. Can this rise in income inequality explain worsening housing affordability? This question has been and continues to be a relevant topic in today's housing market. An astonishing number of Americans are under rental burden and even extreme rental burden. We are approaching the link between income inequality and housing affordability by analyzing a year-fixed effect longitudinal model using demographical, inequality, and housing data from United States counties. Our research design focuses on the Gini coefficient, a measure of inequality, and its effect on housing affordability measured by the rent-to-income ratio. Results from our model show that a .1 increase in the Gini coefficient results in a 1.76% increase in households paying more than 30% of their income toward housing and a 2.87% increase in households paying more than 50% of their income toward housing, but these results are not statistically significant. This seems to suggest that when there is an increase in inequality, housing becomes less affordable.

## An Analysis on the Effects of Air Pollution on Adult Asthma Cases Across the U.S. (Poster)

Grayson Maddox, Jack Curtis, and Chad Farler
Faculty Mentor: Bradley Sturgill (Economics)

Living in America, everyone agrees that human activities have significantly impacted our environment, leading to dangerous forms of air pollution and causing myriad negative health effects which affect nearly 120 million Americans annually. However, when it comes to the specific question of whether this ambient air pollution affects asthma prevalence here in the U.S, we currently know very little. This paper aims to explore that relationship, focusing on the impact of ambient air pollutants like $PM_{2.5}$. We hypothesize that particulate matter and the prevalence of asthma are positively correlated. Our research relies on data from the CDC's National Environmental Public Health Tracking Network and The University of Wisconsin Population Health Institute, which we analyzed using a multiple linear regression populated by panel data from the years 2018-2021. Our results show that in multiple years during that time, particulate matter, specifically levels of $PM_{2.5}$, had effects on asthma prevalence that were statistically significant at both the 5% and 10% levels. The implications of these results are significant in more ways than just statistically, as statistical significance on the positive coefficient of our particulate matter variable means that these air pollutants are causing real and viable increases in the frequency of asthma cases across America today.

## The Effect of COVID-19 on Excessive Drinking (Poster)

Sheppard McVey, Caroline Cobb, and Martha Milek
Faculty Mentor: Bradley Sturgill (Economics)

The novel coronavirus (COVID-19) pandemic irrevocably transformed personal interactions, business operations, and government policies. Although research questions are abundant concerning the relationship between COVID-19 and economic factors, very few focus on the relationship between COVID-19 and alcohol consumption. We explore this relationship by examining the effect of COVID-19 on excessive drinking at the county level. Our excessive drinking data as well as our control variables come from the County Health Rankings (CHR) database created by the University of Wisconsin Population Health Institute. Data on COVID-19 cases come from the *New York Times*. These two sources allow us to create a county-level panel data set over the period 2020-2023. Results from a simple linear regression show a small but significantly positive correlation between average monthly COVID-19 cases and excessive drinking. However, after controlling for other determinants of excessive drinking, the significant relationship disappears.

## The Effects of State Regulations and Consumer Demographics on Marijuana Revenue in Legalized States (Poster)

Hailee Rains and Evangeline Bournias
Faculty Mentor: Marc St-Pierre (Economics)

Marijuana legalization is a controversial topic in the legal realm, with arguments both for and against recreational and medical use. States are given full discretion to legalize or ban the substance, the latter of which is still the popular choice, however, many states are slowly opening up to the idea of allowing widespread access to or, at a minimum, decriminalization of marijuana. With some states leading the charge toward full legalization just as recently as this year, little is known about the determinants of the revenue generated from marijuana sales after legalization. Using state level data post legalization, we examine the role of state-specific regulations and consumer demographics on marijuana sales in the legal market via a regression analysis. The results can be used to estimate the value of this industry in other states as well as the role legalization plays in the US economy as a whole.

## Art as an Investment: How the Stock Market Affects Art Auction Sales (Oral Presentation)

Georgia Ranson
Faculty Mentor: Marc St-Pierre (Economics)

New investment vehicles capture the attention of individuals looking to grow their portfolio. Art, although timeless, has recently entered the financial game and therefore, does not have ample research to support or oppose it as a plausible investment strategy. This paper analyzes the impacts of different sectors of the stock market on art prices sold at auction in order to correlate art with macroeconomic performance. The research design focuses on the financial, real estate and technological sectors as well as the top 100 pieces sold at auction. Preliminary results, using daily data from FRED and Artprice, suggest that the real estate sector has a statistically significant negative relationship with art prices, indicating that investors view art and real estate as substitutes. However, I find no statistically significant relationship with the other sectors.

## The Effects of Minimum Wage Increases on California's Total Employment (Poster)

Jack Reams and Douglas Clements
Faculty Mentor: Bradley Sturgill (Economics)

The discussion between economists regarding the effect of raising minimum wages on employment remains a highly debated field. While much research suggests that an increase in minimum wage will negatively affect employment, there are more recent and historic studies that innovate this common conclusion. California remains a unique and highly relevant state within this debate due to its many minimum wage increases over the last couple of decades. Given California's wide range of local minimum wage mandates that are most relative to low wage workers, analyzing the food services industry provides the most relevant and widely applicable effect of the increases in minimum wage on employment. Using panel data from 2001-2020 from seven different California counties, our model regressions show a slight positive correlation between minimum wage and food service employment. Results from our model could be used to better understand and predict the labor market effects of increasing the minimum wage nationwide.

## Viticulture and Climate: How Will Wines and Wallets Be Affected by Climate Change (Poster)

Hawkins Schnabel and Katherine Popp
Faculty Mentors: Marc St-Pierre and Aaron Elrod (Economics)

Viticulture, the growing of wine grapes is an industry that is valued globally. In recent years agriculture as a whole has been threatened by climate change. This is especially the case for viticulture due to its sensitivity to changes in weather. The economic impact of climate change on the wine industry has been studied extensively across both Europe and South America. But even with growing regions touching every corner of the world, little is known about its impact on California's wine industry. According to Wine Folly, the US is currently the third largest wine producer globally, and California accounts for nearly 95% of US grape growth, making its grape production integral to the global wine industry, but especially to California residents. Many economists who study these issues only look at singular counties or small groups of vineyards, leaving room for possible bias in their models. Additionally, they mainly focus on weather's implications on vineyard profitability and yield, rather than assessing its impact on residents in the area. This is why we are examining all wine-producing counties across California with the hopes of capturing a more accurate understanding of climate change's impact on a key wine-producing industry and specifically its residents. Our research design focuses on connecting changes in weather to grape production at the county level, and how that will affect household income in the area. Our results not only shed light on the importance of prime weather conditions for grape production, but also the importance viticulture has on California's wine producing communities.

### Impact of Financial Literacy on Personal Investment Decisions (Oral Presentation)

Mian Ahmad Shah
Faculty Mentor: Bradley Sturgill (Economics)

In the current complex financial landscape, the role of financial literacy in shaping investment decisions becomes crucial. This study looks into the influence of financial knowledge on the diversity of personal investment decisions. Utilizing data from the National Financial Capability Study, our analysis applies a strong methodological framework through the use of a linear regression model in parsing the effects of financial literacy, demographic attributes, and psychological attitudes on investment behaviors. The results show that financial literacy is positively related to investment decision-making at a statistically significant level. The individual decision-maker with a high score of financial literacy makes diversified choices in investment decisions. This association persists even after controlling for a host of relevant factors including age, gender, income, and education. Furthermore, psychological attributes such as risk tolerance and financial confidence also show significant positive effects, underscoring their role in investment strategies. These findings have substantial implications for policy formation, financial educational programs, and individual financial planning suggesting that better financial literacy can help with better investment decision-making. The research contributes to the broader discourse on how financial knowledge can underpin sound financial behavior, yet it acknowledges potential limitations related to causality and omitted variable biases.

## The Effect of NCAA Division I College Football on Housing Prices (2000 - 2020) (Poster)

Brennan Singer and Hunter Jones
Faculty Mentor: Bradley Sturgill (Economics)

This comprehensive research delves into the intricate relationship between NCAA Division I college football success and housing prices in the towns where universities are situated from 2000 to 2020. Through our empirical analysis, we uncover compelling insights into the economic dynamics driven by college football fans. The study finds a significant positive correlation between a team's winning percentage and housing prices, showing the impact of collegiate athletics on local economies. Furthermore, the research underscores the role of per capita income in driving housing market competitiveness, while population dynamics and unemployment rates show adverse effects. This research is crucial for real estate agents, locals, economists, policymakers, and other stakeholders. It provides actionable insights into the complex relationship between college football success and housing market trends. It enables informed decision-making regarding college towns' investments, urban planning, and economic development strategies.

## Effect of Population Density and Income on Housing Prices in Developing and Developed Economies (Oral Presentation)

Pratham Singhal
Faculty Mentor: Marc St-Pierre (Economics)

The expansion of metropolitan areas and their impact on housing prices is a critical issue, yet there remains a gap in understanding the interplay between population density, household income, and housing prices across different global economic contexts. This research delves into this gap, focusing on the effects of these variables on housing prices in developing and developed countries. Utilizing a hedonic pricing model, the study analyzes data from over 140 cities, incorporating variables such as income, population density, and transportation costs. The findings reveal that median household income and population density significantly influence housing prices, with notable differences between economic contexts. This research not only contributes to the existing body of knowledge but also offers insights for policymakers addressing housing affordability and urban development challenges.

## Exploring the Effect of Food Deserts on Obesity (Poster)

Ryan Stafford and Theo Becker
Faculty Mentor: Marc St-Pierre (Economics)

Food deserts, regions with limited access to affordable healthy foods, present an important public health problem in the United States. There is a large quantity of research on food deserts and obesity, but there is not one that is as specific and as extensive as the one in this research. We collected the detailed effects of food deserts on obesity, for every county in the United States, while controlling for multiple variables to show the detailed specific effects of food deserts on Obesity. This will allow us to make better decisions about public health. The design focuses on these cases using panel data from 2014-2023, which we analyze with a fixed effects regression model. The research examines the relationship between limited access to healthy foods, measured by the Food Environment Index (FEI), and adult obesity prevalence. Controlling for variables such as adult smoking, unemployment, and physical inactivity, the empirical model reveals a statistically significant negative correlation between FEI and adult obesity rates. Specifically, a one-unit increase in FEI causes a decrease in adult obesity of approximately 0.18 percentage points. These findings can underscore the importance of access to healthy food options in combating obesity with public health policies. However, this variable is statistically significant at all significance levels. The study shows valuable insights between food environments and obesity, highlighting the need for interventions/public health policies to improve access to nutritious foods in communities of need.

## The Effect of Urban Tree Canopy Cover on Air Pollution (Poster)

Emily Tindal and David Edge
Faculty Mentor: Marc St-Pierre (Economics)

The role of green spaces in our cities has a direct impact on a citizen's health and quality of life. Trees are known to play a role in the production of the air we breathe, the goal of this study is to assess the significance of this idea in relation to pollution. This study aims to assess the effect of tree canopy cover on CO, PM10, PM2.5, O3, and NO2 levels in urban environments. Air pollutants spark the creation of a plethora of unnecessary problems, including increased health risks and environmental harm. The goal of our research is to determine if increasing the space allowed for tree growth in cities could be the solution to reversing pollutant spread. We aim to determine the impact of tree canopy coverage on the level of air pollution found in urban environments. We approached this problem by accumulating data from 50 different U.S. cities between 2013-2022. We collected panel data on air pollutant types CO, PM10, PM2.5, O3, and NO2, percentage of tree canopy coverage, education level, GDP, population, and average travel time to work, analyzing regression functions for each pollutant type with these variables. Our results show a negative correlation between tree canopy coverage and air pollutants. We found tree canopy coverage to be a statistically significant factor in relation to the levels of PM10, O3,

and NO2. As the level of tree canopy coverage increases, these three dependent variables were found to decrease. Though this is a preliminary study, further research should be done on this topic to fully understand the role our environment plays in helping combat pollution. The reduction of air pollutants is important to help humans live healthier lives and separate themselves from the potential health risks it causes.

### Effect of Innovation on Economic Growth Rates (Poster)

Hamza Zia, Decorian Bowers, and Yuqin Wang
Faculty Mentors: Bradley Sturgill (Economics) and Marc St-Pierre (Economics)

The relationship between innovation and economic growth is widely acknowledged as crucial for global prosperity, yet understanding the nuances of this connection remains a challenge. This study delves into this intricate relationship, focusing on how different forms of innovation influence economic growth rates. Employing cross-section regression research design, we analyze real GDP per worker data from the World Bank, patent data from the World Intellectual Property Organization, and regulatory quality indicators from the Worldwide Governance Indicators. Our approach seeks to shed light on the impact of innovation's scale and its broader implications for economic development. Results from our analysis reveal several key findings. Our findings underscore the importance of patent filings as indicators of innovative output, although their direct impact on GDP growth rates may be limited. Furthermore, we demonstrate the critical role of regulatory quality in fostering economic growth, emphasizing the need for a conducive environment for innovation and entrepreneurship. These results have broader implications for policymakers and businesses seeking to harness the power of innovation for economic development. By understanding the factors driving innovation and their impact on growth, stakeholders can tailor strategies to foster innovation ecosystems conducive to sustainable economic advancement.

# ENGLISH

### “His Sybaritic Privacy”: How Mr. Compson Lost His Body in *Absalom, Absalom!* (Oral Presentation)

Meridith Frazee
Faculty Mentor: Heidi Siegrist (English)

In criticism of William Faulkner's novel *Absalom, Absalom!*, one narrator is often singled out as a failure. Mr. Compson admits, after all, that “nothing happens” when he uses the correct "proportions" (80) to tell a story about Charles Bon and Judith Sutpen. However, more than enough happens when he concentrates on the homoerotic possibilities between Bon and Judith’s brother. Compson’s ambivalent fixation on this aspect of the story causes him to treat his narration as an abstract closet for repressed desire. He exists in Absalom more as a voice than a body, which is strikingly fragmented: just a hand, two feet, a “linen leg” (71, 168). This, in my reading of the novel, is because the closet absorbs and transforms him. As his closet is a narrative space (I will call it a “storyworld”), it has a complicated relationship to authority. The narrator is trapped in it, but they design it; they are the ruler of a fantasy realm, but can't control the ambiguities and entanglements that arise in it. The details of these dynamics are illuminated by comparison of the storyworld with the blueprints of a house designed for twentieth-century entertainer Josephine Baker. Her similarities with Bon show the importance of ambiguous identity to the construction of desire-based imaginary worlds, and the house’s architecture enables description of storyworld surfaces that reflect desire. This world Compson creates is powerful. In a specific way he does not fail, if a critic recognizes his narration as a complicated closet.

### From Definition to Salvation: The Desires of Etiology and Allegory in *Piers Plowman* (Oral Presentation)

Sebastian Hobday
Faculty Mentor: Stephanie Batkie (English)

The narrative of William Langland’s *Piers Plowman* often operates through two distinct narrative forms: allegory and etiology. The various moments of etiology across the poem each reveal themselves to contend with the text’s allegory. In fact, the allegorical mode of reading Piers has long been the standard for critics from the medieval to the present. This conflict results from a fundamental clash between what I have called allegorical possibility and etiological desire. The central goal of Langland’s etiological scheme is the anxious demystification of obscured salvific and economic networks. In his efforts to fight these forms of mystification, Langland is attempting to satisfy the normative teleological desire of etiological narrative. For this, he adopts what I have named the personification machine as a demystifying narrative

device. The allegorical possibility of the personification machine becomes increasingly threatened by etiological desire which aims to adopt this machine in order to naturalize the artificial material conditions of 14th century England through originary narrative. This paper will progress chronologically through the poem from definition to stratification to failure as the conflict between these two narrative desires becomes more dire and the author adopts increasingly drastic mechanisms to maintain the integrity of the poem's etiology. Ultimately I will argue that as the narrative of *Piers Plowman* progresses the personification machine breaks down and the poem becomes an etiological success and an allegorical failure.

### Femininity as an Agent of Destruction in Chaucer's *Troilus and Criseyde* (Oral Presentation)

Kate Jones
Faculty Mentor: Matt Irvin (English)

Geoffrey Chaucer's *Troilus and Criseyde* delves into the intricacies of courtly love amidst the backdrop of war, offering a profound exploration of gender performance, and the ramifications when these performances deviate from expectation. The role of femininity, particularly embodied by Criseyde, acts as a catalyst for change within the narrative. Criseyde's performance of femininity disrupts the traditional gender expectations, directly influencing how Troilus constructs his own masculinity, and unveiling the complexities of gender roles in medieval society. Despite being relegated to subsidiary roles because of her gender, Criseyde maintains her agency even as she navigates the societal pressures and expectations as both a woman of the court, and an object of courtly affection. Her status as a childless widow affords her a unique position to challenge gender norms, highlighting the performative nature of femininity and its impacts on personal agency. Subsequently, Criseyde's performance of femininity often intersects with themes and actions of desire and violence: Troilus's immediate attraction to Criseyde initiates a cycle of desire and destruction, revealing the inevitable intersection between eros and the death drive. Criseyde's prioritization of survival over romantic ideals drives her actions, ultimately leading to Troilus's demise and the fall of Troy. Her departure from traditional gender roles disrupts the reproductive futurism that is expected of her, challenging societal expectations of women's roles in the romantic genre. Through her queered performance of femininity, Criseyde emerges as an agent of resistance against heteronormative structures, reshaping the narrative's trajectory and leaving a legacy of desire and destruction in her wake. Her role as an agent of destruction illuminates the transformative power of gender performance in shaping individual narratives and challenging established norms. The femininity of Criseyde intimately affects the characters around her, especially Troilus, leading him toward a performance of gender and desire that cannot end in any way that deviates from the record of Criseyde's last relationship—childless and alone—, marking her as a symbolic angel of death that leaves behind a murky wake of interwoven desire and destruction.

## Revealing the Flesh: Transgression, Transformation, and Sacrifice in "The Physician's Tale" (Oral Presentation)

Laura Jane Kemper
Faculty Mentor: Matthew Irvin (English)

Throughout its history of scholarship, Geoffrey Chaucer's "The Physician's Tale" has been called a failure. This is due to its inept handling of a number of narrative aspects; specifically its confusing, paradoxical discussions of virtue and its incompatibility with the source material: Livy's "Ab Urbe Condita." However, the tale's failures should not lead readers to reject it outright or disbar it from thoughtful critical analysis. Instead, the very act of transformation from political to moral narrative should be examined, and the failures of the text should not be placed solely on Chaucer's shoulders, but should be measured against the inconsistencies of Christian morality as a whole. No matter how Chaucer attempted to portray Virginia, as long as her character was imbued with medieval Christian values of virginity and virtue, it would have been a failure: the limits they place around female expression and futurity forcing her into oppressive, commodified modes of being incompatible with her transgressive existence. Utilizing the framework laid out in Georges Bataille's 1957 text, *Eroticism: Desire and Sensuality*, I explore the failure of "The Physician's Tale" as an unavoidable consequence of Christianizing the story and martyring Virginia—as a failure that stems from Christian ideals of female virtue and the ways in which they deny the transgressive and erotic potential of death, specifically sacrificial death.

## The Hound and the Bull: How Is the *Táin Bó Cuailnge* Representative of the Irish Iron Age? (Oral Presentation)

Finn Vickrey
Faculty Mentor: Matthew Irvin

This independent study paper discusses the text of the *Táin Bó Cuailgne*, an Irish epic from the Ulster cycle that had been passed down orally for centuries in the Celtic tradition before being transcribed by English Christian settlers in the Medieval Age. While being a fictionalized account of the Irish Iron Age, the *Táin* provides a glimpse into the social and cultural dynamics of Ireland at the time, especially regarding the regional and tribal differences found between the Ulaid and Connachta kingdoms who battle against each other in the text. The *Táin* also contains supernatural phenomena such as the Celtic pantheon, the fae, and Druidic prophecy, all of which contribute to the Celtic "identity" which is shaped by folklore such as this. The Ulster cycle in particular is heavily location-based, and attributes the names of many historical landmarks to the supernatural events that occur in its stories. This paper highlights the importance of Irish folklore in the early forms of oral tradition and Medieval transcription as a means of preserving cultural history. Little to none of Irish history is documented in a literary form due to a reliance on oral

preservation over the written word, which was a Druidic tradition, so what is available today as a means of understanding the cultural and social dynamics of Iron Age Ireland can be found in folklore. This paper also dissects the key characteristics of Irish folklore and the *Táin* in comparison to other mythological works created at the time, especially those which indicate its original oral composition such as its utilization of both poetry and prose. Finally, there is a connection drawn between the social hierarchy found within the *Táin* and archaeological evidence found in Ireland of tribal kingdoms and the unification of groups under Druidic religious and storytelling practices.

### Paternalism to Paternity: The Modern Southern Gentleman in the American South (Oral Presentation)

Richard Alan Waters
Faculty Mentor: John Grammer (English)

As William Faulkner often does, his bildungsroman, *The Unvanquished*, spotlights a dilemma in the old social hierarchy of the American South. The Southern Gentleman, an aristocratic figure whose principal role was to prevent chaos from engulfing his community, finds himself in a present that rejects him. However, Faulkner, through his main character, Bayard Sartoris, introduces the potential for a revised version of the Southern Gentleman who can exist in the contemporary. Found in a place where he no longer belongs, the Southern Gentleman, a man derived from the Chivalric Tradition who historically was considered the patriarchal figure of his community, transforms into a man with compromised masculinity, ironically allowing him to become a paragon of fatherhood. This project investigates the Southern Gentleman's shift from patriarchal to paternal by analyzing Harriett Beecher Stowe's *Uncle Tom's Cabin*, Harper Lee's *To Kill A Mockingbird*, Walker Percy's *The Last Gentleman*, and William Alexander Percy's autobiography *Lanterns on the Levee* as means to begin uncovering the complicated nature of gender and its strange relationship with authority in the American South.

## ENVIRONMENT & SUSTAINABILITY

### Having Your Cake and Eating it Too?: An Economic Analysis of the RGGI Cap and Trade System (Oral Presentation)

Rex Hallow
Faculty Mentors: Aaron Elrod (Economics) and Patrick Gauding (Politics)

Greenhouse gas emissions continue to cause climate change. In the US, 25% of greenhouse gas emissions come from the energy sector. In order to combat this, regulatory authorities implement a variety of policies. One such policy is the Regional Greenhouse Gas Initiative (RGGI), which uses a cap and trade system to reduce emissions. Not only have emissions decreased in the region, but I test the theory that consumer energy prices also have decreased as a result of the

policy. In this study, I conduct a difference in differences analysis of consumer energy prices in four sectors. I use the RGGI region as a treatment group and the rest of the continental United States as the control group. Additionally, this study conducts an analysis of leakage as a result of the policy. The results suggest that prices have decreased in the RGGI region by between 6 and 15%. However, the results also suggest that leakage in the region increased by about 15%. This study provides important information about the efficiency cap and trade systems. Further research is needed to provide a way to relate leakage and consumer energy prices.

### How do Civil Society Organizations Work with Cambodian Fisher Communities to Respond to Hydropower Development on the Mekong River? (Oral Presentation)

Tuyen Le
Faculty Mentors: Amy Patterson (Politics) and Eric Keen Ezell (Environmental Studies)

A series of hydropower dams in the upstream Mekong River has transformed the environment and negatively impacted the livelihood of Cambodian fisher communities. In this situation, nongovernmental organizations (NGOs) of Cambodia's civil society engage with the affected communities to respond to the impacts. While these NGOs are widely celebrated and valorized, not much is known about how effective their work and engagement with communities is. In an ethnographic fieldwork to 6 Cambodian fisher villages, I sought to answer this question. I explore the use of "buzzwords" by NGOs and communities to adapt to a restrictive, undemocratic political context of Cambodia, and to appeal to donors who are attracted to a doctrine of sustainability and empowerment that do not necessarily respond to the needs of Cambodian fishers. This research contributes to the literature on civil society in the context of transboundary river conflict, which has increased in prevalence as a result of rampant development and climate change.

## ENVIRONMENTAL STUDIES

### Analyzing the Shift in Livelihood in the Amboseli Ecosystem as a Result of Climate and Drought (Poster)

Greta Bonomo
Faculty Mentor: Richard Kiaka (School for Field Studies, Kimana, Kenya)
Sewanee Faculty Sponsor: Jennifer Michael (English/Environmental Arts and Humanities)

Among the many manifestations of global climate change, drought has been burdening the semi-arid lands of Kenya. Pastoral communities, such as the Maasai, face vulnerabilities to the

drought due to livestock death. Livestock in Maasai land is seen as both a source of livelihood and an economic asset. Communities often exercise agency to adapt to these vulnerabilities in order to sustain their current livelihood outcomes; however, some of these adaptations include taking desperate measures which are not always sustainable. This paper draws on 150 household surveys conducted within the former Kimana group ranch in order to analyze how Maasai pastoralists adapt to the consequences of drought by changing their livelihoods to agriculture. Our analysis showed a significant trend in people switching from pastoralism to agriculture. Our data also showed that people who received income from agriculture were more likely to not rank conservation as their preferred land use option. Consequently, this paper argues that as prolonged droughts become more common people switch to agricultural land use. Agriculture as a land use option is incompatible with the current community conservancy model and poses a threat to conservation in the Amboseli ecosystem. Thus, this paper calls for intervention in order to alleviate the vulnerabilities that Maasai pastoralists face and promote non-agricultural livelihood changes.

### Increased Breaching by Humpback Whales During Storms (Poster)

Violet Giglio
Faculty Mentor: Eric Ezell (Environmental Studies)

Breaching is an energetically expensive behavior, and various hypotheses have been proposed to explain it. One hypothesis is that breaching and other robust surface behaviors serve as a means of communication in noisy conditions. However, the evidence for this is limited. We tested for a relationship between humpback breaching and other robust activities during rough weather in a feeding habitat in coastal British Columbia, Canada. Data collection consisted of shore-based whale surveys that took place in varying weather conditions, including storms with high ambient noise, during the years 2017-2023 in the traditional waters of the Gitga'at First Nation (Kitimat Fjord System). These surveys yielded 8,247 sightings of humpback whales over the course of 3,644 20-minute systematic scans, 18% of which occurred in Beaufort Sea State 3 or higher. For each scan we calculated the effective detection range, allowing us to compare detection rates across sea states. We found that robust surface behaviors increased with Beaufort Sea State. Detection rates for inconspicuous behaviors such as resting dropped precipitously as sea state increased, as expected. In contrast, breach detection rates increased by nearly six-fold between Beaufort 1 and 4. These findings are consistent with the hypothesis that whales use loud surface sounds in order to maintain social contact in noisy conditions, and may be indicative of humpback whale sensitivity to anthropogenic disturbance in this feeding area. If so, we hypothesize that robust behaviors will become an increasingly common behavior when new shipping projects become operational in this habitat.

# FINANCE

### Short-Term Investing Strategies: Navigating Market Optimism, Leveraging Price Momentum, and Earnings Growth (Poster)

Temi Adejumobi and Addison Baugh
Faculty Mentor: Huarui Jing (Finance)

This paper presents the research methodology, results, and returns analysis of a five stock investment portfolio that has been strategically managed during a holding period from January 18th to April 7th. The aim of this research is to illustrate a potential strategy for maximizing risk-adjusted returns. In managing the portfolio, we employed multiple portfolio management techniques, such as the Capital Asset Pricing Model (CAPM), Modern Portfolio Theory (MPT) and Arbitrage Pricing Theory (APT). Anticipating a market climate driven by economic fundamentals and diminishing U.S. inflation, our approach centers on maximizing risk adjusted returns through selecting equities possessing strong price momentum and potential for earnings growth. In constructing the portfolio, factors such as financial fundamentals, peer comparison and systematic risk were considered. As the the S&P 500 reached record highs in Q1 ‘24, we expect to achieve a favorable return given current market and firm-specific factors outlined in our research.

### Riding the Bull: A Different Approach to Value Investing (Oral Presentation)

George Cheynet
Faculty Mentor: Huarui Jing (Finance)

This project aims to craft a portfolio consisting of 5 US stocks that maximizes returns while controlling for risk. The objective of this project is to outperform the S&P 500 returns between January 2024 and April 2024. Despite the many investment strategies employed by major institutions, experienced investors, and individuals like myself, I will focus on a value investing approach specifically within the Tech, Healthcare, and Financial sectors. This value approach will utilize investing in high revenue generating (high earnings growth) yet potentially “overvalued” publicly traded companies. This strategy will employ various financial models and pricing theories, including CAPM, Markowitz Portfolio Theory, and Arbitrage Pricing Model, to predict asset prices and optimize returns for the portfolio. The project’s findings will illuminate an alpha focused strategy that can be employed when investing significant capital into a small portfolio of equities.

## Beat the Benchmark: Leveraging Large-Cap Technology Stocks in an AI-Centric Portfolio to Outperform the Invesco S&P 500 Equal Weight Tech ETF (RSPT) (Poster)

Isabella Francois and Mary Lewis Tunno
Faculty Mentor: Huarui Jing

This paper presents an AI-centric portfolio approach to outperform the Invesco S&P 500 Equal Weight Tech ETF (RSPT), an investment fund designed to reflect the performance of the S&P 500 Equal Weight Technology Index. Our strategy integrates the robust historical performance of large-cap technology stocks with the growth potential of companies leading the Artificial Intelligence and Cloud Computing sector. Our intensive firm-specific analysis, use of portfolio theory, and evaluation of each stock's beta allow for a calculated weight allocation that will allow us to maximize returns and meet our investment goals. Furthermore, employing the Capital Asset Pricing Model (CAPM) allows us to estimate portfolio returns and analyze systematic risk factors. This adaptive strategy provides valuable insight for investors navigating evolving market and technology landscapes, showcasing the advantages of investing in an emerging sector. Our Beat the Benchmark approach aligns with our investment objectives, leveraging large-cap technology stocks to surpass the Invesco S&P 500 Equal Weight Tech ETF while offering guidance to investors seeking innovative investment approaches amidst technological advancement.

## Inelastic Investing: Building Economic Resiliency Through a Healthcare-Centric Portfolio (Poster)

Sophia Fucci and George Mabry
Faculty Mentor: Huarui Jing (Finance)

This paper introduces an approach to building a healthcare-centric portfolio that can be implemented by investors to achieve consistent returns with the potential to beat the S&P 500 by 9%. The Healthcare industry is considered a defensive investment which means it is less sensitive to the events of the business cycle. This is a green flag as the economy is expected to cool to a GDP growth rate of under 1% in Q3 and Q4 this year. Given that the Healthcare industry has historically returned 15% on average during a slowdown period, we are aiming to outperform the S&P 500 by at least 9%. Our research will be used as a guideline for investing in healthcare by using Portfolio Theory, CAPM, and the Fama French Three Factor Models to control for risk while attaining maximum returns according to historical and projected returns. While taking into account important macroeconomic information and thorough data analysis, this paper will outline the proper steps to investing in this inelastic sector to increase portfolio performance and add stability.

## Optimizing the Sharpe Ratio: Managing Systematic Risk and Macroeconomic Trends for an Artificial Intelligence Portfolio (Poster)

Payne Gridley and Jack Roode
Faculty Mentor: Huarui Jing (Finance)

We are choosing to create a strategy based around optimizing the Sharpe ratio to achieve our goal of creating a risk management portfolio. By leveraging modern portfolio theory, this project looks to balance the risk to reward ratio through our optimal weights. Using the capital allocation line and minimum variance frontier, we will be able to find our optimal weights based which best suits our risk averse portfolio. Since our portfolio size is small we need to focus on managing systematic risk and the current and historical macroeconomic trends. We specifically are focusing on AI technology stocks and the specific sectors with the vast technology space. Through deep firm specific analysis, we believe that our portfolio has the ability to outperform the market. We are using the Sharpe Ratio of the market index and well as technology centered index funds to evaluate the performance of our portfolio. Ultimately, this will give a better understanding of how to manage the systematic risk of our portfolio. This research will help further the conversation of optimizing investment strategies in unpredictable and volatile markets.

## Quarterly Quest: Navigating the 2024 Q1 Business Cycle and Seasonal Stock Selection amid Uncertain Macro-Economic Indicators (Poster)

Greg Ix and Phelps Thomas
Faculty Mentor: Huarui Jing (Finance)

For this paper we will be explaining our decision making process and strategy for creating a portfolio containing five stocks, with a goal to outperform the Standard and Poor 500 Index. In order to accomplish this we will use the momentum of the business cycle, and select our stocks from sectors with conventionally high performing returns during quarter one. Using historical price data, we will select five stocks that have shown consistent high returns during quarter one in the past 5 years. With a risk-averse mindset we will attempt to mitigate systemic risk. For this project we will determine the weights or our stocks by using modern portfolio theory, and our own speculation. This paper will compare our chosen weights to the optimal weights modeled by the Minimum Variance Frontier. We will use the CAPM model, risk reward analysis and portfolio theory to evaluate our portfolio.

## Capitalizing off AI and Tech Infrastructure Growth (Poster)

Maximillian Kezar and Olivia McBurnett
Faculty Mentor: Huarui Jing

Goldman Sachs economists estimated that the Global Economy will perform better than most people believe in 2024, forecasting a 2.6% growth in GDP alongside their predictions for "strong income growth" amid cooling inflation rates and a strong job market. Working with the Macroeconomic predictions above, we have faith in the current conditions of the market and want to take advantage of the potential to capitalize off of the successful quarter. The technology sector and the online retail sector are the most likely to see success in the first two quarters due to the workplace standards that continue to shift post COVID. We believe the "work-from-home" option will see increased popularity and people will place a larger value on the online sectors. The selection criteria for the parameters which we select our stock around are as follows: (1.) companies who either have or have had large returns in the previous quarter and year, (2.) companies who have large revenues and have a prediction for percentage growth for the following year, (3.) established companies who are working on new and competitive services to introduce to the tech market, (4.) companies that have the size of funds to better capitalize on an increased tech presence so mainly looking at large-cap companies. We chose Nvidia (NVDA), Amazon (AMZN), META (META), Crowdstrike Holdings (CRWD), and Microsoft (MSFT) as the five tech-related stocks for this portfolio. The models that we will use to help implement this strategy are the Portfolio Theory, CAPM, APT, Fama French, and Chen Roll Ross models.

## Stability Amidst Market Trends and Economic Fluctuations: Leveraging High Demand and Unique Competitive Advantages (Poster)

Cole Perusek and Mason Ware
Faculty Mentor: Huarui Jing

Our study demonstrates that an investing strategy, focused on companies in sectors of high demand with competitive advantages, can be useful to achieve investment results such as potentially beating the market. While only one sample size, the results underscore the potential effectiveness of our strategy in navigating economic uncertainties, with our selected portfolio not only achieving the projected returns but also potentially demonstrating the robustness of fundamental analysis as a tool for discerning investors. Our research concludes that, despite the allure of trend-following and speculation, an approach grounded in these investing principles can offer a path to financial success, particularly in times of market and economic turbulence.

## Beating the S&P 500: A Portfolio Analysis Using Sector-Based Investing While Maximizing the Sharpe Ratio (Poster)

Jack Selner, Noah Maloy, and Mason Doherty
Faculty Mentor: Huarui Jing

The objective of this portfolio analysis project is to maximize the Sharpe ratio during the construction of our portfolio by investing in companies that have momentum heading into Q1 of 2024, with a focus on sectors that historically perform well during inflationary periods. We believe that through a diverse portfolio strategy and maximization of the Sharpe ratio we will be able to beat the S&P 500 returns in Q1 of 2024. This short-term investment strategy will consist of larger, low-risk companies from the energy, healthcare, and technology sectors, which historically have been resilient to inflation. We feel that these three sectors are better than any other sectors to invest in because of the ingenuity, demand, and efficiency they provide to our portfolio. These sectors also allow us to split up our risk in case of anything abnormal in a respective sector. If we were to add more market diversification to our portfolio it would turn us away from maximizing the Sharpe because these three sectors are the best chance that we have at beating the Sharpe and beating S&P returns. The technology sector adds growth potential, the energy sector acts as a buffer against inflation, and the healthcare sector is viewed as recession-proof because of its inelastic demand. These principal factors will help this portfolio obtain positive returns higher than the S&P500 during this short holding period.

## Betting on Growth: Integrating High Beta Stocks in Emerging Sectors to Beat the Market (Oral Presentation)

Charles Tropauer
Faculty Mentor: Huarui Jing

This paper targets a modernized approach to constructing a portfolio aiming at outperforming the S&P 500. It relies on targeting the AI and Renewable energy sectors, specifically choosing lesser-known, non-large stocks with high betas. My portfolio maximizes return through the combination of analysis from the Portfolio Theory, CAPM, and APT models. The reason why it is best to have a modernized approach in investing is given through hefty macro and firm-specific analysis. Incorporating these lesser-known and non-large stocks along with their high betas, I hope to see that my portfolio can outperform the S&P 500.

# FORESTRY

### Attenuation of Juglone in Soil Near Black Walnut (*Juglans nigra*) Trees Growing in Cumberland Plateau Coves (Poster)

Annie Kennedy
Faculty Mentors: Thomas Powell (Earth and Environmental Systems) and Bethel Seballos (Chemistry)

Juglone is a defensive herbicide and insecticide black walnut (*Juglans nigra*) trees produce and hold in high concentrations in their leaves, fruit, and roots. Exudation of juglone from the roots of black walnut trees has mainly been studied in agricultural experimental settings. This research investigates how juglone that is released into the soil through root exudates and tissue decomposition attenuates in the soil of coves on the Cumberland Plateau This research is part of a broader project investigating the role juglone may play in the maintenance of biodiversity in forested ecosystems. This specific study aims to provide a basis for quantifying juglone concentrations in cove soils of the Cumberland Plateau. Preliminary data collected and analyzed on juglone concentrations will provide information on the potential for juglone to act as a treatment for species of ash trees that are impacted by the Emerald Ash Borer. Methods developed in this project will also serve in future research pertaining to black walnut trees, soil, juglone, and ash species.

# GEOLOGY

### Modeling Bedrock River Erosion Using a Stream Table (Poster)

Pat Evans
Faculty Mentor: Maxwell P. Dahlquist

Stream tables are self-contained models of river processes for research and education. Our model (Emriver Em3) cycles water through plastic pellets of various sizes which are mobilized, transported, or deposited, depending on the flow velocity. However, the pellets are more suitable for simulating the downstream alluvial portions of rivers, where channels rework loose sediment, rather than simulating erosion into bedrock. Here, we test different formulations of xanthan gum, a common binding agent in food, as a means to turn the simulated sediment in our stream table into simulated sedimentary rock. Different concentrations of xanthan gum can be used to simulate rocks of different strengths, allowing for modeling of river erosion into variable bedrock. To test the efficacy of this method, we use the xanthan gum and plastic pellet rock to model the confluence of two bedrock channels. Glacial Lake Outburst Floods (GLOFs) are a

major natural hazard and important agent of erosion in glaciated landscapes. Where channels without GLOFs join channels susceptible to GLOFs, interesting landscape features may develop, such as fluvial hanging valleys, where a shallower canyon joins a deeper one with a waterfall at the junction accounting for the difference in elevation. Since GLOFs are infrequent even in regions prone to them, it is difficult to determine whether landscape features are a result of GLOFs or other processes. Developing a means of simulating river incision into bedrock in the lab will help to diagnose the formation mechanisms of GLOF-related features.

## Melanterite ($FeSO_4 \cdot 7H_2O$) Under Pressure: Implications for Icy Satellite Water Storage (Poster)

Brian Gulick, Mate Garai, Lilly Daniels, Audrey Burch, CS Shushok
Faculty Mentor: Lily Thompson (Earth & Environmental Systems)

Iron (II) sulfates ($FeSO_4 \cdot nH_2O$) have been identified on the surface of Mars, on the surface of Ganymede and Europa, and likely form from the coexistence of water and sulfates in the interiors of Ganymede and Europa—two moons of Jupiter. Although liquid water at the surface of Solar System bodies remains elusive, hydrous minerals, including hydrated Mg-, Fe-, and Ca-sulfates, can provide insights into the hydrologic history of terrestrial bodies. Melanterite ($FeSO_4 \cdot 7H_2O$) contains 45 wt% water and is one of the most hydrated iron sulfates. Yet, despite the important role melanterite may play in the hydrogen cycle of icy satellites, little is known about the hydrogen bonding of melanterite at the pressure conditions relevant to the interiors of icy satellites. In this study, we used elevated pressures produced by diamond anvil cells to systematically probe the chemical bonding in melanterite at a wide range of pressures using Raman and Fourier transform infrared (FTIR) spectroscopies. These measurements, performed at the National Synchrotron Light Source-II, enable us to probe the phase diagram of melanterite at extreme pressures. Based on significant changes in the FTIR $\nu_1$ mode of the sulfate ions (982 $cm^{-1}$), the $\nu_2$ bending mode of $H_2O$ in the 1500-1700 $cm^{-1}$ region, and the $\nu_1$ and $\nu_3$ stretching modes of $H_2O$ in the 3200-3450 $cm^{-1}$ region, our preliminary results suggest three distinct phase transitions in melanterite at room temperature at approximately 2.4, 8.2 and 13.1 GPa. Furthermore, the $\nu_1$, $\nu_2$, $\nu_3$, and $\nu_4$ modes of $SO_4$ in Raman support the transitions at 2.4 and 8.2 GPa. By re-evaluating the stability and chemical bonding of melanterite at a range of pressure conditions, we hope to assess the extent to which melanterite contributes to the storage and cycling of hydrogen in the interiors of icy satellites or extrasolar bodies.

**Shark Teeth from the Mississippian Pennington Formation, Depot Branch, Sewanee, Tennessee (Poster)**

Chloe Suzanne Sims
Faculty Mentor: Martin Knoll (Earth & Environmental Systems)

The Late Mississippian (359-323 my) Pennington Formation represents the final stage of marine carbonate deposition on the southern Cumberland Plateau of Tennessee. The layer marks the last phase of shallow marine sedimentation before deposition of overlying deltaic clastics of the Raccoon Mountain Formation and Warren Point Sandstone. In the Sewanee, Tennessee area the Pennington is composed largely of disarticulated invertebrate fossils typical of a shallow marine assemblage of the time, including pelmatazoans (crinoids and blastoids), bryozoans, brachiopods, foraminifera, and gastropods. In the Depot Branch area of Sewanee over 40 meters of thin-bedded limestones contain an unusually large quantity of shark teeth. Preliminary examination of samples likely record the presence of the genus *Saivodus* and perhaps members of the genera *Agassizodus* and *Campodus*. All teeth occur as isolated fossils and aid in the characterization of the Late Mississippian ecosystem of the Sewanee area.

**Numerical Modeling of Tidal Channel Dynamics on Kiawah Island, SC (Poster)**

Jackson Y. Speary
Faculty Mentors: Maxwell P. Dahlquist (Earth & Environmental Systems) and Kristen K. Cecala (Biology)

Tidal creeks on Kiawah Island are an important and well-studied habitat for Diamondback Terrapins, but over the past few decades the tributary channels that house the vulnerable terrapins have been silting up and populations have been declining as a consequence. Kiawah Island has been subject to extensive development during this time, with corresponding changes in the sedimentary dynamics in the channels. Notably, the mouth of the Kiawah river has been dredged and reshaped periodically, changing flow paths and velocities, and potentially mobilizing large amounts of sediment which could be transported inland with the flood tide currents. Here, we apply the CoastMorpho2D model for coastal sedimentary processes, which accounts for tides, wind waves, vegetation, and mud and sand deposition, among other factors, to the tidal creek landscape at Kiawah Island. We test the effect of different modifications of the channels and examine their effects on erosion and deposition in the channels, identifying potential causes for the silting up of terrapin habitat. Using numerical modeling to predict potential future scenarios resulting from coastal modification and diagnosing causes of current problems could guide better decision making and management practices for fragile habitats.

# GERMAN AND GERMAN STUDIES

### Post-War Reconstruction in Germany: Lessons for Post-Conflict Societies (Poster)

Kamilla Haidaienko
Faculty Mentor: Liesl Allingham (German and German Studies)

Post-World War II Germany offers invaluable lessons for understanding the complexities of post-conflict reconstruction and reconciliation. This research project "Post-War Reconstruction in Germany: Lessons for Post-Conflict Societies," centered on Berlin's experience, delves into the intricate processes of rebuilding a nation from the rubble of war. Drawing from a synthesis of disciplines including memory studies, urban studies, architecture and sociology, this study analyzes the myriad challenges faced by Germany in its post-war transformation. From economic revitalization to urban planning and social integration, Germany's journey serves as a comprehensive case study for societies grappling with the aftermath of violent conflict. Examining both short- and long-term outcomes, this research identifies patterns and issues that are likely to emerge in post-war societies worldwide. While some German cities addressed immediate needs such as public housing, resulting in visible planning inconsistencies, others confronted delayed reckonings with questions of historical transparency and memorialization. This delayed engagement had significant repercussions, emphasizing the importance of timely and comprehensive approaches to post-conflict challenges. Furthermore, the study underscores the significance of interdisciplinary collaboration in navigating the complexities of post-war reconstruction. By integrating diverse perspectives and methodologies, it seeks to provide a nuanced understanding of the factors influencing societal healing and resilience. Through case studies and specific examples, this research project aims to lay the foundation for a framework for policymakers, scholars, and practitioners involved in post-conflict reconstruction efforts. By illuminating Germany's trajectory, it seeks to facilitate informed decision-making and sustainable solutions for rebuilding fractured communities and fostering lasting peace. In summary, the lessons gleaned from Germany's post-war experience can serve as a beacon of guidance for societies navigating the path of recovery and reconciliation in the aftermath of armed conflicts.

# HISTORY

### The Outing System at Carlisle Indian Industrial School (Oral Presentation)

Cole Baker
Faculty Mentor: Stuart Marshall (History)

The Outing System, a central portion of the curriculum used by federally funded Off-Reservation Schools managed by the Bureau of Indian Affairs in the late 1800s to the early 1900s, was created with the intention of assimilating Indigenous Students into Anglo-American society. The program was created to further ensure the erasure of Indigenous culture by preventing students from returning home during breaks and reduce economic costs by placing students with Anglo-American families. The policy and implementation of the program played a large role in the promotion of the Carlisle Indian Industrial School, and both founder Richard Pratt and Carlisle were used as a model for Off-Reservation Boarding Schools. Success of the program in fulfilling the assimilationist goals of the school and the impact that the outing system had on students of Carlisle is examined by using sources written by Carlisle and students, including the policy that directed the Outing System, Carlisle publications, Outing System records, and student memoirs of Carlisle and the Outing System. The evaluation of the Outing System within the curriculum of Carlisle contributes to rising scholarship on Off-Reservation Boarding Schools, illuminating a practice that dictated many student experiences at these schools, contributing to an evolving understanding of student experience and goals of policymakers and the Bureau of Indian Affairs. By detailing a wide range of experiences of students who participated in the Outing System, both advantages and disadvantages for students are seen in gaining agency, resisting or navigating assimilation, and receiving a relevant education. Contributing to the practice of promotion seen at Carlisle is also evaluated with the examination of students who became testaments to the schools goals in publications, but is also countered with research on students who were noted to not have benefitted from the Outing System. Briefly detailing the impact that the Carlisle Outing System had on the Bureau of Indian Affairs Schools in the following decades, this evaluation of a unique Outing System and the role it played in gathering support for Off-Reservation Schools and in students' lives.

### Holocaust Memory in the Federal Republic of Germany: 1945-1989 (Oral Presentation)

Rebecca Cole
Faculty Mentor: Andrea Mansker (History)

The Federal Republic of Germany, while praised for its progressive policies of remembering the Holocaust in the postwar period, struggled with the memory of its past more than scholars

traditionally acknowledged. Evaluating the development of West German memory of the Holocaust, this honors thesis presentation will complement previous work on East German memory and analyze the impact of Vergangenheitsbewältigung, or the overcoming of the past, on West German attempts to remember, commemorate, and discuss the Holocaust. The Bitburg Controversy will be examined in this presentation as an example of attempted and failed Holocaust relativization. "Relativization" refers to the rejection of the Holocaust as an absolute and unique event. The Bitburg Controversy erupted in 1985 when Helmut Kohl, then Chancellor of the Federal Republic, invited the United States President Ronald Reagan to pay a diplomatic visit. During this time, Reagan laid a wreath at a military cemetery in Bitburg at the urging of Kohl and the cemetery was known to contain the remains of SS soldiers. This sparked heated debate around the world and reignited the memory wars. The controversy demonstrates the memory landscape of 1980s Germany that struggled with anger at the United States, a sense of loss and division, and at the same time a hesitance to take responsibility for the Holocaust to avoid the national shame that a Germany trying to re-enter the international field wanted to move past. It was evident that the United States and Germany were not prepared to declare Holocaust memory work "finished." Past scholarship that recognized the FRG's success in the "overcoming of the past" failed to acknowledge the inability of this project and the stifling of the idea of Vergangenheitsbewältigung by the unsuccessful attempt of the FRG to relativize the Holocaust.

### Racial Anxieties in the 1721 Boston Inoculation Controversy: Political and Domestic Fear (Oral Presentation)

Calley Doyle
Faculty Mentor: Kelly Whitmer (History)

This paper considers the role of race in the Boston inoculation controversy of 1721. The existing historiography on this topic focuses on the enslaved man named Onesimus from whom Bostonians first learned about smallpox inoculation. Following his testimony, the prominent Puritan Reverend and intellectual Cotton Mather launched a campaign of inoculation experimentation among Bostonians. Tensions would then arise between those who were pro-inoculation—mostly the Puritan ministry—and those against it—mostly physicians. This project assesses how colonists understood African and Native American medical knowledge within the context of this inoculation controversy. Tensions between colonial fascination with and fear of foreign knowledge intensified. Even though Bostonians came to rely on smallpox inoculation to ensure their safety during regular epidemics, they framed African and Native American understandings of this procedure as inferior. Historians have analyzed colonial understandings of enslaved Africans' testimonies, but generally have not tied these exchanges to related panics and violence that arose during this controversy. This panic mirrored past fears of enslaved rebellion in British colonies as descriptions of organized enslaved rebellions remained a prominent feature of the popular press in this period. For colonists, reckoning with their simultaneous interest in, worries about and aversion toward African knowledge proved deeply uncomfortable. The extent to which they trusted "foreign" knowledge differed from person to person, leading to public and heated disagreements between colonial authorities like Cotton Mather and anti-inoculator William Douglass. This uncertainty made smallpox outbreaks even

more frightening, with average Bostonians losing clarity and guidance from long-trusted authorities. I show how white fears emerged around Africans disrupting colonial authority, the Puritan establishment, as well as the domestic sphere. In doing so, I also draw attention to broad frameworks of intellectual exchange between cultures and how these would manifest simultaneously to the intimate settings of both the home (where inoculation was performed) and within the individual body.

# INTERNATIONAL AND GLOBAL STUDIES

### Doing More Harm Than Good? U.S. Foreign Aid and the Loss of Indigenous Culture in Guatemala (Oral Presentation)

Jessie Atkinson
Faculty Mentor: Emmanuel Asiedu-Acquah (International & Global Studies)

Foreign aid is a relatively novel topic, mainly surfacing after the Second World War and during the Cold War. Its origin is partly rooted in self-preservation, "red scare" instincts in uncertain post-war times. Foreign aid is defined as "private or public bilateral or multilateral assistance to nations suffering the ravages of war, natural calamity, or long-standing poverty" with the hope of creating self-sufficient, capitalistic economic growth for the receiving countries (Godfried & Lynch 1). However, the focus has shifted to emphasize humanitarian aid and supporting the wellbeing of all peoples, aligning with the United Nations' sustainable development goals. Despite the goal appearing to be humanitarian aid, there are national interests being protected through foreign aid programs. I will present the impact of international development and foreign aid being sent from the United States to Guatemala, specifically its effects on the indigenous populations. What are the effects of foreign aid on receiving countries? Do aid programs consider priorities and concerns of the entire population, including indigenous peoples? Does the Guatemalan government get consent from indigenous peoples to accept these aid programs? I argue that international development does not reach the indigenous populations of Guatemala due to discriminatory obstacles put into place by the urban, elite population or government; and when it does reach the indigenous communities, it has a negative impact on their distinct cultures. The obstacles put into place use outdated, colonial ideas of racial hierarchy to keep the indigenous populations below the poverty line and decrease their agency. In return, those in power can maintain or improve their socio-economic positions. My research explores agricultural and social aid programs from the 1950s to present day to prove the existence of hurdles used to marginalize and oppress indigenous peoples in Guatemala. My presentation will begin with my theoretical framework before moving on to background information of Guatemala, indigenous peoples, and U.S. foreign aid. I will then present my research of agricultural and social aid programs and their effects on indigenous cultures. Finally, I will

introduce new approaches to development that must be implemented to maintain and celebrate indigenous knowledge and culture.

### Nuclear Anxiety:  A Catalyst of Cold War Counterculture and Transnationalism (Oral Presentation)

Nicholas Bailey
Faculty Mentors: Nicholas Roberts (International & Global Studies) and Liesl Allingham (German and German Studies)

The advent of man's harnessing of nuclear energy has been a defining moment in humanity's technological history, with some historians pointing at the detonation of atom bombs over Hiroshima and Nagasaki as the marking of a new epoch in our development, the so-called "Atomic Age" or as the beginning of the Anthropocene. The novelty of the power that nuclear weapons were able to yield created an entirely new approach to diplomacy, as states now held the power to annihilate others anywhere in the world with the push of a button. Thus, the implication of nuclear warfare's very existence produces a psychological effect named "nuclear anxiety." This pervasive anxiety of momentary annihilation was exacerbated by the tensions during the Cold War between the West and Moscow, and was most geographically intense in a divided Germany, which according to many military simulations and war games would be the ground zero for a nuclear war. Therefore, out of an environment of Angst, new cultural trends arose as nations gained awareness of their new atomic political landscape. In my presentation I will be investigating the cultural and social impacts of nuclear anxiety in the formation of a population more aware of global issues and skeptical of their governments. I will study how the culture of protest emerging in the 1960s and beyond reflects the beginning of this transformation in culture sparked by nuclear politics. I will be focusing mostly on the effects of West Germans in their cultural transition post WWII until the end of The Cold War as an epicenter of cultural change. Although my focus remains in West Germany, I argue that expanded awareness in response to the nuclear threat intensified a political and environmental global consciousness as nuclear war became the first truly global or transnational issue. Apocalyptic visions of mushroom clouds and barren wastelands transcended culture and became a backdrop for a new cultural imaginary sparking a wave of pacifism, and movements for the peace and protection of the environment.

## Beyond Borders: Austria's Post-Iron Curtain Migration Evolution (Oral Presentation)

Adelai Brewer
Faculty Mentors: Emmanuel Asiedu-Acquah (International and Global Studies) and Chiedozie Uhuegbu (German & German Studies)

Immigration is a movement that has occurred since the beginning of time, and everyone is in one way or another connected to it. It is how countries were established and cultures were created. Austria, located in the center of Europe, has been a primary location for immigration since the Habsburg Empire. It has been a route for passing through many immigrant paths, especially the Balkan route. Over time, it became a location of permanent residence for many of those originally just stopping through. Its geographic position between the Eastern and Western Bloc made the country an important transit route for refugees, especially during the Cold War. There have been many differing views on immigration in Austria, and it has been at the forefront of their government since the fall of the Habsburg Empire. The issue of immigration has caused numerous governments, coalitions, and parties to form in Austria throughout its history. Still, the most prominent time for these was after World War II and following the fall of the Iron Curtain. The evolution of immigration in Austria since the fall of the Iron Curtain has been heavily influenced by the presence of changing politics and new cultural forms. In my paper, I examine this evolution through a theoretical framework that draws on cultural theory, and the concepts of hybridity and cosmopolitanism. I will look at the policies and governments as well as their changes through three main periods: the fall of the Iron Curtain, contemporary Austria, and present-day Austria.

## Will China Ultimately Have Influence in Latin America?: Examining the Economic Benefits and Questionable Growing Allyship (Oral Presentation)

Debanhi Guerrero
Faculty Mentors: Nicholas Roberts (International and Global Studies and Mila Dragojevic (Politics)

The region of Latin America and the Caribbean has been a crucial part of the global market and international trade. Amongst the Third World countries, Latin America and the Caribbean have faced historical and current debt crises. This debt comes from the dependence on borrowing money and increased deficits. Because of this, Latin America has struggled to prosper within its economies, politics and ability to build more infrastructure. The United States, being a significant player in the region's economy, has participated in Latin America's economic policies and increased the debt even further. However, there has been a shift and an emerging influence of China in Latin America. China is looking to expand its economic sector and has had a high demand for raw material goods because they are specialized in manufacturing goods. Therefore, China has created a bilateral trade relationship with the region, with countries like Peru, Venezuela, and Brazil. China is actively integrating its resources and interests into these

vulnerable countries as a strategic move to alleviate their increasing debt burden. Over the years, China's influence has expanded, driven by investment interests and high demand for commodities, enhancing its economic statecraft and escalating regional diplomatic initiatives. Latin American responses to China's presence have been diverse, depending on specific cases. This research paper will focus on the themes of development, neoliberalism, and the economy of appearances.

### Understanding the Implementation of Indigenous Rights under Extractive Nation States in Latin America: A Comparative Study of Ecuador and Bolivia (Oral Presentation)

Elena Hamann
Faculty Mentors: Nick Roberts (International & Global Studies) and Lisa Burner (Spanish)

Indigenous peoples in Latin America comprise around 45% of the region's population, and yet very few countries have encoded indigenous political rights into their constitutions (ECLAC, n.d.). Recent political trends have seen the rise of indigenous social movements in the region articulating sociopolitical demands based on international rights frameworks such as the UN Declaration of the Rights of Indigenous Peoples. However, even when these measures are adopted constitutionally, there is a serious implementation gap between rights written and rights in practice. This paper argues that this gap has three key central causes: (i) the economic dependence of national governments on extractive industries, (ii) the threat posed by indigenous autonomy projects to the hegemonic nation state structure, and (iii) variable regionally present political factors such as the presidential nature of Latin American states. This comparative analysis of Bolivia and Ecuador serves as a case study for the state of indigenous rights in Latin America in the context of hegemonic nation states and extractivist export oriented economies.

### The Impact of Foreign Intervention and Utility Consensus on Transboundary River Under Climate Stress—A Comparative Case Study on Mekong and Rhine River (Oral Presentation)

Tuyen Le
Faculty Mentors: Nicholas Roberts (International & Global Studies) and Kristen Cecala (Biology)

Climate change will affect transboundary river systems and transform the existing scientific knowledge about these rivers that center countries' cooperation over them. While most recent indicators imply that developed democracies are more resilient in cooperation and adaptation abilities to these climate impacts, this paper argues that the indicators do not account for the factors of foreign intervention and utility consensus that can deter cooperation and climate

adaptation in less developed and stable regions. The paper applies the two factors in a comparative case study of the Mekong River in Southeast Asia, which is characterized as a climate-vulnerable river lacking a strong track of regional cooperation, and the Rhine River in Europe, which is considered to be more resilient due to their institutional structures, technological and financial abilities. It finds that the Mekong River's geopolitics are constantly shaped by foreign interests, particularly between China and the United States, who hold starkly different intentions for the region. The Mekong River is also closer to its natural state and supports a rural population of 60 million in the Lower Basin, which contests against national and regional development initiatives to improve Southeast Asia's economic and fiscal welfare. These tensions make it more challenging for the Mekong countries to cooperatively manage the river in the face of a climate crisis. Meanwhile, countries sharing the Rhine River do not encounter these issues. By incorporating the two factors, the climate resilience calculus can be more just and objective, which opens new solutions for climate change and transboundary river conflicts.

### Comparative Analysis of India and China's Economic Development: Strategies and Sustainability (Oral Presentation)

Jadelyn Mitchell
Faculty Mentors: Emmanuel Asiedu-Acquah (International & Global Studies) and Kartik Misra (Economics)

Examining the remarkable economic growth of China and India, this presentation explores their transformative journeys from planned to market-oriented economies. Both nations play pivotal roles in shaping global trade, influencing geopolitics, and driving innovation. The research delves into the distinct economic growth strategies of both nations, analyzing the factors contributing to their success and the challenges hindering sustained growth. I argue that policy, trade, investment, and infrastructure have played pivotal roles in their economic development, but unique challenges such as income inequality, environmental sustainability, political reforms, and demographic shifts pose obstacles to continued growth. Employing a multidisciplinary approach, the study draws insights from history, economics, and political science, guided by theoretical frameworks including Globalization Theory, Developmental State Theory, and Structural Transformation Theory. These frameworks provide a lens to analyze the interconnections between globalization, state-led development, and the structural transformations influencing the economic growth trajectories of China and India. The presentation aims to contribute a nuanced understanding of the challenges and opportunities faced by these nations on the global stage, offering valuable insights into their economic growth trajectories.

## Current and Colonial Views on Desertification and Environmental Politics in Algeria and Tunisia (Oral Presentation)

Elizabeth Rutledge
Faculty Mentors: Nicholas Roberts and Diana Hatchett (International & Global Studies)

The arid North African environment is inherently vulnerable to desertification, which is the process of land degradation in dry areas. Between the 19th and 20th century, the French empire controlled Algeria and Tunisia as colonies, and implemented a series of environmental policies intended to reforest the landscape, and more significantly, achieve French national interests. As a result, since decolonization in the mid-20th century, Algeria and Tunisia have struggled to enforce and maintain sustainable land-use practices, which has led these countries to adopt intensive livestock and agricultural practices and become reliant on international investments for economic stability. Through this thesis, I will argue that the French empire played a role in further driving the natural processes of desertification in North Africa, and in the decades following decolonization, neocolonialism continues to manifest within Algeria and Tunisia in the form of international investments. This is significant because this ongoing dependence on foreign aid will continue to deter this region from progressing towards economic independence, and from this, environmental agency.

## Signified Germanness: The German Nation and Ausländerpolitik (Oral Presentation)

Adrena Walton
Faculty Mentors: Nicholas Roberts (International and Global Studies) and Chiedozie Uhuegbu (German & German Studies)

Analyzing how Stuart Hall's systems of representation and signifiers interact with modern definitions of German national identity, the relationship between blood, language, and religion as historical signifiers of the German nation is initially examined. A political perspective is applied to these three signifiers of Germanness, paying close attention to the recent rise in support for right-wing political parties in Germany. Ausländerpolitik and its implications are next expounded upon, beginning with the termination of Germany's labor recruitment program in 1973 and concluding with the fall of 2023, in conjunction with post-2000 exclusionary cosmopolitanism. The concepts of natural belonging and David Gramling's cosmopolitan monolingualism are employed to analyze the ways in which white Germans dedicated to preserving their blood, language, and religion as signifiers of Germanness have attempted to protect their national identity from the threat of Ausländer and reject a modern, progressive understanding of what it means to be a German national. The shift from racialized rhetoric to that of "culture" is noted in the transition to discussing multiculturalism as policy in Germany and its failures to promote integration, instead reifying cultural differences and equating the Turkish-German population with immigrants and asylum seekers. The interpretation of German multiculturalism-affiliated policy being informed by cultural differentialism is introduced through the lens of Martin

Barker's cultural racism, evidenced by its reinforcement of pluralism and its trajectory through the influence of currently popular politics towards parallelism, which is the source of multiculturalism policy failures. This research paper asserts that despite the introduction of Geburtsortprinzip as a path to citizenship in 2000, blood, language, and religion remain central signifiers of German national identity under the umbrella term of "culture." As a result, there has been a continuous rejection of Turkish-Germans as members of the nation on account that they are not culturally compatible. The current rise in support for right-wing political parties in Germany indicates the persistence of this historical representation.

# MEDICAL AND HEALTH PROGRAMS

### The Relationship Between Parental Wellbeing, (as Measured by Parental Stress, Depressive Symptoms, and Early Relational Trauma) Caregiving Confidence and Competence (Poster)

Kylea Michael and Karen Hanson
Mentros: Soyon Kim (Yale School of Medicine), Amy Meyers (Yale School of Medicine), Jeanette Radawich (Yale School of Medicine), Heather Simon (Yale School of Medicine), Michelle St. Pierre (Yale School of Medicine), and Heather Bonitz Moore (Yale School of Medicine)
Sewanee Faculty Sponsor: Kate Cammack (Psychology and Neuroscience)

The Family-Based Recovery Model (FBR) focuses on creating an optimal substance-free, safe and stable environment for both children and parents. In doing so, FBR combines an attachment-based parent-child therapeutic approach with contingency-management substance use treatment, case management services, and trauma-informed psychotherapy. Most families are referred by the Department of Children and Families; therefore, the model emphasizes the parallel process: building safe relationships between clinical staff and parents and between parents and the child. In short, treatment aims to pair recovery with a feeling of parental competence, increasing parenting confidence, and further positively impacting recovery. The United Community and Family Services (UCFS) and Yale Child Study Center (YCSC) are used as comparable sites since both were established in 2007 and have a similar number of clients. The measures used include the Childhood Trauma Questionnaire, The Edinburgh Depression Scale, the Center for Epidemiologic Studies Depression Scale, and the Parenting Stress Index. The Edinburgh Depression Scale and the Parenting Stress Index prove that the model is statistically significant, and the Center for Epidemiologic Studies Depression Scale proves that the model was not statistically significant. In all, the two sites chosen represent different demographics in the FBR network. UCFS works with families in rural areas who are predominately White. YCSC works with families in an urban center who are majority Black and Latinx. The statistically significant decreased depression and parental stress scores across these two sites suggest that FBR treatment is effective with diverse communities. The Childhood

Trauma Questionnaire data shows that FBR parents have experienced early relational trauma in various degrees. The length of stay data shows that clients stayed in treatment for six months. This suggests that FBR staff have success with being able to build a treatment relationship with FBR parents, for whom safe treatment relationships may be a challenge.

# MEDIEVAL STUDIES

### "From Europe Before the Civil War:" Medieval Honor in the American South (Oral Presentation)

Elizabeth Baker
Faculty Mentor: Stephanie Batkie

In 1958, Charles E. Thomas donated what appeared to be a medieval wall hanging to his alma mater, the University of the South. Local press reported that it was a genuine medieval tapestry that Thomas's relative purchased before the Civil War. In Thomas's correspondence with University historians, he admitted that the wall hanging was not older than the 19th century, but likewise maintained that his great uncle purchased it before the Civil War. The University of the South maintains an archive of documentation about the wall hanging; my study of those documents over the past few months has raised questions about the intersection of Southern masculine identity during the Civil War and the medieval concept of virtus (especially honor). This paper will seek to examine how traditions of medieval honor, inherited through literature and law, influenced the identity of the Southern ruling class in a time of intense turmoil. I will draw on local archival material to describe how the "tapestry" has invoked medieval honor, and how honor shaped the formation and collapse of the Confederacy. I will also add a study of modern scholarship on 19th century Southern virtue and the identity of honor in the Middle Ages, with a distinct focus on self-identification as a "Southern Gentleman"—particularly as supported by academic, theological, and legal discourses. Finally, I seek to articulate some of the complex ways conceptions of the medieval simultaneously shaped a revisionist and a preservationist vision of "aristocratic" Southern identity in the 19th and 20th centuries.

# MUSIC

### Why That Piece?: Analyzing and Assessing Soprano Oratorio Repertoire from the Pedagogical Perspective (Poster)

Kate Dossel
Faculty Mentor: Kerry Ginger (Music)

Choosing repertoire is not just a shot in the dark; there is technique and thoughtfulness to selecting repertoire for students as a vocal coach. An important role of the successful voice teacher is to select appropriate repertoire for a student by focusing on the attributes of their voice and capability of a singer. The purpose of this study was to provide a rubric that helps teachers assess the difficulty level of a song selected from an anthology. The goal of this rubric was to compare and contrast four pieces from the Hal Leonard *Oratorio Anthology* for the soprano voice, and use the information gathered from the scores to find the best fit for a hypothetical student, factoring in criteria such as dynamics, phrasing, tessitura, tempo, rhythm, harmony, registration and language. By using a method such as this a singer or voice teacher will have a better idea of what will be best for the student when selecting their repertoire, yielding a higher success rate for student learning.

### Creating a Queer-Friendly Rubric for Vocal Pedagogy (Poster)

Victor Esparza
Faculty Mentor: Kerry Ginger (Music)

Vocal music has been a traditionally gendered form of art that strictly divides voice parts on a very gendered basis. Terms like “falsetto,” “contralto,” and “countertenor” are designed with a strict binary definition of gender. The purpose of this research was to design a rubric on behalf of trans/non-binary voice students in order to grade the queer-friendliness of select repertoire. This rubric will be used to examine songs from a songbook designed for trans/non-binary students. The rubric will evaluate the colors of the voice used, range, and other technical aspects of the piece to measure how effective the piece is at being gender nonconforming-friendly. This project aims to contribute to the focused effort in advancing the pedagogy of singing to a more gender-inclusive place for every singer, to continue encouraging students to embrace all colors of their voice regardless of their gender identity.

## Repertoire Selection from the Other Side: Informing Musical Educators on How to Better Choose Repertoire for Their Students (Poster)

Shelton Griffith and Eliza Warnock
Faculty Mentor: Kerry Ginger (Music)

There is no vocal repertoire that can be definitively tied to a specific age group, gender, style, or voice type; therefore, it is difficult to successfully choose music that fulfills a student's wants alongside reaching their musical growth goals. This research aims to analyze a musical student's voice to choose an appropriate repertoire that compliments the current state of their voice, in addition to choosing music that is interesting to the performer. In order to investigate all perspectives of the voice we, two female students, chose repertoire for a student who was assigned male at birth. To fulfill the purpose of this research, we considered a theoretical student and assigned them four pieces in line with their musical and growth goals. We then ranked the four pieces of music based on difficulty due to numerous factors. Our research will provide insight to music teachers and allow them to more precisely choose repertoire and accurately evaluate students. In addition, being a different gender from our theoretical student will help to alleviate the stigma surrounding the idea that students and teachers need to be the same gender for the most beneficial instruction.

## Jazz Standards: Standards for Voice Students and Teachers (Poster)

AJ Jacobs
Faculty Mentor: Kerry Ginger (Music)

Anyone can sing, this is true, but without proper usage, singing can become harmful and damage one's voice. Voice students and teachers especially need to be vigilant due to the amount of singing they do. This is why establishing standards for and choosing the right difficulty of music is crucial. The focus of this study is to establish a general rubric with which voice students and teachers can assess the difficulty of a piece of music. This rubric determines a song's difficulty according to range, rhythm, harmony, phrasing, and articulation, among other key factors. I analyzed four songs from the *Alfred Music Anthology Jazz Standards: 40 Sheet Music Bestsellers* to compose this rubric. Using this research, voice students, teachers, and any other singer can assess a song's difficulty, enabling them to avoid harming their voice.

## How to Know What Song Is Right for Each Voice (Poster)

Ruthie Rhodes
Faculty Mentor: Kerry Ginger (Music)

In the world of vocal performance, it can be difficult to gauge how easy or hard a certain song will be for a specific person. To address this issue, this research is focused on creating a rubric to evaluate a selection of songs from *The Singer's Musical Theatre Anthology* published by Hal Leonard. The components of the rubric include everything from the rhythm and tempo, to the registration and accompaniment of the song. The purpose of this rubric is to be a helpful tool in making sure the song assigned to a student fits within their current capabilities. This is important because a song that is too easy for a student won't teach them anything, and a song that is too difficult could hurt their voice. This rubric will allow us to find the middle ground.

## How to Choose Repertoire for Students Studying Voice (Poster)

Gabriel Rice
Faculty Mentor: Kerry Ginger (Music)

As a voice teacher, choosing appropriate repertoire for students is a vitally important task. Assigning repertoire that is too easy will not allow a student to grow their musicianship, while assigning music that is too difficult can stunt development and discourage the singer from continuing lessons. With this issue in mind it can be advantageous to have a system to quickly analyze the difficulty of a piece of music and determine whether to assign it or not, thus reducing the time spent picking repertoire and allowing one to gain an understanding of pieces a teacher might be unfamiliar with. The purpose of this research was to create such a system utilizing a rubric to score the difficulty of a piece of music across a variety of parameters including range and tessitura, rhythmic intricacy, harmonic complexity, linguistic demands, and the difficulty and melodic support of the accompaniment. Drawing inspiration from established practices in the voice pedagogy literature, this project refines already effective metrics into a new rubric, offering a comprehensive and efficient tool for assessing difficulty, and allowing future voice teachers to make informed repertoire decisions.

## Comparing Baroque and Contemporary Settings of the *Twenty-Four Italian Songs and Arias*: The Songs of Judith Cloud (Oral Presentation)

Ellanna Swope
Faculty Mentor: Kerry Ginger (Music)

Many collegiate voice students study Italian-language songs in a classical style for their technical and artistic development. The most common source for these materials is the Schirmer anthology, *Twenty-Four Italian Songs and Arias of the Seventeenth and Eighteenth Centuries*, containing familiar titles such as "Caro mio ben," "Già il sole dal Gange," "Amarilli, mia bella," and more. American composer and mezzo-soprano Judith Cloud (1954-2023) undertook in 2019 to reset the texts of the "Twenty-Four" in a modern classical idiom. This lecture recital compares the popular originals with Cloud's *Twenty-Four Italian Songs and Arias for 21st Century Singers*, elucidating and contextualizing contrasting elements including rhythm, tempi, keys, text repetition, and difficulty, while highlighting pedagogical and interpretive commonalities. Assisted by pianist Vicki Collinsworth, this presentation focuses on Cloud's settings of "Amarilli, mia bella," "Che fiero costume," and "Vittoria, mio core!"; the rehearsal and learning process; the continuing utility of classic Italian texts for the study of voice; and the importance of having a gender-diverse selection of composers in one's repertoire list. Both singers and voice teachers will find the Cloud settings appealing in their fresh technical challenges, contemporary readings of classic texts, and canon-expanding approach to shared stories long defined by male composers.

## Removing the Inherent Canon Bias from the Assignation of Italian Art Song: The Twenty-First Century Songs of Judith Cloud (Poster)

Ellanna Swope
Faculty Mentor: Kerry Ginger (Music)

One of the most challenging yet essential things to assess in a voice student—particularly at the collegiate level—is when they are developmentally ready to sing a particular piece. Observationally, instructors at the college level tend to have a particular "path" pre-set in their syllabus: English and Italian tend to be the "starter" languages for native English speakers. When students show proficiency in diction in those languages, they move on to German and later Thomas French. Many collegiate voice students study Italian-language songs in a classical style for their technical and artistic development. The most common source for these materials is the Schirmer anthology, *Twenty-Four Italian Songs and Arias of the Seventeenth and Eighteenth Centuries*, containing familiar titles such as "Caro mio ben," "Già il sole dal Gange," "Amarilli, mia bella," and more. American composer and mezzo-soprano Judith Cloud (1954-2023) undertook in 2019 to reset the texts of the "Twenty-Four" in a modern classical idiom. The purpose of this research is to create a method of analysis for determining the difficulty of a piece of music using Cloud's innovative songs as an example. Factors including pitch, tessitura,

rhythm, harmony, phrasing, articulation, dynamics, accompaniment, diction and more will be assessed in four pieces from Judith Cloud's *Twenty-Four Italian Songs and Arias for Twenty-First Century Singers*, and one of the pieces will be assigned to a hypothetical voice student. Using a standardized method to analyze music such as the one we are creating here will be helpful to many; by standardizing the method of repertoire selection, inherent familiarity bias can be eliminated, which encourages more selections by canon-expanding composers like Cloud in the voice studio. Furthermore, standardizing the method of repertoire selection will make selecting repertoire easier and faster for voice teachers. Both singers and voice teachers will find it helpful as it offers an unbiased, systematic method for repertoire selection.

# NATURAL RESOURCES AND THE ENVIRONMENT

### Release of Stem Water of Four Rocky Mountain Subalpine Forest Tree Species (Poster)

Meridith Frazee, Lara Kueppers (University of California Berkeley, Energy and Resources Group), Nishita Dashpute (University of California Berkeley, Forestry Department), and Mary Thomas Powell (Colgate University, Biology Department)
Faculty Mentor: Thomas Powell (Earth and Environmental Systems)

Subalpine forests in the Colorado River watershed exert a strong control over the river's water supply, but we still lack basic knowledge about the traits that regulate the water-use of the tree species that dominate these forests. This study examines a particular trait, day capacitance, which is the amount of water released from a tree's stem tissue between dawn and midday. Of the four species studied, three were gymnosperms (Engelmann spruce, Lodgepole pine, Subalpine fir) and one was an angiosperm (Quaking aspen). Branches were harvested twice a day at a site on Snodgrass Mountain in Gunnison County, Colorado, USA. Leaf and twig samples were then analyzed using a Scholander pressure chamber, oven, and scale at Rocky Mountain Biological Laboratory. Measurements taken included leaf water potential and fresh, dry, and saturated mass. Day capacitance was calculated as the difference between available stem water in the afternoon and available stem water in the morning, normalized by the difference between the branch's water potential at midday and before dawn. Preliminary investigation of the data suggests a greater difference between fir and other gymnosperm species, especially spruce, than between aspen and the gymnosperms. Contrary to expectations, wood density does not seem to have a statistically significant impact on differences in day capacitance for these species. Understanding differences in trees' strategies for using water is essential for predicting how forests will respond to global climate change, and thus how a changing climate will affect water resources like the Colorado River.

# NEUROSCIENCE

### The Role of Brain-Derived Neurotrophic Factor in Drug Preference (Poster)

Laura Botros
Faculty Mentor: Kate Cammack (Neuroscience & Psychology)

The role of Brain-Derived Neurotrophic Factor (BDNF) impacts learning, memory, and addiction. BDNF, a vital protein involved in neuronal growth and plasticity, can be influenced by environmental factors and dietary foods such as dark chocolate and blueberries. Research has started to venture into BDNF helping the recovery of addiction from substance abuse. Substance abuse, as defined by DSM-5 criteria, affects a significant portion of the population, with alarming rates of opioid misuse and overdose deaths reported. Drugs like amphetamine, cocaine, etc. alter synaptic transmission and dopamine activity in the brain, contributing to addiction. Increased BDNF levels are found to be associated with enriched environments, affecting learning, memory, and stress recovery in the hippocampus alongside other brain regions. Research on mice with decreasing BDNF levels demonstrated the essential role that it plays in long-term potentiation and memory formation. More research has to be done to understand the specific impact of BDNF on higher cognitive functions. While the research so far has proved a connection more detailed understanding of those effects has to be further investigated. These findings of BDNF can address and enhance substance abuse disorder and the treatment provided for recovery.

### EEG Markers of the Flow State (Oral Presentation)

Sierra Brandts
Faculty Mentor: Christopher Shelley (Biology & Neuroscience)

This project aims to measure flow states quantitatively in real time using EEG in conjunction with an auditory oddball paradigm. The flow state has been defined as being fully immersed and experiencing optimal performance in an ongoing activity. This can occur when the challenge of the task matches the skill of the individual and this flow state has implications for optimizing learning. The standard protocol for measuring this cognitive state has required a self-reported questionnaire or experience-sampling form (ESF). This convention requires breaking the state in order to measure it in addition to other limitations including response bias and retroactive recall. On the other hand, electroencephalogram (EEG) techniques have been explored at length to better understand the neural bases, or biological markers within the brain for many cognitive processes. Namely, an EEG auditory oddball paradigm reveals novel prefrontal cortex activity when participants respond to infrequent, or target, auditory stimuli. This brain activity is referred to as an event-related potential (ERP) and describes a particular brain wave that occurs following a target stimuli. The brain wave produced from this oddball paradigm includes a P300 amplitude

and strong P300 amplitudes occur after participants respond to infrequent, or target, auditory stimuli. We predict that target oddball stimuli in high flow states elicit reduced P300 amplitudes and a slower participant response time to the stimuli. To achieve this, flow states were controlled using video gameplay which can be manipulated to induce high versus low flow states in each participant through tailored video gameplay sessions to their ability. Each participant responded to random and infrequent target auditory stimuli while playing their assigned game sessions in both high and low flow states. Extensive data analysis required isolating brain activity and integrating the ERPs to the target stimuli within each flow condition across forty participants. Through this work, we aim to show that EEG is a plausible way of measuring biological markers of this flow state within the brain. A quantifiable method will provide a foundation to further explore the advantages of flow as well as provide key information in determining the state of flow in a given individual.

## Methods of Drug Administration in *L. clathrata* (Poster)

Jackson Deneka and Yi Voon Lim
Faculty Mentor: Chris Shelley (Biology & Neuroscience)

Various neurotransmitters such as dopamine have been shown to contribute to behavioral responses in echinoderms, including the sea star *L. clathrata*. Existing literature has focused on immersing sea stars in drug solutions, which is a costly and time consuming procedure. We investigate injections as a novel method of administration—a procedure which drastically reduces the volume of drug needed, and therefore its expense. Previous research has demonstrated that a substance undergoes an approximate 500-fold dilution after sea star injection (Rosenberg et al., 2016). Injecting 3 M KCl produced severe effects, with the sea star undergoing autotomy on multiple appendages, suggesting that injection is a viable method of administration. Our preliminary tests also showed that dye injected into the sea star does not diffuse into the surrounding artificial sea water (ASW) solution. Given this, we performed two trials of sea star injections with haloperidol to determine if injections successfully slowed righting time. Beginning with a single injection into the perivisceral coelom in the aboral body wall of their arm, proximal to the central disk region, we adapted the protocol to inject all five arms with a total volume that was twice as high as the single-arm injections. Statistical analysis of both trials confirmed that neither haloperidol injection protocol had a statistically significant effect on righting times compared to control. Future directions will be focused on administration into the oral cavity of the sea star; hydrophobic molecules such as haloperidol cannot dissolve in water at high concentrations, and therefore cannot be taken up into a needle gauge fine enough to be injected into a sea star.

## Movement Velocity and Leading Arm Preference Can Quantify *L. clathrata* Sea Star Behavior (Poster)

Jadon Fetrow, Charlotte Montague, Ellie Vincent, and Allison Bizub
Faculty Mentor: Christopher Shelley (Neuroscience & Biology)

*Luidia clathrata* is a sea star that is typically found along the Atlantic and Gulf coasts. These animals move using thousands of tiny spindle feet, and typically prey on clams. There are limited methods regarding the measurement of sea star behavior, thus very little is known or understood about their conduct. To investigate if sea star movement is indicative of sea star behavior, recording equipment and ToxTrac was utilized to collect movement data for *L. clathrata* in both the presence of a food stimulus and without. Each condition consisted of a short restraint period after the first two minutes of being in the tank. The data collected through ToxTrac showed that velocity increased from 11.62 mm/s to 16.18 mm/s ($p = 0.016$). The acceleration did not significantly change ($p = 0.06$). Thus, the addition of food to the tank successfully changed the sea star's behavior through increasing movement velocity between the two trials. Controls were tested to ensure that any changes in movement were due to the presence or absence of food and not physical restraint. Recording equipment was further utilized to collect visual data on the arm positioning and preference in *L. clathrata* with the hope to determine whether sea stars have a dominant "leading" arm. The sea stars were physically rotated and the effects on arm preference were recorded and later analyzed. The analysis consisted of measuring the angle the *L. clathrata* was moving towards and then comparing this to the angles of the individual arms to determine if a dominant arm was present. In addition to recording the angle, we also recorded the time of travel in each direction to analyze further if *L. clathrata* have a dominant arm.

## Impact of Prenatal Per- and Poly-Fluoroalkyl (PFAS) Exposure on Child Cognition: Evidence from an Early Caregiving Intervention (Poster)

Martha Goldsmith, Adam Lombroso (Yale Child Study Center, Department of Obstetrics Gynecology & Reproductive Sciences), Hung Pham (Yale Child Study Center, Department of Obstetrics Gynecology & Reproductive Sciences)
Faculty Mentors: Krystall Pollitt (Yale Institute for Global Health), Jane Fisher (Monash University), Kieran O'Donnell (Yale Child Study Center, Department of Obstetrics Gynecology & Reproductive Sciences)
Sewanee Faculty Sponsor: Linda Mayes (Psychology)

Prenatal exposure to environmental toxicants such as Per- and poly-fluoroalkyl substances (PFAS) can have adverse impacts on child health and development (Fei et al., 2007), including low birth weight, birth defects, and differences in child cognition (Zhang et al., 2023). PFAS are highly stable, synthetic compounds used to make materials stain, oil, and water resistant (Houde et al., 2006) and have high bioaccumulation potential. This study aims to explore associations between prenatal PFAS levels and maternal characteristics within the Learning Club cluster randomized controlled trial (cRCT) and to test associations between prenatal PFAS exposure and

child cognitive function at 24 months of age. The Learning Club cRCT ($n$ = 1160) examines how early caregiving reduces the negative impact of prenatal health risks on child development in the Ha Nam province in rural Vietnam (Fisher et al., 2018, Fisher et al., 2023). PFAS levels in third-trimester maternal blood samples ($n$ = 60) were quantified using liquid chromatography high-resolution mass spectrometry (LC-HRMS). There was no significant difference in PFAS exposure between participants of different socioeconomic statuses, ages, or mental health scores. Exposure rates of PFAS were generally positively correlated, but PFOS showed the largest variation in concentration. In the full pilot sample ($n$ = 60), no significant correlation was observed between prenatal PFAS exposure and child cognitive function. However, when stratified by intervention group, we note a significant inverse association between PFDA and child cognitive function in the control group ($r$ = .377, $p$ = 0.031, $n$ = 33). No significant association was observed between PFDA and child cognitive function in the intervention group ($r$ = .045, $p$ = .825, $n$ = 27). Only pilot data were available for analysis at this time. This data was a smaller sample size compared to the total sample where $N$ = 860. Due to a small sample, we may not have had adequate power to detect associations between prenatal PFAS exposure and maternal or child characteristics.

### Racial/Ethnic Groups Moderate Correlations Between Parenting and Child Irritability (Oral Presentation)

Yi Voon Lim, Nellia Bellaert (Service de Psychologie Cognitive et Neuropsychologie, Université de Mons;), Julie Zhu (Yale School of Medicine), and Nabihah Ahsan (Yale University)
Faculty Mentor: Wan-Ling Tseng (Yale Child Study Center; Yale School of Medicine)
Sewanee Faculty Sponsor: Chris Shelley (Biology & Neuroscience)

Irritability is a core symptom and diagnostic criterion for various psychiatric disorders in children and adolescents, including disruptive mood dysregulation disorder (DMDD), major depressive disorder, generalized anxiety disorder, and dysthymia. Investigating how specific parenting ideologies and behaviors influence irritability may provide insights into the impact of a child's family environment on the development and maintenance of child irritability, which may inform targeted interventions to support healthy child development. Using three-wave longitudinal data from the Future of Families and Child Wellbeing Study (FFCWS), the current study examines concurrent and longitudinal associations between child irritability, parenting behaviors and parenting stress across different race and ethnicity groups. Novel cross-sectional and temporal network analysis methods (Epskamp, 2020) were employed to understand the complex interrelations between child irritability and parenting behaviors/stress, within and between different cultural contexts. Overall, the results demonstrate that parenting behaviors and stress were associated with child irritability within and over time across different racial/ethnic groups. Importantly, this study showed bidirectional effects between parenting behaviors/stress and child irritability across ages 3, 5, and 9. Results also indicated both similarities and differences in the temporal associations between race/ethnicity groups. That is, physical assault and non-violent discipline predicted future child irritability consistently across race/ethnicity groups. However, child irritability predicted increases in parental neglect in White but not Black participants. Parenting stress was bidirectionally associated with child irritability in Black

participants only. Future work is needed to elucidate factors relevant to each race/ethnic group and culture that contribute to these similarities and differences. By investigating how parenting behaviors are associated with child irritability and how these associations vary by culture, our results may inform tailored, culturally-sensitive interventions to support families in promoting positive child outcomes and well-being across diverse cultural backgrounds.

### Novel Molecular Mechanisms of How Axons Select Their Targets in the Zebrafish Lateral Line (Oral Presentation)

Abdalrahman Najjar, Gaurav Shrestha (Laboratory of Sensory Neuroscience, The Rockefeller University), and Nicolas Velez Laboratory of Sensory Neuroscience, The Rockefeller University
Faculty Mentor: A. James Hudspeth (Laboratory of Sensory Neuroscience, The Rockefeller University)
Sewanee Faculty Sponsor: Kate Cammack (Neuroscience & Psychology)

The lateral line system in zebrafish serves as a model for studying sensory neurogenesis and axon guidance. Here, we investigate the molecular mechanisms underlying axon selection within this system. Contrary to previous assumptions, we demonstrate that lateral line nerves can branch even in the absence of mechanosensory hair cells in the sensory organs known as neuromasts, suggesting a critical role of support cells in nerve branching. To better understand how nerves chose their target neuromast, we aimed to create supernumerary neuromasts. Pharmacological inhibition of ErbB signaling with Ag1478 resulted in the formation of supernumerary neuromasts. Furthermore, our investigation into nerve regeneration post-ablation revealed differential responses to Ag1478 concentrations, with lower concentrations facilitating successful regeneration. Additionally, we explored which molecular cues guide axons to their target. Single-cell RNA sequencing identified candidate genes, including manf and efna1a, potentially involved in axon selection. Knockout of manf using CRISPR/Cas9 technology resulted in a phenotype where axons exhibited imprecise targeting post-branching, underscoring the importance of manf as a guidance cue for axons. Our findings help illuminate the complex molecular mechanisms governing axon selection and nerve branching in the zebrafish lateral line system, providing insights into fundamental aspects of neural development.

### Optimizing DNA Transfection and Patch-Clamping Methodology for Hydra Na+ Channel Electrophysiological Recordings (Oral Presentation)

Madison Reid
Faculty Mentor: Christopher Shelley (Biology & Neuroscience)

Neuropeptide receptors are typically metabotropic and responsible for slow, modulatory synaptic transmission. The recently discovered RF-amide-activated Hydra Na+ channel is an ionotropic neuropeptide channel that plays a role in direct synaptic transmission. Much is still unknown

about the structure and function of this channel. However, the channel may be able to provide much-needed information for determining if ionotropic neuropeptide channels are present in humans and how the mechanism of activation differs from ion channels activated by small molecule classical neurotransmitters. Metabotropic neuropeptide receptors have already been discovered in humans and are implicated in various bodily functions. However, no ionotropic neuropeptide channels have been found to date in humans. This study aims to explore DNA transfection and patch clamping methodology to optimize electrophysiological recordings from Hydra Na+ channels to obtain single-channel recordings of the channels. Optimizing DNA transfection and patch clamping methodology is necessary to ensure that a suitable density of ion channels is expressed on the cell surface for single-channel recording and analysis. In this study, different DNA transfection and patch-clamping methodologies will be analyzed. The results of the methodologies on the electrophysiological recordings from the Hydra Na+ channels will be noted. The implications of these results will be discussed and future research study ideas will be explored.

### Changes in Movement Velocity in Response to Food are Indicative of Behavioral Changes in *L. clathrata* Sea Stars (Oral Presentation)

Ellie Vincent and Jadon Fetrow
Faculty Mentor: Christopher Shelley (Biology & Neuroscience)

The present study focused on the movement of *L. clathrata* sea stars in relation to changes in their experimental environment. Sea stars move using thousands of tubule shaped legs that can move independently of the rest of the tubules. In this study, we investigated whether measuring changes in sea star movement using ToxTrac software could accurately quantify changes in sea star behavior. We proposed that the introduction of food will increase the sea star's movement, particularly focused on changes in velocity and acceleration, indicating that their behavior was changed. Through filming videos with and without food present in a 12” by 6” tank, we were able to determine the average velocity and acceleration during both experimental and control conditions, with and without a 30 second restraint period. The controls included a 30 second restraint period with no food reward to ensure that any changes in velocity and acceleration were due to the presence of food and not the effects of the physical restraint. Similarly, tests using 100 µM haloperidol were conducted to determine the drug’s effect on the behavior of sea stars. From the tests using no food and food paradigms, ToxTrac analysis showed an increase in sea star velocity from 11.62 mm/s to 16.18 mm/s ($p = 0.016$). The change in acceleration from no food to food conditions was not statistically significant ($p = 0.062$). Further experiments will be carried out using the haloperidol immersion to determine if the drug can rescue the increase in velocity caused by food administration. This data begins to show that starfish, like humans, respond acutely to changes in their environments, especially when the stimulus is rewarding.

### Drugs of Abuse and the Brain-Gut Connection (Oral Presentation)

Kelly Walker, AbdAlrahman Najjar, Anna Püsök, Yana Van den Abbeele, and Revie Atkinson
Faculty Mentor: Kate Cammack (Neuroscience & Psychology)

The gut-brain axis has many implications for neuronal processes, especially in the mesolimbic rewards circuit. Alterations to this pathway can be detected using conditioned place preference (CPP) to measure changes in behavior (Kiraly et al., 2016). The gut-brain axis is influenced by bacteria in the gut which can produce neurotransmitters used for cell-cell interactions, but also influence the enteric and central nervous system (Strandwitz et al., 2018). Alterations to this bacterial composition by antibiotics (Abx) or drugs such as oxycodone decrease $\propto$-diversity causes a decrease in short-chain fatty acids (SCFA) that can move through epithelial cell walls and the blood-brain barrier to impact neuronal signaling (Simpson et al., 2020; García‐Cabrerizo et al., 2020). In this study, mice were treated with either normal drinking water or a course of Abx administered orally via their drinking water. After 13 days mice underwent CPP to assess their preference for oxycodone. There was a main effect of session where time spent in the oxycodone-paired chamber during the pre- and post-conditioning sessions differed. This finding suggests that our conditioning procedure was effective, consistent with existing literature (Cunningham et al., 2006, 2011). There was also an interaction between session and treatment with Abx mice spending more time in the oxycodone-paired chamber during the post-compared to pre-conditioning session, compared to control mice. Gut bacteria depletion was confirmed at the conclusion of the study using cecal weights.

## PHILOSOPHY

### On the Nature of Authenticity (Oral Presentation)

Matthew Schaublin
Faculty Mentors: Andrew Moser (Philosophy), Mark Hopwood (Philosophy) and James Peters (Philosophy)

The nature of authenticity appears to be an elusive, contentious, and coveted object of philosophical debate and theorization. Increasingly, authenticity has become an object of interest within the natural sciences, particularly, Psychology and Neuroscience. However, the philosophical approach to engaging with notions of authenticity has been characterized by ontological, metaphysical, and epistemological considerations of humanity, personhood, and selfhood which have been traditionally seen as within an incongruent relationship with the objective means of the natural sciences. This thesis posits the import of a dialectic between the existential, humanistic, and phenomenological traditions of philosophy and contemporary

empirical investigations into the nature of authenticity. This import is then framed by an exemplification of how one might begin such a dialectic, specifically through naturalistic speculation on the nature of authenticity as a process of self-composition—speculation which is informed by several philosophers such as Søren Kierkegaard, Martin Heidegger, Jean-Paul Sartre, and Charles Taylor.

# PHYSICS

### Design and Construction of a Low-Cost Raman Microscope For Undergraduate Experiments With Graphene (Poster)

Máté Garai
Faculty Mentor: Randoph Peterson (Physics)

High spatial resolution spectrometers often pose a financial burden to educational institutions due to their high precision fabrication, manufacturing, and maintenance costs associated with using the instrument. An alternative is an in-house design and construction using readily available optical components. This study presents a low-cost Raman spectrometer with an integrated 90X magnification long working distance microscope designed to analyze and characterize graphene and similar two-dimensional materials. These materials have gained significant attention due to their exceptional electronic, mechanical, and thermal properties, necessitating the availability of cost-effective analytical tools, such as a Raman spectrometer. The system is constructed using readily available components, including a 532 nm 300 mW probing laser, a confocal microscope design with integrated Köhler illumination for simultaneous image acquisition, and an education-grade Ocean Optics UV-Vis spectrometer with a customizable open-source LabView application, all within a budget of less than $10,000. The high-magnification microscope incorporated into the design allows for precise sample observation and positioning, thus enhancing the accuracy of graphene identification from Raman measurements on sub-ten micron size samples. We present results from various carbon-based materials, including commercial and exfoliated graphene flakes, along with the detailed layout and design parameters of the apparatus. The intuitive and open-source layout of the design makes it optimal for use in undergraduate advanced laboratory experiments. Students may use it to find, map, and quantitatively analyze exfoliated graphene samples for further experimentation. For students interested in instrumentation, the current design can be customized and improved upon, introducing them to the challenges of the world of optical design. For students interested in condensed matter experimentation, the Raman system serves as a versatile analytical tool for the characterization of materials and the investigation of light-matter interactions in various solid-state samples.

## Millikan Oil Drop: Electrostatics in Motion (Poster)

Brad Matthys
Faculty Mentors: Randolph Peterson, Michael Coffey, Doug Barlow (Physics)

The Millikan oil drop experiment is renowned for the discovery of the electron mass and foundational to the idea of elementary charges. By using the estimated mass of an oil droplet and measuring its velocity through a known electric field, one can derive the electron charge and mass. This experiment seeks to replicate the results using the Cenco oil drop apparatus in order to investigate the relationship between electrical and mechanical energy (including gravitational potential). While the particular focus of this experiment is on a single oil drop, the concept of electrostatic levitation has many practical applications in modern physics.

## Manipulation of Argon Plasma Under Controlled Environments (Poster)

Jose Osa
Faculty Mentor: Douglas Barlow (Physics)

The primary goal of the experiment is to be able to understand the complexities of controlled plasma formation, as well as to investigate methods of measurement for characterizing the phenomenon. Once these results are obtained, the goal is to implement a mathematical model that would describe the behavior of the observed plasma. It is known that plasma striations of noble gasses can occur when a high voltage is applied within a low pressure environment. We expect that the following measurable quantities will describe the observed striations, these are: anode-cathode distance, voltage supplied, electron density, and pressure of the system. This research explores the way in which a plasma within a controlled environment behaves, which could have relevance for the study of fusion based energy systems that could replace conventional power plants to supply clean energy. The research is mainly focused on Argon as the plasma gas, and the device consists of a vacuumed system with an enclosed glass tube, an anode, and cathode. This allows us to change the amount of plasma, the volume, the pressure, and the voltage across the system so that we can study conditions that may or may not lead to striations. We show that a recently reported semi-classical model describes the striations observed in the experiment

### Quantum Entanglement and the Understanding of Non-Locality (Poster)

Eric Stewart
Faculty Mentor: Randolph Peterson (Physics)

The theory of quantum entanglement is at the forefront of modern physics and challenges conventional ideas of reality. This research explores the fundamental principles and experimental observations to better understand how the quantum world works. Einstein believed that particles are deterministic and that there must be hidden variables to explain the probabilistic nature of quantum mechanics. Through a series of experiments, it is proven that there are no hidden variables acting on entangled particles. The first experiment analyzes how photons interact with polarizing and non-polarizing beam splitters. The next experiment uses the effects that were first discovered by Hong, Ou, and Mandel called photon bunching. These original concepts are fundamental to the final experiment and allow for a greater understanding of how single photons behave. This final experiment uses an entangled photon source created from the spontaneous, parametric down-conversion of a 405 nm photon. This process creates two photons called the signal and idler photons which are polarized horizontally and vertically respectively. The polarizations of these photons are measured in the rectilinear and diagonal bases to determine the behavior of entangled photons. These measurements are similar to bell inequality measurements but are easier to perform and provide clearer intuition. The results will determine which of the four bell states the entangled photons are in. Using these measurements, the experiment provides insight into how entangled photons work and disproves Einstein's local hidden variable theory and his theory of local realism. This means that the universe cannot be both local and real, and that it is possible to produce instantaneous effects at a distance that requires information to be sent at a speed much greater than the speed of light in a vacuum.

## POLITICS

### *Going Off the Books*: An Analysis of the Illegal Arms Trade with Terrorist Organizations in Colombia (Oral Presentation)

William Cady
Faculty Mentor: Rae Manacsa (Politics)

*Going Off the Books* is a deep dive into the world of the global illicit arms trade, discussing policy, administrative bodies, and terrorist organizations. Over the course of this study I reviewed over 30 different source materials from a wide variety of international policy experts including professors and international security analysts. This study uses an additive model to create a theoretical framework that explains how terrorist organizations are able to bypass the laws and regulations of world governments to purchase firearms. Throughout the study I found 4

distinct independent variables that contribute to this additive model. These variables will not necessarily be true in every situation but work to cover the most common scenarios governments face. This essay tests the validity of its theories by applying the framework to a case analysis of the Revolutionary Armed Forces of Colombia. While the purpose of this essay is to analyze the illegal global arms trade with an unbiased opinion, it creates advocacy. *Going Off the Books* is not a study with a happy ending, it is difficult. This study exposes loopholes that are used daily that could be prevented. The process of procuring arms across an international border does not take much effort for these organizations, governments in many cases are directly involved in giving terrorists weapons. There are over 500 million firearms circulating the international arms market, the equivalent of approximately 6% of the global population. This study does not end after graduation, I plan to expand this so that one day our policymakers in the United States will see the statistics and obvious holes. We can fix this collective action problem, but it starts when we begin to be a leader in disarmament. Thank you for taking the time to read a little about *Going Off the Books*, I hope to be able to share my findings with you and the rest of Sewanee soon!

### Losing G-d's War: The Paradox of Catholicism in the Argentine National Identity and Contemporary Progressive Social Politics (Oral Presentation)

Molly Jirgal
Faculty Mentor: Mila Dragojevic (Politics) and Sid Simpson (Politics)

From the modern State's inception, Catholicism has been deeply intertwined in the Argentine national identity. The Church's influence reached into the depths of Argentine political and social institutions, causing Argentinian life to be synonymous with the religious will of the local Catholic Church. To be Argentinian was to be Catholic. However, in the decades following the final military dictatorship (1976-1983) the political hegemonic discourse has veered away from strictly following the teachings of the Church to favoring progressive social policies. This begs the questions: how has the understanding of the Argentine national identity changed? Through analysis of interviews with secularist advocates and of a carefully crafted corpus of State, Church, and press documents, I hope to answer the question: given the importance of religion in the historical development and consolidation of the Argentine national identity, why has the presence of the Catholic Church in public and political life decreased in prominence since the 1960s? This paper focuses on understanding the growing tension between religious and social institutions in Argentina as they progress at different rates, and frequently in opposite directions. It seeks to examine the symbiotic relationship between cultural, social, and political institutions, and what it means for identity when these institutions come into conflict with each other.

## Framing Refugees in Merkel's Germany: Examining How German NGOs Effectively Promoted Asylum Rights (Oral Presentation)

Silas McClung
Faculty Mentors: Rodelio Manacsa (Politics) and Abby Colbert (Politics)

The number of people forced to flee war, violence, and persecution surpassed 100 million worldwide in 2022 for the first time. After a decade, Syria remains the world's largest refugee crisis after violent government crackdowns, civil war, and a deadly earthquake. Germany is the largest non-neighboring host country of Syrian refugees. This politics honors thesis examines how German NGOs effectively promoted international rules on asylum rights after the height of the Syrian refugee crisis under Chancellor Merkel's leadership. From 2017 to 2021, this paper looks at three German NGOs: Pro Asyl, FSH, and BumF's management resources, mobilizational networks, and legitimacy's impact on legal aid and campaign advocacy for Syrian refugees. This paper also analyzes the three German NGO case studies and discusses the implications of the findings for asylum seekers, the government, and others in civil society.

## Sacrificing Sanctuary: Prioritizing National Security over Human Security in U.S. Asylum Law (Oral Presentation)

Adri Silva
Faculty Mentor: Mila Dragojevic (Politics) and Abby Colbert (Politics)

The fact that national security interests often outweigh humanitarian concerns when reviewing asylum applications has been well-documented among scholars in the fields of international relations and asylum law. However, the lived experiences of asylum seekers have yet to be thoroughly examined. This qualitative study explores the paradoxical consequences of asylum in the United States as an international human rights commitment embedded in historically exclusionary and racially biased immigration policies. Specifically, this research aims to answer the following question: How do U.S. national security policies affect asylum seekers? The study uses original data collected by eight Co-PIs in semi-structured, qualitative interviews with a total of 72 asylum seekers on both sides of the U.S.-Mexico Border. Participants were recruited by emails and fliers with the assistance of New Mexico State University's National Science Foundation Research Experience for Undergraduates (NSF-REU) Collaborative Site Program on Immigration Policy and US-Mexico Border Communities. The findings reveal how national security affects human security by sacrificing sanctuary; by prioritizing national security, states do not uphold their commitments to human rights in the case of migrants seeking asylum. The absence of meaningful incentives for the United States to fulfill its obligations towards asylum seekers exposes the inherent flaws in the asylum system and its failure to uphold fundamental human rights principles. Despite systemic barriers, the study also presents the resilience of asylum seekers and finds compelling evidence of their humanity and agency as deserving actors.

### Struggles Plaguing the Abortion Movement in America, and How to Make A Difference (Poster)

LA Smith
Faculty Mentor: Sid Simpson (Politics)

The project I am submitting for the 2024 Scholarship Sewanee is from my current independent study which focuses on abortion rights at the state level before the overturn of *Roe v. Wade* in 2022, and how trigger laws and public school sex education play a huge role in impacting the issue. In this study, I ask the question: how do we make a difference in the struggle for abortion rights? After the passage of *Dobbs*, many U.S. citizens were upset that the right to an abortion would no longer be protected, but in reality, there were trigger laws in some states that were put into effect beforehand that made it utterly impossible to have access to abortions long before the downfall of *Roe*. During former President Obama's time in office, we saw a surge of Republicans taking office in local and state government and pushing their anti-abortion agenda through passing legislation. Through the early 2000s, we saw around 200 trigger laws getting approved and making it impossible for women to have access to abortion, especially in the Bible Belt. At the same time, public school sex education programs are failing to prevent unwanted teen pregnancies, making the need for abortions more acute. Through a cross-comparison of New England and the Bible Belt, I am arguing that the struggle for abortion rights is primarily at the state level instead of the federal. My takeaway from the research and what I want to get out of this independent study is that I want to continue raising awareness to make a difference in your community regarding access to abortion it starts at the state level.

## PSYCHOLOGY

### Self-Regulation and Learning in Elementary Education (Poster)

Caroline Alessio and Madeline DuBois
Faculty Mentor: Kathryn Morgan (Psychology)

Through an examination of qualitative data, this project aims to evaluate the effectiveness of self-regulation techniques taught to students in a mid-sized, urban elementary school. Self-regulation is defined as a self-guided process where individuals focus on their own thoughts, emotions, and behaviors, as well as elements of their surroundings, to adjust their learning objectives (Boekaerts & Cascallar, 2006). While previously popular, self-regulation methods have been increasingly criticized for an overemphasis on individual responsibility for behavior change, neglecting the structural and societal factors that significantly impact behavior (Stern et al., 2022; Vassalo, 2013). This project seeks to answer questions surrounding how teachers choose to integrate properties of self-regulation into classroom settings, or alter these teaching techniques based on the cultural background of the students. This qualitative study employs the

use of Inductive Descriptive approach. Coding was conducted via MAXQDA to evaluate qualitative data from 12 interviews with veteran teachers enrolled in a self-regulation professional development program during the 2013-2014 school year. Drawing on interviews between researchers, teachers, and students, we explored the implications of self-regulation on our understanding of how teachers integrate pedagogical practices based on their knowledge of students' lived experiences. Emergent themes include teachers' perspectives on self-regulation, instances of student self-regulation in teaching environments, and reasons why self-regulation interventions may not apply to every student. This research explores how educators modify, incorporate, and push back upon previously encouraged teaching methods by drawing on the lives and experiences of their students. With these results, educators can implement instructional approaches that consider both structural and societal factors that have a substantial impact on children's behavior. These more specific approaches can address students that would be negatively affected by one-size-fits-all self-regulation interventions, enhancing their ability to positively take charge of their own emotions in a classroom setting in a healthy manner.

## Exploring Perceived Influencing Factors on Sewanee's University Administration (Poster)

Brynn Anderson, Elizabeth Edens, Elizabeth Fletcher, Martha Goldsmith, and Margaret Mentz
Faculty Mentor: Chris Silver (Psychology)

The purpose of this study is to gain insight into Sewanee: The University of the South's student perception of university administration as it relates to their personal experiences. We aim to study the impact of the following student life factors: academics, student life, Greek life, athletics, dining, and safety. We hypothesize that if a participant is satisfied with three or more student life factors, the data will reflect a more positive perception of the administration. Participants must be undergraduate students ($N = 100$), ages 18-23, currently enrolled at Sewanee and in the Psychology research participation pool. Participants will take a survey using Qualtrics through the SONA System. The non-experimental study does not categorize participants by any conditions. The participants will be presented with a questionnaire of the following measures, randomized for each participant: Student Administration Perception Survey (SAPS), IPIP Interpersonal Circumplex (IPIP-IPC), and finally demographic questions. This is an ongoing study, and we expect to have survey results before April 26, 2024.

## Exploration, Perception, and Visualization of Substance Abuse Disorder Among Rural Counties (Oral Presentation)

Laura Botros
Faculty Mentors: Christopher Silver (Psychology) and Kate Cammack (Psychology & Neuroscience)

This study explores the perspectives of rural communities in middle south Tennessee on drug and alcohol abuse, investigating experiences and educational backgrounds related to substance abuse. Three central questions guide the research: strategies for community education, the educational and experiential backgrounds of individuals in rural areas, and generational differences in perceiving addiction. Qualitative one-on-one interviews were conducted following 3 categories of questions foundational, relational, and experiential. Participants shared their earliest memories and definitions of drugs, progressing to deeper discussions on personal experiences with substance abuse. This presentation highlights 4/8 themes in the research which include first memories and education of substance abuse as well as individual's experience using or observing others use substances. The research suggests that individuals with firsthand experiences offer more relatable insights to the community. While recognizing that education programs may not entirely prevent youth from substance use, they can influence behavior by imparting knowledge on the consequences, potentially limiting the use of certain substances. The findings aim to inform strategies for reducing drug use in rural areas of middle south Tennessee.

## Motivations for Substance Use amongst STEM and Non-STEM Majors: Implications for Stress Coping and Belonging (Poster)

Laura Botros, Samuel Grace, and Enistin Moon Gomes
Faculty Mentor: Kate Cammack (Psychology & Neuroscience)

Sewanee has a reputation for being a "party" school where substance use is common and encouraged by peers. Although motivations of substance use vary, it is common for undergraduate students to report using substances to belong, "fit in" and "to cope" or alleviate stress (Welsh et al., 2019; Stevens et al., 2021). Further, STEM students' sense of belonging and stress are impacted by a number of factors, including external factors (e.g., hidden curricula, implicit biases) and internal factors (e.g., imposter syndrome). When STEM students do not have a strong sense of belonging, they are less likely to persist in the STEM pipeline (Riegle-Crumb et al., 2019; Rosenzweig, 2021). Unfortunately, this pipeline is "leakier" for individuals with certain social identities (e.g., first-generation, people of color, women) than others (e.g., white, cis-gendered). It is plausible that STEM students (i.e., those majoring in Math, Biology, Chemistry) may be more likely to endorse motivations for substance use related to coping and stress relief, compared to non-STEM students (i.e., those majoring in English, Politics, Philosophy). It is important to better understand different attitudes and motivations regarding substance use in STEM and non-STEM majors. Findings may provide valuable insights into students' motivations and attitudes regarding substance use, with respect to major, and potentially inform more effective drug education and/or DEIBJ-based interventions within our STEM communities on campus.

## Sewanee Students' Perceptions about Different STEM Majors and Post-Graduate Potential (Poster)

Blake Bouldin, Russ Marr, and Jack Merril
Faculty Mentor: Kate Cammack (Psychology and Neuroscience)

Implicit bias is a subconscious, negative attitude against a certain social group (Greenwald et al., 2006). Everyone has inherent, implicit biases, whether they realize it or not (Gooblar, 2017). Implicit bias against women in STEM is well documented and contributes to less retention, persistence, and career advancement amongst women over time (Riegle-Crumb et al., 2019; Rosenzweig, 2021) and affects hiring practices and decisions amongst STEM managers (Friedmann & Efrat-Treister, 2023). Resulting gaps in STEM faculty, resource allocation, and retention prevents STEM departments from reaching their maximum potential, which potentially discourages students from pursuing their field of interest. Further, diverse teams are more innovative, more thorough, and had more successful outcomes than homogenous teams (Rock & Grant, 2016), which are crucial to the scientific process. Our HSTEM team is exploring faculty gender within Sewanee STEM departments and programs, resource allocation (e.g., lab space), and gender ratio of majors/minors within those departments. We predict that we will see gender bias in faculty rank and resource allocation, and that departments with stronger biases will have more discrepant gender ratios of majors/minors. Findings have implications for implicit biases and hiring and retention practices.

## Why Many STEM Students Feel Like an Imposter, and How This Can Change (Poster)

Will Brookby, Langdon Aronson, and Harrison Mabry
Faculty Mentor: Kristen Cecala

When STEM groups have diversity in thought, variety in ideas in ways of thinking can be revealed. Similarly, if a team has diversity in backgrounds or cultures, the possibility for success and new finding grows tremendously. However, if marginalized groups feel as though they "do not belong" in STEM, this diversity could be lost. One of the big reasons for this sentiment, especially among minority groups, is imposter syndrome. There are so many young students in STEM, namely in middle and high school, that give up on STEM due to bad experiences in an introductory STEM class. Additionally, many young students, many of whom identify with minority groups, feel discouraged when they do not see mentors with whom they align in their field. When individuals do not see leaders in STEM they relate to, they are less likely to pursue a degree or career in a STEM field. Similarly, if these students are told they "are not STEM people" in middle or high school, they will be more likely to leave STEM fields and gravitate Caldwelltowards other subjects. In our project, we will look at anecdotes from students that discuss the reasons for a belief that they do not belong in STEM and attempt to pinpoint how this

can be combatted in the future. We will also attempt to convey to students that feel this way that they are not alone, and potentially find solutions to aid in fighting against imposter syndrome.

### Sense of Belonging in Greek Life Organizations (Poster)

Emma Burns, Ashley Crosby, Elly O'Brien, and Tamara Rodriguez
Faculty Mentor: Terri Fisher (Psychology)

This study looked at the dynamics of sense of belonging and social connectedness within Greek life organizations, comparing sorority and fraternity members. With a sample size of 76 participants, including 63 sorority members and 13 fraternity members, participants completed an anonymous survey measuring these constructs and assessed perceptions of their respective organizations. Contrary to initial hypotheses, the data did not reveal significant differences between sorority and fraternity members in terms of their sense of belonging or social connectedness. This unexpected finding challenges prevailing assumptions about the nature of Greek life experiences and suggests a more nuanced understanding is needed. However, the study had significant limitations, such as a small sample size, disproportionate representation of sorority members, and homogeneity among participants. Despite these constraints, the study highlights the importance of further exploration into the factors influencing belongingness within college environments, particularly within the context of Greek life, to better inform support and intervention strategies for students.

### University of the South Residential Experience: University Housing Conditions' Relationship to Student Satisfaction (Poster)

Emma Caldwell, Louise Ferguson, Emma Lively, Will Pucek, Gennessee Torres, and Cate Yappen
Faculty Mentor: Chris Silver (Psychology)

Student satisfaction with university housing could be a prominent indicator of satisfaction with one's general experience in higher education. Previous studies examining this relationship consider factors such as air circumvention, accessibility of amenities, and housing security, but these factors vary between universities (Baldwin & Lathouras, 2020). Recent anecdotal student experiences with The University of the South's Residential Life led our team to explore the factors contributing to dissatisfaction with university accommodations. As part of our psychology research methods class, our project will analyze the impact that certain conditions of university on-campus housing have on students' satisfaction with residential life. We hypothesize a negative relationship between student satisfaction and housing. The resulting data could provide greater awareness about the effects of Sewanee's university housing on students' satisfaction concerning quality, maintenance, roommates, etc. Consequently, we will test correlations between well-being and particular aspects of residential living that could be improved and provide data on perceptions of improvements to residential procedures at Sewanee.

## HSTEM: Imposter Syndrome in Sewanee (Poster)

Ansley Carpenter, Max Moorman, Kathryn Kennedy, and Quinn Wicklund
Faculty Mentor: Kristen Cecala (Biology)

Students who begin their college education with an interest in STEM fields will enter what is known as the STEM pipeline, where they eventually pursue STEM careers. However, some students "leak" out of the pipeline by choosing non-STEM majors, pursuing non-STEM career paths, or dropping out of college altogether (Rosenzweig et al., 2021). This "leak" from the pipeline can be a result of many factors, but imposter syndrome among students is one of the main contributors. Imposter syndrome is apparent in our daily lives as college students, especially as we face the increasing pressure of finding jobs and pursuing certain career paths. Unfortunately, despite its prevalence on campus, most are not aware that it is even occurring, and do not know how to account for the early warning signs. Not only is it a broad issue, but also multiple research papers show that the levels of impostorism, especially in women, are higher in STEM courses. However, the findings display that this discrepancy also allows for the chance for STEM to start fostering more research collaborations and early feelings of achievement and accomplishment. (Tao & Gloria 2019; Nelson et al., 2019). Therefore, our proposed project aims to understand how imposter syndrome influences students to fall out of the STEM pipeline. Eventually, our findings could potentially be used to help buffer the increasing effects of imposter syndrome at Sewanee and nationwide.

## Gender Discrepancies Within Sewanee STEM departments: Potential Role of Implicit Biases and Implications for University Hiring and Retention Practices (Poster)

Lilly Daniels, Virginia Fox, and Brenna Riseling
Faculty Mentor: Kate Cammack (Psychology & Neuroscience)

Implicit bias is a subconscious, negative attitude against a certain social group (Greenwald et al., 2006). Everyone has inherent, implicit biases, whether they realize it or not (Gooblar, 2017). Implicit bias against women in STEM is well documented and contributes to less retention, persistence, and career advancement amongst women over time (Riegle-Crumb et al., 2019; Rosenzweig, 2021) and affects hiring practices and decisions amongst STEM managers (Friedmann & Efrat-Treister, 2023). Resulting gaps in STEM faculty, resource allocation, and retention prevents STEM departments from reaching their maximum potential, which potentially discourages students from pursuing their field of interest. Further, diverse teams are more innovative, more thorough, and had more successful outcomes than homogenous teams (Rock & Grant, 2016), which are crucial to the scientific process. Our HSTEM team is exploring faculty gender within Sewanee STEM departments & programs, resource allocation (e.g., lab space), and gender ratio of majors/minors within those departments. We predict that we will see gender bias in faculty rank and resource allocation, and that departments with stronger biases will have more discrepant gender ratios of majors/minors. Findings have implications for implicit biases and hiring & retention practices.

## Gender Segregation on Campus (Poster)

Hannah Rose Eason, Selena Piercy, Dagem Samuel, and Vivine Kampire
Faculty Mentor: Terri Fisher (Psychology)

This study investigated gender segregation on college campuses, aiming to identify variables correlated with perceptions and behaviors related to gender segregation. With 83 undergraduate participants, we used surveys to explore demographics, perceptions of gender segregation, and behaviors. While hypotheses predicted correlations between perceptions and gender-segregated activities, as well as attendance at single-sex high schools and participation in such activities, only partial support was found. Results indicated that Sewanee students perceive gender segregation on campus. However, correlations between perceptions and extracurricular activities were not statistically significant. Similarly, attendance at single-sex high schools did not correlate with gender-segregated behaviors. These findings underscore the need to better understand gender dynamics on campus and emphasize the importance of considering various factors influencing students' perceptions and behaviors in higher education contexts.

## Application of a New Ethogram to Study Nonverbal Mother-Infant Interactions in the Context of Substance Use (Oral Presentation and Poster)

Victor Esparza
Faculty Mentors: Jin Young Shin (Yale School of Medicine, Child Study Center), Amanda M. Dettmer (Yale School of Medicine, Child Study Center), Helena Rutherford (Yale School of Medicine, Child Study Center)
Sewanee Faculty Sponsor: Helen Bateman (Psychology)

Substance Use (SU) affects a significant percentage of mothers in the United States. The impact of SU on maternal caregiving behaviors has primarily been studied using self-reporting measures. This study used an ethogram originally developed in rhesus macaques and translated for use in humans to compare non-verbal interactions between mothers and infants in a diverse sample of SU ($n$ = 29) and Non-SU/control mothers ($n$ = 27). A significant SU x parity interaction was revealed for overall maternal attention, with experienced SU mothers exhibiting the lowest frequencies. Further study is recommended to better understand this relationship.

## A Review of Expressive Writing Interventions, Part 3: Positive Outcomes (Oral Presentation)

Victor Esparza
Faculty Mentor: Sherry Hamby (Psychology)

Expressive writing is a popular brief intervention for helping people process traumatic events or increase wellbeing. A systematic review of randomized controlled trials on expressive writing

was conducted of articles published between 2000 and 2021. The articles were coded in terms of population, writing prompt, program "dosage" (in terms of number of sessions and total minutes writing), and whether people are writing about a current or past trauma. This paper presents the articles that included positive outcomes such as subjective wellbeing, quality of life and positive affect.

## The True Colors Assessment Against Established Facets of Personality (Poster)

Joshua P. Fairhead and Maggie J. Barker
Faculty Mentor: Christopher Silver (Psychology)

Even though the True Colors Personality Assessment has seen wide usage in education and corporate business in the United States for the last 40 years, there exists a substantial need for more research on its validity, reliability, and especially its correlation with accepted models of personality. The present ongoing study ($N = 74$) examined how each color score correlated with the various factors of Jackson et al's (1996) Six Factor Personality Questionnaire and measures of Leadership and Teamwork. Orange was positively correlated with extraversion $r(72) = .32$, $p < .006$ as well as teamwork $r(72) = .31$, $p < .007$. Gold was positively correlated with methodicalness, $r(71) = .38$, $p < .001$, and intellectual openness $r(71) = .31$, $p < .007$. Blue was positively correlated with independence $r(72) = -.27$, $p < .019$, intellectual openness $r(72) = .23$, $p < .05$, industriousness $r(72) = .25$, $p < .032$, leadership $r(72) = .32$, $p < .005$, and teamwork $r(71) = .28$, $p < .015$. Green was positively correlated with intellectual openness $r(72) = .36$, $p < .001$. Data collection is still ongoing, and we aim to have a larger, more representative sample size before Scholarship Sewanee.

## HSTEM: Expanding our Understanding of the Influence of an Advisor's Gender on Women's Success in STEM (Poster)

Jillian Hall, Abby Armstrong, Autumn Sims, and Tatum Fortney
Faculty Mentor: Kristen Cecala (Biology)

Belonging in STEM is essential to future success and expansion within the career field. The issue of the leaky pipeline within STEM often affects minorities beginning in their postsecondary education, which results in student dispersal into non-STEM fields and consequently disproportionate representation. With a deficiency of women in administrative positions, there is a direct correlation between lower female employment and female student success within their academic sciences. As a result, first-year female students are often met with the prominent issue of underrepresentation from positive role models who share similar traits and interests. In our research we focused specifically on women advisors at Sewanee, for we acknowledge that there is an interwoven factor showing that female mentors encourage female success in most cases. They have more capability to empathize with the students' experiences firsthand and exert minimal bias, because they have endured and survived the STEM pipeline. Factors that contribute to this issue include negative biases towards female employment in STEM, hostile academic climates for females, and the lack of a social support system for women in STEM.

Therefore, having female role models (advisors) in STEM is important for women pursuing careers in this field. The research that we are pursuing will evaluate the gender ratio of pre-major assigned advisors in comparison to selected post-major advisors and their advisees.

### Stimulants at Sewanee (Poster)

Sally Herrington, Jessie Salisbury, Abby Burns, Baker Wilkins, Aylssa Fair, and Selena Piercy
Faculty Mentor: Chris Silver (Psychology)

The purpose of this study is to investigate the link between stimulant use and multiple aspects of undergraduate students' lives. Some of the aspects include but are not limited to; academic performance, social engagement, and mental and physical well-being. For this project, we are surveying the Sewanee student population to determine the impact of stimulant usage, such as caffeine, nicotine, and prescription stimulants, has a positive or negative relationship with the students' lives. We will be determining whether stimulant use within Sewanee students will positively or negatively correlate in academic and social environments. This study incorporates a sample from the Sewanee student community from a survey-based methodology. Questions that will help us gather our data and make conclusions will include measures of well-being, measuring the reliability of stimulant usage, and measures of social and academic life. Our dependent measure is the use of stimulants. We hypothesize that for individuals who use stimulants, the quantity of social and academic activities and achievements will be increased and the happiness level will be lower for individuals who do use stimulants daily. Essentially, we predict that the results will reveal that students' productivity will increase but their mental health will suffer. This study will have the potential to provide greater awareness about psychological constructs such as symptoms of depression and anxiety (sleep, food habits, exercise), stimulant use (caffeine, nicotine, prescription stimulants), GPA, academic achievements, and social involvement (Greek life, clubs, sports). Students will also have the potential to learn to make conscious decisions when deciding to partake in stimulants. Participants may also gain a greater understanding of how psychological research is conducted. It is important to note that this study is not without limitations. With surveys, self-reported data can be skewed and cause sample bias or be inconclusive. But with this in mind, once our findings are collected, we hope to have evidenced-based strategies to support students with or without stimulant use. The results will be presented at Scholarship Sewanee in hopes of offering insights to psychology-based research.

### A Scoping Review of Resilience In Australian Aboriginal & Torres Strait Islander Communities (Poster)

Camilla Kalthoff
Faculty Mentor: Sherry Hamby (Psychology)

Indigenous Australian people, also known as Aboriginal or Torres Strait Islander peoples, experience a greater degree of adversity, due to experiences of colonialism and racism, than non-indigenous Australian people in many domains of life; ranging from physical health, mental health, experienced racism, and economic inequities (Usher et al., 2021). However, the burden of adversities and trauma can be managed with resilience, particularly by utilizing regulatory strengths, interpersonal strengths, and meaning making strengths (Grych et al., 2015). There is a need for better understanding of the ways Aboriginal people make use of psychosocial strengths to thrive and overcome adversity.

## The Phenomenon of Personality Shift: The Influence of Language on Bilingual Individuals (Poster)

Miu Kazama
Faculty Mentors: Christopher Silver (Psychology) and Teri Terigele (Psychology)

Personality can be influenced by many factors, including bilingualism. Even though there is an argument that different languages produce different personalities, only a small number of studies have investigated the impacts of multilingualism on personality (Veltkamp et al., 2012). Therefore, the present research set out to investigate if a personality shift exists in responses when participants take the Big Five Personality Measure, reflecting on their responses both in their first versus second language. We recruited individuals (N= 155) who identified as being fluent in two or more languages. Roughly 88.8% of the sample identified English as their first language, while 10.7% identified English as their second language. All samples were taken from a small liberal arts university. All participants identified being functionally fluent in a second language. Using a paired-sample t-test, we found that for extraversion, those who reflected on their first language scored higher on extraversion than those who reflected on their second language $t(154) = 6.13$, $p < .001$. Participants reported they were more agreeable in their first language than in their second language $t(153) = 2.91$, $p < .004$. Moreover, first-language individuals were more conscientiousness as compared to how they self-reported their personality in their second language $t(153) = 2.07$, $p < .040$. Finally, participants scored higher on openness to experience in their first language than their second $t(153) = 6.79$, $p < .001$. This study provides evidence that as people reflect on how they behave in their first versus second language, there may be personality shifts in how they express themselves. Drawing on the data obtained through the measuring tool, we will explore whether or not the discrepancies in personality traits exist in functionally fluent individuals and how their specific cultures play a role in how they think and behave.

## What Is the Role of DEI Initiatives in STEM Education at Sewanee, and How Are They Implemented Most Effectively? (Poster)

Tuyen Le, and Mate Garai
Faculty Mentor: Kristen Cecala (Biology)

Current systematic structures in science, technology, engineering, and math (STEM) education benefit students of certain identities more than others while disproportionately harming others. They take on various forms, ranging from 1) explicit microaggression against minority scientists; 2) implicit biases toward favoring male student applications; 3) systemic "hidden curricula" where socially privileged students are more knowledgeable about unspoken expectations; 4) opportunities to succeed. This disparity in treatment and education deprives the STEM community of minority and diverse voices who could not persist in an environment systematically engineered to disadvantage them. However, despite this intimate connection between STEM and the issues of diversity, equity, and inclusion (DEI), it is not a prominent awareness on the Sewanee campus. Though recent initiatives have been taken in some STEM departments, there is still room for improvement for an equitable experience across all departments. By raising awareness and engagement with identity as a factor in performance in STEM classes and careers, students can be prepared to recognize and cope with the systemic imbalances when they encounter them in Sewanee and beyond. Our HSTEM project aims to evaluate how DEI initiatives play a role in STEM education at Sewanee and highlight and outline potential strategies to move forward. We hope to use our data to advocate for a more conspicuous and robust role of DEI in STEM education at Sewanee.

## Enhancing Health Equity in Grundy County, Tennessee Through Community Design Charrettes (Poster)

Mya Lopez, Caroline Alessio, Lindsey Ahrndt, Madeline DuBois, Madeline Thornburg, and Ellie Vincent
Faculty Mentor: Kathryn Morgan (Psychology)

The health of the built environment is vital for ensuring equity, as it shapes physical surroundings that influence public health, well-being, and quality of life. The Healthy Built Environment Project is a community-based participatory research project aimed at understanding and improving the overall health and wellness of individuals living in Grundy County, Tennessee. While health and wellness are highly important for overall well-being, Grundy County faces extreme health issues. Specifically, 38% of the population struggles with obesity, 28% are insufficiently physically active, and the premature death rate is nearly double the national average. Through community design charrettes, the findings of this project will be implemented into a Health Equity Plan that will center the voices of Grundy County residents. Between February and April 2024, we will be conducting participant observation during six community design charrettes facilitated by Grundy County community leaders. These leaders have been selected to help facilitate these discussions and charrettes due to their positions in and connections to these communities. Data collection is ongoing and will conclude on April 25,

2024. This research will share emergent themes present in the community conversations, highlighting priorities concerning connectivity and planning. Through discussions and design charrettes between community leaders and members, we will explore areas that could be improved to better impact the health factors of individuals living in Grundy County. By conducting participatory observation during these charrettes, we can structure a health equity report consisting of priorities identified by the community and work toward establishing resources to increase access to housing, transportation, and other resources needed to decrease negative social determinants of health. This work aims to deepen understanding of the critical role community participation plays in planning processes, particularly in driving positive changes to address health disparities within a community.

### The Correlations Among Religion, Art, and Emotion: An Exploration of Secular and Religious Art on Emotional Responses (Poster)

Madison Loud
Faculty Mentor: Christopher Silver (Psychology)

The purpose of this study was to explore differences, if any, between a group of participants' emotional responses to secular versus religious art. In other words, our hope was to see if someone's religious beliefs would affect how he or she views a secular piece versus a general nonsecular piece versus a nonsecular piece whose subject matter pertains to his or her specific religiosity. To do so, we designed a survey composed of thirty-six images of pieces of art with subject matter of different religions as well as secular art along with a chart attached to each asking participants to rank each of the following emotions on a five-point scale based on the extent to which they feel each: anger, disgust, fear, anxiety, sadness, joy, desire, satisfaction, and transcendence. We sampled college students from a small southeast liberal arts college ($N$ = 102). We sorted the images by secular versus religious art and compared the summed scores on each of the emotions. We selected 18 secular and 18 religious images for overall comparison conducting a paired-sample $t$-test. All emotions except disgust and transcendence showed a statistically significant difference where secular images had higher self-reported summed emotion scores as compared to religious art summed self-reported emotion scores ($p < .05$). Further analysis will be presented at the conference related to religious/secular identity as well. The implication of the study is that liberal arts students may find more emotional meaning in secular versus religious works of art.

### HSTEM: The Role of Professor Mindset and Actions on Student Persistence in STEM (Poster)

Andrew McDonough, Atticus Kowalski, and Cody Baerlocher
Faculty Mentor: Kristen Cecala (Biology)

The STEM pipeline is often used as a metaphor for describing student retention in Science, Technology, Math, and Engineering fields in education (Riegle-Crumb et al., 2019; Rosenzweig

2021). Unfortunately, many “leaks” in the pipeline occur when minority students leave STEM fields to pursue other career paths much more often than their majority peers. One factor that enables leaks in the pipeline is the difference between teachers and their teaching methods. The mindset of a STEM teacher can greatly affect the likelihood of as student dropping out of a class, or even prevent them from taking the class at all (Canning et al., 2019; Lacosse et al., 2020). Further, this effect on persistence in STEM fields is far greater in minority students. Our HSTEM team will use existing resources to identify the effects that professors have on whether or not students leave the STEM pipeline.

## The Effects of Parenting on College Age Religiosity (Poster)

Hope Murphy
Faculty Mentor: Christopher Silver (Psychology)

There is a large dip in church attendance among college students. This research project examines the relationship between parenting styles and religiosity among college students. This survey specifically asks Sewanee college students between the ages of 18 and 23 with questions regarding perceptions of spirituality throughout their lives and how their individual definitions of religion have changed over time. Surveying this specific group in a religious-affiliated school allows a multitude of reasons for this dip in attendance, as well as the reasons why college students expand or change their beliefs so much within the first few years away from home. This study also examines how the influence of others, including parental figures, significant others, and friends, influences a person’s religiosity with measures to determine the parenting styles that each participant experienced during their childhood. With this specific survey style, it is expected that participants who experienced a stricter parenting style will have lower religiosity levels, especially if their parents heavily pushed religion during childhood. This research can hopefully assist colleges and religious institutions alike in aiding in the transition from home to college with religiosity expansion or changes throughout the participant’s new educational journey.

## A Scoping Review of Resilience Among ICU Nurses (Poster)

Selena Piercy
Faculty Mentor: Sherry Hamby (Psychology)

The stressful and traumatic nature of nursing jobs, especially in specialized units such as the intensive care unit (ICU), puts nurses at higher risk for psychological distress or more severe diagnoses like PTSD (Li et al., 2021; Mealer & Jones et al., 2017). However, stressful and adverse events can be overcome by harnessing psychosocial strengths in a process known as resilience. First responders like nurses may be in particular need of resilience but also have unique considerations due to their work. One theoretical model that can be flexibly adapted to different populations is the Resilience Portfolio Model (RPM; Grych et al., 2015). The RPM focuses on three types of strengths: meaning making (connecting to something larger than

oneself), regulatory (managing emotions and behavior), and interpersonal (the social and physical ecology).

### HSTEM: How Belonging in STEM Can Contribute to the Leaky Pipeline at Sewanee (Poster)

Charlotte Proctor, Mary Elizabeth Jackson, and Claire Sanders
Faculty Mentor: Kristen Cecala

Belonging in the STEM field is an ongoing issue throughout many higher education institutions. Students who enter college with an interest in STEM (science, technology, engineering, and mathematics) and flow through a "pipeline" potentially leading to pursuing a major and/or career in these fields (Rosenzweig et al. 2021). The pipeline has proven to have "leaks" particularly for specific minority groups (Rainey et al., 2018). Our team is curious about how this problem manifests itself at Sewanee, and how prevalent it is. We aim to collect data from students about how their intended major has or has not changed since they began their college careers. By surveying the Sewanee student body, we may gain a greater understanding of where we stand as an institution in regard to the STEM pipeline and why students are choosing to change their intended STEM major to another field. We hope to present our findings regarding the amount of students who have left STEM majors, and what role a lack of belonging in the field played in that decision.

### The Relationship between Imposter Syndrome on STEM Major Declaration (Poster)

Maria Rojas, Morgan Canty, and Kelly Walker
Faculty Mentor: Kate Cammack (Psychology & Neuroscience)

Imposter syndrome is a common phenomenon affecting many college students and contributing to stress (Bravata et al., 2020). Recent research indicates that imposter syndrome impacts first-generation students and students who identify as underrepresented minorities more frequently (Holden et al., 2024; Peteet et al., 2015). Students who feel a greater sense of imposter syndrome are often less likely to take advantage of opportunities presented to them, as they don't feel as though they deserve them or are as capable as their peers to perform the tasks necessary to take part in said opportunities (Johnson, 2022). Imposter syndrome can significantly impact students' academic experiences, and it is essential to explore its influence on major declarations. Our HSTEM team is exploring qualitative and quantitative data from students about their experiences with imposter syndrome and declaring a major at Sewanee. We will discuss the process of study design, participant recruitment, data collection, and how data could be shared with the campus community. Findings have important implications for students feeling capable and supported, leading to more diverse environments that increase innovation and critical thinking (Rock & Grant, 2016).

## The Impact of Parental Influence on Young Adults' Community Engagement: A Qualitative Study (Poster)

Maria Rojas and Annie Beth Clark
Faculty Mentor: Kathryn Morgan (Psychology)

As youth progress into young adulthood, assessing their parents' influence on community involvement is essential to understanding the developmental roots of sociopolitical control (SPC) (Christens & Peterson, 2012). SPC encompasses individuals' beliefs regarding their capability and efficacy in making a positive change within social and political systems. Community involvement strongly impacts psychological empowerment and positive SPC beliefs (Christens et al., 2011). Drawing on a 25-year longitudinal study of Canadian families, this presentation explores how early-life experiences may influence young adult community involvement. Utilizing data from 51 dyadic interviews with parents and their young adult children, we explore the nuances of family dynamics and developmental experiences that may shape community engagement in later years. In dyadic interviews, participants were asked questions about their sense of community and community engagement from childhood to adulthood. By drawing on the narratives of parents and young adult children, we explore the extent to which parents' community involvement influences the community engagement of their young adults. These qualitative accounts reveal three intergenerational patterns in which parental influence shapes the development of SPC during the transition from youth to young adulthood: 1) early-life experiences, 2) family interactions, and 3) parents' level of community involvement. We will explore themes related to a sense of community while illuminating SPC's potential developmental roots. We will also share future directions for this research and suggest pathways to sustaining engagement in the community in ways that might support SPC development, including early participatory action interventions and approaches to fostering a sense of community among family members.

## A Scoping Review of Resilience Among Youth Experiencing or At-Risk for Schizophrenia (Poster)

Matthew Schaublin
Faculty Mentor: Sherry Hamby (Psychology)

Schizophrenia and other psychotic disorders encompass a range of serious psychological conditions characterized by self-concept disturbances, delusions, hallucinations, disorganized speech or behavior, and negative symptomatology such as affective flattening and poverty of speech. People with psychotic symptoms have higher trauma rates than others, but also have strengths. This scoping review identifies psychosocial strengths associated with better outcomes for youth experiencing or at-risk for psychosis, using the resilience portfolio model as a framework. Method: We searched PsycInfo and PubMed for articles that included "resilien*," "schizophrenia*," and either "youth" or "adolescen*," yielding 410 articles. After excluding duplicates, and articles focusing on genetics/neurology, lacking data on strengths, or focused on adults, 22 articles remained. Results: Interpersonal strengths such as social support were most commonly studied; most of these focused on the home environment. Even research including

regulatory strengths often looked at external sources. Only two studies assessed meaning making strengths, even though this is an important domain in other resilience research. Conclusion: There is a surprising lack of research on individual assets of youth who have experienced psychotic symptoms, with almost all research focusing on family or other interpersonal assets. A more holistic, strengths-based approach to working with these youth is needed.

### Authenticity, Transformation, and The Sense of Agency In Narrative Identity (Oral Presentation)

Matthew Schaublin and Gavin Goodwin
Faculty Mentors: C. Albert Bardi (Psychology) and Christopher Silver (Psychology)

This study explores the intricate relationship between narrative identity and the themes of authenticity, agency, and communion. Employing an enactivist framework of personality functioning, the research utilizes self-report measures and life-narrative methodologies in a mixed-method experimental design to examine the retrospective sense of agency in individuals' authentic and developmental life stories, as well as the thematic content of these narratives. The experimental investigation centers on the degree to which individuals report having experienced the sense of agency during moments transformative for their self-understanding, and moments in which they felt most like their true selves. Prior literature highlights the complexities in defining authenticity and differentiating between the actual, true, and real self-conceptions as constructs related to narrative, pointing to various perspectives on how authenticity and agency may contribute to a process of "narrative self-composition." This study uniquely focuses on the retrospective, reflective sense of agency within narrative accounts of authenticity. We hypothesized that individuals who articulate more themes of authenticity and agency in their stories are likely to self-report a stronger sense of agency retrospectively. The presented research aims to contribute to understanding how narrative identity is constructed and reflects deeper psychological processes related to authenticity and agency. By integrating theoretical perspectives and empirical findings from previous studies, this research addresses a gap in the current understanding of how individuals narrate their experiences and perceive their roles within these narratives, offering insights into the dynamic interplay of authenticity, agency, and communion in personal identity development.

### Female Representation in Video Games Over Time (Poster)

Rose Sykes, Cat Ruen, and Andrew Cobb
Faculty Mentor: Teri Terigele (Psychology)

The video game entertainment industry is widely popular, with a market revenue estimated to be about 347 billion USD in 2022 (Clement, 2024). Meanwhile, the gaming industry is largely driven by male creators, often catering to male audiences. The inaccurate and negative representations of women in video games can perpetuate stereotypes, biases, and unrealistic standards held toward women in real life. With this study, we aim to measure how or whether representations of female video game characters in popular franchises have changed over time. This research promotes diversity and inclusion in the gaming industry by highlighting the

importance of female representations in video games and discussing its real-life implications. This study is guided by feminist theory and framing theory. By taking a feminist approach (Arinder, 2020), this study examines and discusses the urgent need of developing women's portrayal in video games from overly sexualized, non-autonomous characters toward independent and accurate representations of women. Additionally, supported by framing theory (Goffman, 1974), this study explores the specific characteristics of women that video games frame and highlight. The overarching research question is whether the gaming industry made an adjustment towards less stereotypical representation of female characters, with an introduction of more self-sufficient, playable, respected, and not overly sexualized female characters over time. We conducted quantitative and qualitative content analyses to answer the research question. Specifically, we compared the primary female characters in the earliest and most recent applicable games from six franchises, *Super Mario Bros*, *Legend of Zelda*, *Mortal Kombat*, *Resident Evil*, *Tomb Raider*, and *The Last of Us*, respectively. These games were selected due to having at least 50 million sales and featuring a story aspect. In order to measure the changes in depictions of the primary characters, we coded their representations through four categories: sexualization, self-sufficiency, playability, and treatment of character. This is a project in progress. We're planning on completing the coding process by April 1st, checking the inter-coder reliability and completing the data analyses by April 15th, and finishing a full manuscript by May 1st.

### Is There a Gender Difference Within Personality Traits and Conflict Management Styles? (Poster)

Brooklyn Taylor, Arden Laster, Jazmin Sevillano, Camilla Kalthoff
Faculty Mentor: Terri Fisher (Psychology)

This study investigated the relationship between gender, personality traits, and conflict resolution styles (CRS) among undergraduate college students. Hypotheses predicted gender differences in CRS, with females scoring higher in compromising and competing styles and males higher in avoiding styles. Additionally, correlations were expected between certain personality traits and CRS. Surveys including measures of personality traits and CRS were administered to 75 participants. Results showed limited gender effects on CRS and personality traits, challenging previous findings. Notably, males exhibited a correlation between an avoidant CRS and neuroticism. Contradictory findings suggest a need for further research to understand the factors contributing to CRS. While hypotheses were not fully supported, the study sheds light on the complexity of gendered experiences and their impact on behaviors, mental health, and personality traits related to conflict resolution.

## Intersecting Identities: The Relationship between Greek Life and STEM Disciplines (Poster)

Carlton Ward, Levitt Mosely, and Henry Kovan
Faculty Mentor: Kate Cammack (Psychology & Neuroscience)

STEM disciplines can be important drivers of technological and social change. Many people are interested in STEM, particularly through early experiences (VanMeter et al., 2014), but drop out of STEM as they get older, including the college years (Riegle-Crumb et al., 2019; Rosenzweig, 2021). STEM courses are perceived as academically rigorous (Wyse & Soneral 2018) and often require a level of focus and time commitment (e.g., lab sections) that can leave students with limited time for extracurriculars. Extracurricular involvement, however, can be a key factor contributing to students' sense of belonging on campus. A common example is Greek life, which has been shown to enhance belongingness, particularly amongst students with minoritized identities (Mowreader 2024). While Greek life also has a lot of negative stereotypes that may push the more devoted academics away from it (e.g., stereotype threat), it is possible that STEM students who do not participate in Greek life have less of a sense of belonging on campus and also miss out on various aspects of social capital (e.g., networking, peer support). Our HSTEM project explores the extent to which Greek and STEM identities intersect, with a specific focus on fraternities. Findings might help Sewanee's campus better support STEM-curious students who are involved in Greek life and/or enable greater sense of belonging on campus in our STEM majors.

## Dialogic Research through Podcasting to Promote Inclusivity, Belonging, Self-Discovery, and Storytelling (Oral Presentation)

Makayla Williams
Faculty Mentor: Kathryn Morgan (Psychology)

This study investigates the influence of storytelling on enhancing connectivity and collective awareness among minority student populations at Predominantly White Institutions (PWIs). These students often experience underrepresentation and discomfort in expressing themselves within such environments. Employing an Action Research paradigm alongside a qualitative research methodology, the study uses deductive thematic analysis to explore the factors influencing student belonging and identity within the campus community. The research methodology included Group Level Assessment (GLA) with a focus group of five participants, two individual interviews, and two auto-ethnographic insider interviews led by researchers. GLA was chosen for its emphasis on the co-creation of knowledge and the development of actionable plans to address community issues, facilitated through seven open-ended prompts categorized into themes such as strengths, specifics, silliness, structure, negatives, and seriousness. Participants engaged in focus groups and interviews were encouraged to share their experiences regarding privilege, oppression, and adversity, aiming to create a safe space for dialogue. This participatory approach empowered both researchers and students, fostering a deeper

understanding of the intersectionality between individual sense of belonging, self-perception, and community integration. Findings highlighted the necessity of acknowledging the complex interplay between individual identities and community dynamics. As a result, the study proposed the creation of a community product to embody student and community voices, leading to the development of "The Wellness Pod." This podcast aims to collect and disseminate diverse narratives from Sewanee's community, enhancing accessibility to conversations and broadening audience reach. Through "The Wellness Podcast," the study underscores the significance of dialogic research in community engagement and the impactful role of storytelling in bridging gaps within the community. This research underscores the transformative potential of storytelling and dialogic engagement in promoting inclusivity and understanding within academic communities. Similar initiatives may benefit minority student populations across Predominantly White Institutions.

# RELIGIOUS STUDIES

### Theosophy: A Spiritual Journey (Poster)

Bella Boswell and Elizabeth Outlaw
Faculty Mentor: Kati Curts (Religious Studies)

Our research explores the principles of Theosophy, a spiritual and philosophical movement that emerged in the late 19th century. Influenced by Buddhism and Hinduism, founders Helena Blavatsky and Henry Steel Olcott formulated three "core objects" of Theosophy. Firstly, to form a nucleus of the universal brotherhood of humanity, without distinction of race, creed, sex, caste or color. Secondly, to encourage the comparative study of religion, philosophy, and science, and finally, to investigate unexplained laws of nature and the esoteric powers latent in humanity. The Orientalist history of Theosophy's emergence and its unique conglomeration of religious phenomena continues to animate considerable work among scholars of religious studies. However, public knowledge of this movement remains much more limited. In this project, we describe and analyze Theosophy's "core objects" and contextualize them by exploring their historical formation, philosophical meanings, and contemporary relevance. Through a study of Blavatsky's original doctrinal works and analyses of later Theosophist texts, we seek to examine the tradition's esoteric teachings and provide insights into its mix of various eastern esoteric practices and beliefs as well as its significant relationship to Spiritualist practices. We hope to foster intercultural understanding and contribute to a more comprehensive understanding of this seemingly mysterious religious movement.

## Issues of Sexual Assault within the Jehovah's Witnesses (Poster)

Anna Brooks and Beylie Ivanhoe
Faculty Mentor Kati Curts (Religious Studies)

This research project explores incidents of sexual assault among members of Jehovah's Witnesses (JW). Like many other minority religious groups in the United States, the organization has been subject to much scrutiny and conflict with the United States government. Much of that attention has focused on its controversial practices, including JW members' tendency to refuse blood transfusions and the group's pacifist position relative to military service. Existing scholarship on Jehovah's Witnesses has tended to focus on how these practices and positions contribute to larger discussions about religious freedom in the United States, including concerns about women's rights and bodily autonomy among JW. Our research builds upon this work by focusing on the way that the Jehovah's Witnesses handle sexual assault cases, which will help us to better understand this aspect of religious freedom. This project examines on how JW intersects with the legal system by focusing on the court case *Conti v. Watchtower* and the case of Ria Williams, each of which document child molestation and rape within JW communities. We consider these cases in order to approach questions of sexual assault and religious freedom within minoritized groups like the Jehovah's Witnesses.

## He Said, He Said: Confusion Behind the Radical Faeries (Poster)

Rowan Carter, Morgan Phares, and Hailee Rains
Faculty Mentor: Kati Curts (Religious Studies)

The Radical Faeries is a group founded in San Francisco, California in 1979 to cultivate gay consciousness, queer spirituality, and sexual practices. They derive many of their rituals from Neopagan and Native American traditions, potentially appropriating them as many members were white. After their initial meeting, they began to focus on living in communion in rural spaces liberating gay men from urban centers, and forming new communities focused on collective processes of self-discovery and ties to settled land. The Radical Faeries borrowed ideas from feminism, Marxism, and anarchism. The group originally only allowed members who were gay men but has shifted to include other genders and sexual identities. Founded by Harry Hay, Don Kilhefner, and Mitch Walker, there was a divide in the group about determining what the purpose or message of the movement would be. Part of the group wanted it to be more political while the others wanted it to be more spiritual. After being unable to determine their focus, the founders split with Mitch Walker leaving early on. They also could not agree on whether or not to use queer psychoanalysis in the development of their ideology. We look to clarify the history of the Radical Faeries using different perspectives, including interviews and writings from some of the group's founders. We will also examine secondary sources from insiders and outsiders of the group that delve more deeply into the Radical Faeries' practices, dynamics, and beliefs to comprehend the ambiguity behind the movement. We find differing understandings from each founder regarding the function of the group from its beginnings. We find that it stemmed from the different understandings of its initial goals. We find that the group's beliefs and practices changed after the death of Harry Hay and as more gender and sexual identities were included in the Radical Faeries. This research is important because the

study of queer religiosities is limited and we want to acknowledge that there is diversity in religious practices and spiritual beliefs. This is also important because one of the major queer religions has such a complex history.

### Communion Cracker Calorie Counting: A Cultural Understanding of Religious and Diet Culture Power Dynamics in the United States (Poster)

Annie Beth Clark
Faculty Mentor: Eric Thurman (Religious Studies)

Diet culture, evangelicalism, and popular culture in the United States permeate almost every aspect of everyday life. The societal obsession with thinness is not merely a matter of aesthetics but reveals deeper power dynamics rooted in religious and pop-cultural messaging. To investigate these dynamics, the study utilizes a theoretical framework developed by David Forbes (2017). Forbes outlines four dimensions of intersectionality between religion and popular culture: religion in popular culture, popular culture in religion, popular culture as religion, and religion and popular culture in dialogue. Applying Forbes's framework, the study investigates how religious themes and iconography manifest within mainstream diet culture (religion in diet culture). It further examines how Evangelical churches may incorporate secular marketing and strategies derived from popular culture (popular culture in religion). Additionally, the study questions whether aspects of diet culture take on a quasi-religious function (diet culture as religion) and explores spaces where diet culture and religious ideologies overlap and interact (religion and diet culture in dialogue). The cultural idealization of thinness serves as a tool within patriarchal Evangelical power systems. Through a close reading of these cultural intersections, the study aims to uncover how the religious valorization of thinness functions as a mechanism of social control, particularly over women's bodies.

### Sexual Freeness and the International Spread of Raelism (Poster)

Brendan Downes
Faculty Mentor: Kati Curts (Religious Studies)

For the last 50 years, religious scholars have extensively researched "UFO religions." These scholars have emphasized how these religions center their theology around space, extraterrestrial beings, and alien technology. Raelism is a UFO religion founded by French journalist Rael. Raelism's reinterpretation of the theology of other religions and its ethical system grounded in sexual liberalness make it unique among its peers. Many social critics and some religious scholars cite pop culture's fascination with aliens, UFOs, and science-fiction in the mid-20th century as the secret to Raelism's success. Although this may explain the rise of many of these UFO religions, it fails to explain Raelism's lasting appeal. This project argues that the Raelist belief of free love and the unique place reserved for women in the religion are central to Raelism's lasting appeal and helps lend Rael's claim of leading "the world's largest UFO religion" greater legitimacy. This project describes the roles reserved specifically for women in Raelism and contextualizes those roles with prevailing religious research on gender within

religions. This project solely focuses on Raelism as opposed to comparing UFO religions, first giving a brief history of its formation before moving into the gendered politics of Raelism.

### Unveiling the Masonic Sisterhood: Women's Involvement in Freemasonry (Poster)

Virginia Echols
Faculty Mentor: Kati Curts (Religious Studies)

Freemasonry is a fraternal organization that focuses on self-improvement and teaching moral, intellectual, and spiritual lessons to becoming a better individual. Freemasonry is often understood to be the oldest fraternity in the world, rumored to have existed since the Middle Ages. Historically, the rituals and ceremonies of freemasonry have been exclusive to men, as the concept of "brotherhood" is one of its main aspects. The process of introducing women freemasons would seem radical and unlikely. Freemasonry is commonly viewed as a male only space, where women would never be able to be a part of the process of self-development. However, The Order of the Eastern Star began inducting women in 1850, the same year the order was established, in order to develop a method by which women could share with the Masonic Brothers the same inspiration that "prompts man to noble deeds," according to founder Dr. Rob Morris. This order was created particularly during a period of strong feminist and women's suffrage campaigning. Exactly 100 years later, in 1908, the Order of Women Freemasons was founded as an exclusively female organization. In my project, I describe and analyze the origins and historical narratives provided by the organizations themselves, and I seek to consider how the culture and impact that these branches have on members. This study aims to bring more awareness to these female-originated Masonic chapters, and to look deeper into their effects, including how these women found their own community within the larger movement. In the process, I consider how the women's suffrage movement contributed to the inclusion of women in freemasonry, as well as controversies that emerged as women began participating in what priorly was previously an exclusively male space.

### Religious Issues within the Supreme Court: Jehovah's Witnesses and the Law (Poster)

Ellie Friedman, Sheppard McVey, and Sally Kennedy
Faculty Mentor: Kati Curts (Religious Studies)

Jehovah's Witnesses are a religious group that was formed in the 1870s by Charles Taz Russell and continues to be active today. Their millennialist foundation teaches the second coming of Christ, and members seek to share their beliefs with all who are willing to listen. Jehovah's Witnesses believe that society will not be saved without intervention from the second coming of Christ. Many members' beliefs and values have come into conflict with external forces, including specific elements of the United States legal system. This project focuses on how Jehovah's Witnesses interact with the law within the 20th and 21st centuries in the United States, and how their religious beliefs conflict with some of the expectations and obligations of American citizens. We examine cases of how Jehovah's Witnesses have acted on their religious beliefs and subsequently come into conflict with the law. How were Jehovah's Witnesses seen by

some as “Un-American”? What legal exemptions have they received? Our research explores three Supreme Court cases that involve disputes between Jevohah’s Witnesses and the medical field, educational system, and property rights. These court cases include *Hall vs. Commonwealth*, *West Virginia State Board of Education vs. Barnette*, and *The People of the State of Illinois v. E.G., a Minor*. By examining these court cases separately and then drawing on common themes, we offer insight into how Jehovah’s Witnesses’ interact with outsiders’ perspectives and national structure. Common themes we consider include religious freedom, freedom of speech, and individual versus nation-state rights. This research is important because it examines the disconnect between new religious movements and the United States law. Researching Jehovah’s Witnesses specifically can illuminate themes that can be generalized to other religious movements to help us better understand these relationships.

### Satan versus the Law: How the Satanic Temple is Fighting for Freedom of and Freedom from Religion (Poster)

Camille Greening
Faculty Mentor: Kati Curts (Religious Studies)

Since 2012, the Satanic Temple has been pushing the envelope on how far the United States is willing to go in the name of religious freedom. A federally recognized religious organization, the Satanic Temple functions not only as a “church” but as a conduit for the protection of civil liberties. The Temple uses the image of Satan to embrace blasphemy and rational thought removed from superstition, as they consider Satan to be the ultimate rebel and defender of personal sovereignty against authority. The Satanic Temple does not worship Satan, as is the popular misconception; however, their use of Satanic symbols and imagery often results in society either not taking them seriously or perceiving them as directly offensive to Christianity. To the Temple, the rise in what they deem to be Christian nationalism and the passage of increasingly conservative laws is an imminent threat to both the separation of church and state and their religious beliefs regarding sovereignty. In this project I explore how the Satanic Temple is using its status as a tax-exempt religious group to test and challenge the limits of religious freedom in the U.S. The legal battles I will examine are *Doe v. Parson*, *Satanic Temple, Inc. v. City of Scottsdale*, and *The Satanic Temple, Inc. v. City of Belle Plaine*. The Satanic Temple is too often disregarded due to their legal losses, their sometimes humorous approach, and their overall aesthetic, but this project argues that they are doing real and important work. Using legal documents, court cases, news articles, and information from the Temple’s spokesperson himself, I demonstrate how their lawsuits bring to light crucial issues regarding religious freedom. Though largely unsuccessful in terms of legal wins, they reveal much about the concept of the separation of church and state as it is imagined and adjudicated in the United States.

## Rastafari: How Jamaican Belief Systems Evolved African-American Culture (Poster)

CiCi Hardin, Will Snead, and Jack Cook
Faculty Mentor: Kati Curts (Religious Studies)

Our research focuses on the Rastafari movement, including its beliefs and practices, and how it contributed to African-American culture in the 20th century. The Rastafari movement began in the 1930s and was started by black Jamaicans. Rastafari consider black people the chosen people of God, but because of the severe oppression faced through slavery and colonization this was forgotten and suppressed. A core belief of this religious tradition consists of the redemption of black people in society and their eventual return to their homeland, Africa. Scholars have observed connections between Protestant Christianity and Rastafari textual traditions. More specifically, Rastafari utilizes many biblical stories, especially from Exodus, to explain African peoples' migration to America and other places around the world as the "exiles to Babylon." From the New Testament, they draw upon Revelation to explain that they are waiting for their return to Zion, which is for Rastafarians in Ethiopia. Rastas believe that their god "Jah" is testing their strength and religious commitment through enslavement, economic injustice, and related oppressive structures. Though Rastas came to the United States earlier, large numbers of Jamaican Rastas immigrated to the US in the 1960s and 1970s. Many of them found community in cities such as New York, Philadelphia, Los Angeles, etc. With this migration, the religious, cultural, and political beliefs of the Rastafari movement spread into many predominantly black American communities. Culturally, Reggae music, hairstyles, clothing, along with marijuana (ganga) use provided a sense of identity and also worked its way into American culture more broadly. These once-taboo cultural practices became more mainstream trends for Americans of all ages. Our project examines how this relatively small Jamaican community contributed to African-American and American culture more broadly with particular attention to Rasta influence within the civil rights movement of the 1960s. We also aim to share a broader understanding of this unique and intricate alternative religion and its effect on American culture in the late 20th century.

## An Examination of Heaven's Gate (Poster)

Hurt and Hope Murphy
Faculty Mentor: Kati Curts (Religious Studies)

This project focuses on the actions and steps that were taken within Heaven's Gate that contributed to the mass suicide among members on March 26th, 1997. We examine Heaven's Gate itself, including members who took their own lives and those who survived. There is a considerable gap within the literature surrounding Heaven's Gate survivors and the grief practices of families who lost loved ones through mass suicide. Our project begins to fill that gap, while also attending to the different practices of this religious movement. We further describe and analyze the leadership of the group by Marshall Applewhite and consider how he impacted members of Heaven's Gate. We draw upon psychological theories in our analysis, paying explicit attention to the theory of group thinking and how it helps us understand

decision-making among members of Heaven's Gate. Drawing on personal interviews and news footage, we also consider the impact of the group on surviving families. We contend that groupthink significantly influenced the eventual mass suicide of 1997 and offers insight into the death, dying, and grief of individuals, both in and outside of Heaven's Gate. With this in mind, we are committed to respecting all the members of Heaven's Gate while also using this example as a case study to educate members of our own community about how vulnerable individuals and groups can be to practices of groupthink.

### The Commodification of Vodou: How Popular Culture Warped a Religion (Poster)

Jasper Jones, Reagan Nash, and Arthur West
Faculty Mentor: Kati Curts (Religious Studies)

When most people hear Vodou, they immediately picture the famous voodoo dolls or think of the evil Dr. Facilier from *The Princess and the Frog*. Vodou, a once sacred religion among the Haitian people, has since found itself a heavily sensationalized caricature. Most media depict Vodou in poor taste; they demonize, commercialize, exploit, and distort it, misshaping Vodou into something unrecognizable to those who practice it. Because of their prolonged subjugation since 1492, the enslaved peoples of Haiti were forced to adapt, both culturally and religiously, to external forces. As a result, Haitian Vodou was created as a way to connect a slave to their home and join themselves with other slaves in Haiti. Our paper focuses on how popular culture and media misrepresent the true nature of Haitian Vodou and discount its abundant culture. It is important to study the rich history of Haitian Vodou and how it later spread to New Orleans, while also acknowledging the racism, colonialism, and overall imposition of white values on the ever-evolving religion. By highlighting the beginnings of Vodou, the practices and methods, and the public perception of Vodou, we can work to better understand its importance. We will showcase these findings through our research and analysis of photographs, newspaper articles, scholarly texts, and opinion pieces related to Haitian Vodou. We will also deconstruct popular media examples of Vodou such as "Scooby-Doo," "Pirates of the Caribbean," "American Horror Story," and "Princess and the Frog." While the commodification of Vodou has been studied by scholars, the evidence often lacks direct media examples. The media examples used seek to show that Vodou has been commodified in American media since the 1970s in both adolescent and adult television and reduced to a word meant to invoke fear in both audiences.

### Legal Considerations of Christian Science Beliefs and Healthcare Delivery (Poster)

Briana LaSanta
Faculty Mentor: Kati Curts (Religious Studies)

Christian Science is a religion that was founded in Boston Massachusetts in 1879 by Mary Baker Eddy. Its system of beliefs emphasizes spiritual healing through prayer, viewing prayer as a primary method for addressing health issues. Followers trust that through prayer and deeper spiritual awareness, one can overcome illness. Disease is viewed as a misconception or mental error, as any material thing is also viewed as an illusion in this truly spiritual world. Christian

Scientists teach that all real being is in God, the divine mind, and that life, truth, and love are all-powerful and ever present. Since there is this confidence that anything of material is of false testimony and false sense, this has become an issue when it comes to the need for conventional medicine in the U.S. Christian Scientists frequently choose to not seek medical attention in most cases, due to the typical result being that other members will then refrain from speaking with them. This is because using medical treatment as opposed to faith healing goes against the teachings of Christian Science. During this study, I analyze the reasons Christian Scientists give when eschewing from medical treatments. First, I examine Mary Baker Eddy's scriptures that followers abide by in order to understand the depths of spirituality these members have encountered. I then turn to the personal point of views of current and former members of this religion through interviews and first-person documents. Finally, I study court cases where children were allegedly harmed in the process of faith healing. Christian Science is one of many religions that choose to implement spiritual healing as a substitute for conventional medicine. This study seeks to deepen our understanding of Christian Science's avoidance of healthcare, exploring its religious motives and how it relates to the First Amendment rights.

### Heaven's Gate (Poster)

Alice Martin and Adele Cassidy
Faculty Mentor: Kati Curts (Religious Studies)

In the study of new religious movements (NRM) at the end of the 20th century, much scholarship has been devoted to investigating the expansion of technology's role within NRMs throughout the United States. Founded in 1974 by Marshall Applewhite and Bonnie Nettles, the Heaven's Gate Movement was a new religious movement whose ideology of Christian millenarianism incorporated elements of ufology. Research devoted to this topic has uncovered how Applewhite's personal struggles had a significant effect on the composition of Heaven's Gate doctrines as well as how technological advancements at the end of the 20th century led to a surge in new religious movements drawing from ufology. The movement is most known for the mass suicide committed in 1997 that resulted in the deaths of 39 members. Our project seeks to uncover the conditions in which new members are willing to devote themselves to a new religious movement, potentially engaging in monastic lifestyles and self-sacrifice. We aim to understand the tactics that a group can employ to attract followers who abandon their lives and relationships and commit fully to a movement. The dissolution of the divide between human life and the virtual world that technological advancements established during this time period generated interest in the movement across the United States. This project will investigate how Heaven's Gate incorporated ideas about ufology and metamorphoses of their belief system which ultimately led to the mass suicide event of 1997.

### Heaven's Gate Religious Group: How Initial Self Selection Encourages Future Adherence to Group/Leader Ideology (Poster)

Frances McKay and Willa Pocklington
Faculty Mentor: Kati Curts (Religious Studies)

Heaven's Gate was a religious group founded by Marshall Herff Applewhite and Bonnie Nettles, and was active from 1970 until 1997. It came to a close when 39 members participated in a mass suicide in a mansion located in Rancho Santa Fe, California, on March 27th. Heaven's Gate members believed that they were divine spirits, limited and trapped within a human body. Initial teachings by Applewhite and Nettles emphasize that a spaceship would come and take them to the "kingdom of heaven." However, when the UFO did not show up in 1983, their prophecy was challenged and group members' beliefs were shaken. This research aims to understand how Applewhite retained followers after his prophecy was not fulfilled, which forced him to reconsider and redefine the group's ideology. Applewhite's prophecy evolved. He increasingly suggested that to "graduate" from the Human Evolutionary Level, members had to leave their physical bodies behind. Applewhite's new teachings prompted a carefully calculated plan for members' "graduation." Over three days in March of 1997, 39 members consumed lethal amounts of poison, including Applewhite, so as to ascend to the next level of existence. Scholars and surviving members today still debate whether this event should be considered a mass suicide, or one suicide and 39 murders. Through our research, we explore the dynamics of the group, focusing especially on the strong sense of trust and loyalty members felt towards Applewhite and its effects on members' sense of individuality and freedom of choice. Further, we analyze how members remained in compliance with Applewhite and his teachings, even after the absence of a spaceship forced a shift in the group's ideology, leading some members to question their original beliefs. Through exploration of the Heaven's Gate website, personal accounts and narratives, and interviews of surviving members, we hope to understand how initial self-selection by the group members to join the group reduced cognitive dissonance, decreased their chances of leaving, and allowed Applewhite to maintain his influence and ensure his "students" adherence to his teachings, even as those teachings changed or became more extreme.

## Oneida Perfectionists (Poster)

Zoe Napier
Faculty Mentor: Kati Curts (Religious Studies)

The question of affect within religious movements and the emotional wellbeing of members is a complicated but pressing one, fueled by different theoretical approaches, definitional parameters, and public interest about the relative agency of religious practitioners. Recognizing the difficulty of determining the emotional states of historical subjects, this project draws upon the work of Raymond Williams and Teresa Brennan to consider the structures of feeling and transmission of affect in one specific religious community: the Oneida Perfectionists, a new religious movement from the 19$^{th}$ century known, among other things, for its unique communal and marital structures, and sometimes considered a "cult" in popular discourse. Religious movements typically branded as "cults" often prompt public concern, including about the emotional wellbeing of members. My project uses the Oneida community as a case study for consideration of religious affect among marginalized groups. The question of emotional wellbeing is one that is frequently linked, both implicitly and explicitly, to questions of the relative agency and regulation of members. Using the daily journal of John Humphrey Noyes, daily publications read by community members, the Oneida Handbook, and photographs of the community, I analyze the discourse and practices of the Oneida community and consider how to characterize the affects they reveal and reproduce. This project further offers insight into how scholars of religion

can begin to understand the affective and emotional wellbeing of minoritized religious communities like Oneida.

## "So Much Things to Say": American Perception of Rastafarianism, Pre- and Post-Marley (Poster)

Shelby Phillips
Faculty Mentor: Kati Curts (Religious Studies)

In 1960s American media, Rastafarianism was presented as a sect of violent, fanatical cultists. Rastas were known for a number of arrests in Jamaica regarding ganja (marijuana) usage, weapon caching, and communication with Fidel Castro. Coinciding with the height of the Cold War, these arrests were especially worrisome for Americans, who wished to distance themselves from communists around the globe. By the mid-1970s, however, public opinion had begun to change. Reggae music was catching on quickly, recreational marijuana usage was becoming more widespread, and people were gaining a better understanding of Rasta ideology. Most significantly, the term "cult" was falling out of usage when speaking about the group. This project contends that the shift of opinion in the mid-70s was driven by one man in particular: Bob Marley. As many Americans' first introduction to Rastafarianism, his portrayal in the media was inextricably linked to the American public's views of the group. Recent and historical scholarship acknowledges the influence of Bob Marley on Rastafarianism in the minds of both Rastas and non-practicing Americans. However, little research has been done to find precisely how Rastafarianism's "cult" status changed as a result of Marley's breakout in the US. In this project, I argue that the media, through the dissemination of religious imagery and non-scholarly debate, played the most significant role in Rastafarianism's public perception as a cult. My analysis focuses on newspapers and music to study when and how public perception of the Rastafari changed. I pay particular attention to mentions of Bob Marley's practice of Rastafarianism in these mediums. I also consider how Rasta imagery and ideology—reggae, ganja, dreadlocks, Jah—were adopted into the broader American culture to make the group more accessible to Americans. By exploring how the Rastafari movement overcame its negative perception as a cult, I answer broader questions in the field of religious studies about the use of Powersthe word "cult" by the general public and how representations of religions circulate in the media.

## The Role of Education in Seventh-Day Adventist Identity Formation (Poster)

Kaila Seger and Melody Ottinger
Faculty Mentor: Kati Curts (Religious Studies)

In the study of religion, scholars have devoted time and research to examining the institutionalization of theology largely in Catholic parochial schools. However, little attention has been paid to the institutionalization of theology in Seventh-Day Adventist post-secondary schools. Our project examines how theology becomes institutionalized in Seventh-Day Adventist post-secondary schools by examining the policies and structures of these institutions. In our project, we look at books, journals, reports, and writings published by members of the

Seventh-Day Adventist Church analyzing the impacts and the merit of this type of education for its members. We also build upon existing academic literature, which has analyzed the historical change of Seventh-Day Adventist education and the contemporary and historical emphasis of Seventh-Day Adventist education. We argue that, like Catholic parochial schools, the institutionalization of theology in Seventh-Day Adventist post-secondary schools has been and continues to be an important advancement in forming the Seventh-Day Adventist identity, through the transmission of Seventh-Day Adventist ideals. By closely examining the institutionalization of theology in Seventh-Day Adventist post-secondary schools, this project sheds light on the role of education in forming denominational identity within the Seventh-Day Adventist Church.

## Problematizing Vodou's Cultish Classification (Poster)

Olivia Stafford and Amelia Gauthreaux
Faculty Mentor: Kati Curts (Religious Studies)

One way to trace the origins of Haitian Vodou is its public appearance after the passage of the Code Noir, which was the legal code decreed by the French government to enforce the practice of only Catholicism and no other religions. Studies of Vodou place its development amid the prolonged colonization of the island nation by France and later the United States. As a way of justifying the colonization of Haiti, Western powers demonized and even outlawed aspects of Africana religious traditions, including Vodou. Considerable scholarship has since considered the ways in which Vodou practitioners incorporated Catholic traditions in order to be able to practice their religion more publicly amid this colonialist context and has examined the tradition in light of the controversial idea of religious syncretism. In an effort to begin understanding and critiquing stereotypical ideas of the "vodou cult" some scholars have also remarked upon the racist tropes of many depictions of Vodou. Our project builds upon this scholarship, focusing on how stereotypes perpetuated by French and American colonial forces continue to be reproduced in twenty-first century media to this day. Using historical documents like France's Code Noir and documents from America's occupation of Haiti from 1915-1934 we track some of the central stereotypes still seen today. Including those reproduced in media reports and racist narratives of a "devil worshiping cult" following the 2011 earthquake in Haiti. However, we also consider interviews by practitioners of Vodou, paying particular attention to how they have continued to protect their religion and resist ongoing "cultish" narratives. This project reveals the dangerous results of colonial stereotypes on the religion and its practitioners and longstanding resistance to them. By closely examining the reasons behind the stereotype that Vodou is a cult, we seek to shed new light on how narratives on cults evolve from colonization and further critique the ever-problematic classification of "cult."

## Expression and Reception: The Gendering of the Publick Universal Friend (Poster)

Rachel Williams and Emma Lively
Faculty Mentor: Kati Curts (Religious Studies)

Our research focuses on the Publick Universal Friend, a religious leader from Rhode Island in the late eighteenth century, and the intersection between gender, gender expression, power, and religious freedom. The Publick Universal Friend claimed to be a genderless spirit sent from God inhabiting the body of the deceased Jemima Wilkinson. During the Friend's time as a religious leader and in modern scholarship, the Friend has been referred to by several names, including the PUF and Jemima Wilkinson. The gendered pronouns used to refer to the Friend also vary, referencing the Friend as they/them, she/her, and even he/him in some cases. Scholars have begun to assess the gender identity of the Publick Universal Friend through their historical writings and biographies, but looking into discrepancies among scholars like Larson and Brekus, there is no real consensus over how the Friend's gender identity affects the structures of gender and power. Embracing the blurry lines between the possible gender identities of the Friend, we seek to analyze the stakes of these differing arguments. The Friend's work as a prophetess can be read as empowering, one of the earliest powerful female religious figures in the US. Alternatively, does calling the Friend Jemima and using exclusively she/her pronouns deny the theology behind the death of Jemima and the resurrection of a "genderless spirit?" Then again, what does it mean to apply gender and transgender* theory to the late eighteenth century? Perhaps the masculinity of the Friend denies the power of women to hold religious leadership and actually mimetically reinforces gender stereotypes. There is no consensus, but rather than create one, we hope to analyze what is to be gained and lost in arguing that the Friend fits into a limiting category of gender.

## A Look into Oneida Perfectionism (Poster)

Jackson Young
Faculty Mentor: Kati Curts (Religious Studies)

In the study of Oneida Perfectionism scholars often look at how the Oneida community was formed as a whole and what led to its dissolution with most of the focus being on the enigmatic leader John Humphrey Noyes. Thus, the impact that individual members had within the community is often overlooked. Rather than looking at the community as a whole, I describe and analyze the livelihoods and practices of specific members of Oneida in order to see how they affected the Oneida Community over time and how they were impacted by external forces. Drawing upon journal entries, books, photographs, newspaper articles, and writings from Oneida's founder, this project considers the beliefs and practices of Oneida over time with a specific focus on the lives of its members. I contend that a changing economic and political environment over the decades that Oneida existed fundamentally altered the lives of its members and the community as a whole. By closely examining the Oneida Community, this project helps demonstrate how a changing political and economic landscape in America in the middle to late 1900s affected religious groups, a dynamic that continues to be a concern today.

# WATERSHED SCIENCE

### Release of Microplastics from a Turf Athletic Field into a First-Order Watershed and Karst System (Poster)

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A synthetic turf athletic field on the campus of the University of the South is releasing microplastics into an adjacent first-order stream. The microplastics consist of small grass-like filaments of high-density polyethylene (hdpe) and sand-sized particles of shredded automobile tires. These microplastics enter an adjacent stream through the drainage system installed under the turf field and from the surface of the field during heavy rain. The stream leaves the Cumberland Plateau and enters an underlying karst system composed of Mississippian carbonates. This study will document the extent to which the microplastics have moved off of the escarpment and through this karst system. Water analyses (by ICP-MS methods) from the field drainage system will determine if the water has elevated levels of metals that are associated with shredded tire rubber (e.g., cadmium, lead, zinc). This study will increase understanding of the extent to which artificial turf fields can contaminate both small streams and karst systems with microplastics and heavy metals.