26TH ANNUAL CELEBRATION OF STUDENT RESEARCH, SCHOLARSHIP, & CREATIVE WORK

JANUARY 23, 2026 | WABASH COLLEGE

Congratulations!

The Celebration event planning committee is excited to announce the winners of two prestigious awards associated with today's event.

Celebration Research, Scholarship, and Creativity Awards

These $150 prizes are awarded to the students who most effectively articulated gains in professional development and personal growth as a result of their research, scholarship, or creative work. This year's winners are listed below, in alphabetical order.

Elijah Arnold - The Sting of Regret: Personality Outweighs Choice in Social Rejection Distress

Curtis Faughnan - Lanyard Policy Tracker: A Secure, Privacy-Aware Student Compliance System for K–12 Environments

David Leal - Latine Belonging in Higher Education

Robert Wedgeworth '59 Library Research, Scholarship, and Creativity Awards

These $750 prizes are awarded to recognize effective use of library resources in the preparation of Celebration work. This year's winners are listed below, in alphabetical order.

Lucas Barrett – History of Chadwick Court

Jeremiah Clayton - T.H.E. R.A.P.T.U.R.E. - A High-Energy Oral Tradition Shaping Experience, Culture, and Faith

Tri An Le - MemeMatch: A Large-Scale Dual-Context Multimodal Dataset and Retrieval System for Internet Memes

Welcome and Introduction

Welcome to the 26th Annual Celebration of Student Research, Scholarship, and Creative Work— one of Wabash's long-standing traditions. I was a Wabash faculty member at the time of the first Celebration, and I even served for a time as chair of the organizing committee. As such, this is one of my favorite Wabash events—one of my favorite Wabash traditions—an occasion at which the College proudly and publicly recognizes the creative accomplishments of its students. We celebrate not only the particular achievements of individual students, but also the College's deeply embedded commitment to teaching and learning. The impressive breadth and quality of student creative work stand as evidence of the challenge and change that define the Wabash experience.

This program is dedicated to the memory of Paul Caylor McKinney '52, who passed away in 2003 after a courageous battle with cancer. Dr. McKinney proudly served the College for more than half a century as a chemistry teacher, department chair, division chair, and Dean of the College. He was an exemplar of the liberally educated person, with interests that ranged from quantum mechanics to Plato, from playing the piano to pondering Nietzsche. He acted in Wabash College Theater productions and was often found backstage working on difficult equations in his notebook. He was a master teacher who helped countless Wabash students develop their creativity and their love of the liberal arts. Among Wabash men, he would well understand and appreciate everything presented today; he would be the first to celebrate the successes of Wabash students and faculty members.

Close collaboration between Wabash students and faculty across the College is a hallmark of our culture, a labor of pedagogy and love that makes a difference for our students. It is a special pleasure to introduce some of the results of that collaboration through these presentations. Our thanks go to the students who are prepared to teach the Wabash community about their work, and to the faculty and staff members who have devoted considerable time to helping students with their research and creative productions.

A conference of this size and scope would not be possible without the dedicated work of many people. I want personally to express my thanks to the planning committee: Chair Erika Sorensen-Kamakian, Karen Gunther, Michelle Janssen, Matt Meyer, Jorge Montiel, Lon Porter, and Joe Scanlon. Hien Anh Hoang Phan and ETS students contributed to poster production; Nate Baldwin authored the online event presentation application system; Becky Wendt designed the original program book format; Julia Phipps created the campus event poster; and Campus Services, Mary Jo Johnston, and her Bon Appetit staff made the logistical support appear effortless. Finally, we are grateful to all of you for your attendance at this community Celebration.

—Todd McDorman, Dean of the College

Schedule for Oral Presentations & Performances

Oral presentations and performances will begin at 1:30 p.m. and continue every 20 minutes. The last session begins at 2:50 p.m. In general, students will present information or perform for 12-15 minutes with a 5-minute pause between presentations for questions, technology reset, and passing time. There will be a 20-minute break at 2:10 p.m. Please see the following pages for a list of oral presentations and performances by room location and time slot. Presenter names, as well as their sponsors and abstracts, are listed beginning on page 9.

Schedule for Poster Presentations & Exhibitions

Students will present and discuss their posters and exhibits in 60-minute increments starting at 1:15 p.m. and 2:30 p.m. in Detchon International Hall. You will find a list of presenters and their time slot beginning on page 7. The names of the presenters, as well as their sponsors and abstracts, are listed beginning on page 16.

Enjoy Delicious Treats on the Detchon Balcony

A wonderful selection of treats will be available on the second-floor balcony, overlooking the poster sessions.

Oral Presentations & Performances Schedule

Detchon 109		
1:30	Christopher Board	How Can I Call This Home: Jason Robert Brown's Musical Storytelling of Discrimination in *Parade* Mollie Ables (Music)
1:50	Jeremiah Clayton	T.H.E. R.A.P.T.U.R.E. - A High-Energy Oral Tradition Shaping Experience, Culture, and Faith Tim Lake (English)
2:10	Break	
2:30	Carson Wirtz	The Dramaturgy of Wabash Theater's "1984" James Cherry (Theater)
2:50	Quinn Sholar	Slavery Persists Through Black Lives Today Annie Strader (Art) & Elizabeth Morton (Art)

Detchon 111		
1:30	Justin Spurgeon	Crisis, Law, and the Direction of Executive Power Ryan Liou (Political Science) & Huei-Jyun Ye (Political Science)
1:50	Evan Baker	Industry-Specific FDI: An Analysis of ASEAN Developing States Ryan Liou (Political Science) & Huei-Jyun Ye (Political Science)
2:10	Break	
2:30	Broderick Rucker	Happy Wife, Happy Life: Examining the Gender Unemployment Gaps and Marriage Premium Between College Graduates Joyce Burnette (Economics)
2:50	Elijah Arnold	The Sting of Regret: Personality Outweighs Choice in Social Rejection Distress Robert Horton (Psychology)

Oral Presentations & Performances Schedule

Detchon 112		
1:30	Carter Bertsch	Food Insecurity Through the Lens of Global Health Eric Wetzel (Global Health Initiative)
1:50	John Nabors & Nathaniel Litts	Charge Transfer in Silver Clamped Molecules Joe Scanlon (Chemistry)
2:10	Break	
2:30	Cole Shifferly	A Fungus Among Us: The Underground Lives of Orchids Erika Sorensen-Kamakian (Biology)
2:50	Owen Wright	Developing a Low-Power Sensor System to Classify Movement Behavior in Eastern Box Turtles Brad Carlson (Biology)

Detchon 209		
1:30	John Schnerre	Marcus Modius Maxximus: How Priestly Puns Can Give Insight into Multiculturalism in Rome Jeremy Hartnett (Classics)
1:50	Lucas Barrett & Carson Granger	How Pathways and Architecture Shape our Interactions in the Ott Residential District Jeremy Hartnett (Classics)
2:10	Break	
2:30	Leonard Enz	The Imploding U.S. Foster Care System: A Look at a Hypothetical Solution Ryan Liou (Political Science) & Larry Busk (Philosophy)
2:50	Ethan Hill	The Making of Gentlemen: A Look at Moral Formations and Masculinity at Wabash College Ryan Liou (Political Science) & Larry Busk (Philosophy)

Oral Presentations & Performances Schedule

Detchon 211		
1:30	Curtis Faughnan	Lanyard Policy Tracker: A Secure, Privacy-Aware Student Compliance System for K–12 Environments Qixin Deng (Mathematics and Computer Science)
1:50	Isaac Grannis & Arman Luthra	Uncovering Hidden Costs: A Mechanistic Approach To AI Safety and Ethics Qixin Deng (Mathematics and Computer Science)
2:10	Break	
2:30	Evan Zambrano	Redefining Political Discourse Through *The Joe Rogan Experience* Sara Mehltretter (Rhetoric) & Gabriela Tscholl (Rhetoric)
2:50	Connor Phillips	Choosing To Be Communal To Govern Together Chris Anderson (Rhetoric)

Detchon 220		
1:30	Austin Pickett Hayden Lewter Evan Bone	Empowering a Culture Note: This is a 1 hour Discussion about the Black Studies Minor. Please be present at the start of this session if possible. Tim Lake (English) & Julian Whitney (English)
	Additional Breakout Rooms: 226 & 212	
2:30	Break	

Poster Presentations & Exhibitions Session #1 Schedule

Detchon International Hall		
1:15–2:15	Aidan Mason	Healthcare in the Regions of Peru and Montgomery County Eric Wetzel (Global Health Initiative) & Erika Sorensen-Kamakian (Biology)
	Francisco Bibian	How Do Cells Take Out the Trash? We Broke Worms to Find Out. Walter Novak (Chemistry) & Erika Sorensen-Kamakian (Biology)
	Andrew Ross	Comparison of Asset Performance in US Financial Crises; A Time Series Analysis Sujata Saha (Economics)
	Precious Ainabor & Jonathan Parackattu	Flipping the Switch: Controlling Protein Degradation in Bacteria Walter Novak (Chemistry) & Erika Sorensen-Kamakian (Biology)
	Gabriel Brandenburg & Matthew Moran	Examining Metal Salt Hydroxide Precipitates Under Microfluidic Properties Nathan Tompkins (Physics)
	Hunter Otto	The Relationship Between Sustained High Amish Fertility and Economic Structure Ryan Liou (Political Science) & Larry Busk (Philosophy)
	Cole Shifferly	Hidden Players in Proteostasis: Protease Contributions to Proteostasis in *C. elegans* Erika Sorensen-Kamakian (Biology) & Walter Novak (Chemistry)
	Joshua Helms	The Effects of the Great Recession on Different Labor Markets Sujata Saha (Economics)
	James Day	Assessing Soil Microbial Diversity in Wabash's Native Plant Garden: Insights from Carbon Substrate Utilization with Biolog® EcoPlates™ Brad Carlson (Biology)
	Brandon Hammer	Titrated Audiovisual Crossmodal Congruencies Karen Gunther (Psychology)
	Walid Kasab	Strong Group-Valued Zonal Labelings on Platonic and Archimedean Graphs Andrew Bowling (Mathematics)
	Owen Wright, Grant Brewer, Isaac Jansen, & Dominic Litchfield	Behavioral and Habitat Responses of Eastern Box Turtles to Human Disturbance: The Role of Boldness Brad Carlson (Biology)

Poster Presentations & Exhibitions Session #2 Schedule

Detchon International Hall		
2:30–3:30	Brandon Hammer	DGAT1 Inhibition Amplifies ER Stress-Mediated Suppression of GnRH Expression Heidi Walsh (Biology)
	David Leal	Latine Belonging in Higher Education Aiala Levy (History)
	Eugene Enchill, Coby Stephens, & Charles Chanin	Capstone Project MCAWL Website Qixin Deng (Mathematics and Computer Science)
	Arman Luthra, Isaac Grannis	Prism: An Interactive Platform for Exploring Language Model Behavior Qixin Deng (Mathematics and Computer Science)
	Gregory Powers & Abdul Basit Tonmoy	WALLY – An autonomous robot Qixin Deng (Mathematics and Computer Science)
	Julio Cruz-Romero	Seeing Life as a Hero's Journey: Impact on Meaning in Life and Exercise Intentions Neil Schmitzer-Torbert (Psychology)
	Jacob Guse & Benedict Grill	Synthesis of AlexaFluor Dyes for the Open Chemistry Initiative Laura Wysocki (Chemistry)
	Logan Porter	Effect of Reduction on Tethered Electron Donor-Acceptor Complexes for Use as Molecular Switches Joe Scanlon (Chemistry)
	Lucas Barrett	History of Chadwick Court Jeremy Hartnett (Classics)
	Lucas Cunningham	The Digitalization of the Montgomery County Free Clinic Qixin Deng (Mathematics and Computer Science)
	Myles Bernat & Justin Lewis	Understanding the Role of Lipid Droplets in Neuron Function Heidi Walsh (Biology)
	Tri An Le	MemeMatch: A Large-Scale Dual-Context Multimodal Dataset and Retrieval System for Internet Memes Qixin Deng (Mathematics and Computer Science)

Oral Presentations & Performances (Alphabetical by Presenter)

Presenter: Elijah Arnold
Sponsor: Robert Horton (Pyschology)
Title: The Sting of Regret: Personality Outweighs Choice in Social Rejection Distress

Social rejection is universally painful, but does the act of choosing the group that rejects you amplify that distress? Integrating Cognitive Dissonance Theory with the Temporal Need-Threat Model of Ostracism, this study (N = 590) examined whether voluntarily choosing a group increases the psychological discomfort experienced after rejection. Participants either chose or were randomly assigned to a group and were subsequently ostracized. Contrary to the hypothesis that choice would amplify dissonance, participants who chose their group did not report higher psychological discomfort. In fact, the distribution of scores revealed a marginal trend in the opposite direction, suggesting that being randomly assigned to a group may have actually elicited slightly higher distress than making a choice. While the situational manipulation did not drive the expected effect, individual personality differences proved critical: participants high in "Trait Regret" reported significantly higher discomfort regardless of the condition. Finally, analysis revealed a strong link between this psychological discomfort and behavior: as dissonance increased, participants engaged in a significantly greater reduction of their favorability toward the rejecting group. These findings indicate that while the simple act of choice may not worsen the sting of rejection, an individual's predisposition to regret is a critical predictor of distress.

Presenter: Evan Baker
Sponsors: Huei-Jyun Ye (Political Science) & Ryan Liou (Political Science)
Title: Industry-Specific FDI: An Analysis of ASEAN Developing States

Governments have sought to attract Foreign Direct Investment (FDI) to bring in more capital, technology, and management. Nevertheless, people have not always welcomed such efforts. This project explores the relationship between FDI, protests, and the government responses to protests, asking: Does the dispersion of FDI into differing industries in developing countries affect the government's repression of non-violent protests? My research fills the scholarly gap of examining the dispersion of FDI into differing sectors–extraction industries, manufacturing industries, etc.–and the government responses. Thus, I theorize that the industry of FDI affects how a government responds to protests. I hypothesize that countries with a disproportionately high concentration of FDI into an extraction industry or in any single industry are most likely to repress non-violent protests. I test these hypotheses by analyzing empirical relationships across ASEAN countries between 2012 and 2020. Overall, I find no evidence supporting the hypotheses. Nevertheless, examining the impact of FDI on protest repression remains integral to a greater understanding of differences in human rights achievement around the world. Therefore, I recommend expanding the research over more years and into other regions. This way, a greater understanding of industry-specific FDI and protest repression could be formed.

Presenters: Lucas Barrett & Carson Granger
Sponsor: Jeremy Hartnett (Classics)
Title: How Pathways and Architecture Shape our Interactions in the Ott Residential District

About a decade ago, Wabash constructed the Ott Family Residential District to house independent men, and its living units have become very popular. This presentation examines how its buildings — on both a macro- and a micro-scale — enhance social interaction among Wallies by creating frequent opportunities for students to encounter one another and form connections during their everyday routines. On a macro-scale, the buildings' location draws Ott residents into a flow of regular foot traffic to and from nearby academic, athletic, and residential areas. Meanwhile, the buildings' arrangement invites in passers-by and even channels pedestrians through to district to foster spontaneous connections and a stronger sense of community among all students, both independents and fraternity men. On a micro-scale, the decorative finishes within the buildings — especially the strategic use of glass and wood — subtly direct student behavior. Extensive windows, deliberate sight lines, and the warm use of material throughout the building subtly draw residents away from their isolated areas and into communal spaces for social interaction.

Oral Presentations & Performances

Presenters: Carter Bertsch
Sponsor: Eric Wetzel (Global Health Initiative)
Title: Food Insecurity Through the Lens of Global Health

Food insecurity is a major issue across the globe, including within the state of Indiana, and is shaped by economic, social, and political factors. In this presentation I examine the issue of food insecurity from multiple perspectives, showing how the liberal arts can be used to examine a pressing issue like food insecurity. Additionally, I will consider structural barriers to food security such as redlining and the benefits gap. This presentation looks to bring all these perspectives together so that a plan can be imagined about how to tackle this multidisciplinary issue.

Presenter: Christopher Board
Sponsor: Mollie Ables (Music)
Title: How Can I Call This Home: Jason Robert Brown's Musical Storytelling of Discrimination in *Parade*

Jason Robert Brown's 1998 musical Parade tells the story of Leo Frank, a Jewish man in 1913 post-Civil War Atlanta, Georgia where he is wrongfully accused of murder. Throughout the show, Brown makes plenty of references to the discrimination faced by the characters through compositional techniques. These techniques vary from key changes and tonicization to the use of motifs and themes. Leo's journey through religion, his wife Lucille's journey through her relationship, and the feelings of the African American slaves are all addressed within the score of the musical. The presentation will identify unique musical styles and devices throughout the show that create a world where social injustice runs rampant.

Presenter: Jeremiah Clayton
Sponsor: Tim Lake (English)
Title: T.H.E. R.A.P.T.U.R.E. - A High-Energy Oral Tradition Shaping Experience, Culture, and Faith

My presentation, T.H.E. R.A.P.T.U.R.E. - A High-Energy Oral Tradition Shaping Experience, Culture, and Faith, is an original performance that approaches poetry and spoken word as both spiritual inquiry and living oral tradition. Drawing on the concept of Akashic Records - the collective archive of human experience, and the Griot practice of passing knowledge through storytelling, this work treats lived moments as both data and legacy. Developed independently of coursework, this project reflects an ongoing creative practice in which I translate raw experience into a rhythmic narrative form called T.H.E. R.A.P.T.U.R.E. - Triangulated High Energy Rhythm and Poetry Thriving Under Real Experiences.

Through shifts in tone, pacing, and emotional intensity, the performance invites the audience into the interior forces that drive my work: the tension between pressure and purpose, the echoes of family and community, and the divine clarity that guides my artistic process, all while honoring the historical lineage of oral communication. Ultimately, this project establishes creative practice as scholarly exploration, spiritual excavation, and cultural manifestation, offering the Wabash community an encounter with the layered, archival, and living dimensions of human experience.

Oral Presentations & Performances

Presenter: Leonard Enz
Sponsors: Ryan Liou (Political Science) & Larry Busk (Philosophy)
Title: The Imploding U.S. Foster Care System: A Look at a Hypothetical Solution

In recent years, the U.S. Foster Care System has been sub-par, yielding welfare outcomes and reunification rates that are profoundly disappointing. As a result of the U.S. Foster Care system, it has been found that children within the system experience higher rates of mental health disorders, incarceration, and even sex trafficking. Using Katherine Davies idea of 'Familiality", Adam Smith's idea of sympathy, and Martha Nussbaum's "capabilities approach", this paper argues that a systematic shift of the U.S. Foster Care System is needed. More specifically, I argue in this paper that an antifederalist direct democracy that prioritizes the welfare of a child may procure better welfare outcomes amidst its current secular system. Furthermore, in general, I will propose a new hypothetical solution to further revise the U.S. Foster Care System for the better, which includes: a greater presence of an interfaith foster care agency, more economic stipends, more religiously affiliated foster home options, and a greater presence of stricter criteria surrounding foster home environments. Additionally, as in line with Davies, I will also suggest for the minimum age of consent to be lowered to the age of 14, specifically only for when a foster child decides which "home" they are to live in.

Presenter: Curtis Faughnan
Sponsor: Qixin Deng (Mathematics and Computer Science)
Title: Lanyard Policy Tracker: A Secure, Privacy-Aware Student Compliance System for K–12 Environments

Security and efficiency requirements in K–12 environments have attracted considerable attention. To address these needs, we propose Lanyard Policy Tracker, a system designed to satisfy these requirements. The Lanyard Policy Tracker was developed as a secure, desktop-based application designed to monitor and enforce student compliance with school lanyard policies while prioritizing data protection and system integrity. Implemented in Python using the Tkinter framework, the system integrates with Google Sheets through encrypted API communication, providing centralized storage and real-time synchronization across multiple authenticated devices. All data transactions occur through a secured Google Cloud service account, preventing unauthorized access and ensuring auditability. The application features layered validation and error-handling mechanisms to safeguard against duplicate or corrupted entries, while local caching maintains operational continuity in case of network interruptions. A modular design separates the user interface, data synchronization, and administrative control layers, reducing the attack surface and enhancing maintainability. Password-protected administrative tools restrict access to configuration and reset functions, ensuring that sensitive operations are performed only by authorized users. Deployed successfully within a middle school network environment, the system demonstrated high reliability, rapid synchronization, and resilience to connectivity and concurrency challenges. Overall, the Lanyard Policy Tracker exemplifies a practical application of cybersecurity principles—integrating authentication, encryption, and data integrity safeguards—within an educational technology framework that remains efficient, transparent, and scalable.

Presenters: Isaac Grannis & Arman Luthra
Sponsor: Qixin Deng (Mathematics and Computer Science)
Title: Uncovering Hidden Costs: A Mechanistic Approach to AI Safety and Ethics

As large language models become increasingly deployed in high-stakes domains, understanding their internal representations of ethical concepts and potential failure modes has become critical. This presentation demonstrates our work examining model self-concept and bias through mechanistic interpretability and feature analysis, investigating how safety interventions interact with demographic associations in training data, both in the model and users. Using contrastive prompt and cross-layer activation pattern analysis, preliminary analysis reveals systematic asymmetries in model responses to demographic substitution + self-referential contexts. These results suggest current approaches to AI safety may introduce systematic distortions & novel problems that merit further investigation into our current alignment approach.

Oral Presentations & Performances

Presenter: Ethan Hill
Sponsors: Ryan Liou (Political Science) & Larry Busk (Philosophy)
Title: The Making of Gentlemen: A Look at Moral Formations and Masculinity at Wabash College

This paper examines whether all male colleges such as Wabash cultivate empathy and civic virtue or reinforce traditional ideas about masculinity. Drawing on Adam Smith's account of sympathy, John Stuart Mill's view of civic formation, and gender frameworks from Judith Butler and R. W. Connell, along with contemporary insights from Richard Reeves and the IGNITE 2024 civic engagement report, I explore how moral character and masculine identity develop within a single sex environment. To connect these theories with lived experience, I surveyed forty-five Wabash students measuring empathy, civic responsibility, adaptability, and expectations of masculinity. The results show strong levels of empathy and civic engagement, consistent reports of adaptability to new expectations, and a broad sense that masculinity at Wabash is changing. Students also described mixed pressures around emotional composure and confidence. Taken together, the findings suggest that all male colleges preserve some traditional expectations while also offering distinctive opportunities for moral growth and civic development.

Presenters: John Nabors & Nathaniel Litts
Sponsor: Joe Scanlon (Chemistry)
Title: Charge Transfer in Silver Clamped Molecules

Molecular switches are a unique type of molecule that hold two states. These molecules have applications in medicine, catalysis, and photochemistry. Our research examined Electron-Donor-Acceptor (EDA) complexes, which can be formed by a molecule with a positive partial charge and another molecule with a negative partial charge. When separated, they can form an "open" state with no interaction. When complexed in a "closed" state, EDA complexes can transfer electrons between donor and acceptor molecules via light excitation and form a molecular switch. We analyzed tethered EDA complexes which hold promising results for molecular switch application. Our systems of interest examined three different tether isomers, one that should be able to form an EDA complex, one that might be able to, and one that should not be able to form an EDA complex. Furthermore, we examined whether coordinating Ag+ to the tethers would lock the complexes into specific conformations and how charge transfer was affected between the donor and acceptor molecules in the closed state. Using computational methods, we were able to theoretically determine the stability, the excitation state, and the charge transfer of the complexes.

Presenters: Austin Pickett, Hayden Lewter & Evan Bone
Sponsors: Tim Lake (English) and Julian Whitney (English)
Title: Empowering Culture

This is a presentation and discussion about the Black Studies minor at Wabash. The presentation examines the history of Black Studies at Wabash and its development to its current state. The following dialogue aims to identify solutions to expand the Black Studies department to a major.

Oral Presentations & Performances

Presenter: Connor Phillips
Sponsor: Chris Anderson (Rhetoric)
Title: Choosing to be Communal to Govern Together

As democratic institutions face declining trust and increasing polarization amid the global rise of authoritarianism, youth engagement has emerged as both a critical challenge and an underutilized resource. Research consistently shows that democratic participation is strongest when individuals feel heard, empowered, and connected to their local communities, yet many civic systems remain inaccessible or unresponsive to young people. This presentation draws from the outcomes of the 7th IYTT Youth Conference, where 24 students from 14 countries collaborated to identify barriers to democratic participation and develop community-centered solutions. Through structured dialogue and collaborative policy design, participants generated twelve proposals addressing information trust, equitable power relationships, community-building, and accessible civic participation. These proposals emphasize strategies such as youth-facilitated public dialogue, civic education through experiential learning, inclusive public spaces, and mentorship-based civic engagement. Together, they highlight the importance of people-centered, locally grounded approaches to democracy that prioritize trust, reciprocity, and inclusion. This talk will outline key insights from the conference, discuss emerging themes across the proposals, and demonstrate how youth-led initiatives can strengthen democratic resilience by transforming democracy from a distant institution into a shared, participatory practice.

Presenter: Broderick Rucker
Sponsor: Joyce Burnette (Economics)
Title: Happy Wife, Happy Life: Examining the Gender Unemployment Gaps and Marriage Premium Between College Graduates

This paper studies how marriage and gender relate to unemployment among college graduates in the United States. Using IPUMS USA data from 2013 and 2023, it compares unemployment rates by gender, marital status, and degree fields. The results show that married individuals are less likely to be unemployed than unmarried individuals, with this effect being much stronger for men. Although overall unemployment declined between 2013 and 2023, the marriage advantage remains present in both years. Differences across degree fields exist, but are smaller than the effects of gender and marital status.

Presenter: John Schnerre
Sponsor: Jeremy Hartnett (Classics)
Title: Marcus Modius Maxximus: How Priestly Puns Can Give Insight into Multiculturalism in Rome

Many people think of Romans as being bland empire-builders, but Romans had a funny side too and adored a good pun: in literary texts, graffiti, and even in tombstones. One striking and mysterious example is the funerary marker of "Marcus Modius Maxximus." It featured a rooster (gallus in Latin) perching proudly on top of a bushel-like vessel (called a modius) overflowing with grain. An inscription names Maxximus as the chief priest — archgallus — of Magna Mater in Rome's port city, Ostia, through which flowed all manner of goods to feed the imperial capital, especially grain. The visual tie to both his name and his office are clearly intentional. This presentation will address the jocular nature of Maxximus' double-pun artwork, the Cult of the Magna Mater, and the broader historical patterns of adoption of foreign customs in the Roman empire.

Oral Presentations & Performances

Presenter: Cole Shifferly
Sponsor: Erika Sorensen-Kamakian (Biology)
Title: A Fungus Among Us: The Underground Lives of Orchids

Microbial populations are vital to the health of many organisms and the ecosystems they support. Orchids are organisms that, in most species, rely heavily on fungal microbes to undergo seed germination. This reliance on microbes makes the presence of orchids an incredible indicator of soil health. Orchids are disappearing from certain ecosystems, suggesting that human activities have disturbed fungal populations and, by extension, orchid populations. We collected orchid root samples from northern Michigan, where orchids remain prevalent. Fungal samples were isolated from the roots of these plants to allow for genetic comparisons with fungi from other locations. Additionally, we recorded the distances between clustered orchids, allowing us to analyze their fungal diversity. Our analyses revealed that G. repens and G. oblongifolia orchids found in Michigan used fungal partners that were genetically similar to those found elsewhere in the US. Additionally, our analysis of a single local population, found that, in some cases, Goodyera (G.) orchids share the exact same fungal individual. We found that the likelihood of this decreases as the physical distance between the orchids increases. Taken together, these results indicate that low-disturbance ecosystems like those in northern Michigan likely undergo frequent turnover of fungal populations, fostering abundant orchid populations.

Presenter: Quinn Sholar
Sponsors: Annie Strader (Art) & Elizabeth Morton (Art)
Title: Slavery Persists Through Black Lives Today

This presentation examines how the legacy of slavery continues to shape Black lives in the United States through systemic, cultural, and social structures. Drawing from an in-depth visual and historical analysis of contemporary Black artists, the project argues that slavery is not a distant past but an enduring presence embedded in modern systems such as education, housing, labor, policing, and cultural representation. The research highlights artists including Deborah Roberts, Michael Dixon, Nathaniel Mary Quinn, Ernie Barnes, Willie Cole, Kadir Nelson, Germane Barnes, and Arthur Jafa, whose work explores how art communicates histories of oppression while also expressing resilience, community, and resistance.

Alongside this research, I position my own artistic practice in conversation with these artists. Like their work, my art is rooted in justice, identity, and lived experience, using symbolism and material choices to challenge dominant narratives and invite critical reflection. By studying how these artists translate historical trauma into visual form, I apply similar conceptual strategies in my own work to address equity and collective responsibility. This presentation is intended for a general audience and demonstrates how artistic research not only preserves history, but also creates space for dialogue, accountability, and continued action toward justice.

Presenter: Justin Spurgeon
Sponsors: Huei-Jyun Ye (Political Science) & Ryan Liou (Political Science)
Title: Crisis, Law, and the Direction of Executive Power

This study examines how the nature of an attack on the United States influences the direction of executive power expansion. By comparing the 1941 bombing of Pearl Harbor and the 2001 terrorist attacks of September 11, it evaluates whether the organizational character of an attacker—state or non-state—affects how presidential authority grows during national emergencies. The project hypothesizes that attacks by sovereign nations lead to foreign-facing expansions, such as military mobilization, censorship, and foreign intelligence coordination, while attacks by ambiguous or decentralized actors lead to domestic-facing expansions, including surveillance, detention, and internal security restructuring. Using a comparative historical design grounded in legislative and executive documents, this research traces how these powers emerge, what legal mechanisms enable them, and whether they persist beyond the crisis. The study contributes to understanding the conditions under which emergencies alter the balance of powers in the American constitutional system.

Oral Presentations & Performances

Presenter: Carson Wirtz
Sponsor: James Cherry (Theater)
Title: The Dramaturgy of Wabash Theater's "1984"

As the Dramaturg for Wabash Theater's production of "1984," from the Fall of 2025, I am proud to speak on my work and the dramaturgy of the production. This presentation is recommended to members of the Wabash community who got to see "1984" and would be interested in learning more of its creation. From selecting an adaptation of George Orwell's classic dystopian novel to the program you held in your hands in the audience, this presentation offers insight into some of the research and creative work behind the scenes to bring "1984" to life.

Presenter: Owen Wright
Sponsor: Brad Carlson (Biology)
Title: Developing a Low-Power Sensor System to Classify Movement Behavior in Eastern Box Turtles

This project explores the use of miniature electronics to monitor fine-scale movement behavior in eastern box turtles. I designed and built a custom tracking device using ESP32 and TinyDuino microcontroller boards paired with a 3-axis accelerometer and a real-time clock (RTC). The system continuously logs acceleration data with precise timestamps while operating on extremely low power, making it suitable for multi-day field deployment on free-ranging turtles. The goal is to classify both the timing and type of movement, including resting, slow walking, and rapid locomotion, and to determine whether turtles show consistent daily activity patterns such as increased movement in early morning or evening. By pairing accelerometer signatures with real-time data, the device provides a low-cost, scalable method for behavioral monitoring without relying on GPS or constant human observation. This project demonstrates how lightweight electronics can support wildlife research by revealing activity patterns that are difficult to measure in the field and that may change when animals are observed directly.

Presenter: Evan Zambrano
Sponsors: Sara Mehltretter (Rhetoric) & Gabriela Tscholl (Rhetoric)
Title: Redefining Political Discourse Through the Joe Rogan Experience

Podcasting has become a powerful medium through which people engage with politics, not because it claims authority, but because it feels real. Long-form conversations pull listeners into the room, encouraging them to trust the tone, humor, and back-and-forth in ways that traditional cable news interviews often fail to do. This project analyzes The Joe Rogan Experience, focusing on episode #2341 with Bernie Sanders and episode #2219 with Donald Trump, to examine how Rogan's show creates a different kind of political rhetorical space than mainstream media. Using Kenneth Burke's theories of identification, division, and cluster criticism, I argue that Rogan builds credibility by performing authenticity while also protecting his independence from traditional media. My findings suggest that political influence can be exercised through identification and intimacy rather than expertise, raising questions about responsibility and accountability within alternative media spaces that increasingly shape public political understanding.

Poster Presentations & Exhibitions (Alphabetical by Presenter)

Presenters: Precious Ainabor & Jonathan Parackattu
Sponsors: Walter Novak (Chemistry) & Erika Sorensen-Kamakian (Biology)
Title: Flipping the Switch: Controlling Protein Degradation in Bacteria

There are a variety of molecular tools to control protein levels inside cells, yet none offer the potential of the Latching Orthogonal Cage/Key pRoteins system (LOCKR). LOCKR works like a molecular switch with two parts: a Switch and a Key. The Switch can be programmed with different functional sequences, including degrons—short sequences that tell the cell to break down a protein. When the Key binds to the Switch, the Switch opens and exposes the degron, causing the attached protein to be degraded. Here, our research explores using LOCKR in bacteria. To make LOCKR function in bacteria, we designed an inducible fluorescently-tagged Switch with a bacterial degron (GFP-bacdegronSwitch) and an inducible fluorescently-tagged Key (RFP-Key). At 18°C, we saw reduced GFP-bacdegronSwitch fluorescence when we increased RFP-Key levels. To measure degradation over time, we repeated the experiment at 37 °C and tracked fluorescence. Under these conditions, GFP-bacdegronSwitch levels increased while RFP-Key levels remained low, suggesting that higher temperature limits Key expression. To determine if degradation is specific, we designed a Key variant (RFP-KeyC) predicted not to interact with GFP-bacdegronSwitchA and a bacSwitch lacking the degron. Our work shows that bacdegronLOCKR has strong potential for controlling proteins in bacteria, opening up new synthetic biology opportunities.

Presenter: Lucas Barrett
Sponsor: Jeremy Hartnett (Classics)
Title: History of Chadwick Court

This project is a podcast-style video that documents and interprets the history of Chadwick Court through interviews and institutional storytelling. The episode features conversations with former head coach Mac Petty, school archivist Nolan Eller, and Brent Harris, Director of Athletic Communications. Together, these voices provide personal, historical, and administrative perspectives that help situate Chadwick Court as more than a physical space. The project traces how the court has shaped athletic tradition, student life, and campus identity over time. By combining oral history with archival context, the podcast preserves lived experiences while connecting them to broader themes of memory, community, and institutional legacy within the university.

Presenters: Myles Bernat & Justin Lewis
Sponsor: Heidi Walsh (Biology)
Title: Understanding the Role of Lipid Droplets in Neuron Function

Lipid droplets are organelles that take up free fatty acids and store them as neutral triglycerides, serving as hubs for lipid metabolism and energy homeostasis. During our summer in Dr. Walsh's research lab, we developed an optimized lipid droplet staining protocol and quantified RNA levels in GT1-7 neuron cells exposed to fatty acid treatments. This new method simultaneously stains the nucleus, membrane, and lipid droplets, allowing for accurate visualization and counting of lipid droplets in GT1-7 cells. By quantifying these droplets, we aim to enhance our understanding of cellular responses to different fatty acids. We also tested the effects of two drugs that affect lipid droplets: Atglistatin, which inhibits the lipase ATG-L that breaks down lipids, and A-922500, which inhibits DGAT1, an enzyme involved in lipid storage. Analyzing RNA from cells treated with these inhibitors enables us to investigate the role of ATGL and DGAT1 on genes related to lipotoxicity and stress pathways. Understanding these mechanisms is crucial, as previous research indicates that lipid droplet formation supports neuron function by sustaining mitochondrial and endoplasmic reticulum homeostasis. By exploring how fatty acids influence these processes, we can gain insights into the effects of diet and fatty acid intake on neuronal cell function and homeostasis.

Poster Presentations & Exhibitions

Presenter: Francisco Bibian
Sponsors: Walter Novak (Chemistry) & Erika Sorensen-Kamakian (Biology)
Title: How Do Cells Take Out the Trash? We Broke Worms to Find Out

Healthy cells balance functional and damaged proteins using the proteasome, a molecular machine that breaks down unwanted or damaged proteins. To better understand the function of the proteasome in C. elegans, a nematode worm widely used in scientific research, we set out to optimize the method for purifying the proteasome. Ultimately, we hope to determine a high-resolution 3D model of the worm proteasome, which will require a large and pure quantity of proteasome. Our recently developed purification techniques have used small volumes of lysate, yielding a fraction of the pure proteasome needed for structural studies. Here, we tested multiple techniques to produce worm lysate, including: dounce homogenization, Balch homogenization, sonication, and glass bead beating. Following lysis, we experimented with larger columns to increase the processing volume. Our results showed that dounce followed by sonication produced the highest protein concentration from lysate; however, the larger column did not yield large amounts of functional proteasome. Developing a model of the worm proteasome will be helpful for a better understanding of how organisms maintain the balance of functional and damaged proteins.

Presenters: Gabriel Brandenburg & Matthew Moran
Sponsor: Nathan Tompkins (Physics)
Title: Examining Metal Salt and Hydroxide Precipitates Under Microfluidic Properties

When metal salts encounter hydroxide, a precipitate reaction occurs and, in that reaction, a potential difference is generated due to the redox states between the respective elements. Information over the properties of these reactions is still unknown, so to contribute to the ongoing research of metal salts, we researched the average potential difference between the reaction of different metals salts and hydroxide. To accomplish the goal of finding the average potential difference, the experiments required a controlled environment in which fluids can be manipulated easily. Microfluidics, which occurs when you experiment on fluids flowing into a channel that is microns wide, allow the experiments to be repeatable and controlled. The metal salts that we tested were iron chloride, cobalt chloride, and nickel chloride each netting a different average potential difference. Applications for our research may include powering big infrastructures and the extraction of specific minerals.

Presenter: James Day
Sponsor: Brad Carlson (Biology)
Title: Assessing Soil Microbial Diversity in Wabash's Native Plant Garden: Insights from Carbon Substrate Utilization with Biolog® EcoPlates™

Native plant gardens provide important ecosystem functions by supporting wildlife, enhancing soil health, and contributing to climate regulation through carbon sequestration. However, population growth and suburbanization have led to widespread loss of native plant communities, which are frequently replaced by turfgrass lawns that support lower biodiversity and fewer ecological functions. Wabash's Native Plant Garden was established to enhance the biodiversity and ecosystem functions on campus, which is largely dominated by turfgrass lawns. However, its effects on soil microbial communities have yet to be assessed. This study evaluated the metabolic diversity of soil microbiomes in Wabash's Native Plant Garden using Biolog® EcoPlates™, which measure microbial utilization of 31 carbon substrates. Soil samples were collected in triplicate from native planting beds and nearby turfgrass control plots and incubated on EcoPlates™, with color development quantified as a proxy for metabolic activity. Shannon diversity indices and multifunctionality metrics were used to compare metabolic diversity between samples. No significant differences were observed between native and control soils for either Shannon diversity ($p = 0.52$) or multifunctionality ($p = 0.30$). Principal coordinates analysis revealed substantial overlap between treatments, indicating no distinct metabolic signatures of native plantings at the time of sampling.

Poster Presentations & Exhibitions

Presenters: Eugene Enchill, Coby Stephens & Charles Chanin
Sponsor: Qixin Deng (Mathematics and Computer Science)
Title: Capstone Project MCAWL Website

A new public-facing website for the Animal Welfare League of Montgomery County (MCAWL). The goal of the project was to create a modern, easy-to-maintain site that helps the shelter showcase adoptable animals, explain its mission, and collect the donations it depends on to operate. The work included rethinking the site information architecture (Welcome, Get Involved, Learn, Events, Donate, and About Us), implementing a responsive navigation bar and landing pages, and improving content layout and readability. We also built several key technical features, including a fully embedded adoption page for real-time animal updates and new custom forms to streamline community engagement.

Presenters: Jacob Guse & Benedict Grill
Sponsor: Laura Wysocki (Chemistry)
Title: Synthesis of AlexaFluor Dyes for the Open Chemistry Initiative

Fluorescent dyes are a class of chemicals integral to biological research, as they can be targeted to specific molecules and brightly fluoresce within biological systems. These characteristics have enabled the visualization of tissues and fundamental chemical processes, serving a foundational role in driving scientific progress since their integration. However, the high cost and lack of accessibility to fluorescent dyes remain prohibitive factors for many research labs in further optimizing their experiments, potentially limiting the scope of their research. The Wysocki lab has joined the Open Chemistry initiative run through Howard Hughes Medical Institute, which synthesizes commonly used fluorescent dyes in order to give samples away for free. We have synthesized three AlexaFluor dyes to contribute to the available inventory and will discuss the opportunities and challenges of doing this work at a primarily undergraduate institute. The hope of this initiative is that by reducing or eliminating the cost of fluorescent dyes, scientists are able to optimize the dyes they use for their experiments, thereby expanding the impact of their work.

Presenter: Brandon Hammer
Sponsor: Karen Gunther (Psychology)
Title: Titrated Audiovisual Crossmodal Congruencies

Human perception is fundamentally multisensory, and crossmodal correspondences (e.g., the natural association between high pitch and high spatial elevation) can influence how quickly we respond to stimuli. In this study we examined how varying the proportion of congruent (e.g., a high-pitched tone paired with a visually elevated target) to incongruent (e.g., high-pitched tone paired with a visually low target) pitch-elevation pairings affects reaction time and whether visual dominance (i.e., a tendency for visual information to outweigh auditory information when the two conflict) emerges across tasks. Participants completed blocks ranging from 96% to 4% congruent trials while responding either to pitch or to visual elevation. Congruence scores (i.e., the difference in reaction times in congruent trials compared to incongruent trials) increased steadily as percent congruence rose, indicating a stronger congruency effect when congruent pairings were more frequent. At low congruency levels, scores diminished toward zero and some even migrated past negative, suggesting participants exhibited a reversed congruency effect. Congruency effects were substantially larger in the auditory task than in the visual task, consistent with visual dominance. These results suggest that the proportion of congruent trials can mediate the magnitude and direction of crossmodal congruency effects.

Poster Presentations & Exhibitions

Presenter: Brandon Hammer
Sponsor: Heidi Walsh (Biology)
Title: DGAT1 Inhibition Amplifies ER Stress-Mediated Suppression of GnRH Expression

Excess intracellular lipids can induce lipotoxicity and endoplasmic reticulum (ER) stress, disrupting normal cellular function. Lipid droplets reduce this stress by storing excess fatty acids, a process that depends on diacylglycerol acyltransferase 1 (DGAT1), which catalyzes triglyceride synthesis. Gonadotropin-releasing hormone (GnRH) is a hypothalamic hormone essential for reproductive function, and previous work from our lab demonstrated that obesity-associated stressors, including ER stress and the saturated fatty acid palmitic acid, reduce Gnrh1 gene expression in GnRH-producing neurons. Building on this work, we investigated how DGAT1 inhibition affects the expression of GnRH and ER stress–related genes in GT1-7 cells. Cells were treated with DMSO, A-922500 (DGAT1 inhibitor), thapsigargin (ER stress inducer), palmitic acid (saturated fatty acid), or a combination, and gene expression was assessed by qRT-PCR. Thapsigargin and palmitic acid significantly decreased Gnrh1 expression, and co-treatment with the DGAT1 inhibitor showed a trend toward further suppression. Future studies will examine additional ER stress markers and protein expression, as well as assess cell viability following DGAT1 inhibition.

Presenter: Joshua Helms
Sponsor: Sujata Saha (Economics)
Title: The Effects of the Great Recession on Different Labor Markets

This paper examines how major economic and financial indicators affected employment across different U.S. labor sectors during the 2008 Great Recession. This study divides employment into two groups, those that were most and least affected from the recession. Using monthly data from the Federal Reserve Bank of St. Louis (FRED) from 2000 through early 2024, the paper applies a panel regression framework to analyze how different factors such as housing prices, interest rates, labor force participation, oil prices, inflation, etc. relate to employment in each group. Employment in the most affected, more cyclical industries responds strongly to changes in housing prices, production capacity, and labor force participation, reflecting their close connection to consumer demand and business investment. In contrast, employment in the more stable sectors is far less sensitive to these indicators and, in some cases, responds in the opposite direction. These findings suggest that economic downturns do not affect all labor markets in the same way, even within a single country which offers insights that may be useful for designing more targeted and effective policy responses during future crises.

Presenter: Walid Kasab
Sponsor: Andrew Bowling (Mathematics)
Title: Strong Group-Valued Zonal Labelings on Platonic and Archimedean Graphs

Zonal labelings assign the two nonzero elements of Z_3 to vertices of a plane graph so that each face-sum is 0, while dually, cozonal labelings assign nonzero labels to faces so that each vertex-sum is 0. Recent work extends these notions to abelian groups Γ and introduces strong and generative variants, which require label orders to match local degrees or face lengths and ask that the labels generate Γ. We study strong Γ-(co)zonal labelings on polyhedral graphs, focusing on the Platonic and Archimedean solids. We present several explicit examples, including a strong generative $(Z_3 \oplus Z_3)$-zonal labeling of the cube and a strong $(Z_4 \oplus Z_4)$-zonal labeling of the octahedron. We also investigate the icosahedron and find that it admits no strong Γ-zonal labeling for any finite Γ. Finally, we describe a Tait-type correspondence: for 2-connected plane graphs, strong Γ-zonal labelings are equivalent to proper vertex-cyclic Γ-edge-colorings.

Poster Presentations & Exhibitions

Presenter: Tri An Le
Sponsor: Qixin Deng (Mathematics and Computer Science)
Title: MemeMatch: A Large-Scale Dual-Context Multimodal Dataset and Retrieval System for Internet Memes

Internet memes are typically images paired with text, reused and remixed across communities, carrying shared sentiment and cultural references in a compact, multimodal form. Memes therefore offer a powerful lens into online community communication, with meaning emerging from both visual cues and user-added captions.

MemeMatch starts with nearly one million memes collected from Reddit's r/Memes (2018–2022) and ImgFlip, then cleans and curates a core set of about 301K memes spanning 2,083 common templates. For each meme, I extract local context by reading the overlaid text with OCR and combining it with the post title, and I extract global context by masking the text and captioning the underlying image. Using this dual-context pipeline, I built a large-scale multimodal meme dataset with rich annotations (emotion vectors, topics, and usage-intent labels) and studied how these attributes relate to virality and engagement. Building on the dataset, I then engineered a context-aware retrieval system on top of it by developing a framework of case-based text embeddings and an LLM-based parser to examine how meaning and intent shift across communities and contexts, and how those shifts relate to engagement. Together, MemeMatch provides a structured way to study online communities through memes and how humor, emotion, and culture spread online.

Presenter: David Leal
Sponsor: Aiala Levy (History)
Title: Latine Belonging in Higher Education

What barriers weaken Latine college students' sense of belonging in higher education at the undergraduate level, and what factors help them build community and succeed despite these challenges? This central question guided our research project, which began in Spring 2025. Using community and alumni interviews, the project explains how, over the past two decades, Latine students and their families have navigated institutional, financial, and global pressures. In this presentation, I focus specifically on immigration. These interviews show that the intersection of immigration status and Latine identity creates systemic and institutional barriers to a sense of belonging at the access, retention, and graduation points of the higher education journey. National, institutional, local, and familial factors are often complicated by immigration status, which limits the support available to students. However, Latine students have found support navigating these challenges from educators, educational institutions, external organizations, friends, and relatives. By elevating these underrepresented voices, this work aims to provide and inform strategies to create a more inclusive and supportive college environment for Latine students, including campus-community collaborations.

Presenters: Arman Luthra & Isaac Grannis
Sponsor: Qixin Deng (Mathematics and Computer Science)
Title: Prism: An Interactive Platform for Exploring Language Model Behavior

This report presents Prism, a web-based platform that makes the inner workings of AI language models visible and understandable to researchers and educators without requiring programming expertise. Language models—the AI systems behind tools like ChatGPT—operate as "black boxes," making it difficult to understand why they generate particular responses. Prism addresses this challenge by providing two core capabilities: exploring how the model represents individual words and concepts internally, and visualizing which learned features activate when the model generates text.
The system uses Google's Gemma-2-2b language model and combines a Python-based backend with an interactive web interface. The interface features intuitive visualizations and real-time controls that let users steer the model's behavior by adjusting feature activations, enabling hands-on exploration of how language models process and generate text. By translating complex machine learning concepts into accessible visual interactions, Prism serves as both a research tool for studying model behavior and an educational platform for understanding AI systems that are increasingly prevalent in academic and real-world applications.

Poster Presentations & Exhibitions

Presenter: Aidan Mason
Sponsors: Eric Wetzel (Global Health Initiative) & Erika Sorensen-Kamakian (Biology)
Title: Healthcare in the Regions of Peru and Montgomery County

During of my time in Peru, I experienced various sectors of the Peruvian healthcare system. The system is fragmented at best, with vast swaths of the country situated in a medical desert. Additionally, each distinct region of Peru (coast, mountains, jungle) presents its own set of challenges in access, quality of care, and staffing. In addition to examining differences within Peru, I will compare the Peruvian healthcare system to that of the US, specifically Montgomery County, as our county is also considered a medical desert.

Presenter: Hunter Otto
Sponsors: Ryan Liou (Political Science) & Larry Busk (Philosophy)
Title: The Relationship Between Sustained High Amish Fertility and Economic Structure

Background: Global fertility is falling, with 110 of 204 countries having sub-replacement fertility (under 2.1). However, the American Amish greatly deviate from this trend, with some Amish communities seeing 11.2 children per couple. Existing literature on the Amish emphasizes culture and religion, but few studies examine their economic structure as it pertains to their pronatalism.

Objective: This paper examines whether the sustained high fertility seen in the Amish is correlated with labor demands caused by their religiously constrained economic system. More specifically – whether labor-intensive, endogamous production incentivizes large families.

Methods: This study uses both quantitative demographic data on the Amish along with qualitative ethnographic research on Amish economic organization. These are interpreted using Austrian economic theory, especially the concepts of market incentives, spontaneous order, and praxeology.

Results: Amish communities experience fertility rates significantly higher than national averages, even when controlling for age of marriage. Their economy is dominated by family-run businesses, agriculture, and trades, while relying minimally on mechanization and having limited access to external labor markets. Under these circumstances, large families serve as a means of economic stability and labor.

Conclusions: Amish high fertility is not merely culturally motivated but economically selected. Large families serve as a rational adaptation to labor constraints caused by religious norms, thereby allowing Amish communities to remain economically viable without wage-laborers or capital-intensive technologies.

Contribution: This paper contributes to fertility research by integrating economic theory into the study of religious pronatalism. Rather than seeing Amish fertility as ideological, it reframes this debate as that of incentive structures. Furthermore, this paper offers a framework that may apply to other labor-intensive, isolated/endogamous communities.

Poster Presentations & Exhibitions

Presenter: Logan Porter
Sponsor: Joe Scanlon (Chemistry)
Title: Effect of Reduction on Tethered Electron Donor-Acceptor Complexes for Use as Molecular Switches

Molecular switches are molecules that can orient themselves in two separate geometries: open and closed. In our case, an open complex occurs when there is a clear separation between the electron accepting and electron donating rings, whereas a closed complex forms when the rings eclipse each other. Previous research has explored tethered electron donor-acceptor (EDA) complexes, analyzing various electrostatic and geometrical properties for both conformations. In our most recent study, we used computational methods to examine whether reduction can be used as a means to control the molecular switch and alternate the conformations from open to closed and vice versa. We measured geometrical differences, energy changes, and reduction potentials, comparing open versus closed and neutral versus anionic states. Overall, studying EDA complexes and the potential to control molecular switching behavior opens new pathways for the design and development of molecular machines can help perform precise tasks at a small scale, such as targeted drug delivery.

Presenters: Gregory Powers & Abdul Basit Tonmoy
Sponsor: Qixin Deng (Mathematics and Computer Science)
Title: WALLY – An autonomous robot

WALLY is a sophisticated autonomous mobile robot system designed for GPS waypoint navigation, obstacle avoidance, delivery and security applications. The project combines computer vision, sensor fusion, and autonomous navigation technologies to create a versatile robotic platform capable of navigating complex environments while providing security features through face recognition.

Presenter: Julio Cruz-Romero
Sponsor: Neil Schmitzer-Torbert (Pyschology)
Title: Seeing Life as a Hero's Journey: Impact on Meaning in Life and Exercise Intentions

This study attempts to replicate key findings from Rogers et al. (2023). They reported that seeing one's life as a hero's journey is linked with greater meaning in life. In their work, a restorying intervention increased scores on the Hero's Journey Scale (HJS) and was linked to higher meaning in life. In our project, we carried out a classroom replication with male undergraduates at Wabash College. Students were randomly assigned to conditions labeled "control" and "restorying" and then completed an online survey including the HJS, a brief meaning in life scale, and several items about exercise motivation and planned weekly exercise. Our total sample included 44 students tested either in class or online. We found that students in the restorying condition scored higher on the HJS than students in the control condition, and that HJS scores were strongly and positively related to meaning in life. However, we did not find clear differences between conditions in planned exercise. Taken together, these results partially support Rogers and colleagues' conclusions about the link between hero's journey thinking and meaning in life, but they do not provide evidence that this extends to short-term exercise planning in our sample.

Poster Presentations & Exhibitions

Presenter: Andrew Ross
Sponsor: Sujata Saha (Economics)
Title: Comparison of Asset Performance in US Financial Crises; A Time Series Analysis

When economic uncertainty arises, what should investors do with their capital? This research answers this question by analyzing the behavior of four fundamental financial assets; short- and long-term bonds, gold, and the S&P 500 using monthly data from 1990 to 2024. Employing time series regressions and a set of key macroeconomic indicators, this research identifies factors affecting these assets. The effects of specific economic events, such as the Dot-Com Bubble, the 2008 Recession, and the Covid-19 Pandemic are captured using dummy variables. The results show that long- and short-term bond yields decrease in times of economic uncertainty, while the S&P 500 index and gold price show mixed results that can be explained by investor expectations and speculation. By comparing asset behavior, this research explains asset behavior in times of economic uncertainty and offers practical applications, informing investing strategies during times of financial instability.

Presenter: Cole Shifferly
Sponsors: Erika Sorensen-Kamakian (Biology) & Walter Novak (Chemistry)
Title: Hidden Players in Proteostasis: Protease Contributions to Proteostasis in *C. elegans*

Protein homeostasis (proteostasis) describes how cells maintain a balance between functional and damaged proteins. Enhanced proteostasis is associated with longevity, whereas decreased proteostasis results in the accumulation of dysfunctional proteins, which contribute to neurodegenerative diseases. One way that organisms clear dysfunctional proteins is using a cellular machine called the proteasome. We studied proteasome activity in C. elegans, a nematode worm that serves as a widely used model for aging and neurodegenerative disease. We assessed proteasome activity using fluorogenic peptide cleavage assays in lysates derived from animals reported to have elevated proteasome activity at high temperatures and from wild type (normal) worms. We found that peptide cleavage was elevated at high temperatures regardless of genetic background; however, some of this cleavage was due to small proteolytic enzymes rather than the proteasome. We identified four candidate enzymes responsible for this non-proteasomal cleavage and tested their contribution using gene depletion (RNAi) or knockout mutants. Our results confirm reduced peptide cleavage when these enzymes are compromised and show that worms with the highest cleavage activity exhibit increased expression of these enzymes, using qRT-PCR. Clarifying how proteases and proteasomes differentially contribute to peptide cleavage will help guide researchers using peptide-based assays to measure proteasome activity.

Presenters: Owen Wright, Grant Brewer, Isaac Jansen & Dominic Litchfield
Sponsor: Brad Carlson (Biology)
Title: Behavioral and Habitat Responses of Eastern Box Turtles to Human Disturbance: The Role of Boldness

In this project we investigated how human disturbance influences movement, habitat selection, and thermal preferences in male eastern box turtles, and whether these responses vary with individual boldness. Over four weeks per turtle, we compared behavior in disturbance and control periods using repeated tracking and paired habitat measurements. Disturbance did not affect movement distance, and boldness did not explain variation in movement. However, boldness played an important role in habitat cover use: shy turtles tended to move into areas with less cover after disturbance, whereas bold individuals showed a slight increase in cover use. This pattern was consistent whether analyzing raw cover or cover preference relative to random available sites. Disturbance also led turtles to select warmer microhabitats, but this effect did not depend on boldness. Overall, the results show that behavioral personality traits shape how turtles adjust to disturbance, particularly in their habitat selection, while movement and temperature responses are more uniform across individuals.


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