

**LOYOLA UNIVERSITY CHICAGO**

**THE GRADUATE SCHOOL'S 19TH ANNUAL INTERDISCIPLINARY SYMPOSIUM**

**SATURDAY, APRIL 11, 2026**



## HOSTED BY THE GRADUATE SCHOOL & THE GRADUATE STUDENT ADVISORY COUNCIL

The Graduate School and the Graduate Student Advisory Council host an annual interdisciplinary research symposium on the Lake Shore Campus organized around the diverse research methods exhibited in scholarly work. The symposium is an excellent forum for Loyola graduate students to present their scholarly work. Any current graduate student within The Graduate School is eligible to submit a presentation. Monetary awards are given based on research category and student's program status.

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**VOLUNTEERS:** The Interdisciplinary Research Symposium cannot operate without the help of volunteers who assist with moderating as well as judging paper and poster sessions. The Graduate Student Advisory Council would like to recognize and show appreciation for those who have kindly offered their time and assistance.

### MODERATORS

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CHERYL FOK      KITZIA RUVALCABA

MAXWELL GILLUM

## REGISTRATION AND WELCOME

9:00 – 9:30 – PALM COURT (4TH FLOOR MUNDELEIN CENTER)

### PAPER SESSION A

9:30-10:45

#### **MUND 403**

**Nicholas Sekits**, Factors Influencing Common Gartersnake (*Thamnophis sirtalis*) Detections using the Adapted-Hunt Drift Fence Technique (AHDriFT) in Northern Indiana

**Audrey Nolen**, The Real Housing Crisis: Chicago Legal Service Disparities

**Stephanie Wallace**, Biometric Contracts: Designing Consent Mechanisms for Biometric Data Use

**Leo Mendoza**, The Idolatry of Nation: Christian Nationalism and the Loss of Civil Conversation

#### **MUND 404**

**Christian Yeomans**, Articulating the Future: How the Techno-Optimist Manifesto Constructs AI Hegemony

**Vinchenzo Vassalotti**, Constructing Queer & Drug Culture: The Side Effects of Stigma

**Leo Mendoza**, The Idolatry of Nation: Christian Nationalism and the Loss of Civil Conversation

#### **MUND 406**

**Jonathan Savidge**, Skin Color, Gender and Mental Health Challenges Among Latina/o/x Immigrants to the United States

**Zachary Stevenson**, The Mormon History Wars, 1981-1985

**Fatima Hasnain**, Paradise Plums and Black-Elm Leaves: The Mother's Nostalgia in Audre Lorde's *Zami*

## BREAKFAST AND COFFEE

PALM COURT (4TH FLOOR MUNDELEIN CENTER)

### POSTER SESSION

11:00 – 1:00 – PALM COURT (4TH FLOOR MUNDELEIN CENTER)

**Hannah Eure**, Tactics of Terror: The Influence of Ideology on Terrorist Target and Weapon Choice

**Scott Kaiser**, Electrochemical Analysis of the Local Charge of a Self-Assembled Monolayer

**Meredith Sauer**, An Investigation of LLM Use in Scientific Papers

**Yoldas Yildiz**, Estrogen Receptor Beta (ER $\beta$ ): A Transcriptional Repressor of APP and ITPKB in Alzheimer Disease

**Belinda Ofofu**, Predicting Antimalarial Drug Resistance from Genome-Wide Variation Using Machine Learning

**Brian Ortiz**, Large Language Models (LLM) and Temporal Logic of Actions (TLA): How Effective are LLMs for Verification Systems

**Dawson Gallay**, The Science of Science: Loyola University's Research Network

**Sofia Orellana**, Does mode of larval development influence dispersal capacity and genetic connectivity in the ocean?

**Meagan McDowell**, Navigating microaggressions together: The role of gender, identity centrality, and responsiveness in African American romantic relationships

**Kussum Ghimire**, A Genomic Investigation into *Fusconaia flava*

**Clare Favela**, Chronic activation of stem cell migration causes regenerative decline in the aging intestinal epithelium

**Manuel Sandoval Madrigal**, Insta-CTSR: Cyberbullying, Topics, Severity, and Roles for Instagram

**Mousumi Paul**, Role of Groucho in *Drosophila* Spermatogenesis

**Alessandra Vellucci / Emil Shahbazov**, AI for Scientific Integrity: Detecting Paper-Mill Publications Through NLP and Scholarly Metadata

### LUNCH

**1:15 – 2:15 – PALM COURT (4TH FLOOR MUNDELEIN CENTER)**

### PAPER SESSION B

**2:30 – 3:45**

#### **MUND 406**

**Elizabeth Serna-Sanchez**, Structural Study of Rhodium Based Metal Surfaces

**Kate Douglas**, “Watch That Crotch, We Got Fangs!”: Organizing Rage through the SisterSerpents Radical Feminist Art Collective

**Bruna Tatematsu**, Poor Pregnancy Outcomes in the Absence of Regulatory Natural Killer Cells

#### **MUND 407**

**Emily Dominique**, Is the catalytic current always proportional to the surface of electro-catalyst?

**Alisson Anguiano Salas**, Motherhood in Bondage: Narrative Resistance in Harriet Jacobs’s *Incidents in the Life of a Slave Girl*

**Emily Krueger**, The Neuronal Membrane Proteasome (NMP) Expression is Modulated by Neuronal Activity to Regulate Pain Sensitivity

**Sonia Beltz**, Marrying Bleak House: Arguing for an Asexual Reading of Esther Summerson

#### **MUND 408**

**Kai Lehocky**, The Caterpillar Model: A New Way of Understanding Resilience for Non-Binary Activists

**Dena Heyasat**, Natural Killer Cells Regulate the Time of Delivery During Pregnancy

**Grant Steiner**, How the Green Algal Genus *Chlorella* Biochemically Mitigates Photosystem II Photoinhibition

**Alexandra Kamm**, Investigating the mechanism of HCV cell-to-cell spread

### RECEPTION AND AWARDS CEREMONY

**4:00 – 5:00 – PALM COURT (4TH FLOOR MUNDELEIN CENTER)**

*Outstanding Paper Presentation in the Humanities*

*Outstanding Paper Presentation in the Sciences*

*Outstanding Paper Presentation in the Social Sciences*

*Outstanding Research Poster*

*Honorable Mention Research Poster*

*EDGE Award for Integrating Diversity & Inclusion*

*Loyola Community Impact Award*

## PAPER ABSTRACTS

### Alisson Anguiano Salas, Motherhood in Bondage: Narrative Resistance in Harriet Jacobs's Incidents in the Life of a Slave Girl

This paper examines how Harriet Jacobs's *Incidents in the Life of a Slave Girl* represents Black motherhood under slavery as a complex site of both suffering and resistance. Scholarship on enslaved motherhood often emphasizes either trauma and exploitation or communal resilience, but Jacobs's narrative resists this binary. Instead, she depicts motherhood as a contradictory experience shaped by overlapping systems of racial, gendered, and economic oppression.

Jacobs not only represents these tensions thematically but also enacts them through narrative form. Through shifts in voice, tone, and narrative structure, maternal experience becomes a political and rhetorical technique that exposes the violence of slavery while asserting Black maternal agency. By foregrounding the formal and emotional complexity of Jacobs's narrative, this paper demonstrates how *Incidents in the Life of a Slave Girl* reframes Black motherhood as a space where vulnerability, endurance, and resistance coexist.

### Sonia Beltz, Marrying Bleak House: Arguing for an Asexual Reading of Esther Summerson

Charles Dickens's *Bleak House* appears to end happily: its protagonist, Esther Summerson, is given in marriage to Alan Woodcourt by her guardian—even without her accepting his proposal. This mirrors the phenomenon that asexual scholarship calls “compulsory sexuality,” which describes the idea that society compels individuals towards sex as a central end of human existence. Applying this concept to *Bleak House*, I query the accepted narrative of Esther's “happy ending.” If we de-center sexual relationships as the end-goal of human life—and thus, read Esther through an asexual lens—how does that recontextualize her priorities and wants within the novel? If Alan Woodcourt is no longer assumed to be Esther's “happy ending” ...what, if anything, is? In this paper, I apply “compulsory sexuality” to argue for a new asexual reading of Esther Summerson: in this, I propose that her rejections of Guppy and Woodcourt are equally valid and, indeed, align with social pressures placed upon asexual individuals. Furthermore, I analyze Esther's non-sexual relationships with Ada and with Mr. Jarndyce to highlight sources of platonic fulfillment. By de-centering sexual relationships, I push back on the sexual pressures placed upon Esther by her society and by critics, and instead, argue that her foremost relationship in the text is not to any person, but rather to the domestic space of *Bleak House* itself. In doing so, I argue that Esther offers a possible representative portrait of asexual striving towards a domestic future: one which de-centers sexual relationships and foregrounds domestic stability.

### Emily Dominique, Is the catalytic current always proportional to the surface of electro-catalyst?

Surface electrocatalysts are important components in industrial reactions responsible for saving millions of dollars in production. Optimal use of the electrocatalyst is typically achieved upon the dispersion/attachment of nanoparticles that maximizes the surface to volume ratio. The assessment of electrocatalytic performance typically assumes that current (electrocatalyst response) is linearly associated to the extent of the surface of the electrocatalytic active material. We develop methodology that combines numerical simulations with electrochemical measurements, cyclic voltammetry (CV) and microscopy-Scanning Electron Microscope (SEM) measurements to analyze and assess electrocatalysts. We demonstrate using a surface electrocatalyst and redox probe in solution that only a limited range of active electrocatalyst coverage obeys this assumption of linearity. Based on our numerical model we provide guidelines to correctly assess electrocatalytic activity of dispersed material on a less active surface for optimal use.

**Kate Douglas, "Watch That Crotch. We Got Fangs!": Organizing Rage through the SisterSerpents Radical Feminist Art Collective**

The SisterSerpents radical feminist art collective purposefully shocked, antagonized, and rattled the City of Chicago and beyond from 1989 to 1998. This paper, centered on the archives of the SisterSerpents radical feminist art collective, seeks to expand third wave feminist historiography to include the contributions of these artists. They sought to intrude into public life and to educate broad audiences about women's oppression by men through guerilla tactics, choosing to "fight fire with fire." The Serpents postered and stickered around Chicago and at times staged rhetorical attacks on establishments. They launched campaigns against politicians and organizations actively contributing to women's exploitation by mailing letters (often accompanied by their posters or other explicit illustrations) to media outlets and political offices. And they hosted exhibitions, film screenings, and speaking events to build audiences. The collective grew from a group of four women in 1989 to over 50 regularly contributing artists and thousands of supporters in 1998. Even more so than their forerunners and contemporaries, the Serpents used their rage and hatred for the patriarchy as fuel to produce in-your-face, aggressive works of art. A deep dive into their art, their tactics, and their organizing can answer questions about what it meant to be a feminist art collective in the late 1980s and early to late 1990s and reveal the broader impact of their work on local and national levels.

**Fatima Hasnain, Paradise Plums and Black-Elm Leaves: The Mother's Nostalgia in Audre Lorde's Zami**

This paper studies the interplay of diasporic memory and identity formation for the second-generation Caribbean female diaspora in the US and the struggle of first-generation Caribbean immigrant women with assimilation and nostalgia in Audre Lorde's 1982 biomythography titled *Zami: A New Spelling of My Name*. In this paper, I analyze Linda Lorde's struggle with assimilation and systemic racism in America, as well as her homeland nostalgia vis a vis the material and immaterial elements that constitute her nostalgia to assert that her nostalgia is not passive remembrance but critical engagement with memories for the recreation of home as a necessity for survival in foreign land. Although this paper primarily focuses on Linda Lorde's critical engagement with nostalgia, it also briefly analyzes Audre Lorde's perception of home through her mother's homeland memories to identify the role of intergenerational transference of memories in the building of diasporic identity.

**Dena Heyasat, Natural Killer Cells Regulate the Time of Delivery During Pregnancy**

Inflammation promotes key transitional stages during pregnancy such as implantation, placentation, and labor. The cellular sources and mechanisms behind such beneficial inflammation during labor are yet to be understood. Natural killer (NK) cells are innate immune cells that make up over 70% of the immune cells at the maternal-fetal interface in both human and mice. Mice that are deficient in NK cells give birth to fewer pups with lower birth weights. Although NK cells are important for successful pregnancy outcomes, whether they are involved in the initiation of labor has yet to be studied. Here, we investigated NK cells as possible promoters of inflammation and thus regulators of labor. To do this, we used a novel biosensor caspase-1 reporter mouse to monitor in vivo inflammation during the course of labor. Additionally, we administered an antibody intravenously to deplete NK cells. We found that caspase-1 biosensor activity (ie., inflammation) peaked at labor onset and diminished seven days postpartum. Depleting NK cells prior to labor onset reduced inflammation and extended the time of delivery by 2-3 days. These results suggest NK cells play a role in induction of inflammation that precedes labor, and when

abrogated delays the delivery time extending the gestational length of the pups. Understanding the triggers of the inflammatory response at labor onset is critical for the development of therapeutic strategies to keep preterm birth at bay and prevent neonatal complications.

**Alexandra Kamm, Integrative Cell Biology Program (HSC)**

There are multiple ways a virus can spread from one cell to another. During cell-free (CF) spread, a viral particle exits one cell and travels in the extracellular space before entering a new uninfected cell, whereas cell-to-cell (CTC) spread allows viral transmission directly to adjacent cells without diffusing extracellularly. Because CTC spread shields the virus from neutralizing antibodies and is thought to provide a faster means of spread that delivers more viral genomes, CTC spread has been implicated in the establishment and maintenance of chronic infections. Hepatitis C virus (HCV) establishes chronic infection in most exposed individuals causing severe liver disease including cancer. Although it has been shown that HCV can spread CTC, little is known about how this occurs. To elucidate the pathways/mechanism(s) of HCV CTC spread, we performed a targeted siRNA screen. Knockdown of 37 genes reduced HCV CTC spread without toxicity or reducing HCV replication. These 37 genes were further screened to find those uniquely involved in CTC spread by monitoring effects on HCV CF spread (i.e., CF entry and CF egress). We found 18 genes that did not decrease CF spread revealing host genes specifically involved in HCV CTC spread. Pathway analysis of these genes suggests three trafficking pathways with overlapping components. We are currently assessing the role of the shared host factors while differentiating between the pathways by targeting non-overlapping genes. Importantly, identification of HCV CTC spread factors enables antiviral targeting which should help prevent the viral escape that occurs during clinical HCV treatment.

**Emily Krueger, The Neuronal Membrane Proteasome (NMP) Expression is Modulated by Neuronal Activity to Regulate Pain Sensitivity**

Neuropathic pain affects around 7-10% of the population, significantly impacting patients' quality of life. Despite extensive research, the molecular mechanisms that regulate pain sensation remain poorly understood. Recently, we identified the neuronal membrane proteasome (NMP), a specialized proteasome localized on the plasma membrane of a subpopulation of somatosensory neurons that sense mechanical and pain sensation. The NMP mediates neuron-to-neuron communication to modulate pain sensitivity; however, the mechanisms regulating its expression remain unknown. Given that sustained neuronal hyperactivity is a hallmark of neuropathic pain, we hypothesized that hyperactivity increases NMP expression to shape neuronal responsiveness. Using dorsal root ganglion (DRG) neuron cultures, we applied prolonged KCl stimulation to induce hyperactive conditions. We measured NMP expression using membrane fractionation and antibody feeding. We found that sustained stimulation increased NMP localization to the plasma membrane, suggesting that neuronal activity influences NMP expression. We then assessed NMP expression in neuropathic pain using the chronic constriction injury (CCI) model. Our data show that NMP levels in the ipsilateral sciatic nerve and L3-L5 DRGs are elevated in the CCI mice compared to the sham mice. We administered biotin epoxomicin (BE), an NMP-selective inhibitor, and used behavioral assays to measure changes in pain sensitivity. We found that acute NMP inhibition attenuated pain hypersensitivity. Taken together, these findings suggest that neuropathic pain drives increased NMP expression, which in turn contributes to pain development. These results suggest that the NMP is a dynamic modulator of neuropathic pain development and may serve as a promising target for new pain therapies.

**Kai Lehocky, The Caterpillar Model: A New Way of Understanding Resilience for Non-Binary Activists**

Introduction: Transgender/gender-diverse (TGD) individuals exhibit a higher prevalence of mental illness and suicidality compared to the general population. This increased prevalence can be attributed to their exposure to

gender identity-based minority stress experiences (GIBMSE). TGD individuals can protect themselves from the harmful effects of GIBMSE by learning and then engaging in a variety of resilience-based coping mechanisms.

**Method:** The present grounded theory study sought to explore the GIBMSE and resilience strategies of non-binary individuals who engage in online social activism (OSA), both historically and within the current sociopolitical climate. The study sample was selected using non-probability quota sampling and included seven non-binary young adults aged 18-26 who engage in moderate or higher levels of OSA. Semi-structured interviews were conducted to explore each participant's exposure to GIBMSE and use of resilience strategies.

**Results:** GIBMSE were identified and sorted into internal (proximal) and external (distal) categories. Resilience strategies were identified and sorted into individual (contracting) resilience strategies (ICRS) and social (expanding) resilience strategies (SERS). Overreliance on ICRS resulted in the development of internal stress, and overreliance on SERS resulted in the development of external stress.

**Discussion:** Participants described that the adaptive quality of resilience strategies often diminishes over time and context, revealing that resilience is more complex than simply establishing which strategies are most effective, and then practicing those strategies. Non-binary activists regularly fluctuate between ICRS and SERS while protecting themselves from the harmful effects of GIBMSE. The Caterpillar Model is presented to assist clients with understanding and addressing these fluctuation experiences.

### **Leo Mendoza, The Idolatry of Nation: Christian Nationalism and the Loss of Civil Conversation**

In recent years, democracies around the world have experienced a profound ethical and theological crisis. The rise of Christian nationalism, goes beyond a sociopolitical phenomenon; it distorts the theological imagination, aims to sanctify national identity, equate divine authority with political power, and subjugate pluralism to a homogeneous conception of Christian culture. This paper interprets the threat of Christian nationalism through the thought John Courtney Murray's theology of public reason to offer a theological ethic capable of sustaining democratic coexistence within plural societies.

The study adopts a theological-ethical and hermeneutical methodology, combining textual analysis of Murray's major works, *We Hold These Truths* (1960) and *Religious Liberty: Catholic Struggles with Pluralism* (1993), with critical dialogue between his Catholic public theology and recent discourses on nationalism, populism, and political theology. Drawing upon both Catholic social teaching and interreligious ethics. The analysis proceeds in three steps: (1) a theological-ethical diagnosis of Christian nationalism as a failure of public reason; (2) an exposition of Murray's concept of the "civil conversation" as a mode of ethical pluralism grounded in natural law and the dignity of conscience; and (3) a constructive proposal for reorienting religious identity within democratic institutions through practices of dialogue, solidarity, and moral humility.

### **Audrey Nolen, The Real Housing Crisis: Chicago Legal Service Disparities**

With over 2,700,000 residents in Cook County, Illinois, housing is a challenge that all residents and agencies, private and public alike, consistently face (City of Chicago, 2025).

Throughout the 2010s, the average eviction filing rate was 3.7 per 100 rental units, meaning 1 in 25 renters faced eviction every year (LCBH, 2020).

In the courtroom, 81% of landlords appeared with attorneys while only 11% of tenants had legal support (LCBH, 2020). Nonprofit organizations began stepping in and although attorney support does not guarantee success, by

2019, tenants received an outcome other than eviction 70.1% of the time when represented by a legal aid attorney, while without representation 60% of cases resulted in eviction (LCBH, 2020).

Although the United States Constitution ensures the right to an attorney, this promise is often broken in housing matters. As a result, local fair housing nonprofits step in, processing over 75% of U.S. fair housing complaints (Stern and Hepburn et al., 2025).

Relying upon case study analysis of three current efforts aiming to achieve fair housing in Chicago, I hope to uncover how the current apparatus fails to address long-term affordability and just housing. Organizations such as Beyond Legal Aid find themselves stretched thin on legal resources, highlighting the necessity of meaningful government attention and policy change. Regardless, these nonprofits continue to survive and serve their communities while governments allow unjust housing practices to continue, placing Chicago residents and the city's economic future at risk.

### **Jonathan Savidge, Skin Color, Gender and Mental Health Challenges among Latina/o/x Immigrants to the United States**

Current mental health research only recently began to incorporate issues of skin color and colorism into its analytical framework. This paper examines the mental health outcomes of Latina/o/x immigrants to the United States, focusing on how one's skin color, gender, and country of origin shape reported mental health challenges. Using data from the New Immigrant Study, we analyze mental health outcomes, seeking to understand how these outcomes vary when considering multiple acculturative, socioeconomic, and biographical factors. By considering this intersection between gender, skin color, and country of origin, this study contributes to a growing body of literature seeking to address how structural colorism affects mental health outcomes. These findings from this study provide insight on how visible markers of difference such as skin color affect health outcomes beyond what is considered with rigid racial categorizations.

### **Grant Steiner, How the Green Algal Genus Chlorella Biochemically Mitigates Photosystem II Photoinhibition**

The desert-native, extreme light-adapted green alga *Chlorella ohadii* expresses exceptional photosystem II photoprotection. This is due in large part to a mechanism of cyclic electron flow around the primary photosynthetic protein, the intermediate steps of which are not well-defined by current scientific literature. When two closely related, yet temperate and lower light-adapted *Chlorella* were subjected to the natural growth conditions of *C. ohadii*, we observed various changes to their photosynthetic electron transport chain indicative of high photosystem II cyclic electron flow acclimation, and recorded minimum doubling times well under 2 hours. However, in extreme light grown *Chlorella* sp. NIES 642 and *Chlorella sorokiniana*, PSII reaction centers do not perform efficient photochemical quenching compared to *C. ohadii*. Fast repetition rate fluorometry, 77K fluorometry, and chlorophyll concentration measurements suggest this may result from extensive minimization of chlorophyll to carotenoid pigmentation ratio, inducing high levels of non-photochemical quenching in the naturally lower light species. The extreme light acclimated *Chlorella* also show various characteristics of high cyclic electron flow on the acceptor side of photosystem II, including near-constant utilization of the plastoquinone pool, and a majority of reaction centers performing a fast-phase, primary electron transfer to this acceptor pool. The addition of plastoquinone mimics, namely 2,5-dimethyl-1,4-benzoquinone, rescues the oscillatory behavior of reaction center fluorescence by oxidation state of the water oxidizing complex. These findings strongly suggest that electron recycling to the donor side of photosystem II is regulated by a larger ratio of plastoquinone to functional photosystem II.

**Nicholas Sekits, Factors Influencing Common Gartersnake (*Thamnophis sirtalis*) Detections using the Adapted-Hunt Drift Fence Technique (AHDriFT) in Northern Indiana**

Snakes can be difficult to study due to low population densities across wide ranges, crypsis, and secretive behavior. Survey methods such as artificial cover objects and live trap/drift fence systems are effective but require significant sampling effort in the field. The Adapted-Hunt Drift Technique (AHDriFT) combines drift fences with camera traps and has potential to reduce effort and resources required to sample snakes. We investigated whether landscape and weather variables influenced the number of Common Gartersnakes (*Thamnophis sirtalis*) detections using the AHDriFT system. We installed three-camera, Y-shaped, omnidirectional arrays in grassland habitat near wetlands at 12 sites across Northern Indiana that we sampled from mid-April through mid-October of 2024. We report on the influence of landscape variables, weather, and seasonality on snake detection. Results suggest that area of cultivated croplands, temperature, humidity, cloud cover, and time of year are predictive variables of *T. sirtalis* detections. This research aims to shed light on patterns in snake activity and population dynamics as well as potential biases associated with AHDriFT as a method for sampling snakes.

**Elizabeth Serna-Sanchez , Structural Study of Rhodium Based Metal Surfaces**

Heterogeneously catalyzed oxidation reactions, such as the catalytic conversion of CO to CO<sub>2</sub>, are extensively utilized for the production of modern commodities. However, there is little information known about the atomic level details of these catalytic processes. In order to further our understanding of catalytic surface oxidation at an atomic level, the investigation herein will focus on characterizing structures that evolve during the oxidation of a Rh single crystal surfaces. Scanning tunneling microscopy (STM) images illustrate how the behavior of oxygen is affected by features such as surface defects and step width. Alongside with the STM, other techniques such as temperature programmed desorption (TPD), and low energy electron diffraction (LEED) are used to identify the various species of oxygen present on the surface and the structures those oxygen species form.

**Zachary Stevenson , The Mormon History Wars, 1981-1985**

During the 1970s and 1980s, the Church of Jesus Christ of Latter-day Saints faced criticism from Mormons and non-Mormons alike for its policies on race, gender, and sexuality. This paper argues that in response to these pressures, some church leaders returned to the faith's past and insisted on a particular type of Mormon history, one that was hagiographic, sacred, and inspiring. The catch was that this effort to sanitize the Mormon past ran headlong into the New Mormon History, a trend in the narration of Mormon history that emphasized neutrality, facticity, and honesty. To borrow Newsweek's Ken Woodward's framing of the dispute, the apostles entered into a conflict with the historians. Beginning in August 1981, when apostle Boyd K. Packer delivered a confrontational address to Mormon educators that sharply criticized Mormon historians, and continuing through the mid-1980s, this paper follows the reverberations of efforts to curb the influence of academic historians of Mormonism, many but not all of them practicing Mormons themselves. It draws on letters, diaries, periodicals, and newspaper articles to illuminate a heated and multi-layered debate that resulted in firings, speaking bans, and the shuttering of a campus newspaper.

**Bruna Tatematsu , Poor Pregnancy Outcomes in the Absence of Regulatory Natural Killer Cells**

Pregnancy is a complex process tightly regulated by hormones and immune cells at the maternal-fetal interface. Natural killer (NK) cells are innate immune cells found circulating in the peripheral blood and residing in various organs, known as tissue-resident NK (trNK) cells, where they comprise over 70% of the immune cells in the

uterus. However, signals regulating trNK cell differentiation and contribution to pregnancy remain unclear. In our recent publication, we used intravascular labeling and parabiosis to demonstrate that trNK cells are derived from peripheral NK cells and are regulated by progesterone. Moreover, we found that progesterone induced the expression of TGF $\beta$  in the uterus. Given the role of TGF- $\beta$  in immune cell differentiation we hypothesize that TGF- $\beta$  locally activated and differentiated progesterone-responsive trNK cells needed for successful pregnancy. We assessed pregnancy outcomes in mice lacking TGF- $\beta$  receptor II specifically in NK cells; *Ncr1iCreXTGF $\beta$ RIIf/f*. We intravascularly injected a fluorescently labeled anti-CD45 antibody to distinguish between circulating and tissue resident immune cells and analyzed their function in pregnancy. We found that *Ncr1iCreXTGF $\beta$ RIIf/f* mice lacked trNK cells at the maternal-fetal interface despite intact peripheral NK cells in the spleen. Moreover, the deficient mice had increased fetal death and dysregulated cytokine response at the maternal-fetal interface. Take together, our findings uncovered a TGF $\beta$ -mediated differentiation pathway important for the generation of regulatory NK cells important for a successful pregnancy.

### **Vincentzo Vassalotti, Constructing Queer & Drug Culture: The Side Effects of Stigma**

Research on LGBTQ+ populations often centers risk and “problems” that generate heteronormative group disparities. This approach is frequently applied to substance use—identifying LGBTQ+ individuals as more prone to developing substance use disorders or experiencing harmful communal peer pressure. As a product, stigma towards queer identities intertwines with negative attitudes towards substance use, thereby producing a disparaging image of LGBTQ+ substance users. Research about positive outcomes of substance use, like intracommunity care and connectedness or resilience, helps augment this image. In our study, 49 LGBTQ+ participants reflected on their substance use experiences, connection to community, and perceptions of substance use within LGBTQ+ culture. Using reflexive thematic analysis, we found three themes: 1) Intertwining Cultures: LGBTQ+ and Substance Use; 2) “Dividing the Community”: Normalization & The Development of Subcultures; and 3) “A Greater Level of Trust”: Creating Conditions of Communal Safety. These data encourage us to be thoughtful of historic sociocultural influences and systemic marginalization when approaching substance use research within a variety of relevant fields and our responsibility to combat stigma via our study framing and rhetoric. We conclude that the impacts of stigma and shaming on queer identities, substance use, and their interconnectedness provides essential context to empathetically understanding the lived experiences of queer substance users.

### **Stephanie Wallace, Biometric Contracts: Designing Consent Mechanisms for Biometric Data Use**

Biometric technologies such as facial recognition are increasingly deployed in authentication and access-control systems, yet consent is often implemented as a single checkbox rather than a structured, auditable agreement. This project proposes the concept of a “biometric contract” that treats consent for biometric data use as a lifecycle: capture, verification before each use, revocation, retention expiry, and evidentiary export.

I analyze three legal frameworks that regulate biometric data; Illinois’ Biometric Information Privacy Act (BIPA), the EU’s General Data Protection Regulation (GDPR), and Ghana’s Data Protection Act, alongside the Patel v. Facebook litigation case. From these, I derive system requirements for explicit, informed consent; purpose limitation; retention and deletion; and demonstrable accountability.

These requirements are then implemented in a prototype consent management system built in Python with a SQLite backend. The system models biometric contracts as database objects linked to a timeline of consent events (capture, verify, revoke, delete, export). A command-line interface demonstrates how biometric operations are allowed or denied based on contract status, retention rules, and user revocation, while an audit trail provides a reconstructable history for legal or compliance review.

The project illustrates how legal and ethical principles can be embedded into the design of biometric systems, bridging computer science, law, and privacy research. Future work will extend this framework using large language models to help generate and evaluate user-facing consent notices and to support formal publication and broader dissemination.

**Christian Yeomans, Articulating the Future: How the Techno-Optimist Manifesto Constructs AI Hegemony**

This paper analyzes the Techno-Optimist Manifesto (TOM), published online in 2023 by tech billionaire Marc Andreessen, and how it articulates a political vision for the artificial intelligence (AI) industry. AI industry leadership is a cacophony of competing individuals with strong personalities and competing ideological interests—from OpenAI's liberal Sam Altman to xAI's ultra-conservative Elon Musk. Utilizing Laclau and Mouffe's discursive theory of articulation, the research examines how TOM functions as a tool for unifying otherwise disunited AI moguls by a process of speaking forth and linking ideas into a united, techno-accelerationist ideology. This discursive process allows previously marginal discourses to become dominant, thereby constructing new forms of political power. To further emphasize the discursive elements of TOM that enable it to construct AI hegemony successfully, the research turns to a post-Great Recession case in which a published document failed to articulate a vision for an emergent technology: the Bitcoin Whitepaper (BW) by Satoshi Nakamoto. TOM unites Altman and Musk behind a larger AI-centric ideology, despite their differences; the BW case showcases the persistently fraught relationship between JPMorgan CEO Jamie Dimon and Coinbase CEO Brian Armstrong, despite the manifesto's attempt at articulation. Comparing these cases reveals how TOM has articulated in a particularly effective way, thus solidifying its ideological dominance amongst our technological elite. It demonstrates that theorists need to place greater emphasis on the power of discourse in constructing new ideologies and, thus, radical political change.

## POSTER ABSTRACTS

### Hannah Eure, Tactics of Terror: The Influence of Ideology on Terrorist Target and Weapon Choice

Ideology is a key component in terrorist attacks and is vital to understanding why and how terrorists operate. Despite this, the area exploring how ideology influences terrorist tactics is heavily understudied. Previous research mainly focuses on group lethality, and cross-comparison studies across ideological groups are rare. This study addresses these gaps by comparing differences in target and weapon selections in terrorist attacks from 1970 to 2017 perpetrated by left-wing, right-wing, and Islamist terrorist groups globally, using the Global Terrorism Database merged with ideological classifications provided by Jasko et al (2022). A series of logistic regressions shows that ideological groups have significant differences in weapon choice and target selection, which could reflect group values, reinforcing the correlation between group ideology and terrorist tactics.

### Clare Favela, Chronic activation of stem cell migration causes regenerative decline in the aging intestinal epithelium

Somatic stem cell migration is critical for positioning newly-divided cells near sites of injury during tissue repair. The effects of stem cell aging on migration and the consequences of migratory dysfunction on regenerative capacity are poorly understood. We have now demonstrated in the *Drosophila* intestinal epithelium that migration of intestinal stem cells (ISCs) becomes hyperactive during aging. Chronic migration is caused by the interplay of elevated Jun-N-terminal kinase (JNK), non-canonical Wnt, and Ca<sup>2+</sup> signaling in the ISC niche. Elevated JNK activity in aging enteroendocrine cells (EEs) promotes cleavage of Otk, the *Drosophila* homolog of the senescence-associated secretory phenotype factor Ptk7. Release of extracellular Otk from EEs non-autonomously activates non-canonical Wnt signaling in aging ISCs, which, in turn, upregulates downstream Ca<sup>2+</sup> and JNK signaling to hyperactivate migration. Chronic activation of signaling pathways causes ISCs to lose their directionality during migration. Importantly, interfering with the migratory machinery is sufficient to improve intestinal physiology and extend lifespan. Our data highlight a poorly understood aspect of stem cell aging and provide insight into how restoring stem cell function can rejuvenate aging tissue.

### Dawson Gallay, The Science of Science: Loyola University's Research Network

This study analyzes bibliometric data to map the research footprint of Loyola University Chicago. We started with a dataset provided by SciSciNet and OpenAlex that documents the collaboration networks, topics, funding, and more that goes into a successful research paper: 250 million papers by 100 million authors representing over 100 thousand institutions across the world; 30+ tables, hundreds of fields, and over 100GB.

To navigate this complex schema, we utilized parquet push-down predicates to mine the data, target Loyola's ID, and filter through nearly 1 billion paper-author affiliations to create a focused subset: 42,015 papers with at least one author from Loyola University. We found that of the 8,128 institutions Loyola collaborates with, the most frequent are Southern University, Clark Atlanta University, and UT Arlington, and the most cited are The University of Chicago, UIC, and Edward Hines VA Hospital. We further identified Medicine, Biology, and Political Science as the most common of 302 different research areas, funded by 1,547 unique NSF and NIH grants.

These metrics tell the story of a school with global reach, broad interests, and recognized expertise. Looking ahead, we can expand this analysis beyond Loyola's historical output. Our robust dataset provides the opportunity to build a complete picture of the scientific ecosystem — the untapped collaboration networks, the way topic switches are encouraged by historical events like COVID, and the downstream effects of funding. Understanding this data is the

gateway to future models that promote smarter, more efficient academic growth and scientific development.

**Kussum Ghimire, A Genomic Investigation into Fusconaia flava**

High-quality genomic data are now considered foundational for biodiversity studies, enlightening the genetic basis of biological traits, ecological interactions, and population dynamics. However, freshwater mussels (Order Unionida) remain severely underrepresented in genomic resources despite their immense diversity and threatened status. In this project, I will generate the first high-quality, chromosome-level reference genome for the Wabash pigtoe, *Fusconaia flava*. The project integrates both wet lab and computational approaches, encompassing DNA extraction, library preparation, sequencing, and downstream bioinformatic analyses. High molecular weight DNA has been extracted and the Illumina sequencing library has been prepared, the resulting sequencing data will be used to estimate the genome size of *F. flava*. Based on comparisons with related freshwater bivalve species, we predict the total genome size will fall between 2 and 3 gigabases (Gb). Using a combination of Oxford Nanopore long-read sequencing and Hi-C scaffolding, an annotated assembly will be produced to characterize the genome size, chromosomal architecture, gene content, and repetitive elements. This chromosome-scale assembly will represent the first of its kind for a North American native unionidae species, serving as a reference point for the genus. These genomic resources will enable future transcriptomic studies across populations and provide critical data for understanding mussel biology.

**Scott Kaiser, Electrochemical Analysis of the Local Charge of a Self-Assembled Monolayer**

Self-assembled monolayers (SAMs) can be terminated with various functional groups, which are often acido-basic groups (acid, amine, sulfonate etc...) bearing either a positive or negative net charge. The fraction of which molecules break apart into charged particles on the surface controls potential electrostatic interaction with charged species in a solution. Nondestructive and simple ways of characterizing the surface charge of a SAM, in solution, is thus important. We propose an electro-analytical study of surface ionization based on the analysis of the voltametric response of adsorbed redox species. Charged iron complexes are electrostatically adsorbed onto an ionized SAM and the width of the voltametric peaks of the adsorbed redox couple is then analyzed with an electrostatic model accounting for potential drop within the SAM as well as electrostatic interactions between adsorbates and ionized terminal groups. We will present the system with a positive SAM system to demonstrate the effectiveness of our approach.

**Meagan McDowell, Navigating microaggressions together: The role of gender, identity centrality, and responsiveness in African American romantic relationships**

For African American couples, both partners experience racial discrimination which means that one's experiences can impact their own and their partner's well-being. However, when discussing microaggressions with a partner who shares their identity and experiences, there is less pressure to overexplain themselves and an expectation that their partner will understand due to a shared cultural knowledge of racism (Nightingale et al., 2019). High perceived partner responsiveness helps manage stressors and regulate emotions (Reis, 2012), so feeling like their partner is responsive should increase their willingness to share. In the current study, African American couples (N = 143 couples) answered questions about experiences of microaggressions, ethnic identity centrality and perceived partner responsiveness. Using the Actor-Partner Interdependence Model (APIM; Kenny et al., 2006), results revealed a significant three-way interaction between gender, identity centrality, and partner responsiveness on tendency to share microaggressions with their partner. For women, they shared more when they perceived that their partner was very responsive (regardless of

their identity centrality), However for men, simple slope analyses showed that high partner responsiveness played a larger role in sharing for men low in identity centrality compared to men high in identity centrality. These results suggest that when men are not as strong in their identity, they rely more on how much understanding and validation they anticipate from their partner when deciding to share.

### **Belinda Ofofu, Predicting Antimalarial Drug Resistance from Genome-Wide Variation Using Machine Learning**

Antimalarial drug resistance threatens global malaria control. Current genomic surveillance relies on known resistance markers, but resistance to combination therapies is often polygenic, involving interactions among multiple loci. This study proposes an integrative framework combining population genomics, genome-wide association studies (GWAS), and interpretable machine learning to model resistance phenotypes inferred from validated markers in *Plasmodium falciparum*.

Using whole-genome SNP data from 15,664 isolates in the MalariaGEN Pf8 dataset, resistance status for artemisinin, chloroquine, and sulfadoxine-pyrimethamine will be assigned based on established mutations in *pfkelch13*, *pfprt*, *dhfr*, and *dhps*. Population structure will be characterized via principal component analysis with and without resistance loci to assess their influence on genetic stratification. Predictive models including random forest, gradient-boosted trees, neural networks, and elastic net will be trained and evaluated using accuracy, sensitivity, specificity, precision, and AUC. Interpretability will be assessed through SHAP values and feature importance compared to GWAS signals.

Cross-population generalizability will be tested using a leave-one-population-out framework, including Africa-Asia transferability.

This study evaluates whether genome-wide variation can model marker-inferred resistance even when known loci are excluded, and whether models generalize across regions. By capturing polygenic signals and population-specific architectures, this approach addresses limitations of single-marker surveillance and demonstrates the potential of machine learning for genomic epidemiology.

### **Sofia Orellana, Does mode of larval development influence dispersal capacity and genetic connectivity in the ocean?**

The duration of larval stages in marine invertebrates is expected to influence dispersal capacity and affect population connectivity and gene flow. While some studies find positive correlations between pelagic larval duration and dispersal, contradictory findings exist. Previous studies often target only one or two species, in different geographical contexts and using few genetic markers, limiting comparisons and generality. My project applies a comparative genomic approach using 10 species of intertidal gastropod mollusks distributed throughout the Pacific coast of Panama to test how larval developmental mode affects dispersal and connectivity. Using Illumina sequencing data, I first assembled draft genomes, which vary from 0.23 GB to 0.86 GB in size. I am now using 3RAD data mapped to the reference genomes to characterize population structure through PCA, admixture analysis, and FST. To test the hypothesis, I will compare isolation-by-distance patterns between species with short-lived and long-lived larvae using phylogenetic ANOVA. This approach increases power to detect differences, accounts for species relatedness, and minimizes confounding environmental factors, providing a powerful test of developmental mode as a predictor of marine connectivity.

**Brian Ortiz, Large Language Models (LLM) and Temporal Logic of Actions (TLA): How Effective are LLMs for Verification Systems**

Formal specification plays a key role in designing reliable distributed and concurrent systems, yet converting natural language requirements into precise formal models remains time consuming and error prone. Large language models (LLMs) have shown strong performance in code generation, but their ability to generate semantically correct formal specifications has received little empirical evaluation. This paper presents FormaLLM, an automated pipeline that generates, validates and refines TLA+ specifications from natural language descriptions. We evaluate transformer models across four prompting strategies on 26 TLA+ specifications, performing 3,276 total runs validated using the SANY parser and the TLC model checker. LLMs achieve up to 26.6% syntactic validity but only 8.6% semantic correctness, with successful results appearing only under progressive prompting. Model size shows an inverse relationship with quality: DeepSeek r1:8b outperforms its 70B counterpart. Code specialized models perform worse overall, suggesting negative transfer from programming language training data. Our analysis identifies five recurring hallucination patterns that can be traced to biases in model training corpora. These results indicate that current LLMs cannot reliably generate correct TLA+ specifications without human oversight. However progressive prompting and automated validation suggest potential for human AI collaborative workflows supported by FormaLLM.

**Mousumi Paul, Role of Groucho in Drosophila Spermatogenesis**

Defects in signaling between the germline and soma during spermatogenesis can lead to an arrest in sperm development and infertility. Many signaling pathways regulate germline-soma communication in spermatogenesis, including Notch signaling. Notch is active in cyst cells around 4-16-cell spermatogonial cysts. The early cyst cell marker Traffic Jam (Tj) and late cyst cell marker Eya are both present in cells surrounding 4-16-cell spermatogonial cysts, in a region known as the transition zone. When somatic cysts cells surround spermatocytes, Tj is no longer expressed, and only Eya persists. We have found that both increased and decreased Notch signaling disrupt spermatogenesis. Elevated Notch in cyst cells maintains Tj expression, blocks the transition to Eya-only late cyst cells, and causes sterility. Decreased Notch signaling affects the timing of germline differentiation. To better understand the mechanism of Notch signaling, we performed RNA-seq on testes with imbalanced Notch activity and identified groucho (gro), the homolog of mammalian Transducin-like Enhancer of Split, as a downstream target. Previous work has shown that gro represses Notch targets by binding to the transcription factor, Suppressor of Hairless (Su(H)). Moreover, its activity is negatively regulated by Epidermal Growth Factor Receptor (EGFR) via phosphorylation by Mitogen Activated Protein Kinase (MAPK). Earlier studies show, losing EGFR signaling in testes halts germ cell development inducing cell death, which can be rescued by activated Notch. We propose, Gro integrates Notch and EGFR signals and are testing how changing Gro levels affects spermatogenesis and its genetic interactions with these pathways.

**Manuel Sandoval Madrigal, Insta-CTSR: Cyberbullying, Topics, Severity, and Roles for Instagram**

Existing labeled cyberbullying datasets primarily focus on binary bullying presence with post-level labels, overlooking the nuanced nature of this problematic online behavior. We present Insta-CTSR, a multidimensional Instagram dataset with labels at the post (session) and comment levels. Insta-CTSR captures four key dimensions: binary cyberbullying presence, bullying severity (mild, moderate, severe), cyberbullying topic (physical appearance, gender identity, race, etc.), and fine-grained cyberbullying roles (bully, non-aggressive victim, aggressive victim, aggressive defender, etc.). Using Amazon Mechanical Turk Master Workers with rigorous quality controls, we achieved reliable annotations that enable more nuanced studies of cyberbullying in the AI and social science communities. This paper presents a detailed description of the labeling process, the extended array of labels, and the implemented reliability guidelines. The paper

also includes a set of descriptive analyses of the labeled data and the results of initial but promising predictive learning tasks using the new dataset.

### **Meredith Sauer, An Investigation of LLM Use in Scientific Papers**

Since the advent of ChatGPT in late 2022, LLMs have become ubiquitous in academic settings. Several recent papers have investigated the increase in LLM use in scientific papers since 2022, finding a broad and increasing presence of LLM-modified text in papers across disciplines. Previous research has attempted to measure LLM use in shorter texts: paper abstracts and conference peer reviews. In this project, we build on this work by developing a model to quantify the use of LLMs in the full text of scientific papers that have been posted on ArXiv, an open access archive for pre-print articles primarily in Physics, Mathematics, and Computer Science. Our method uses individual word frequencies in known human-written and AI-generated articles to train a model to provide a population-level estimate of the proportion of text produced by an LLM in a mixed set of human-written and AI-generated papers. We then use this model to estimate the percentage of text that has been substantially modified by LLMs in a corpus of papers posted on ArXiv between 2023 and 2024. This lets us track and quantify the rise of LLM use in full text of papers across several disciplines spanning different research areas.

### **Alessandra Vellucci / Emil Shahbazov, AI for Scientific Integrity: Detecting Paper-Mill Publications Through NLP and Scholarly Metadata**

The proliferation of paper mills, organizations that produce fraudulent scientific manuscripts for profit, poses a growing threat to the integrity and reliability of academic publishing. Detecting such publications remains challenging because paper-mill articles often imitate legitimate research structures, language, and citation patterns. This work explores an artificial intelligence approach to support scientific integrity by identifying potential paper-mill publications using natural language processing (NLP) and scholarly metadata.

Our research is currently in progress and focuses on building a large-scale dataset combining suspicious and legitimate scientific publications. Retracted papers associated with potential paper-mill activity are collected from publicly available retraction databases, while a large set of non-retracted academic papers is being gathered through the OpenAlex snapshot API server to represent legitimate scientific output. These datasets are used to construct a binary classification task distinguishing fraudulent or suspicious publications (positive class) from legitimate research papers (negative class).

To model textual patterns in scientific writing, we are fine-tuning a BERT-based transformer model to analyze article titles, abstracts, and related textual content. In addition to linguistic signals captured through NLP, selected scholarly metadata features are incorporated to capture structural patterns that may be indicative of paper-mill production.

By combining transformer-based language representations with metadata analysis, this project aims to identify subtle signals of fraudulent publication practices. The long-term goal is to develop AI-assisted tools that can help editors, publishers, and research integrity investigators prioritize suspicious manuscripts for further review and strengthen safeguards for scientific publishing.

### **Yoldas Yildiz, Estrogen Receptor Beta (ER $\beta$ ): A Transcriptional Repressor of APP and ITPKB in Alzheimer Disease**

Women account for approximately 2/3 of Alzheimer Disease (AD) patients, face worse cognitive impairment and faster disease progression. Furthermore, early onset menopause has been linked as a risk factor for AD, suggesting a lack of hormone signalling could be a mechanistic explanation for this sex bias. Estrogen Receptor Beta (ER $\beta$ ) is a nuclear receptor in the brain that regulates mood, learning, memory and cognition, processes which are impaired in AD. Our lab previously demonstrated that ER $\beta$ :protein interactions were altered with age. One of these proteins was gelsolin (GSN), an actin binding protein that can sever amyloid plaques. ER $\beta$  regulates gene transcription by binding to estrogen response elements (ERE) on promoters, or tethered by other transcription factors to AP-1 motifs. Some AD associated genes contain AP-1 sites in their promoters, such as amyloid precursor protein (APP) and inositol-trisphosphate 3-kinase B (ITPKB). We hypothesized that ER $\beta$  represses transcription of APP and ITPKB, and GSN facilitates that repression. To test this, we transiently transfected APP and ITPKB promoter-luciferase constructs into SK-N-SH cells. Our results showed that GSN activated transcription of APP and ITPKB, which was repressed by ER $\beta$ . We also used an ER $\beta$  splice variant, ER $\beta$ 13, which is unable to directly bind DNA. Our results showed that ER $\beta$ 13 repressed promoter activity, indicating that a majority of ER $\beta$  repression was result of indirect ER $\beta$ :promoter interactions. These results suggest that a decrease in ER $\beta$ :GSN interactions in age leads to reduced gene repression and potentially increased APP, consistent with AD pathology.