

**LOYOLA UNIVERSITY CHICAGO**

**THE GRADUATE SCHOOL'S 18TH ANNUAL INTERDISCIPLINARY SYMPOSIUM**

**SATURDAY, APRIL 12, 2025**



## 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.

### GSAC OFFICERS

GRANT STEINER, PRESIDENT & SYMPOSIUM COORDINATOR

NAIDA SOFTIC, VICE PRESIDENT

ALEXIS GONZALEZ, SECRETARY

MADELYN SHOEMAKER, TREASURER

**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

MARIE-ANGE DJIE      EMILY DOMINQUE

FATIMA HASNAIN      OMAR KHALI

KAYLA TROWBRIDGE

### JUDGES

KISHAN BHARWAD      TRISTRAM BUCK

LESLIE CASTILLO      MAXWELL GILLUM

ALEXIS GONZALEZ      RYAN KRANTZ

MINELA MUMINOVIC      MEHERUN NESA

KAJAL PATEL      ELIZABETH SERNA-SANCHEZ

MADELYN SHOEMAKER      NAIDA SOFTIC

KAYLA TROWBRIDGE      MADALYN ZAUCHE

## REGISTRATION AND WELCOME

9:00 – 9:30 – 4TH FLOOR INFORMATION COMMONS

### PAPER SESSION A

9:30-10:45

#### IC 215

**Leslie Castillo**, Chloride Influence on Electron Transfer in Photosystem II of *Limnospira maxima*  
**Marie-Ange Djie**, Two Leading Female Figures of the Anti-Colonial Struggle in Africa  
**Bella Fiorucci**, Mapping Silence and Speech in the “Contents” of Jacobs’ Incidents in the Life of a Slave Girl  
**Jonathan White**, Walker’s Point: How Queerness of the Built Environment Created Community

#### IC 216

**Alexis Gonzalez**, Oxygen Diffusion Dynamics on a Rh(111)/(322) Multifaceted Surface  
**Michell-Lee Graham**, Life After Death in a Simulated Reality: Myth or Possibility?  
**Hannah Lahti**, A Spatial Narrative: Life In Jewish Oshpitzin  
**Tyler Rosario**, Cyberbullying Network Graphs: Analyzing Victim, Aggressor, and Defender Interactions on Instagram

### BREAKFAST AND COFFEE

4TH FLOOR INFORMATION COMMONS

### POSTER SESSION

11:00 – 1:00 – 4TH FLOOR INFORMATION COMMONS

**Arslan Bisharat**, ML Model to Identify Cyberbullying towards LGBTQ+ Community  
**Maureen Burns**, Out-of-School Activities and Racial and Ethnic Identity Among Black Adolescents  
**Karen Chang**, B cell-intrinsic TLR signaling inhibits IgE class switching  
**Behnaz Eslami**, A Performance-Based Voting Framework for Assertion Detection in Clinical Notes  
**Ryan Krantz**, Interactions Between Microplastics, the Antimicrobial Compound Triclosan, and Microbial Biofilm Communities in Freshwater Microcosms  
**Jeremiah Lateef**, Counter-Mapping Resistance: Changing the Narrative of Runaway Slaves on Newspaper Advertisements  
**Julian Lomeli**, Optimization of Red-Light-Absorbing BODIPY Photoredox Catalysts Through Electron Donor Modulation for Enhanced Catalytic Efficiency  
**Manuel Sandoval Madrigal**, Identifying Cyberbullying Roles  
**Shoaib Hussain Mohammed**, Adv2FL: Attacking Secure and Differentially-private FL Systems  
**Mujtaba Nazari**, BSAF: BadNets in Sentiment Analysis with Federated Learning  
**Meredith Sauer**, A Computational Reading of Gender and Environment in Virginia Woolf’s Orlando  
**FNU Shwetha Vaidyanathan**, Designing for Engagement: Exploring Human-Centered Instructional Design  
**Kristen Young**, A Hidden Enemy: Targeting DKK1 to Defeat ER+ Breast Cancer

## LUNCH

**1:15 – 2:15 – 4TH FLOOR INFORMATION COMMONS**

## PAPER SESSION B

**2:30 – 3:45**

### **IC 105**

- Alexandra Kamm**, Investigating the mechanism of HCV cell-to-cell spread  
**Leo Mendoza**, Queering US Latinax Theology: A Thorn on the Side of the US Catholic Church and Latino Theologians  
**Hisham Nsier**, Exploring ethnic identity, racialization, and psychological well-being among US-born Arab Americans

### **IC 111**

- Erika Gustafson Dietz**, Competency Alignment and CBE in Higher Education: Institutional Perspectives from Illinois' Early Childhood Workforce Initiatives (**Virtual Presentation**)  
**Emily Krueger**, Investigating the Function of the Neuronal Membrane Proteasome (NMP) in Modulating Neuropathic Pain Sensation  
**Amy Kuhl**, Probability Based Analysis of Dataset Clustering  
**Kylie Lazzo**, The "Monstrous" Sex: Androgynos in Aldrovani's The History of Monsters

### **IC 112**

- Tim Bertucci**, Creating a Digital Survey of Romance Historical Phonetics  
**Prabha Kaundinya**, Being Desi in School: Exploring the Racialized School Experiences of South Asian American Youth  
**Surovi Mohona**, Coronavirus Spike Hijacks Host Trafficking Machineries For Virus Assembly  
**Nicholas Synovic**, PTMs For Science - An Exploratory Study Of Scientist's Reuse Methods (**Virtual Poster Presentation**)

## RECEPTION AND AWARDS CEREMONY

**4:00 – 5:00 – 4TH FLOOR INFORMATION COMMONS**

- |  |   |
|--|---|
| <i>Outstanding Paper Presentation in the Humanities</i>      | <i>Outstanding Research Poster</i>                          |
| <i>Outstanding Paper Presentation in the Sciences</i>        | <i>Honorable Mention Research Poster</i>                    |
| <i>Outstanding Paper Presentation in the Social Sciences</i> | <i>EDGE Award for Integrating Diversity &amp; Inclusion</i> |
| <i>Rule of Law Institute Award</i>                           | <i>Loyola Community Impact Award</i>                        |

## PAPER ABSTRACTS

### Tim Bertucci, Creating a Digital Survey of Romance Historical Phonetics

The present research project satisfies the Digital Humanities capstone, using diatopic and synchronic lenses to assemble a database of the modern phonetic outcomes of Latin's phonological system across the Romance-speaking areas of Europe. Its base is the *Questionnaire de phonétique historique* contained within the *Atlas Linguistique Roman (ALiR)*, a list of over 250 phonetic contexts (such as word-initial /t/, intervocalic /pp/, short /e/ before a nasal, etc). This database could also be interpreted as an enhanced digital edition of the Questionnaire, amplifying and specifying the given list of contexts. The primary intention is to centralize a set of linguistic information which typically is not readily available at this "level of zoom"; many linguistic atlases exist for the regional level at a level of precision too specific for this purpose, and these hefty volumes are not always digitized or available for free online. Other, more universal sources tend to limit their coverage to the "Big Four" Romance languages of Portuguese, Spanish, French, and Italian, and perhaps also Romanian if one is lucky. A second goal, just as important, is to increase representation of less recognized or standardized language varieties, whether Galician or Sicilian or Occitan, by including as many as possible. Having engaged in this line of research for years on a more casual level, my hope is to gather this information in an open-source environment for the benefit of those interested in Romance linguistics, especially because the data is useful for historical linguists trying to tease out patterns of phonological change occurring across Romance-speaking areas. Lastly, this presentation will reflect on methods of data visualization to represent preliminary results: expanding upon a scale previously created to represent obstruents, an abstracted chart modeled after the International Phonetic Alphabet will serve as a method of quantification alongside geotagged maps showing resultant phonemes for each context.

### Leslie Castillo, Chloride Influence on Electron Transfer in Photosystem II of *Limnospira maxima*

The role of dissolved inorganic carbon (DIC) on the donor side of Photosystem II (PSII) is postulated to be associated with proton removal, a process facilitated by chloride ions. Chloride ions are posited to facilitate proton removal from the water-oxidizing complex (WOC) through specific "water channels" to the lumen. Structural studies have confirmed the presence of chloride at consistent sites near the WOC, where they are essential for proper PSII function and proton release. The mechanism by which chloride ions influence PSII function is not fully resolved, though studies using anion substitution, such as replacing chloride with bromide, provide insight into their roles in proton transfer and PSII stability. The hypercarbonate-requiring filamentous cyanobacterium *Limnospira maxima* was used to investigate the broader effects of chloride's role in PSII. 77K spectrofluorometry suggests substitution of chloride results in less exciton transfer from the phycobilisome to PSII due to proportional increase of fluorescence emission from allophycocyanin. Chlorophyll fast repetition rate fluorometry revealed less efficient PSII operation under bromide compared to chloride. QA<sup>-</sup> reoxidation kinetics suggest that substitution results in fewer QB sites remaining in the semiquinone state, with more sites either empty or fully reduced. This effect may be due to bromide's influence and proton removal from the WOC. Overall, electron transfer from QA<sup>-</sup> to QB and QA<sup>-</sup> to QB<sup>-</sup> is faster compared to native *L. maxima*. P700 redox kinetics reveal that under bromide conditions, there is an increase in electrons on plastocyanin (PC) and PSI, while under chloride conditions PC experiences less oxidation.

**Erika Gustafson Dietz, Competency Alignment and CBE in Higher Education: Institutional Perspectives from Illinois' Early Childhood Workforce Initiatives (Virtual Presentation)**

This study explored how policy contexts, institutional structures, and faculty perspectives shape the adoption and implementation of competency-based education (CBE) in Illinois postsecondary early childhood education (ECE) programs. Findings indicate that while policy-driven initiatives such as Gateways and ECACE have increased engagement with competency-based approaches, institutions have largely adopted CBE selectively rather than fully restructuring their programs. The study contributes to the literature by applying Institutional Theory to examine how coercive, normative, and mimetic pressures shape CBE adoption, while also considering adult learning theories to explore how competency-based models support working professionals in ECE. As postsecondary institutions continue to explore competency-based education, this study highlights the complex interplay between policy incentives, institutional structures, and faculty engagement. While Illinois has made significant progress in integrating CBE principles, meaningful and sustainable adoption requires ongoing collaboration between policymakers, institutional leaders, and faculty. By ensuring that CBE models align with both institutional capacity and student needs, higher education can better support adult learners, workforce development, and equitable access to high-quality early childhood education pathways.

**Marie-Ange Djie, Two Leading Female Figures of the Anti-Colonial Struggle in Africa**

The Eurocentric and male narrative of the anti-colonial struggle in Africa during the twentieth century marginalized women's contributions and presented them as passive victims of colonialism. Therefore, this study offers a more comprehensive historical account of women's leadership in Africa and a more inclusive and liberated narrative of the anti-colonial movement. Achieving this goal involves delving into the roles and contributions of two prominent female figures in the anti-colonial resistance in Northern and Sub-Saharan Africa during the twentieth century: Huda Shaarawi from Egypt and Funmilayo Ransome-Kuti from Nigeria. Furthermore, this study aims to demonstrate that the actions and strategies of these female leaders were rooted in Black feminist principles. This research is crucial not only for its contribution to academia through the exploration of a new topic and the generation of fresh insights but also for empowering African men and women to share their own narratives and challenge the Eurocentric knowledge that has shaped the understanding of Africa's history. Additionally, this work is vital for presenting the Black feminist activism of African women as they fight for their communities' political and patriarchal liberation. The theoretical framework will be informed by Black feminism and Afro-decolonialism, while the methodological approach will incorporate textual analysis.

**Bella Fiorucci, Mapping Silence and Speech in the "Contents" of Jacobs' Incidents in the Life of a Slave Girl**

The complex discursive terrain onto which Harriet Jacob's maps her narrative, *Incidents in the Life of a Slave Girl*, produces variable understandings of her text. Scholars across disciplines have engaged with the conversation that Jacob's work yields. Frances Smith Foster, Mark Rifkin, and P. Gabrielle Foreman all enter into the narrative through this context to position Jacobs' speech as an intervention to narrative silences in the discourse of slavery. The relationship between speech and silence, both forced and voluntary, occupy the discussion of Jacobs' narrative choices and frameworks. Out of the tension between speech and silence, I argue that the mapping of Jacobs' contents section provides her with the space to complicate resistant speech and provide new readings alongside that of her narrative content. The titling of chapters, and their placement on the table of contents, serve as a spatial and temporal map that reifies Jacob's narrative and provides coexisting discursive paths through the narrative. Understanding the concurrent narrative renderings, and the spaces they carve out, resists and works through new geographic possibilities for reading slave narratives.

### **Alexis Gonzalez, Oxygen Diffusion Dynamics on a Rh(111)/(322) Multifaceted Surface**

The diffusion of oxygen on Rhodium (Rh) multifaceted crystals is of significant interest due to its implications for catalytic processes, such as oxidation reactions. In this study, we investigate the diffusion dynamics and oxygen species on these two surfaces using temperature-programmed desorption (TPD) and low-energy electron diffraction (LEED) techniques. Despite the structural differences between the (111) and (322) facets, our experiments reveal that the oxygen species on both surfaces are similar, with oxygen existing on the surface as atomic oxygen shortly after adsorption. TPD experiments show that oxygen desorption occurs at comparable temperatures on both surfaces, indicating similar binding energies for oxygen species on each facet. LEED shows that there may be different structures forming on either side of the crystal and the orientation of oxygen species are dissimilar. These findings suggest that the oxygen species formed on both (111) and (322) surfaces are essentially the same even though the two surfaces have different atomic arrangements. This observation highlights the importance of other factors, such as surface defects and temperature, in governing the oxygen diffusion process. The study provides information on how surface structure influences the diffusion behavior of oxygen on Rh crystals and emphasizes the need for considering both surface morphology and adsorption characteristics in the design of catalytic materials.

### **Michell-Lee Graham, Life After Death in a Simulated Reality: Myth or Possibility?**

Suppose for the sake of the argument we are all living inside of a simulation, is that a problem? Nick Bostrom, a Swedish philosopher in his "Are We Living in a Simulation?" proposes the question of whether we are living in a simulated reality. This paper, in particular, explores the possibility of an afterlife within the context of Nick Bostrom's simulation hypothesis. While much of the discussion surrounding Bostrom's hypothesis focuses on the implications for free will, morality, and the nature of existence, this paper narrows its focus to a specific and intriguing question: could the concept of an afterlife or resurrection exist within the framework of a simulated reality? By examining the structural and computational limits of a simulation and considering parallels between theological notions of afterlife and the technological possibilities of simulated consciousness, this paper aims to explore whether the promise of eternal existence—or its simulation—could hold meaning in a digital universe.

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

There are multiple ways for a virus to spread from one cell to another. During cell-free (CF) spread, a viral particle exits a cell and travels freely in the extracellular space entering a new uninfected host cell, whereas cell-to-cell (CTC) spread allows viral transmission directly to adjacent cells without the particle diffusing through the extracellular space. Because CTC spread shields the virus from neutralizing antibodies and is thought to provide a faster means of spread that delivers more viral genomes which would help the virus outcompete innate host immune defense as well, CTC spread has been implicated in the establishment and maintenance of chronic virus infections. Hepatitis C virus (HCV) establishes chronic infection in most exposed individuals causing liver disease including liver cancer. Although it has been shown that HCV can spread CTC, little is known about how this occurs. Therefore, our objective is to elucidate the mechanism(s) of HCV CTC spread and potentially identify novel antiviral targets. We performed siRNA screens to identify the cellular genes involved in HCV CTC spread and are in the process of determining which of these genes are directly involved in CTC spread and/or which act on other aspects of the viral life cycle. The genes that are specifically involved in HCV CTC spread are already starting to provide some insight into the cellular pathways that might be involved. Future work will include dissecting these pathways and identifying the viral components involved.

**Prabha Kaundinya, Being Desi in School: Exploring the Racialized School Experiences of South Asian American Youth**

Schools in America have been central areas for racialization, and as an immigrant, racial-ethnic minority population, South Asian American (SAA) students have been subjected to a variety of racialization processes (S. J. Lee et al., 2017; Rice, 2020; Subedi, 2013). However, what is known about SAA educational experiences is often based on celebratory stereotypes that proclaim their uniform success while neglecting attention towards the diversity of their needs (including academic, social-emotional, or mental health needs; Saran, 2015; Ngo & Lee, 2007; Patel & Patel, 2017; Pedraza & Guillaume, 2023; N. Sharma & Shaligram, 2020). The purpose of this dissertation study is to explore the racialized school experiences of SAA youth based on retrospective accounts of their K-12 school experiences. The theoretical lens of critical race theory will be applied to gain a deeper understanding of the play of racialization processes as they manifest in the retrospective accounts of these youth. It is hoped that such an exploration will provide insights on ways that educators and school-based mental health professionals serving SAA students can build more supportive and inclusive school climates for these youth.

**Emily Krueger, Investigating the Function of the Neuronal Membrane Proteasome (NMP) in Modulating Neuropathic Pain Sensation**

Neuropathic pain affects around 7-10% of the population, significantly impacting patients' quality of life, contributing to disability, psychological distress, and economic burden as no effective treatment is available. The neuronal membrane proteasome (NMP) has recently emerged as a key modulator of mechanical and pain sensation. This NMP localizes on the plasma membrane of a subpopulation of sensory neurons and acts as a signaling proteasome that mediates communication between neurons to modulate sensitivity to painful stimuli. However, the mechanisms that control NMP expression to regulate pain sensitivity are not understood. Here, we investigated the effects of neuronal activity on NMP expression and how this affects sensitivity to painful stimuli. We hypothesized that hyperactive conditions affect the localization of NMPs on the neuronal membrane and ultimately shape neuronal sensitivity to stimulation. We used membrane fractionation and antibody feeding techniques on dorsal root ganglion (DRG) neuron cultures to measure NMP expression in response to sustained KCl stimulation. We found that sustained neuronal stimulation results in increased NMP expression. These data demonstrate that the NMP expression is regulated by the neuronal activity, suggesting that the NMP is a dynamic modulator of sensitivity to painful stimuli and a potential target for novel therapeutic strategies to manage pain.

**Amy Kuhl, Probability Based Analysis of Dataset Clustering**

DistanceSCAN, a density-based clustering algorithm, along with probability based refined distance enhances efficiency and accuracy in large-scale graph analysis. DistanceSCAN utilizes a parameterized similarity measure to identify community structures while prioritizing internal connectivity over external links. This implementation is tested on a dataset of 1000 weighted graphs, each containing approximately 65,000 nodes, with varying edge weights in the range [0.1, 1). Adding refined distance to distanceSCAN advances clustering methodologies by integrating optimizations into reliability, offering insights into graph structure with improved computational efficiency.



### **Hannah Lahti, A Spatial Narrative: Life In Jewish Oshpitzin**

For four centuries, the Jewish community of Oświęcim, Poland called their hometown Oshpitzin—the Yiddish word for ‘guests’. Over time the Jewish residents of the town developed its local cultural heritage, but with the German invasion in 1939, the Nazis renamed the town Auschwitz and constructed the largest Nazi death camp of the Holocaust nearby. Local Jewish residents witnessed the systematic destruction of Jewish cultural heritage throughout the town before their deportation and the small number of returning Holocaust survivors struggled to recover the fragments that remained. The impact of the Holocaust and the postwar period contributed to the erasure of the tangible and intangible legacy of local Jewish life, as former residents tried to overcome the association of their hometown with the former death camp and attempted to protect the memory of Jewish Oshpitzin. Since the 1990s the Auschwitz Jewish Center has recovered the local Jewish history of the town and established itself as a changing presence of Jewish life, even in the absence of a local Jewish community. By employing various public history approaches, I argue that the Auschwitz Jewish Center preserves, memorializes, and engages the history and memory of Jewish Oshpitzin by emphasizing a spatial narrative of the town’s multiethnic past. Conducting exhibition analysis and oral history methodologies, I examine the challenging conditions of historical memory and fragmented material culture to explore how the Auschwitz Jewish Center complicates the memorial landscape and serves as an expression of living memory.

### **Kylie Lazzo, The "Monstrous" Sex: Androgynos in Aldrovani's The History of Monsters**

Ulysse Aldrovani’s *Monstrorum historia*, or *The History of Monsters* (1642) is a reflection on Early Modern Europe’s fascination with abnormality in physical and behavioral studies. The book, containing both woodcut prints and text to accompany them, serves as a comprehensive collection of monstrosities, ranging from the somewhat subtle to the unmistakably monstrous. As a result, the lines between “human” and “monster” are blurred. This blurring was a source of keen interest for Early Modern Europe, as to be born a monster—or to give birth to one—was often seen as a sign of divine wrath, or punishment, and therefore of a lack of purity. However, I argue that many portrayals of monstrosities in *The History of Monsters* are portrayals of disability and/or queerness presented as monstrosities due to the monsters’ atypical bodily presentations. Specifically, I argue that I can perform a queer reading of the entry for “Androgynos” due to the figure’s untraceable gender/sex and their appearance of being intersex. Further, I argue that it is the Early Modern cultural obsession with ties between morality, faith, women, and “monstrous births” that makes this figure out to be a monster rather than a human being. By nature of blurring the lines between human and monster, this figure defies the expectations of Early Modern morality and is therefore queered.

### **Leo Mendoza, Queering US Latinax Theology: A Thorn on the Side of the US Catholic Church and Latino Theologians**

This paper will interrogate the ways in which U.S. Hispanic/Latine theology has developed its theological discourse on queer Hispanic/Latine bodies and lives. It will explore how US Hispanic/Latine theological frameworks of have historically marginalized queer voices and experiences within Hispanic/Latine communities, often sidelining the complexities of identity in favor of more conventional narratives. This paper will highlight the emergence of queer Latina/o theologies that challenge heteronormative paradigms by engaging the works of Queer Latino/x Theologians who have sought to create theological frameworks that affirm the dignity and lived experiences of queer individuals, emphasizing the need for a more nuanced understanding of faith that incorporates diverse identities. Additionally, the paper will address the socio-political contexts that have shaped these theological developments, including the impact of governmental and ecclesial policies, as well as changing cultural perceptions of sexuality within faith communities and families. Through this lens, it will consider how queer Hispanic/Latine bodies have navigated their faith in environments that are often contested and precarious. Lastly, this paper aims to demonstrate the evolving dialogue within Hispanic/Latine theology regarding queer bodies and lives, advocating for a more inclusive and affirming approach that recognizes the diversity of experiences within these communities and bring hope to often marginalized populations.

### **Surovi Mohona, Coronavirus Spike Hijacks Host Trafficking Machineries For Virus Assembly**

With the SARS-CoV-2 pandemic, coronaviruses (CoV) have become the most extensively researched human viruses to date. However, conspicuous knowledge gaps remain at the level of CoV assembly. An infectious CoV particle is made of four viral proteins and one gene. The four proteins are designated as Spike (S), Envelope (E), Membrane (M), and Nucleocapsid (N). To make particles, all four proteins congregate at a specific subcellular location (called ERGIC). My dissertation focuses on how the S, E, M and N proteins congregate at ERGIC to make virions. Essential transport events within cells are performed by trafficking machinery. These machineries recognize special motifs on cargoes. Recognition of such motifs functions as a molecular handshake, which is required for transport. Interestingly, CoV S proteins have evolved motifs to shake hands with coatamer protein-I (COPI) complexes, a host cargo transport regulator. To investigate S:COPI interaction, we have utilized recombinant Mouse Hepatitis Viruses (rMHVs) as biosafety level-2 models of SARS-CoV-2 infection. I engineered rMHVs with varying COPI binding strength for comparative analyses. Of note, viruses with altered S:COPI interactions were depleted in S proteins. They were also far less infectious compared to viruses with optimal S:COPI binding. These findings demonstrate the importance of S:COPI interactions in S protein incorporation into infectious CoV particles.

### **Hisham Nsier, Exploring ethnic identity, racialization, and psychological well-being among US-born Arab Americans**

Psychological science remains agnostic about the bicultural identity development process in Arab Americans, as well as how this process relates to psychological health. Even less formal research has been conducted with an explicit focus on Arab Americans born in the United States (US-born AA), who are fully American by birth yet experience interlocking forms of marginalization and alienation, in part due to differences between their official racial classification as 'white' and their self-perceptions of ethnic identity. The present work aimed to 1) understand the racialized lived experiences of US-born AAs and how they differ at the intersection of co-existing identities, and 2) to examine the relationship between bicultural ethnic identity, racialization, and psychological well-being at the intersection of US-born AAs' co-existing identities. Qualitative semi-structured interviews were conducted with eight adult US-born AAs (Mage = 28 years, SD = 4, 63% cisgender women) recruited from professional Listservs and WhatsApp affinity groups. Using intersectional and interpretative phenomenological analytic theories of knowledge, results showed how participants viewed themselves as being misperceived by mainstream American society, felt erased by existing racial classification systems, and are hypervigilant due to physical and psychological safety concerns. They also described their cultural value(s) as protective against the negative psychological consequences of discrimination and often leverage their ethnocultural visibility to find community. Findings illustrate the complexity of identity, providing important context for how participants make sense of, and embody, their bicultural identities. Psychological interventions tailored to this population may benefit from strategies aimed at increasing bicultural identity integration.

### **Tyler Rosario, Cyberbullying Network Graphs: Analyzing Victim, Aggressor, and Defender Interactions on Instagram**

In today's world, cyberbullying on social media platforms presents a growing concern, with significant psychological and social consequences. This study explores cyberbullying dynamics on Instagram through a combination of network analysis and machine learning techniques. Using a labeled dataset of user interactions, we construct directed graphs that capture relationships between victims, bullies, and defenders. We use interactive network visualizations to capture key patterns, including the roles played by different users and severity levels of bullying. Our findings highlight the structural characteristics of cyberbullying interactions. By leveraging visualization and statistical analysis, this work contributes to the ongoing efforts in automated cyberbullying detection and prevention.

**Jonathan White, Walker's Point: How Queerness of the Built Environment Created Community**

From 1950 to 1969, a neighborhood in Milwaukee named Walker's Point transformed during a period of intense urban renewal which caused the space itself to shift from space that was created to be straight into its primal queer space. This paper uniquely focuses on the changes and the dysfunction of the built environment that allowed the neighborhood to foster queer community. The research is centered on one bar that opened in the neighborhood in 1965 and stayed in business for nearly 30 years. This paper asks why such an establishment can exist in an environment that is dominantly manufactured to uphold principles of heteronormativity. It argues that four unique factors, specific to this neighborhood, allowed for the creation of queer space. These factors include the demolition of much of its existing properties with little or no rebuilding after previous demolition, along with the densification of preexisting properties. There was also a unique shift in the demographic characteristics of the neighborhood from single families to mainly adults, with men outnumbering women in the neighborhood. This paper also argues that the neighborhood's unique uncertainty about its current existence in the future allowed queer people to hide in the neighborhood while many who promoted heteronormativity looked away. The last unique factor was the demolition of a previous, small queer neighborhood that pushed queer people towards this specific neighborhood. This paper not only displays the complexities of how the built environment assisted in the creation of queer space; it also significantly contributes to the limited historical analysis of Milwaukee's queer community, thereby expanding our understanding of this community in general.

## POSTER ABSTRACTS

### Arslan Bisharat, ML Model to Identify Cyberbullying towards LGBTQ+ Community

Current cyberbullying detection models struggle to capture the unique language and patterns targeting the LGBTQ+ community. This proposal addresses this gap by developing a novel approach that leverages the community's lived experiences. The model will involve data collection through surveys and social media (focusing on potential cyberbullying instances), with the LGBTQ+ community actively involved in the process. Deep learning algorithms like CNNs will be used to analyze the data, aiming to identify the nuanced patterns of online harassment specific to this community. To combat bias, the model development incorporates strategies like reinforcement learning and considers social and semantic contexts. The performance will be meticulously assessed using various metrics. This research seeks to achieve several crucial outcomes. Firstly, it aims to significantly improve the detection of cyberbullying directed towards the LGBTQ+ community. Secondly, by addressing bias in the model, it strives to promote solutions with higher fairness levels. Thirdly, the model's potential integration into monitoring systems offers real-time protection. Finally, the developed methodology can be adapted to address cyberbullying faced by other vulnerable communities, fostering a broader positive impact. By actively engaging the LGBTQ+ community and employing robust techniques, this research aspires to create a safer and more inclusive online space for all.

### Maureen Burns, Out-of-School Activities and Racial and Ethnic Identity Among Black Adolescents

Positive racial and ethnic identity (REI) formation is associated with psychological well-being, especially for Black adolescents. Currently, little is known about influences on this facet of identity formation, outside of parental socialization and school-related factors. Participation in out-of-school activities is associated with positive outcomes but little is known about its role in REI formation. The goal of the present study was to better understand the relation between out-of-school activity participation and REI among Black adolescents. Among a sample of Black identifying adolescents, ages 14-19 (N=181; M age= 16.30, SD= 1.38; 69% female), more out-of-school activity participation (i.e., total number of activities), types of activities, and hours of participation were significantly associated with higher reports of REI ( $p < .01$ ). School-based activity participation was the only activity type significantly associated with higher reports of REI ( $p < .001$ ). Latent classes analysis revealed three distinct classes of activity participation: 1) High Activity Breadth (48% of the sample), 2) High Activity Breadth and Sports Participation (31%), and 3) Low Participation (22%). The Wald tests indicated classes characterized by a high breadth (classes 1 and 2) reported significantly higher REI compared to the Low Participation class. These findings suggest that out-of-school activity participation is associated with REI formation among Black adolescents. While these findings suggest out-of-school activities may play a role in the social ecology that informs an adolescent's identity formation, future work is needed to examine this dynamic exchange. As REI is associated with well-being, these findings have strengths-based clinical, programmatic, and community implications.

### **Karen Chang, B cell-intrinsic TLR signaling inhibits IgE class switching**

Chronic allergic diseases such as allergic asthma are driven by allergen-specific IgE antibodies. B cells produce IgE through class switch recombination (CSR), a process regulated by T cell help and the cytokine, IL-4. Early life exposure to microbial products correlates with lower IgE levels. To model this, we administered a synthetic toll-like receptor 9 (TLR9) agonist, CpG, to mimic microbial DNA exposure in a mouse model of airway hypersensitivity. CpG lowered antigen-specific IgE in the airway and serum. Because B cells express TLRs including TLR9, we examined if direct TLR signaling on B cells inhibits CSR to IgE. We cultured resting mouse B cells with anti-CD40 antibodies and IL-4, with or without various TLR agonists, and observed that all tested agonists reduced IgE CSR by decreasing I $\epsilon$ -GLT, a prerequisite for IgE CSR. Although TLR signaling slightly reduced IL-4 receptor expression at later timepoints, inhibition of I $\epsilon$ -GLT preceded the decrease of IL-4 receptor, suggesting an earlier, independent pathway of inhibition. TLR signaling also drives B cells to differentiate into plasma cells, which cannot undergo CSR. Therefore, we cultured B cells from BLIMP1-reporter mice and found that CpG still inhibited I $\epsilon$ -GLT in BLIMP1-negative cells (non-plasma cells). Notably, we found that TLR signaling upregulated C/EBP $\beta$ , an inhibitor of I $\epsilon$ -GLT in B cell lines. We are now investigating whether C/EBP $\beta$  mediates TLR-driven reduction of IgE CSR.

### **Behnaz Eslami, A Performance-Based Voting Framework for Assertion Detection in Clinical Notes**

Extracting structured information from unstructured clinical text remains a critical challenge in healthcare, significantly impacting clinical decision-making and patient care. This study introduces a robust framework for clinical assertion detection, integrating domain-specific embeddings such as BioBERT, contextualized learning, and a performance-driven voting mechanism. Leveraging pre-trained models, including BiLSTM-CNN-Char architectures, the framework effectively classifies clinical assertions across diverse dimensions, specifically Polarity, Subject, and Tense. Evaluations conducted on discharge summaries from the MIMIC-III database demonstrated exceptional performance, achieving high F1-scores between 0.95 and 0.98 across key clinical categories, including PROBLEM, TEST, and TREATMENT. The framework notably addresses common NLP challenges, such as handling nested concepts, small datasets, and imbalanced data, surpassing existing methodologies. The integration of multiple assertion models combined through a voting mechanism enhances reliability, reduces dependency on single-model predictions, and optimizes assertion labeling. Detailed analysis revealed consistently high precision in assertion classification, with correct assertions (True attributes) dominating at approximately 66%. The occurrences of overly general assertions remained minimal (less than 1%), emphasizing the framework's precision and specificity. Despite these strengths, limitations include the study's scope confined to discharge summaries and potential constraints from reliance on pre-trained embeddings. Future research highlights the potential of advanced NLP techniques in structuring clinical narratives, enhancing decision-making, and improving patient care. By addressing limitations of earlier rule-based and machine-learning approaches, this framework offers a scalable and adaptable solution for clinical assertion detection.

**Ryan Krantz, Interactions Between Microplastics, the Antimicrobial Compound Triclosan, and Microbial Biofilm Communities in Freshwater Microcosms**

Microplastics (MPs), plastics < 5mm in diameter, are ubiquitous contaminants in freshwater ecosystems that could be hotspots for the interaction of antimicrobial compounds and surface-attached microbial biofilm communities. Triclosan is a synthetic, broad-spectrum antimicrobial compound and a common contaminant in surface waters and sediments. MPs and antimicrobials are both common in wastewater, and hydrophobic MPs or those with high surface area can adsorb contaminants like antimicrobials to their surface. Adsorbed antimicrobials could affect microbial communities colonizing MPs, altering their diversity, composition, and antimicrobial resistance. Using a microcosm approach, we assessed the potential for MP fibers to adsorb triclosan and alter bacterial and algal communities in MP associated biofilms and in the surrounding water. We exposed acrylic, nylon, and polyester MP fibers to triclosan and measured its adsorption to each, finding that polyester adsorbed the most triclosan (2.5 ng / fiber) and nylon the least (0.2 ng / fiber). Experimental microcosms containing triclosan-exposed or control fibers of each polymer type were incubated in the lab with water from the Chicago River for 30 days. We analyzed bacterial and algal communities via high-throughput amplicon sequencing and determined that exposure to triclosan significantly changed the taxonomic composition of both bacterial and algal communities. These results suggest that widespread MP and triclosan contamination could potentially alter bacterial and algal biofilm communities, so we hypothesized that triclosan could also select for antimicrobial resistance in these communities. We used quantitative polymerase chain reaction (qPCR) to measure the abundance of the class 1 integrase gene *intl1* as a proxy for the impact of triclosan on resistance, finding no significant difference in *intl1* abundance according to triclosan exposure.

**Jeremiah Lateef, Counter-Mapping Resistance: Changing the Narrative of Runaway Slaves on Newspaper Advertisements**

In the annals of subjugation of Black people in the United States, print media played a crucial role in the sale and capture of enslaved people. Their freedom was reduced to a commodity—controlled and consumed by slave masters. An example of this commodification is the prevalence of runaway slave advertisements in newspapers. These ads served a clear purpose: to recapture and subjugate those who had dared to escape from their appointed station. However, these advertisements also unintentionally documented the ingenuity and resilience of enslaved people in their pursuit of freedom, often aided by the famous Underground Railroad. The means of escape often featured in these ads include forged passes, false identities, waterways, and horses. They raise an important question: Were these means of escape arbitrary, or do they reveal discernible patterns? At the core of this project is the subversive ideological framework of counter-mapping. Counter-mapping is the alternate representation of maps to subvert a dominant narrative propagated by hegemonic establishments or powers. Counter-mapping is resistance. This project focuses on extracting the means of escape from four states as documented in advertisements from the Freedom on the Move database. Two of the state border free states, while the other two are located deep in the South, where slavery was still legal. My poster will present these states on a map with a color code of each of the means of escape. It offers a different insight into how Black people executed their agency in their path to freedom.

**Julian Lomeli, Optimization of Red-Light-Absorbing BODIPY Photoredox Catalysts Through Electron Donor Modulation for Enhanced Catalytic Efficiency**

Photoredox catalysts play a crucial role in carbon-carbon bond-forming reactions, often relying on heavy metals to access long-lived triplet excited states necessary for efficient catalysis. This research aims to optimize the structure of a red-light-absorbing photoredox catalyst composed of a dibenzo-fused BODIPY core covalently linked to an orthogonally arranged electron donor. Upon excitation of either the electron donor or the BODIPY unit, the catalyst undergoes charge separation, generating a radical pair state capable of single electron transfer (SET). The catalyst's SET efficiency is governed by the free energy change associated with charge separation, which can be predicted using the redox potentials of the donor and BODIPY moieties. To enhance catalytic performance, we explore modifying the catalyst by introducing an electron donor with a lower oxidation potential, such as a benzocarbazole derivative. This substitution makes the charge separation more thermodynamically favorable, ultimately increasing catalytic activity and efficiency. The impact of this modification is assessed through cyclic voltammetry, providing accurate estimations of the free energy change and validating the improved catalyst design.

**Manuel Sandoval Madrigal, Identifying Cyberbullying Roles**

Social media has revolutionized communication, allowing people world wide to connect and interact instantly. However, it has also led to increases in cyberbullying, which poses a significant threat to children and adolescents globally, affecting their mental health and well-being. It is critical to accurately detect the roles of individuals involved in cyberbullying incidents to effectively address the issue on a large scale. This study explores the use of machine learning models to detect the roles involved in cyberbullying interactions.

**Shoaib Hussain Mohammed, Adv2FL: Attacking Secure and Differentially-private FL Systems**

Federated learning (FL) is a decentralized approach that allows multiple parties to collaboratively build a shared machine learning model while keeping their data locally stored and secure. Differential privacy plays a crucial role in privacy-preserving FL, with approaches such as Local Differential Privacy (LDP) and Central Differential Privacy (CDP) being applied to protect user data privacy. Despite these privacy measures, federated learning systems are vulnerable to adversarial attacks, such as poisoning and backdoor attacks. In this work, we investigate the vulnerability of FL models that implement LDP and CDP to backdoor attacks. We investigate the number of malicious clients needed to inject a hidden trigger into the global model and the impact of these malicious clients on the global update. To this end, we propose a new hidden trigger backdoor attack that creates malicious clients' models that are highly similar to the benign models and utilizes a number of malicious clients to achieve a high success rate. Our results show that these malicious clients not only maintain similar accuracy to benign clients but, in some cases, improve the global model's overall performance. The attack is executed during the final round of training, allowing the trigger to be carefully inserted with minimal disruption. Our research shows the impact of hidden trigger backdoor attacks in federated learning systems, even under privacy-preserving techniques like LDP and CDP, and emphasizes the need for additional defenses against such intricate attacks.

### **Mujtaba Nazari, BSAF: BadNets in Sentiment Analysis with Federated Learning**

Federated Learning (FL) enables collaborative model training without sharing raw data, making it a promising approach for privacy-preserving machine learning. However, FL remains vulnerable to backdoor attacks, where adversaries manipulate local updates to implant hidden model behaviors. This work investigates backdoor vulnerabilities in FL-based sentiment analysis, focusing on how differential privacy can unintentionally facilitate backdoor injection. We introduce BSAF, a framework that applies BadNets-style attacks to transformer-based sentiment analysis models in FL settings with Central and Local Differential Privacy (CDP/LDP). Our experiments on IMDB, Yelp Polarity, Amazon Polarity, and AgNews reveal that while DP prevents direct data leakage, it also reduces model robustness, making backdoor attacks more effective. We analyze the trade-off between privacy, accuracy, and security, highlighting the risks of deploying privacy-preserving FL in adversarial settings. Finally, we discuss potential defense mechanisms to mitigate these risks.

### **Meredith Sauer, A Computational Reading of Gender and Environment in Virginia Woolf's Orlando**

This project traces Virginia Woolf's descriptions of nature throughout *Orlando* to attempt to answer the question of whether there is a relationship between the gender of the character Orlando and the way that Woolf describes the natural environment in the novel. The project finds its theoretical roots in Martin Paul Eve's, Stephen Ramsay's, and Sarah Allison's writings on computational criticism and computer-aided close reading. Using the computational text analysis tool Voyant, the novel has been reduced to instances of the word "tree" and its variants. This transformed text has then been displayed as an interactive digital timeline, with passages containing "tree" ordered and spaced according to the century in the narrative in which they appear. This timeline enables viewers to read and think through the trees of *Orlando*, using it to generate their own readings of gender and environment in the novel. Woolf's writing of the trees remains overtly constant as Orlando changes gender. However, she offers hints that Orlando's perception of, and thus relationship to, the environment is not so constant. As for the role that gender plays in these shifting perceptions, it does not appear to be the sole mechanism that shifts Orlando's relationship to the environment, though there are moments where gender is a contributing factor. Orlando's relationship to nature is also dependent on the century and its cultural norms, as well as Orlando's age and stage in life.

### **Nicholas Synovic, PTMs For Science - An Exploratory Study Of Scientist's Reuse Methods**

The Nobel Committee's recognition of deep learning (DL) models' importance in computational science has underscored its crucial role in advancing knowledge within this field. However, developing bespoke DL models entails substantial technical, financial, and environmental costs. To mitigate these costs, it is advised to leverage pre-trained deep learning models (PTMs). Previous studies have examined PTM reuse methods in open-source engineering projects and surveyed DL practitioners about their PTM reuse practices. However, a significant knowledge gap remains regarding PTM reuse among scientists. By bridging this gap between the software engineering and scientific communities, we aim to develop an understanding and process model that addresses who is leveraging PTM reuse methods, how they are doing so, why they do it, and when it is necessary. By gaining a deeper understanding of how scientists leverage pre-trained deep learning models (PTMs) to tackle complex research questions, we can gain insights into PTM engineering practices among scientists, identify the limitations and shortcomings of existing PTMs for scientific applications, and inform efforts to improve the PTM supply chain to better serve the needs of scientific endeavors. To achieve this, we conduct a qualitative analysis of peer-reviewed papers from PLOS, spanning 2014 to 2024, and ongoing interviews with natural scientists. These studies were selected for their focus on computational natural science, the timing of DL method adoption (pre- and post-popularization), and the journal's open-access status. The interviews offer insights into the decision-making model that scientists use when leveraging PTMs.



## **FNU Shwetha Vaidyanathan, Designing for Engagement: Exploring Human-Centered Instructional Design**

Instructional Design (ID) is a multidisciplinary field which involves creating effective learning experiences through the iterative blend of theoretical principles, technological tools, and learner-centered practices. ID's reach is vast extending from academia, corporates, government agencies, and even informal learning spaces like online communities. Instructional designers work collaboratively with educators and subject matter experts to ideate and create inclusive learning materials to cater to all kinds of learning modalities. With digital devices vying for attention, designing for engagement requires a learner-centric iterative design which adapts for all kinds of learners. Designing for modern learners, especially in culturally rich environments, requires a human-centered approach that blends technology (including coding, UI/UX), education (pedagogical theories and principles), and an iterative design to create adaptive learning experiences. To address this challenge, three key elements will drive this iterative ID process- learning analytics, gamification, and personalized learning. Learning analytics inform gamification strategies, gamification enhances learner engagement by generating data for further personalization of the learning environment, and personalized learning provides data to further tailor the learner's journey. This cyclical relationship ensures constant agile improvement in the learning design leading to better learner engagement and outcomes. Emerging trends like generative AI seemingly hold promise for enhancing this design process but require thoughtful implementation to avoid perpetuating inequalities. Ultimately, ID's future will lie in its ability to blend creativity, technology, and pedagogy in ways that remain inclusive and impactful.

## **Kristen Young, A Hidden Enemy: Targeting DKK1 to Defeat ER+ Breast Cancer**

Targeted therapies for estrogen receptor-positive (ER+) breast cancer (BC) are initially successful; however, almost 50% of women will have persistent disease. This recurrent disease is more aggressive and often spreads to other parts of the body. One way these cancers grow is by secreting proteins that dampen immune cell recognition and killing tumor cells. Therefore, it is critical to identify novel therapeutic targets for durable patient response. In our laboratory, we have developed a new targeted therapy for ER+ BC that shows efficacy in preliminary studies. We also find that our drug uniquely downregulates a protein called DKK1, which is secreted by tumor cells. In other cancers, DKK1 promotes cancer growth by impairing immune cells from attacking the tumor, but this is poorly understood in the context of ER+ BC. Currently, there are clinical trials targeting DKK1 in other cancers, and results show promise. Therefore, we hypothesize that DKK1 helps ER+ BCs grow by blocking immune cell function, making it harder for the body to kill the cancer cells. To test this, we looked at blood samples from over 100 ER+ BC patients and compared them to healthy people. We find that DKK1 is significantly higher in ER+ BC patients, correlating with the size of the tumor. We also find that DKK1 inhibits the function of Natural Killer (NK) cells, which are immune cells critical for detection and killing of cancer cells. These data suggest that targeting DKK1 in ER+ BC may improve the effectiveness of current treatments.