PROGRAM

First Annual

TEMPLE UNIVERSITY

GRADUATE SYMPOSIUM

FOR RESEARCH AND CREATIVE WORKS

11 April 2025

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NEXT YEAR'S SYMPOSIUM

April 2026

Temple University's 2025 Graduate Symposium

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B6	Xuting Jiang	Peer, I'm Your Leader Now: How Internally Promoted Leaders Change Their Role Relationships with Prior Peers into Leader-Follower Relationships
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Graduate Dean's Message

It is my great pleasure to welcome everyone to Temple University's first annual Graduate Symposium for Research and Creative Works. At this inaugural symposium, we host over 120 scholars from schools and colleges across the university. These presenters offer oral and poster presentations covering a wide range of topics and content. At the symposium, you will encounter cutting-edge research and creative work from first-year graduate students through post-doctoral scholars, and everyone in between.

My deepest thanks to our presenters for sharing their scholarship with the university community. I also thank our reviewers who generously volunteered their time to providing valuable feedback to our presenters. Finally, I thank the Graduate School staff for the dedication to this event and to helping all graduate students succeed every day in their daily work.

I wish you all a stimulating symposium.

Renée M. Tobin, PhD
Dean of the Graduate School

ORAL PRESENTATIONS

ROOM 200A

1:15 - 1:30 PM

The Greenhouse Effect

Presenter: **Lia Haynes**

Co-author(s):

Department: *Dance*
School/College: *Boyer College of Music and Dance*

Faculty Mentor: yaTande Whitney V. Hunter

The Greenhouse Effect uncovers the parallels of first-generation Americans in conjunction to their parents and family members who are Caribbean native. This documents the trials, tribulations, differences that are experienced on both sides. Including how immigrant parents carry a weight that is passed onto their children unconsciously when relocating to the United States, thus, leading to a multitude of issues and trauma that first-generation Americans bear in silence because we are thought to have a 'good' life. This project was conducted through a series of interviews covering the following topics: adolescence, dreams/goals, parental struggles, choices, and advice. Whilst, The Greenhouse effect, mostly extends from my personal life, it is a common discussion amongst Caribbean people and other immigrants, hence, why I decided to interview non-family members as well to get their perspective. The Greenhouse Effect not only highlights these struggles but also seeks a resolution to avoid this in the future for many other individuals who are looking to relocate to the United States.

1:30 - 1:45 PM

The Interplay between Stiffness and Hyperglycemia on Diabetic Foot Ulcer Wound Closure

Presenter: **Nourhan Albeltagy**

Co-author(s):

Department: *Bioengineering*
School/College: *Engineering*

Faculty Mentor: Karin Wang

Diabetes impairs fibroblast migration, hindering wound closure and contributing to diabetic foot ulcers. Despite the increased stiffness of diabetic plantar skin, which should enhance fibroblast mechanotransduction for wound closure, fibroblasts fail to migrate effectively. This suggests hyperglycemia alters fibroblast mechanotransduction, affecting parameters like velocity, directionality, and actin alignment, all crucial for wound healing. Using a 2D in vitro wound closure model, we investigated the impact of diabetic plantar stiffness and hyperglycemia on fibroblast migration. PDMS substrates will be used to mimic normal and diabetic skin stiffness, while media will be used in two glucose levels 5.5 mM (normal) or 11.1 mM (hyperglycemia). Preliminary results showed fibroblasts migrated faster on diabetic stiffness but slower under hyperglycemia, with reduced directionality. These findings suggest hyperglycemia impairs wound closure by reducing fibroblast directionality, highlighting potential therapeutic targets for improving diabetic wound healing.

1:45 - 2:00 PM

Test of the Reward/Circadian Rhythm Dysregulation Model of Bipolar Spectrum Disorders at a Micro Time Scale Using Multilevel Moderated Mediation

Presenter: **Logan Smith**

Co-author(s): Mackenzie A. Maddox, Rachel F. L. Walsh, Joshua Klugman, Namni Goel, and Lauren B. Alloy

Department: *Psychology and Neuroscience*
School/College: *Liberal Arts*

Faculty Mentor: Lauren B. Alloy

Introduction: Two prominent theoretical frameworks, the Social Zeitgeber Theory and the Behavioral Approach System/Reward Theory, have been proposed to explain the onset of bipolar spectrum disorders (BSDs), highlighting the roles of disrupted sleep-wake rhythms and hypersensitivity to reward in the onset and course of illness. This study tested a component of the integrated Reward/Circadian Rhythm Dysregulation Model of BSDs by examining how reward-relevant life events predict affective symptoms via social rhythm disruption (SRD) in young adults with differing levels of reward sensitivity across a 20-day period.

Methods: Young adults with high (HRew) or moderate (MRew) reward sensitivity participated in a 20-day ecological momentary assessment study. Participants reported mood symptoms three times daily and daily life events each evening and completed a life events interview. To determine whether HRew individuals experienced more reward-relevant events and associated SRD than MRew individuals, 2x2 ANOVAs were conducted. Multilevel moderated mediation was used to examine the relationships between daily reward-relevant events, SRD, and next-day depressive/hypomanic symptoms moderated by group.

Results: Significant interaction effects were observed such that high-reward individuals experienced more reward-relevant life events and associated SRD. Moderated mediation analysis fully supported the hypotheses for depressive symptoms. For hypomanic symptoms, hypotheses were partially supported such that reward-activating events predicted SRD, which predicted hypomanic symptoms.

Discussion: Findings suggest hypersensitivity to reward amplifies the effects of reward-relevant life events on SRD, contributing to the onset of depressive symptoms in individuals at-risk for BSD. Results highlight potential early interventions targets.

2:00 - 2:15 PM

The Effects of Ketamine on Methamphetamine Withdrawal-Induced Anxiety and Drug-seeking Behaviors in Rats

Presenter: **Marco Ghilotti**

Co-author(s): Richardo Petrilli Fortuna and Danielle Stern

Department: *Neuroscience - CSAR*
School/College: *Lewis Katz School of Medicine*

Faculty Mentor: Ellen Unterwald

Recently, the recreational and prescription use of methamphetamine and its derivatives has risen among the youth and adult populations. In addition to facilitating dopamine neurotransmission, methamphetamine indirectly increases the release of glutamate which activates N-methyl-D-aspartate receptors (NMDARs). Ketamine noncompetitively blocks NMDARs. Thus, we hypothesized that ketamine may be a potential therapeutic method to treat methamphetamine use disorder. This was explored using a rodent model of methamphetamine self-administration. Male rats underwent methamphetamine or saline IV self-administration for 10 sessions with tone and light cues, then 10 sessions of extinction training, followed by tests for cue and drug reinstatement. Anxiety-like behaviors were measured 48-hr after methamphetamine self-administration and again after the 10-day extinction period. During extinction only, rats received 5mg/kg ketamine or saline IP injections daily before entering the operant chambers. The findings from anxiety-like behavioral measurement tests performed 48-hr after cessation of methamphetamine self-administration are congruent with existing literature; methamphetamine withdrawal increased anxiety-like behaviors on the elevated plus maze and open field test compared to rats that self-administered saline. Moreover, anxiety-like behaviors remained elevated in the rats that received saline during extinction, while anxiety-like behaviors were significantly attenuated in the rats that received ketamine. The data from drug-induced reinstatement tested six days after the last ketamine extinction session showed a significant reduction of active lever presses for methamphetamine by rats treated with ketamine during extinction. NMDA and AMPA receptor subunits were quantified in brains obtained after the test for reinstatement by Western blot analysis. In the nucleus accumbens, methamphetamine significantly reduced the levels of NR2A, NR2B, GluA1 and GluA2 receptor subunits, and these reductions were partially rescued in the rats treated with ketamine. Together, these findings demonstrate that ketamine reduced anxiety-like behaviors produced by methamphetamine withdrawal, attenuated methamphetamine-seeking behavior, and normalized glutamate receptor levels.

This work was supported in part by P30 DA013429 (EMU).

2:15 - 2:30 PM

Context-Dependent Host Use by the Invasive Spotted Lanternfly (Lycorma delicatula)

Presenter: **Owen Schneider**

Co-author(s): Jocelyn Behm

Department: *Biology*
School/College: *Science and Technology*

Faculty Mentor: Jocelyn Behm

Generalist insect herbivores interact with diverse plant communities, yet the extent to which community-level factors—such as host availability, species composition, and abiotic conditions—shape host preferences and herbivore abundance remains unclear. Investigating patterns of host use across different plant communities can help identify key factors influencing the context-dependent interactions between host and herbivore. The invasive Spotted Lanternfly (Lycorma delicatula) is a highly polyphagous phloem-feeder that utilizes a wide range of host plants throughout its life cycle. However, the degree to which its abundance and host preferences shift in response to local plant community composition and environmental conditions is not well understood. In this study, we surveyed L. delicatula abundance and host-use across 10 forest fragments in the mid-Atlantic throughout the 2024 lifecycle. We analyzed variation in host preference and abundance in relation to plant community species richness, composition, and abiotic factors. Preliminary observations suggest that L. delictula exhibits strong preferences for Ailanthus altissima, but secondary host preference varies depending on local tree and vine composition. Additionally, sites with higher tree and shrub species richness and longer time-since-invasion may support lower lanternfly densities, possibly due to reduced dominance of preferred hosts. These preliminary findings provide insight into the context-dependent nature of L. delicatula host use and may inform management strategies aimed at mitigating its impact on forests across the mid-Atlantic.

2:30 - 2:45 PM

The Dark Side of Digital Governance: How Platform Governance Shapes Platform Work Experience in the Tourism and Hospitality Industry

Presenter: **Peihao Wang**

Co-author(s): Ceridwyn King

Department: *Sport and Tourism*
School/College: *Sport, Tourism, and Hospitality Management*

Faculty Mentor: Laurie Wu

The proliferation of digital platforms has led to the rise of a new working class: the digital proletariat. Drawing on digital capitalism theory and the digital governance framework, this research explored how platform digital governance mechanisms (i.e., coordination, control, incentives, and trust) influence digital proletariats' (i.e., platform workers) work experiences, via large-scale online worker reviews from a tourism and hospitality gig platform. Leveraging topic modeling approach, this research identified seven topics that are relevant to automated or augmented platform digital governance mechanisms. Findings from follow-up OLS-regression analyses suggest that, while platform workers exhibit overall negative responses toward automated governance mechanisms (e.g., coordination and control), augmented governance mechanisms (e.g., incentives and trust) have more nuanced impacts on platform workers' work experience.

2:45 - 3:00 PM

If the Blockchain Could Block: Strategic Blockchain Adoption by Manufacturer as Deterrence to the Selling of Counterfeits by Retailer

Presenter: **Jingjing Weng**

Co-author(s): Abhishek Roy

Department: *Statistics, Operations, and Data Science*
School/College: *Fox School of Business*

Faculty Mentor: Subodha Kumar

Counterfeiters are increasingly infiltrating legitimate supply chains by blending counterfeits with genuine products, raising significant concerns for manufacturers and consumers. To mitigate the potential harm of these counterfeits to their profits, manufacturers are striving to identify effective countermeasures. Although blockchain technology (BT) has recently garnered attention as a potential solution to address counterfeits, its effectiveness to the manufacturer remains largely unexplored when its retailer strategically sells counterfeits. Therefore, we fill this gap by developing a game-theoretic model to examine the strategic adoption of BT by the manufacturer as a countermeasure. Our results provide several actionable insights for manufacturers, retailers, and policymakers.

First, we find that even when the blockchain adoption cost is low and counterfeits hurt the manufacturer, the manufacturer may not adopt BT. Second, although a larger production cost gap incentivizes the retailer to sell counterfeits, surprisingly, it does not necessarily lead to a higher counterfeit rate. Third, remarkably, deceptive counterfeits can sometimes benefit the manufacturer. Fourth, BT adoption can sometimes benefit the retailer by serving as a credible commitment device, resulting in a ``win-win" situation. Our qualitative findings remain robust when we incorporate several additional practical considerations. Our insights provide practical guidance for manufacturers on BT adoption and retailers on reactions to this adoption. Moreover, we provide guidelines for policymakers on how to intervene to promote the win-win outcome.

3:00 - 3:15 PM

Searching for new astrophysical objects, the pulsar halos, in gamma-ray astronomy with Cherenkov telescopes

Presenter: **Pauline Chambery**

Co-author(s): Marianne Lemoine-Goumard and Thierry Reposeur

Department: *Physics*
School/College: *Science and Technology*

Faculty Mentor: Miguel Mostafá

In 2017, emissions four times full moon size in degrees were detected for the first time in the gamma-ray sky and became a new category of astrophysical objects: the pulsar halo. They are formed about a hundred thousand years after the star's supernova when its core becomes a compact object, the pulsar. The powerful pulsar magnetic field ejects and accelerates its particles. This pulsar wind expands and deforms over time in its dense environment until particles escape, but they remain confined in a much bigger area. They radiate in gamma-ray by non-thermal processes to give the pulsar halo. The latter seems to be numerous in the galaxy and therefore constitutes an important element for understanding the particle acceleration mechanisms in the Milky Way.

To detect these objects, it is necessary to have very sensitive instruments with a large field of view and a precise angular resolution like the Cherenkov telescope arrays. Indeed, the halos are very extended with a faint luminosity and an energy variable morphology. Then their spectro-morphological analyses allow to describe the physical phenomena involved.

I will present the results of my PhD. Firstly, we optimized the telescopes layout of the futur array CTA for the extended emissions by studying the simulation of one of the largest in gamma-ray. Secondly, we performed detailed analyses of complex galactic regions with the current array H.E.S.S. data to unveil several new emissions some of which appear to be halos.

3:15 - 3:30 PM

Reclaiming Cambodian identity: Media, memory, and culture in the Bophana Center

Presenter: **Minsoo Lee**

Co-author(s): Minsoo Lee

Department: *Media and Communication*
School/College: *Klein College of Media and Communication*

Faculty Mentor: Patrick Murphy

This research examines the transformative role of the Bophana Audiovisual Resource Center in Phnom Penh, Cambodia, as a space for negotiating collective memory and reconstructing cultural identity. Employing an ethnographic approach, the study explores how documentary filmmaking and archival media serve as vehicles for reclaiming erased narratives and fostering community resilience. It critically examines the intersection of external funding dynamics and local agency, revealing a complex negotiation between Western-oriented grant expectations and the preservation of authentic cultural expressions. The findings highlight the Center's ability to challenge dominant representations of Cambodian history while promoting inclusive storytelling and local authorship. This work contributes to broader debates in media studies, postcolonial memory, and cultural diplomacy, offering insights into the transformative potential of culturally engaged media practices. By centering personal narratives and community engagement, the study demonstrates how participatory media can bridge interdisciplinary perspectives on power, memory, and resilience.

3:30 - 3:45 PM

Human Tooth as a Fungal Niche: Candida albicans Traits in Dental Plaque Isolates

Presenter: **Zhenting Xiang**

Co-author(s): Rohan S. Wakade, Apoena Aguiar Ribeiro, Weiming Hu, Kyle Bittinger, Aurea Simon-Soro, Dongyeop Kim, Jiyao Li, Damian J. Krysan, Yuan Liu, and Hyun Koo

Department: *Oral Health Sciences*
School/College: *Maurice H. Kornberg School of Dentistry*

Faculty Mentor: Yuan Liu

Candida albicans is commonly found in mucosal niches yet frequently isolated from the dental plaque of toddlers with severe childhood caries, a widespread public health issue. However, little is known about its phenotypic and ecological features on the tooth surface. Here, we investigate the phylogeny, phenotype, and interkingdom interactions of C. albicans isolates from toddlers' plaque, comparing them with reference strains, including mucosal isolate 529L. We show that tooth isolates exhibit broad phenotypic diversity but share cariogenic traits, such as elevated proteinase activity, acidogenicity, and acid tolerance. Unexpectedly, these isolates vary in filamentation from hyphal-defective to hyperfilamentous forms. We further examine their biofilm-forming capabilities with Streptococcus mutans (a cariogenic partner) and Streptococcus gordonii (a mucosal partner). While hyphal-defective isolates lack cobinding with S. gordonii, all isolates form robust biofilms with S. mutans, regardless of filamentation. Both hyphal-defective and hyperfilamentous C. albicans enhance sucrose metabolism and acidity, driving pH below 5.5. Transcriptomic analyses reveal changes in pathways linked to pH regulation, adhesion, and cell wall composition compared to reference strains, indicating niche-associated adaptation. Our findings demonstrate that C. albicans can thrive on the tooth surface and drive an acidic environment in concert with cariogenic bacteria, diverging from its interactions in mucosal niches. These observations underscore the fungus's distinctive adaptive strategies on teeth and highlight the potential for novel insights into fungal colonization, interkingdom biofilm development, and caries pathogenesis.

3:45 - 4:00 PM

Ottoman Political Thought: Caliphate or Sultanate?

Presenter: **Munevver Gulce**

Co-author(s):

Department: *Religion*
School/College: *Liberal Arts*

Faculty Mentor: Khalid Y. Blankinship

In this study, I examine the concepts of the sultanate and the caliphate in Ottoman political thought concerning Ottoman political discourse. I analyze seminal western and Ottoman-Turkish literature and trace the genealogy of the image of the caliphate as a ruler in the Ottoman world in the 16th century. I also suggest a framework to analyze the legitimacy of the Ottoman sultanate. I focus on what "caliphate" meant in Ottoman political thought and how the sultanate was transformed into the caliphate as a legitimization tool in the 16th century. This analysis explains how the treatise of Lütfi Pasha could be a reference to the juristic-political view regarding the Ottoman caliphate theory.

4:00 - 4:15 PM

Unlocking the Brain: Exploring Transcranial Magnetic Stimulation (TMS) Through Computational Modeling

Presenter: **Zachary Miksis**

Co-author(s):

Department: *Mathematics*
School/College: *Science and Technology*

Faculty Mentor: Gillian Queisser

The human brain is an incredibly complex organ, with billions of neurons working together to control every aspect of our thoughts, feelings, and actions. Understanding how it functions is no easy task, but advances in computation and mathematics are making it possible to peer inside the brain in new ways. This talk will explore advances in computational modeling of transcranial magnetic stimulation (TMS) and its applications to studying treatments for neurological conditions.

TMS is a non-invasive technique that uses magnetic fields to stimulate specific areas of the brain. It is being used to treat a wide variety of neurological disorders such as depression, Parkinson's, and Alzheimer's, by generating targeted activity within and between neurons. To study the effects of this stimulation, we utilize powerful computing and mathematical techniques to create simulations of neuronal activity, helping scientists predict how different regions of the brain respond. Techniques include developing mathematical models and methods, as well as machine learning algorithms and utilizing virtual reality for interactive study of these techniques to approach real time data analysis and guidance for clinicians. Our modeling and simulation reveals insights into how single neurons respond to TMS at the electrical and biochemical scale, allowing us to better understand both normal and abnormal brain function.

ROOM 200B

1:15 - 1:30 PM

Becoming Bilingual: Spanish and English in Philadelphia

Presenter: **Camila Franco-Rodriguez**

Co-author(s):

Department: *Spanish and Portuguese*
School/College: *Liberal Arts*

Faculty Mentor: Augusto Lorenzino

Language variation and change encompasses the process in which people find their language shifting due to social, economical and political realities. In bilingual settings we usually look towards the acquisition of L2, for example, how do Spanish Speaking immigrants learn English? However, sociolinguistics tries to bring attention to the complex social interactions that occurr inside the bilingual experience and thus, it allows us to ask the question : What happens to immigrant Spanish in the US?. In this presentation I discuss the syntactical, social and cognitive changes that spanish-speaking immigrants experience in the Philadelphia area and, specifically, how the Colombian-born population in Philadelphia sheds light into the process of language change into what has been understood as "US Spanish". I look at logistic regression predictions, as well as experiential interviews as I present how the clash of dialects, the presence of English, and the unique linguistic landscape of Philadelphia, nurtures Spanish variation and Hispanic community formation.

1:30 - 1:45 PM

Malditas/Damned: Sandra Ceballos and the practice of curatorial coalitions at Espacio Aglutinador

Presenter: **Maria de Lourdes Mariño Fernandez**

Co-author(s):

Department: *Art History*
School/College: *Tyler School of Art and Architecture*

Faculty Mentor: Mariola Alvarez

The study of Cuban art, particularly after the 1980s, has been primarily focused on the effects of state-led projects transforming the educational system in the country. However, the end of the Cold War in 1991 precipitated a new age where private gatherings in home spaces became a common practice for avoiding state censorship and, at the same time, engaging in private art sales. The development of an independent art movement in Cuba can be traced back to the emergence of this informal network of independent art gatherings. The Cuban artist and curator Sandra Ceballos became a crucial figure of the independent art movement in Cuba when her freelance gallery Espacio Aglutinador was founded in 1994. My presentation analyzes the coalitional nature of Ceballos's curatorial practice at Espacio Aglutinador. I take up "Malditos de la Posguerra", a program of six exhibitions between 2016 and 2018 addressing topics of cultural memory and political activism within the history of Aglutinador itself. I argue that Ceballos' curatorial practice fosters feminist solidarities through coalitional collaborations. Following this direction, my presentation draws on different coalitions established by Ceballos' curatorial work. I investigate Ceballos's curatorial practice as solidarity acts in collaboration with Coco Fusco and Tania Bruguera to create alternative alliances and friendships in the face of institutional censorship. Ceballos' Espacio Aglutinador represents a relevant case in the forming and ramifying of an independent cultural movement on the island that has transformed the landscape of contemporary Cuban art.

1:45 - 2:00 PM

Sex Differences in P2X7R-Driven Neuroinflammation and Extracellular Vesicle Dynamics in Alcohol-Induced Brain Injury

Presenter: **Namdev S Togre**

Co-author(s): N Togre, P Bhoj, N Mekala, R Hancock, J Trivedi, M Winfield, U Sriram, S Rom, and Y Persidsky

Department: *Pathology*
School/College: *Lewis Katz School of Medicine*

Faculty Mentor: Yuri Persidsky

Chronic alcohol exposure disrupts blood-brain barrier (BBB) integrity and promotes neuroinflammation, with P2X7 receptor (P2X7R) signaling playing a critical role. Our prior work linked P2X7R inhibition to reduced eATP release, modulated extracellular vesicle (EV) cargo, and attenuated neuroinflammation in chronic intermittent ethanol (CIE)-exposed mice. However, sex differences in these effects remain unclear.

Male and female mice were exposed to ethanol vapor for three weeks and treated with Brilliant Blue G (BBG), a P2X7R inhibitor. Gene expression in brain tissues and microvessels was analyzed using qRT-PCR and RT²PCR arrays, respectively, and circulatory cytokines using MSD ELISA. Circulatory eATP, EV size and number, and EV-mt-DNA levels were evaluated using ELISA, NanoSight, and digital PCR, respectively.

Compared to their respective CIE-unexposed controls, TNF-α, IL-1β, IL-6, MCP-1, and Fasl significantly increased in CIE-exposed males, while only IL-1β increased in females. BBG treatment significantly reduced these levels. Genes involved in apoptosis, vasodilation, and platelet activation were upregulated 2–6-fold in CIE-exposed microvessels but downregulated 15–50-fold in males and 1–6-fold in females after BBG treatment. Circulatory cytokines (MIP-1α, TNF-α, IL-1β, and IL-27p28/IL-30) were significantly elevated in CIE-exposed males but not in females, with BBG treatment reducing these levels in males. Circulatory eATP, EVs, and EV-mt-DNA, key activators of autocrine/paracrine signaling, were reduced in both sexes after BBG treatment.

Our findings reveal sex differences in CIE-induced neuroinflammation, with a stronger inflammatory response in males. P2X7R inhibition effectively mitigates these effects, particularly in males, and reduces EV-mediated mitochondrial DNA release.

2:00 - 2:15 PM

Afro-Diasporic Aesthetics and Cinematography; Color, Lighting, and Framing in Black Hollywood and Early Nollywood

Presenter: **Kate-Jane Peter-Afunanya**

Co-author(s):

Department: *Media Studies and Production*
School/College: *Klein College of Media and Communication*

Faculty Mentor: Osei Alleyne

My research explores how filmmaking in an ethnographic style can help to analyze the concepts of belonging, cultural hybridity, and afro-diasporic identity creatively and methodologically. With the use of an autoethnographic approach as a transnational student, this research investigates the various use of cinematic techniques in Black Hollywood and early Nollywood to showcase the intricacies of diaspora, belonging, and double consciousness. Rooted in the theories of postcolonialism, double consciousness and third space, this research seeks to examine how filmmakers in diasporic territories maneuver diverse cultural identities to visually tell a story.

The method encompasses an autoethnographic analysis of my filmmaking process combined with a corresponding evaluation of cinematographic techniques in black Hollywood and early Nollywood. Having shot part of my film in Nigeria and in America, and reflecting on its cinematographic aesthetics, this research analyzes how visual decisions like lighting, location choice, color grading and framing can represent the core of a diasporic existence while illustrating the emotional and psychological realities. This study practically aims to understand how diasporic filmmaking operates as grounds for self-representation and a force of opposition by combining practice-based research with film theories and textual-analysis.

This study potentially plays a role in postcolonial critique, transnational cinema, and ethnographic visual storytelling which displays how film can serve as an academic and artistic ground for grasping the experience of recollection, migration and belonging. Future directions of this research can broaden the implications of diasporic cinematography in ways global film discourse and visual narratives can be decolonized and reshaped.

2:15 - 2:30 PM

Next Generation of Educators: Dual Enrollment as a Model for Early Exposure to Careers in Teaching

Presenter: **Jawaria Ashraf**

Co-author(s):

Department: *Policy, Organizational, and Leadership Studies*
School/College: *Education and Human Development*

Faculty Mentor: Jennifer Johnson

Dual enrollment (DE) programs provide high school students with early exposure to college coursework, increasing postsecondary access and degree attainment. While DE has been widely studied in STEM fields, there is limited research on its impact in teacher education. This study examines how DE serves as a pathway to careers in teaching, particularly for underrepresented students.

Using a phenomenological approach, this study explores the lived experiences of 25 – 85 participants from a DE program (2018-2024) who expressed interest in Early Childhood, Elementary, Secondary, or special education. Semi-structured interviews (30-45 minutes) will investigate their college motivations, career aspirations, and DE experiences. Thematic analysis, guided by socio-cultural theory (Vygotsky, 1978), will be used to analyze interview transcripts, demographic data, and student journal entries.

Anticipated findings suggested that DE enhances students' preparedness for teaching careers fosters motivation, and improves college matriculation and retention in teacher education programs. Institutional support, mentorship, and peer cohesion are anticipated to be key factors influencing student success. Given declining college enrollments and the ongoing teacher shortage, this research provides timely insights into expanding and refining DE initiatives. This study contributes to the literature by identifying how DE fosters pathways that promote the profession, highlighting institutional support mechanisms that promote student persistence, and offering recommendations for strengthening DE programs in teacher education. Findings will inform future DE efforts and be disseminated through academic conferences and institution reports to shape policy and practice.

2:30 - 2:45 PM

Lobbying for Accounting Legislation

Presenter: **Alice Lee**

Co-author(s):

Department: *Accounting*
School/College: *Fox School of Business*

Faculty Mentor: Sudipta Basu

I provide the first large-scale evidence on the lobbying forces seeking to regulate and deregulate accounting and their consequences using the U.S. congressional archive and lobbying disclosure data. I focus on congressional bills aimed at changing accounting rules ("accounting bills"), which attracted over a billion dollars in lobbying from industries and firms between 1999 and 2022. When lobbied more, accounting bills that seek to regulate ("regulating bills") are more likely to become law, while those that seek to deregulate ("deregulating bills") are more likely to result in downstream deregulatory actions. Notably, 72 percent of the lobbying expenditures are for deregulating bills. Lobbying is positively associated with the length and specificity of regulating bills, which seek to accommodate various lobbying interests. Furthermore, after lobbying for accounting bills, firms are less likely to face accounting-related regulatory scrutiny from the SEC. These findings are consistent with the special interest theory of regulation.

2:45 - 3:00 PM

Experimental Study of Highly Excited ^1\Sigma_g^+ and ^1\Pi_g States of the Cesium Dimer

Presenter: **Brendan A. Rowe**

Co-author(s): Jacob T. Stahovich, Sylvie Magnier, Vladimir B. Sovkov, Alexander B. Nikolov, Sylvia Whang, Adam D. Hersh, Peter L. Wardach, Joel D. Keen, A. Marjatta Lyyra, and Ergin H. Ahmed

Department: *Physics*
School/College: *Science and Technology*

Faculty Mentor: A. Marjatta Lyyra

We report the results of an experimental study of two highly excited (^1\Sigma_g^+ and ^1\Pi_g) electronic states of the cesium dimer. The rovibrational structure of these states was probed using the optical-optical double resonance (OODR) technique in which Cs_2 molecules from thermally populated levels in the X^1\Sigma_g^+ ground state were excited through intermediate levels of either the B^1\Pi_u state or the mixed A^1\Sigma_u^+~b^3\Pi_u manifold. Probe laser resonance frequencies were determined by detecting laser induced fluorescence (LIF) from the target states to the a^3\Sigma_u^+ triplet ground state. Bound-bound fluorescence scans from the target states to the mixed A^1\Sigma_u^+~b^3\Pi_u manifold were taken in order to confirm state multiplicity. Using ab initio results from our collaborators and through consideration of selection rules for dipole-allowed transitions, the two experimentally observed states were identified as the 11^1\Sigma_g^+ and 6^1\Pi_g electronic states. The Dunham-RKR method was utilized to generate experimental potential energy curves for the two electronic states.

3:00 - 3:15 PM

Ontological Blackness Revisited: An Afrocentric Analysis of Victor Anderson's Postmodern Theology

Presenter: **Min. Qadry Harris, M. Div.**

Co-author(s):

Department: *Africology and African American Studies*
School/College: *Liberal Arts*

Faculty Mentor: Molefi Kete Asante

Since 1969, Black Liberation Theology has framed African American suffering within Christian narratives, with James H. Cone pioneering the discourse. However, Victor Anderson, in Beyond Ontological Blackness, critiques Cone for reinforcing a dialectical dependence on whiteness. This study interrogates Anderson's critique by examining its Eurocentric postmodern underpinnings, specifically his dismissal of Afrocentricity as a legitimate epistemological alternative.

Using Molefi Kete Asante's Afrocentric Paradigm as a theoretical framework, this research challenges Anderson's marginalization of African agency. It critiques Anderson's failure to engage African epistemologies beyond Euro-American intellectual traditions, particularly his rejection of Asante's Location Theory and Cheikh Anta Diop's civilizational continuity model. Through a comparative analysis of Cone, Anderson, and Afrocentric thought, this study demonstrates that Anderson's critique of Cone, while valuable, remains embedded in colonial theological structures.

Findings indicate that Afrocentricity provides a necessary corrective, repositioning African identity as a central rather than peripheral element of theological discourse. This work advances the argument that Black theology must move beyond the Race Paradigm toward a framework prioritizing African cultural continuity over Eurocentric conceptualizations of race and suffering.

This research contributes to Africology, theology, and religious studies by proposing a shift in theological discourse—one that affirms African cosmologies and sacred knowledge systems as foundational to Black theological thought. Future studies should further explore the integration of Africology into theological education, strengthening African agency within religious scholarship.

Keywords: Afrocentricity, Black Liberation Theology, Victor Anderson, James Cone, Africology, Molefi Kete Asante, African epistemologies, theological discourse.

3:15 - 3:30 PM

Predicting impact of the Pgp transporter on drug distribution and disposition from in vitro drug transport assays with modeling and simulation

Presenter: **Mohammed Yousuf**

Co-author(s): Dr. Swati Nagar and Dr. Ken Korzekwa

Department: *Pharmaceutical Sciences*
School/College: *Pharmacy*

Faculty Mentor: Ken Korzekwa

Purpose: Transporters have a significant role in drug permeation, distribution, and disposition. We can evaluate the transporter activity of potential drug candidates prior to preclinical and clinical studies. Our research aims to determine the transporter efflux clearance from in vitro drug permeation across MDCK cell monolayers.

Methods: The MDCK cells are cultured as a monolayer on the insert filter of the transwell device. Upon plating, the Pgp transporters are expressed on the apical side of the cells. Using the net clearance concept, we developed equations for measuring the efflux clearance (CLeff) and clearance into the membrane (CLi) from the apparent permeability from the apical side to the basolateral side and the basolateral side to the apical side. Drug transport assays provide the time course of drug concentrations in the donor and receiver chambers after dosing in the apical or basolateral chamber with or without a Pgp inhibitor. The time course data are used to optimize model parameters. The fraction unbound in microsomes (fum) is used to parameterize the membrane partition coefficient (Kp, mem). The fum values are measured by equilibrium dialysis.

Results: The measured fum value for Loperamide is 0.38 at 1mg/ml microsomal protein concentration after 6 hours of incubation in an equilibrium dialysis device. The non-steady state transport model is parameterized with the concentration-time data of loperamide, quinidine, verapamil, and propranolol. The mathematical model for the MDCK cell monolayer with these model-fitted parameters can accurately simulate the time course of drug permeation.

Conclusions: The primary parameters, the efflux clearance and clearance into the membrane, can be added to PBPK models to predict the impact of Pgp for drug candidates early in drug discovery. This approach will help predict the distribution and disposition profiles of Pgp substrate molecules.

3:30 - 3:45 PM

Measuring the Chiroptical Activity of Individual Plasmonic Nanocrystals

Presenter: **Zachary J. O'Dell**

Co-author(s): Megan Knobeloch, Dane Paulson, Sara E. Skrabalak, and Katherine A. Willets

Department: *Chemistry*
School/College: *Science and Technology*

Faculty Mentor: Katherine A. Willets

Chiral plasmonic nanoparticles can be used to amplify molecular signal and reduce the concentration required to observe chirality in a given sample, with potential applications in single-molecule chiral sensing and directed chiral synthesis. However, assessing the degree of chirality of these heterogenous, structurally complex nanoparticles remains a challenge in and of itself, especially at the single-particle level. Electron microscopy, tomography, and circular differential scattering (CDS) spectroscopy are the standard for determining structural chirality and chiroptical properties in single nanoparticles, but can be restrictive based on their cost, time, and required expertise. Here, we introduce a new simple, fast, and inexpensive optical microscopy technique to simultaneously determine the extent of circular birefringence, circular dichroism, linear dichroism, and linear birefringence found within single gold nanoparticles. The technique, coined calcite-assisted localization & kinetics (CLocK) microscopy, probes individual nanoparticles with linear polarized light and analyzes the resulting scattered light with a rotating birefringent calcite crystal to determine both the change in orientation of linear polarized light and change in the degree of ellipticity at various wavelengths, allowing for left-handed, chiral, and right-handed nanoparticles to quickly be distinguished and chiroptical parameters to be quantified.

3:45 - 4:00 PM

Differential Profile Diagram for Breast Tumor Classification Using Vibro-Acoustic Tactile System

Presenter: **Nazia Rahman**

Co-author(s): Vira Oleksyuk and Chang-hee Won

Department: *Electrical and Computer Engineering*
School/College: *Engineering*

Faculty Mentor: Chang-hee Won

We introduced an approach for breast tumor characterization with a Vibro-acoustic Tactile System (VTS), which is based on an ultrasound transducer for vibration and a tactile sensor for imaging. This system captures both tactile and vibro-tactile images of breast tumor phantoms, which are then integrated into two representative diagrams: the Tactile Profile Diagram and the Vibro-tactile Profile Diagram, respectively. These diagrams provide valuable touch-based information about the breast tissue and tumor characteristics. We quantify the differences induced by ultrasound vibrations by comparing pixel values between the Tactile Profile Diagram and the Vibro-tactile Profile Diagram, resulting in the development of Differential Profile Diagrams. Finally, we employ convolutional neural network (CNN) algorithms to classify these Differential Profile Diagrams into benign and malignant tumors with 86.4% classification accuracy.

4:00 - 4:15 PM

Moving People from "Aware" to "Interested" When Developing Social Influence Campaigns

Presenter: **Anyun Chatterjee**

Co-author(s):

Department: *Media and Communication*
School/College: *Klein College of Media and Communication*

Faculty Mentor: Bruce Hardy

In political campaigns, public health interventions, and other "social influence campaigns," targeted individuals need to progress through a number of behaviors and cognitive states before taking the desired action, be it getting vaccinated or casting a ballot. In marketing and behavioral science, these progressive stages are sometimes called the "hierarchy of effects," and are ordered as awareness → interest → knowledge → attitude → (desired) behavior. While building awareness of a political or public health matter can be straightforward, through techniques like advertising, moving individuals from being aware to being interested remains a major challenge. One potential way to address this challenge may be through the consideration of what the members of a target population value, and to what degree they perceive a campaign's messenger as aligned with those values. This construct is surprisingly underdeveloped in the literature, so this manuscript synthesizes literature from multiple relevant disciplines to develop a "Theory of Agential Value." By considering the evaluations a focal agent makes and referencing existing literature on the criteria that might influence or preclude those judgements, I further hypothesize that the evaluations are not, strictly speaking, economical, objective, or universally beneficial to the evaluators. This manuscript presents the theoretical advancement to justify this hypothesis, and further illustrates it by considering multiple reviews of the literature on vaccine hesitancy. Finally, the manuscript ends with future directions to empirically test the constructs proposed and the theoretical linkages between the construct and the progression from awareness to interest.

POSTER PRESENTATIONS

POSTER SESSION A: 1:15–2:30 PM

1

Turbulence Control: De-Escalation Strategies in Aviation with Lessons for Law Enforcement

Presenter: **Jared Daniel**

Co-author(s): Judith L. Komaki

Department: *Psychology*
School/College: *Liberal Arts*

Faculty Mentor: Donald Hantula

This study examines the statistical reliability and validity of an adapted airline de-escalation scale, originally developed from nursing practices, to explore its applicability for future use in policing. The research aims to assess how well the scale measures key de-escalation behaviors in the context of airline employee interactions with aggravated clients and evaluate its potential for adaptation to law enforcement. The scale was tested for consistency across various unique scenarios using a mixed-methods approach to ensure accurate behavior-based assessment. The long-term goal of this work is to carefully select pre-established, multidisciplinary research methods to refine the original scale for incorporation into police training programs, where it could improve conflict resolution by promoting progressively informed de-escalation techniques. The study's findings intend to lay the foundation for further empirical testing in policing environments, contributing to efforts in reform by emphasizing organizational behavior modification through positive reinforcement.

2

From Fiction to Friction: Abusing Autonomous Mobile Robots

Presenter: **Lindsay Ouellette**

Co-author(s):

Department: *Psychology and Neuroscience*
School/College: *Liberal Arts*

Faculty Mentor: Donald Hantula

Intro: As autonomous mobile robots (AMRs) become more prevalent in public spaces, incidents of human aggression toward them have increased, particularly towards food delivery robots. A pilot study and 2 follow up studies investigated levels of humanness attributed to AMRs and the role of dehumanization in shaping instrumental and moral violence toward AMRs.

Methods: A pilot study examined if successful methods from human-human interaction (HHI) could be transformed and work in a human-robot interaction (HRI) context. The main study implements the novel Human Attribution Scale (HAS) to measure levels of humanness in robots. Videos and vignettes are used to investigate humanization and dehumanization framing effects on participants' willingness to harm a robot. A second experiment considers how factors like science fiction, media, economic concerns, and fears of job displacement shape how people see and treat robots.

Results: The pilot study provided evidence that humans may respond similarly in HHI and HRI thus providing support to move forward. The first experiment shows that low levels of humanness were attributed to robots and participants were more likely to engage in violence against AMRs for instrumental motives than for moral motives. Humanizing the AMR did not significantly reduce the likelihood to aggress. The second experiment is in progress.

Discussion: A fundamental assumption for successful HRI is to make the robots more humanlike. This may inadvertently foster conditions for their dehumanization and abuse. Rather than making robots more human-like, researchers should focus on fostering their acceptance in society.

3

The Fate of the Sanfeng Sect: Using Historical Network Analysis to Trace the Heirs of Miyun Yuanwu and Hanyue Fazang

Presenter: **Rouying Tang**

Co-author(s):

Department: *Religion*
School/College: *Liberal Arts*

Faculty Mentor: Marcus Bingenheimer

The complex master-disciple relationship between Miyun Yuanwu (1566–1642), a patriarch of the Linji School, and Hanyue Fazang (1573–1635), the founder of the Sanfeng sect of the Linji School, fostered the unification of Linji, propelling it to its zenith as the largest Buddhist school of its time and establishing broad social connections with nearly all prominent figures of the period. Despite their influence, the Sanfeng sect's decline and eventual "disappearance" have long intrigued scholars.

While traditional research often attributes its extinction to Emperor Yongzheng's 1733 ban of the Sanfeng Sect, recent studies suggest its decline began earlier, with the lineage shrinking by the fourth generation due to reduced philosophical innovation, changes in the social environment, and the decline of the Ming refugee population. Additionally, evidence points to the possibility of continued transmission in the border regions of Hunan and Sichuan, raising questions about the sect's actual fate.

This study aims to determine the decisive moment when the Sanfeng lineage faded from history with the help of social network analysis. Drawing on the DILA Buddhist Studies Person Authority Database (January 2025) and complementary sources, this research examines their relationships with other Buddhist figures and the institutional dynamics of the late Ming and Qing periods. Through network analysis and historical cross-referencing, this paper seeks to uncover the structural and temporal factors behind the Sanfeng sect's decline, offering new insights into the sect's historical trajectory and the institutional development of the Linji School.

5

The Role of Social Media in Fostering Civic Engagement: A Diffusion of Innovation Perspective on Sub-Saharan Africa

Presenter: **Cleves Nkie Mongo**

Co-author(s):

Department: *Media and Communication*
School/College: *Klein College of Media and Communication*

Faculty Mentor: Meghna Tallapragada

This study explores the role of social media in fostering civic engagement through the lens of Everett Rogers' Diffusion of Innovation theory, focusing on Kenya, Nigeria, and South Africa. Using secondary data from Pew Research Center's 2023 Global Attitudes surveys, this manuscript examines how smartphone adoption and social media usage impact perceptions of democracy and drive online civic participation. The findings indicate that smartphone ownership significantly predicts social media use, which in turn positively influences perceptions of social media as beneficial for democracy. These perceptions subsequently increase the likelihood of individuals posting or sharing political and social issues online. However, despite high smartphone and social media adoption rates in all three countries, civic engagement through these platforms remains low potentially due to structural barriers, including limited infrastructure, high costs, rural-urban disparities, and fear of government surveillance. This study highlights the need for targeted interventions to unlock the transformative potential of social media for participatory democracy in Sub-Saharan Africa. While this study provides valuable insights, future research can further enhance our understanding in this area. The reliance on Pew Research Center's 2023 global attitudes surveys provides a broad perspective but may not fully capture localized nuances in civic engagement, particularly in rural regions. For instance, the specific challenges faced by rural communities, such as limited connectivity and excessive costs, are not adequately represented in this data. While correlations between smartphone ownership, social media use, and civic engagement are evident, longitudinal studies are needed to explore how these relationships evolve over time and under different sociopolitical contexts.

6

Embodied Resistance: Choreographing Through Crisis

Presenter: **Olivia Alsamadi**

Co-author(s):

Department: *Dance*
School/College: *Boyer College of Music and Dance*

Faculty Mentor: Karen Bond

This creative research explores how embodied practice serves as a means of navigating the tension between daily routines and the emotional toll of global crises. As a choreographer and researcher, I facilitate a collaborative choreographic process that investigates disembodiment, helplessness, and resilience. Drawing from contemporary, social, and Levantine dance modalities, I guide dancers through structured improvisations and composition exercises that translate personal and collective experiences into physical form.

This research unfolds through layered methodologies, beginning with movement exploration rooted in personal narratives and progressing into the development of a shared choreographic language. While I shape the overarching structure of the work, dancers contribute through improvisational tasks, group problem-solving, and embodied reflection. These collaborative moments reveal how physicality holds both grief and agency, transforming abstract emotional states into tangible movement and meaningful connection.

The final choreographic work, to be performed in Temple Dance's 50th Anniversary Concert, functions as both a performance and a research artifact, embodying the tensions and solidarities that arise when confronting crisis in community through dance. This study positions choreography as an act of resistance, care, and survival—one that reimagines how we move through uncertainty together. Future directions will extend this inquiry by engaging broader communities in participatory performance structures, deepening the role of embodied methodologies in discourses on activism and collective healing.

7

Tuning the Instrument: A Phenomenographic Study on the Value of Personal Music Therapy for Music Therapists

Presenter: **Thomas J. Biglin, Jr.**

Co-author(s):

Department: *Music Therapy*
School/College: *Boyer College of Music and Dance*

Faculty Mentor: Michael Zanders

Personal therapy is a widely recognized practice for psychotherapists; however, its value and impact on music therapists remain underexplored. This study investigates how U.S. board-certified music therapists experience and understand the role of personal music therapy in their professional and personal development. Using a phenomenographic research methodology, this study seeks to explore the range of ways music therapists conceptualize and engage with personal music therapy.

Data collection involved semi-structured interviews with 18 board-certified music therapists, recruited through purposive and snowball sampling. Interviews were conducted and transcribed via Zoom, reviewed using PDF Expert and Microsoft Word, and analyzed systematically using ATLAS.ti for qualitative coding. A phenomenographic approach is being applied to identify emerging themes and develop the Outcome Space Model, representing qualitative distinctions in therapists' experiences.

Preliminary patterns suggest that music therapists describe personal music therapy as (1) a means of professional growth, (2) a form of self-care, and (3) a valuable yet often inaccessible resource due to financial, logistical, or systemic barriers. As analysis continues, this study aims to develop an Outcome Space Model that captures these evolving distinctions while also recognizing how participants' experiences resist binary categorizations of benefit versus non-benefit. A non-dualistic ontological lens—characteristic of phenomenographic methodology—will be used to examine how music therapists understand personal music therapy as a fluid, context-dependent engagement rather than a fixed conceptualization. These findings will inform ongoing discussions in music therapy education and practice, encouraging a more nuanced understanding of self-care, musicianship, and therapeutic presence.

8

Evaluating the Impact of a Dual Enrollment Program on College Readiness and Commitment to The Field of Education

Presenter: **Cory Roberts**

Co-author(s): Kelly McGinn

Department: *Center for Assessment, Evaluation, and Education Policy Analysis*
School/College: *Education and Human Development*

Faculty Mentor: Kelly M. McGinn

This study evaluates the impact of the Temple Education Scholars (TES) program, a dual enrollment program for Philadelphia high school seniors, on changes in college knowledge, changes in interest in education careers, college GPA, high school graduation rates, and college acceptance rates. The research also assesses changes in scholars' college readiness and commitment to education. The results of this evaluation can help institutions design more effective programs that improve student transitions to college and potentially increase overall higher education success rates. The research study includes 16 high school seniors from Philadelphia enrolled in a year-long dual enrollment program. The participant sample consisted of 82% women and 12% men. Racial and ethnic representation included 18% Asian, 41% African American, 12% Hispanic or Latinx, 12% White, and 12% identifying as more than one race. The study employs pre- and post-program surveys and outcomes data (e.g., GPA and college acceptance rates) provided by program leaders. Findings indicate that scholars' overall college knowledge increased on average by 15%, with the largest gains being in decision-making regarding college selection (36%) and financial awareness (19%). 81% of scholars achieved a cumulative college GPA of 3.0 or higher, and all participants graduated high school. Nearly all scholars received at least three college acceptances. Interest in education careers increased by 6.25%. The findings suggest that participation in dual enrollment programs prepares students to enter higher education with early college credits, informed college selections, and enhanced financial literacy.

9

Motivation and Aptitude in International Students: Classroom Practices and Instructor Insights from Two English Learning Classes

Presenter: **Jia-han Yang**

Co-author(s):

Department: *Psychological Studies in Education*
School/College: *Education and Human Development*

Faculty Mentor: James Byrnes

While aptitude and motivation have been studied in language learning, little has been done to examine how the two constructs manifest in pedagogies and students' performance. This qualitative narrative inquiry employs field notes and interviews to examine in-class observations and classroom practices related to students' motivation and aptitude in two English classes at Temple University. Quantitative measures of English learning aptitude will be collected during the subsequent phase, but preliminary findings suggest impacts on aptitude include factors such as familiarity with test formats, age, and homesickness. Instructors leverage students' learning aptitude through opportunities for authentic use of language, such as videotaping, discussion sessions, self-paced online learning, and in-person event attendance. Interestingly, instructors prioritize vocabulary development and center their instructions on how vocabulary is used in context. They also change teaching strategies in response to cohorts' characteristics or technological advancements. Corrections to students' errors take place in varying forms and modalities.

Additionally, students' motivation will be assessed using attitude-motivation test batteries (AMTBs), although preliminary findings have been informed by insights from interviews with faculty members. Most adult learners are self-driven, and their reasons for attending classes vary, as do their definitions of hard work. A class size of around 10 with diverse demographics can also ensure an enriching yet manageable classroom. The future direction of this study includes the administration of AMTBs and aptitude tests. The study may inform instructors of the students' profiles of aptitude-motivation combinations and suggest practices of tapping students' innate ability and motivation to become self-sufficient.

10

Knowledge and Confidence: A Confirmatory Factor Analysis of the Reasoning About Socioscientific Issues Instrument

Presenter: **MG Hodge**

Co-author(s): MG Hodge, Kristen Brighter, Richard Kedanis, and Janelle M. Bailey

Department: *Psychological Studies in Education*
School/College: *Education and Human Development*

Faculty Mentor: Janelle M. Bailey

Socioscientific issues (SSIs), such as the causes of the current climate crisis, are complex, but understanding and reasoning about these topics is critical for participation in a democratic society. The Reasoning About Socioscientific Issues (RASSI) instrument is designed to measure such abilities. This survey instrument investigates one's knowledge of certain socioscientific issues, their motivated reasoning about their responses, and their confidence in their reasoning. The RASSI consists of 12 items with a salient scientific claim and a six-point Likert scale for respondents to rate the accuracy of the claim, followed by four reasoning response options, as well as a six-point Likert scale for respondents' confidence in their answer. The current study recruited participants through Prolific, and approximately 500 participants completed the RASSI. A previous exploratory factor analysis suggested three underlying dimensions (factors), but we wish to understand how well the items within each factor measure their intended construct. We hypothesize that a confirmatory factor analysis will validate our previous findings, specifically that the RASSI accurately measures three distinct factors of Earth and environmental science knowledge (for example, resources, climate change). If this hypothesis holds true, the RASSI can be used to measure knowledge and reasoning about science topics that are relevant for today's society. This could inform the development of instructional strategies to help students better engage with these topics. Future research will involve using the RASSI with middle and high school students.

12

Predicting Sentence Repetition Performance in Young Bilinguals with and without DLD

Presenter: **Karyssa White**

Co-author(s):

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School/College: *Public Health*

Faculty Mentor: Lisa Bedore

This study investigates the effectiveness of sentence repetition (SR) as a diagnostic tool for identifying developmental language disorder (DLD) in young bilingual (Spanish-English-speaking) children. Using data from a longitudinal study with 186 children aged 4-7, we examine the predictors of SR performance, such as phonological memory, vocabulary knowledge, and language exposure. A qualitative analysis compares SR performance between children with and without DLD to identify reliable early markers of language impairment. The analysis revealed significant differences between TD bilingual children and those with DLD across both kindergarten and first grade. Children with DLD consistently scored lower in English and Spanish SR tasks compared to their TD peers, with mean differences ranging from 15 to 21 points. For TD children, expressive vocabulary emerged as the strongest predictor of English SR performance, while phonological memory played a more prominent role in Spanish SR tasks. In contrast, for children with DLD, expressive vocabulary also correlated with SR performance, but phonological memory did not significantly contribute. Error analysis revealed that TD children made minor phonological errors, while children with DLD frequently omitted function words and key grammatical elements, leading to more fragmented sentences. Despite the impact of phonological memory on error patterns, expressive vocabulary was identified as the strongest predictor of SR performance. The findings aim to improve early identification and intervention strategies for young Spanish-English bilinguals.

13

Examining Added Sugar Intake through Adolescent and Parent Focus Groups to Inform the Development of a Nutrition Intervention

Presenter: **Paris Ford**

Co-author(s): Alasia Williams

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School/College: *Public Health*

Faculty Mentor: Gina Tripicchio

Background and Purpose: Adolescents over consume added sugar, increasing risk for chronic illnesses. This formative study was conducted to understand parent and adolescent added sugar behaviors, routines, and preferences to tailor intervention efforts. Methods: Six parent (n=3) and adolescent (n=3) focus groups were recorded and transcribed over Zoom from January-February 2025. Demographic data were captured through RedCap. Quantitative data were collected to assess preferences for behavior change via Zoom polls. Interview guides informed the discussion on sugar intake and intervention preferences. This study was approved by Temple University's IRB. Transcripts were analyzed using thematic analysis, and demographics and poll data were analyzed using Stata. Analysis will continue through March 2025. Results/Outcomes: Ten teens (age = 13.8(1.3)y, 70% female) and 9 parents (46.7(11.7)y, 88.9% mothers) from 9 families participated; 77% of families received government assistance. Preliminary thematic analyses revealed that sugar intake among teens is influenced by routines and time of day (after school and late-night), the availability of sugar at home, and food preferences derived from social media. Related to after school, 80% of teens stated it would be easy to stop eating snacks, while 66% of teens said it would be harder to stop drinking sugary drinks. Conclusion: Food routines and environment influence adolescent sugar intake. Addressing sugary drinks in adolescents may be harder than addressing sugary snacks, and after school is an important time to target sugar consumption. Clinical and social relevance: These data will be used to tailor a nutrition intervention for teens and their parents.

14

Exploring Disenfranchised Grief in Immigrant Populations: Implications for Social Work Interventions

Presenter: **Sara Wuillermin**

Co-author(s):

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School/College: *Public Health*

Faculty Mentor: Julia Kobulsky

Purpose: Disenfranchised grief refers to loss that is not publicly acknowledged or socially supported, which can lead to emotional suffering and isolation. Individuals who emigrate from their home countries face unique forms of disenfranchised grief relating to their experiences, including a profound loss of cultural identity, social connections, and familiar environments. This literature review aimed to understand these grief experiences in the context of social work to help establish more empathetic and effective interventions for vulnerable populations.

Research methods: Research included a review of quantitative studies focused on the unique disenfranchised grief experience relating to immigration. These included the bereavement experiences of Latino immigrants in the United States coping with transnational deaths (Lipscomb, 2021) and familial separation (Solheim, Zaid, & Ballard, 2016); and the migratory grief of first-generation, adult Korean American immigrants (Chang, Yoon, and Lee, 2024).

Results & Findings: These studies reveal themes such as anticipatory grief, the struggles associated with acculturation, and feelings of isolation due to a lack of recognition or support. The findings suggest that immigration-related disenfranchised grief is complex and often goes unaddressed, exacerbating mental health challenges for individuals.

Conclusion: Reviewing the literature within the context of social work highlights the importance of addressing disenfranchised grief as part of the immigration experience and offering culturally competent interventions for these populations. Future research should continue to explore the impact of disenfranchised grief on immigrant populations with a focus on improving coping strategies and support systems provided in social work practice.

15

Fleeing OCC: A Run for Regulatory Arbitrage or Regulatory Expertise?

Presenter: **Shuai Gong**

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Faculty Mentor: Sudipta Basu

Over the past two decades, many more U.S. national-chartered banks switched to state-chartered banks than vice versa. We try to understand the incentives driving national banks' decisions by examining the impact of their charter switching on key outcomes. We address the endogeneity of charter switching by using the assessment fee schedule as an instrumental variable. We first validate its relevance through a Cox proportional hazards model, finding that higher fees increase the probability of national-to-state switching. Using predicted switching probabilities as the instrument, we find that national switchers increase their risk-weighted assets and experience a deterioration in loan loss provision accuracy. These findings align more with banks seeking lenient regulators than seeking expert regulators.

16

Beyond Competition: An Exploration of How Collegiate Women Athletes Navigate Name, Image, and Likeness (NIL) Opportunities

Presenter: **Carolyn Adkerson**

Co-author(s):

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School/College: *Fox School of Business*

Faculty Mentor: Lynne Andersson

The advent of Name, Image, and Likeness (NIL) opportunities has redefined the collegiate athletic landscape, particularly for women athletes who are increasingly leveraging personal branding for entrepreneurial ventures. This dissertation employs a two-study qualitative design grounded in interpretivist and grounded theory methodologies to examine how collegiate women athletes navigate NIL opportunities. Study One, which includes 21 in-depth interviews and secondary data analysis, explores the enhancement of athletic identity, personal branding, and professional growth through NIL deals, while revealing the critical role of social support systems—such as coaches, teammates, and family—in optimizing these opportunities. Moreover, gaps in the operational dynamics of emerging stakeholders (e.g., NIL agents, collectives, third-party platforms, and brand programs) were identified. Building on these insights, Study Two delves into the evolving NIL support ecosystem, mapping the interactions between traditional support networks and new market-driven entities to develop a comprehensive framework for understanding the multifaceted influences on athlete success. The findings contribute to Social Support Theory and sports entrepreneurship literature by providing actionable insights for policy makers and industry stakeholders, advocating for more equitable and robust support structures that empower women athletes in the NIL era.

17

Post-Pandemic State of Early Childhood Education: Exploring Educators' Adjustments to Achieve Safe and Structured Classrooms

Presenter: **Grace Zechman**

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School/College: *Education and Human Development*

Faculty Mentor: Kelly McGinn

This study explores educator perceptions of how they adapted practices to create a safe, structured classroom environment post-pandemic. Conducted in 2022, it examined a trauma-informed, social-emotional learning intervention, revealing key challenges in early childhood education. Researchers then held focus groups to explore educators' adjustments, including modifying classroom routines, SEL strategies, teaching methods, behavior management, and family support. Findings will highlight how educator adaptation fosters engagement, reduces distractions, and promotes positive behaviors, ultimately enhancing student success.

18

Sex Differences in the Impact of Childhood Threat and Deprivation on Social Network Size in Late Midlife: The Moderating Role of Perceived Stress

Presenter: **Lily C. Towle**

Co-author(s): Madeline R. Pike, Blake Elliott, Ann M. Kring, Barbara A. Cohn, Piera M. Cirillo, Nickilou Y. Krigbaum, Ashby Cogan, Bhakti Patwardhan, Thomas M. Olino, and Lauren M. Ellman

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Faculty Mentor: Lauren M. Ellman

Background: Over half of U.S. adults have experienced childhood trauma, increasing risks for health issues, psychopathology and social isolation. Childhood trauma has been associated with heightened stress sensitivity, which has the potential to contribute to smaller social networks in late adulthood. This study explored the relationship between childhood trauma and social network size in late midlife, along with the moderating role of perceived stress and sex assigned at birth (herein referred to as "sex").

Methods: Participants (N = 189, Mean age = 59.85, SD = 1.52) from the Healthy Brains Project (HBP) completed self-report questionnaires, including the Childhood Trauma Questionnaire (CTQ), the Lubben Social Network Scale (LSNS) and the Perceived Stress Scale (PSS). The CTQ was re-coded into three binary variables: total score, childhood threat, and childhood deprivation. Hierarchical linear regressions were adjusted for total household income. Significant results were stratified by sex.

Results: Adjusted findings indicated that there was a significant interaction between perceived stress and total CTQ scores (B=-0.43, SE=0.18, p=0.02) and childhood deprivation (B=-0.41, SE=0.18, p=0.02), but not childhood threat (B=-0.31, SE=0.18, p=0.09) on decreased social network sizes. In addition, the interaction between childhood deprivation and perceived stress on decreased social network was significant only for male participants.

Conclusion: Childhood deprivation may contribute to smaller social networks in late midlife, especially for males, and these findings were dependent on perceived stress. Further longitudinal research is needed to understand the temporal relationships between early-life deprivation, perceived stress and social isolation.

19

Tracking the Influence of Emotional Uncertainty on Memory for Complex Social Events

Presenter: **Emma Moughan**

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Faculty Mentor: Chelsea Helion

Hypothesis: The goal of the current study is to use stimulus-based approaches to identify what features of emotionally complex stimuli determine the likelihood and extent of their recall. We hypothesized that scenes with higher levels of emotional entropy (higher uncertainty detecting the focal emotions associated with the scene) would be associated with a higher likelihood of recall. Methods: We conducted analyses in a sample of 26 participants (mean age = 24.4 years; age range = 19-44; SD age = 5.6 years; 12 female). Participants continuously rated how certain they were of a character's innocence or guilt while watching a television episode (The Undoing, HBO Television) while undergoing fMRI imaging, followed by a free recall session wherein participants were prompted to talk for at least 10 minutes. To test our hypothesis, we ran a generalized linear model to account for clustering at the scene and participant level. Results: We found a marginal effect that scenes higher in emotional entropy were more likely to be recalled relative to those that were lower in entropy ($z = 1.807$, $p = 0.071$). Conclusions/Future Directions: These results potentially indicate that information that is emotionally ambiguous is attended more deeply than information that is more emotionally discernible. Notably, disgust may be the driving emotion behind a scene being recalled, consistent with its previously identified role in social and moral cognition. Neuroimaging implications for both information processing and memory retrieval, as well as machine learning analyses done on emotional output, will be discussed.

20

Microarchitectural Characterization of EDA-Containing FN in Tumor-Derived Matrices and Its Immunomodulatory Role

Presenter: **Ghazal Bashiri**

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Faculty Mentor: Karin Wang

Extracellular matrix (ECM) alterations in tumor microenvironment (TME) dysregulate cellular activities and drive tumor progression through ongoing stroma remodeling. Extra domain A fibronectin (EDA FN) is upregulated in tumor stroma and regulates numerous cell functions. Despite extensive research on ECM remodeling, the microarchitectural features of EDA-containing FN in tumor stroma and its contribution to immune modulation of TME remains largely unknown.

Tumor-conditioned media from MDA-MB-231 breast cancer cells was used to differentiate human mammary fibroblasts (HMF) into cancer-associated HMF (mTCM-HMF), while control HMFs (INC-HMF) were conditioned in incubated low-serum media. Each group deposited ECM over 7 and 10 days and was subsequently decellularized. Half of the samples were fixed and immunostained (DAPI, total FN, EDA-containing FN) for confocal imaging (Olympus IX 81) and analysis (ImageJ, CT-FIRE). The rest were stored at 4°C for macrophage reseeding. Human peripheral blood monocytes were differentiated into macrophages (20ng/ml MCSF, 7 days), and reseeded onto the matrices, and brightfield images were captured (Keyence BZ-X800).

We successfully developed a 3D in-vitro tumor-associated HMF-derived ECM model (>20 um thick). Fibroblasts in tumor-conditioned media (mTCM-HMF) assembled FN fibers with high anisotropy (>70%), while INC-HMF produced more disorganized, isotropic fibers. EDA-FN fibers from mTCM-HMF had larger intrafibrillar spaces and higher colocalization with total FN, indicating the upregulation of the EDA+ isoform of FN in tumor-associated matrices. Macrophages reseeded on these matrices exhibited distinct morphologies, underscoring the influence of TME on immune cell behavior.

21

Tactile Zero-Shot Sensing of Breast Tumors: Recognition of Human Data from Phantom Data

Presenter: **Arpita Das**

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School/College: *Engineering*

Faculty Mentor: Chang-hee Won

One of the biggest challenges of biomedical research is not having enough human data. Human data is extremely important, especially in testing any biomedical device as these devices need to be human-body friendly. However, acquiring human data is expensive as it is time-consuming, whereas phantom data is easier to get. To address this problem, this paper explored Tactile Attributes-based Zero-Shot Learning to recognize human data results from phantom data. Using this Artificial Intelligence (AI) method, we trained a Multilayer Perceptron (MLP) and a Support Vector Machine (SVM) with the phantom data, tested with the human data, and finally estimated the malignancy level of the human data. Instead of class labels used in typical machine learning methods, we incorporated binary attributes of each tactile image. Thereby, the classifiers (MLP and SVM) output the attribute probabilities indicating whether an attribute is present or absent rather than the class probabilities. We further calculated the L_1 distance using the attribute probabilities to assess the classifiers' performance and achieved 83.33% accuracy. The method showed that despite using phantom data for training, we successfully applied the knowledge to human data, achieving a malignancy level calculation accuracy of 74.42%, a sensitivity of 73.68%, and a specificity of 75.00%.

22

Dynamic Sensing of an Embedded Object using Laser, Camera, and Collaborative Robot

Presenter: **John Bannan**

Co-author(s): Nazia Rahman and Chang-hee Wo

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School/College: *Engineering*

Faculty Mentor: Chang-hee Won

Dynamic sensing is a way to characterize embedded objects using optical sensors and dynamically moving robots. Here, we use diffuse optical imaging techniques to determine the spectral properties of an embedded object. The dynamic sensing is split into two phases. In the first phase, the location of the target is estimated; coarse interrogation. Then in the second phase, the embedded object's size and depth are estimated; fine interrogation. The results of this study demonstrate a dynamic sensing method that autonomously estimates the location, size, and depth of embedded objects using a collaborative robot. The size and depth estimation yielded an error of 11.1% and an error of 5.6mm, respectively.

23

Microperforated Panels for Pickleball Noise Mitigation

Presenter: **Subhrodeep Ray**

Co-author(s): Dr. Haijun Liu

Department: *Mechanical Engineering*
School/College: *Engineering*

Faculty Mentor: Haijun Liu

The increasing noise complaints from pickleball courts have necessitated effective mitigation strategies to address the sport's characteristic high-frequency noise. Micro-perforated panel (MPP) absorbers present a viable solution by providing broadband sound absorption without the use of fibrous materials. This study focuses on the design, optimization, and performance evaluation of MPP absorbers specifically tuned to mitigate pickleball noise, targeting a 400 Hz bandwidth centered at 1 kHz.

An analytical model was developed to predict absorption performance under oblique incidence and was validated through numerical simulations. The optimized MPP configuration, featuring a perforation diameter of 1.5 mm, a panel thickness of 3 mm, and an air gap of 10 mm, achieved simulated absorption coefficients exceeding 0.8 within the target bandwidth. Large-scale testing using a 3ft × 3ft × 3ft anechoic test box confirmed real-world absorption exceeding 50%, demonstrating practical effectiveness for community noise control.

To maintain transparency and structural durability, the panels were fabricated using acrylic and polycarbonate, ensuring aesthetic integration into residential and recreational settings without obstructing visibility. The results indicate that MPP absorbers can significantly reduce the high-pitched impact noise of pickleball while offering a visually unobtrusive and mechanically resilient alternative to traditional barriers. Future work will focus on optimizing large-scale implementation strategies and assessing long-term environmental performance to enhance community noise mitigation efforts.

24

Mechanism of Molecule-Probed Raman Spectroscopy for Femtogram-per-Liter Level Per- and Polyfluoroalkyl Substances Detection

Presenter: **Jiayue Hu**

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School/College: *Engineering*

Faculty Mentor: Ling Liu

Per- and poly-fluoroalkyl substances (PFAS) have received significant attention due to their persistence in the environment. Because of their accumulative nature, even trace amounts can adversely impact human health and ecosystems. Thus, technologies for ultra-sensitive, low-cost, and fast PFAS detection are needed for monitoring efforts. Here, we discovered a new PFAS detection method, which uses the methyl group (-CH3) of polydimethylsiloxane polymer as a molecular probe and detects the enhancement of its Raman intensity of symmetric vibration upon PFAS adsorption. This method, termed Molecule-Probed Raman Spectroscopy (MPRS), enabled ultra-sensitive detection down to the femtogram-per-liter level of perfluorooctanoic acid (i.e., 3.7 × 10-15 g/L). The PFAS detection mechanism is investigated through a combination of classical molecular dynamics (MD) simulations and quantum ab-initio calculations using PFOA as an example. MD simulations show that the system's potential energy decreases as PFOA approaches the PDMS substrate, confirming a thermodynamically favorable adsorption process. Quantum ab-initio calculations quantitatively reveal changes in the electronic structure of -CH3 as it serves as a molecular probe for PFAS detection. These results demonstrate that the approaching C-F bonds in PFOA redistribute electrons in the -CH3 groups of PDMS, particularly along the C-H bond closest to PFOA.

25

Retrograde Tracing of Breast Cancer-Associated Sensory Neurons

Presenter: **Svetllana Kallogjerovic**

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School/College: *Engineering*

Faculty Mentor: Bojana Gligorijevic

Breast cancer is the second most common cancer among women, where 1 in 8 will develop this disease. Few recent clinical studies have shown that in the presence of cancer, breast innervation is increased, which leads to higher aggressiveness and poor prognosis. This pointed out the importance of studying the interaction between innervation and breast cancer progression, which has been overlooked so far.

Sensory nerves make up the majority of innvervation in the breast, and Le et al. have recently reported that in the tumor-bearing animals, sensory innervation is approximately 10-fold larger in comparison to to sympathetic one. Hence, we are here focusing on the sensory innervation of the breast tumors.

The sensory innervation in the breast derives from axonal branching of thoracic intercostal T3-T5 nerves. While the neural bodies remain located in dorsal root ganglia (DRG) in the spinal cord, neurons extend axons, which are combined into fascicles and nerves, connecting the peripheral organs with our brain. Based on the presence of myelination, the size of the nerves, and receptors on the axon terminal, the sensory nerves can be classified in different subtypes. It is currently unclear which types of nerves are innervating the breast tumors, making it hard to start developing specific targets to deactivate or ablate these nerves towards treatment.
Here, we are focusing on specifying the subtypes of sensory neurons, and the DRG locations that are responsible for innervating breast cancer, and comparing them to the healthy mammary glands, to develop differential targeting strategies. To address these questions, we are using combination of retrograde tracing techniques, tissue clearing and immunofluorescence technique.

26

Examining the Impact of Adolescent Social Isolation on Oxycodone Sensitization

Presenter: **Erin English**

Co-author(s): Lisa Briand

Department: *Department of Psychology and Neuroscience*
School/College: *Liberal Arts*

Faculty Mentor: Lisa Briand

Chronic stress during adolescence can disrupt normal development and increase substance use behaviors in adulthood. Our lab has established a mouse model of adolescent social isolation stress that leads to increased cocaine seeking and motivation for cocaine. However, the impact of social isolation on opioid behavioral phenotypes is less clear. These differences could be a result of differential pharmacology or due to methodological differences between the paradigms used including light phase of experimental animals. The current study examined the influence of light cycle on oxycodone-induced locomotor behavior and sensitization following adolescent social isolation. Mice were either group-housed or socially isolated at weaning and remained in these housing conditions until adulthood. Male and female mice in both housing conditions received 5 daily injections of oxycodone (5mg/kg) during the light or dark phase. A subset of mice remained in their home cage for five additional days prior to a final oxycodone challenge. When oxycodone was administered during the light cycle, we found that group housed female mice exhibited oxycodone sensitization; socially isolated females did not. This effect of social isolation was not seen in male mice, as both groups exhibited oxycodone sensitization. While none of the groups exhibited oxycodone sensitization when it was administered during the dark phase, socially isolated females developed significant tolerance, showing a decrease in oxycodone-induced locomotor activity on the challenge day. These findings point towards alterations in oxycodone experience dependent plasticity following adolescent social isolation in female mice and highlight the importance of phase-dependent mechanisms in oxycodone-induced locomotion.

27

Hypervigilance, Suspiciousness, and the Paranoia Spectrum: A Latent Factor Structure and Measurement Invariance Investigation

Presenter: **Zeeshan M. Huque**

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Faculty Mentor: Lauren Ellman

Purpose: Hypervigilance and suspiciousness are conceptually overlapping constructs on measures of paranoid ideation and may differentially determine psychosis-risk status. Endorsement of hypervigilance and suspiciousness differs among ethnoracial groups; however, no studies have examined potential racial/ethnic differences across the paranoia spectrum. We hypothesized that hypervigilance and suspiciousness are related constructs on a paranoia spectrum. We also tested measurement differences across ethnoracial groups. Methods: Asian, Black, Hispanic, and non-Hispanic White community individuals aged 16-30 were recruited across four U.S. catchment areas. Participants self-reported hypervigilance [PTSD Checklist-Civilian Version (PCL-C); nAsian=593, nBlack=191, nHispanic=490, nWhite=921] and suspiciousness [Prodromal Questionnaire (PQ); nAsian=1,778, nBlack=858, nHispanic=1,172, nWhite=3,566]. Confirmatory factor analyses tested a bifactor hierarchical model with hypervigilance and suspiciousness loaded onto a general paranoia factor, and a comparison 2-factor first-order model with no general factor. Measurement invariance analyses were conducted on the optimal latent factor structure. Results: The bifactor and 2-factor models showed good fit across ethnoracial groups (CFI>0.99, RMSEA<0.03) though items loaded significantly ($p<0.001$) onto respective factors only in the 2-factor model. Factors were correlated across ethnoracial groups ($r>0.58$). Measurement invariance analyses demonstrated good fit across levels (CFI>0.99, RMSEA<0.03). Conclusion: Rather than belonging on the same dimension, hypervigilance and suspiciousness are distinct though moderately correlated constructs, reflecting their co-morbid nature within psychosis. The PCL-C and PQ assess hypervigilance and suspiciousness similarly across ethnoracial groups, which may improve access to self-report screening tools for community individuals. Future studies should determine whether hypervigilance should be included in dimensional models of suspiciousness/paranoia to improve diagnosis of psychosis-risk syndromes among individuals with diverse ethnoracial identities.

28

Conditioned Taste Aversion as a Tool to Explore Neural Mechanisms of Food Avoidance and Generalization

Presenter: **Emma Riley**

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Faculty Mentor: Ames Sutton Hickey

Avoidant restrictive food intake disorder (ARFID) is a debilitating eating disorder affecting 0.5-5% of individuals globally that is primarily characterized by a fear of aversive consequences related to food intake absent a desire for thinness. Fear of eating maps onto the well-described cross-species phenomenon termed conditioned taste aversion (CTA), in which an ingested substance such as liquid sucrose (conditioned stimulus, CS) is paired with a peripheral injection of a malaise-inducing compound such as lithium chloride (LiCl; unconditioned stimulus, US). This pairing creates a robust negative association and decreased consumption of the CS even in the absence of the US. Here, we leverage CTA to capture key aspects of ARFID with the goal of further understanding the behavioral and neural substrates of the disorder using solid food. Mice were exposed to novel, highly palatable 60% high-fat diet (HFD) paired with either LiCl (CTA) or vehicle (control) injections. During re-exposure to the 60% HFD, CTA mice ingested significantly less of the HFD compared to control mice, requiring multiple days for extinction. Additionally, preliminary studies suggest that CTA using solid food is generalizable, such that CTA mice reduce intake of not only 60% HFD, but also a novel, unpaired 45% HFD. This generalizability mirrors key behavioral abnormalities observed in ARFID in which over-generalization of aversive experiences with individual foods drives anorexic responses. These findings suggest that this approach may be used to study neural mechanisms driving food aversion related to fear of aversive consequence, potentially better informing treatment options for individuals with ARFID.

29

Effect of PICK1 Knockdown in the Nucleus Accumbens on Cocaine and Food Self-administration and Reinstatement in Mice

Presenter: **Mia Roberts**

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Faculty Mentor: Lisa A. Briand

Protein interacting with C kinase 1 (PICK1) plays a critical role in internalizing GluA2-containing AMPARs, a process that is induced by cocaine exposure. Disrupting PICK1 function, by global knockdown or site-specific knockdown in the medial prefrontal cortex, attenuates cocaine seeking in male rodents. However, prefrontal knockdown of PICK1 increases cocaine seeking in female mice. As manipulating AMPAR trafficking in the nucleus accumbens is also established to impact reward and motivation, the current study investigated the role of PICK1 in the nucleus accumbens and its effects on cocaine and sucrose self-administration. Following accumbal PICK1 knockdown, female mice exhibited reduced cocaine intake and responding during acquisition of either sucrose or cocaine self-administration, while males did not. Preliminary evidence points towards a decrease in motivation for reward in female mice following accumbal PICK1 knockdown. Collectively, these behavioral findings indicate that PICK1 in the nucleus accumbens plays a sex-specific role in reward and reinforcement. While the phenotypes differ from those seen following PICK1 knockdown in the prefrontal cortex, together, these studies clearly outline the necessity for studying the impact of biological sex in the role of AMPAR trafficking proteins. To characterize PICK1 expression in the brain, we used RNAScope to assess PICK1 mRNA throughout the reward circuit. Preliminary data shows that drug-naïve wildtype females exhibit higher PICK1 mRNA levels in the nucleus accumbens compared to male mice. Ongoing work is examining PICK1 mRNA levels in the prefrontal cortex as well as examining how cocaine self-administration impacts PICK1 mRNA across biological sex.

30

The Wishing Gap: US Parents Wished they Played More than they Actually Do

Presenter: **Jade Robinson**

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School/College: *Liberal Arts*

Faculty Mentor: Kathy Hirsh-Pasek

A resurgence of research on play suggests that it is an important driver of learning and development. As caregivers are instrumental in integrating play into their children's lives (Eichner, 2023; Jeynes, 2012), it is important to understand parent's views on play. While caregivers appreciate the merits of play (LaForett & Mendez, 2017a, 2017b) and view play as a tool for learning (Bugallo et al., 2024), caregiver beliefs may not translate to frequent play-based behavior with their children. In this presentation, we ask: Do caregivers believe that play is important? Do caregivers' beliefs translate to engagement in play with their children? If not, we explored whether this discrepancy is associated with demographic factors that may affect the home environment, in accordance with prior research (Fogle & Mendez, 2006). A sample of 336 caregivers in the United States completed a survey including questions about how much time they spent playing with their children versus how much time they wished they spent playing with their children during a typical week. Consistent with prior work, we found a gap between how much parents desired to play with their children and how much they played ($p<0.0001$, $d= -0.67$). Notably, this gap was consistent across income ($p= 0.11$, $\eta^2= 0.04$), race ($p= 0.07$, $\eta^2= 0.04$), and parent gender ($p= 0.87$, $d= 0.02$). Therefore, it is imperative to understand how we can support parents across populations to bridge this gap so children and families can reap the benefits of play.

31

Impact of Housing Status on Medication for Opioid Use Disorder (MOUD) Treatment completion

Presenter: **Devika Narendra Joshi**

Co-author(s): Dr. Hoda Jradi and Dr. Molly Candon

Department: *Epidemiology and Biostatistics*
School/College: *Public Health*

Faculty Mentor: Hoda Jradi

Purpose: Housing instability is a well-documented barrier to treatment retention for opioid use disorder (OUD). This study aimed to assess how housing status—categorized as independent living, dependent living, and homelessness—affects medications for opioid use disorder (MOUD) treatment completion among individuals with OUD in Pennsylvania, New Jersey, and Delaware.

Methods: This study conducted a cross-sectional analysis of a subset of the Treatment Episode Data Set-Discharges (TEDS-D) for Pennsylvania, New Jersey, and Delaware from 2014 to 2020 (N=10,315). An adjusted multinomial logistic regression model evaluated the impact of housing status on treatment completion, voluntary dropout, and dropout due to incarceration. Independent variables included an individual's housing status at admission, number of arrests 30 days prior to admission, and co-occurring mental and substance use disorders.

Results: The study found a statistically significant relationship between MOUD treatment completion and housing status. Specifically, individuals in dependent housing were less likely to drop off out treatment (OR = 0.879, 95% CI: 0.787-0.981) compared to individuals in independent housing. Additionally, racial disparities were evident, with non-Hispanic Black (OR = 1.828, 95% CI: 1.620-2.062) and Hispanic (OR = 1.383, 95% CI: 1.230-1.555) individuals having significantly higher odds of voluntarily dropping out of treatment compared to non-Hispanic White individuals. There was no statistically significant relationship between arrest history and co-occurring mental and substance use disorder and MOUD treatment completion.

Clinical/Social Relevance: The study calls attention to the advantages of residential rehabilitation settings and peer support provided to individuals with dependent housing for MOUD treatment retention.

32

Exploratory Factor Analysis of Sexual Functioning Items among Postmenopausal Women in the Study of Women Across the Nation (SWAN)

Presenter: **Tugce Kinik**

Co-author(s): Resa M. Jones

Department: *Epidmeiology and Biostatistics*
School/College: *Public Health*

Faculty Mentor: Resa M. Jones

Purpose/Hypothesis: This study aimed to identify the best factor solution and assess the psychometrics of the latent construct of sexual functioning among postmenopausal women who engaged in sexual behavior using the Study of Women's Health Across the Nation (SWAN, Visit-10). We hypothesized that at least three factors/domains would be identified. Methods: The study used cross-sectional data from 933 postmenopausal women who reported sexual activity within the last six months. Using SAS 9.4, exploratory factor analysis was performed on 15 self-reported sexual functioning items, measured on a 5-point Likert scale. Possible factor solutions were guided by eigenvalues and the scree plot. Varimax rotations were performed for 1-, 3-, and 4-factor solutions, and psychometrics were calculated. Results: Kaiser's Measure of Sampling Adequacy (MSA=0.836) indicates partial correlations among variables, making them suitable for factor analyses. The 4-factor solution conceptually covered 4 primary sexual functioning domains, and it had the best fit explaining 63.69% of the total variance. The 4-factor solution showed strong internal consistency: Sexual Satisfaction (α=0.880) (i.e., arousal during sexual activity, reaching climax, importance of climax, satisfaction after sexual activity); Sexual Interest (α=0.764) (i.e., importance of sex, desire to engage in sex, frequency of intercourse, sexual touching, oral sex); Relationship Satisfaction (α=0.625) (i.e., emotional satisfaction, satisfaction with frequency of sexual activity, kissing); and Sexual Pain (α=0.543) (i.e., dyspareunia, lubricant use). Conclusion: The 4-factor model had fairly strong psychometric properties and construct validity. These findings may inform future research and clinical assessments related to sexual function in postmenopausal women.

33

Teens Daily Behaviors: How Contextual Factors Shape Added Sugar Intake of Teens in North Philadelphia

Presenter: **Tymple Burrell**

Co-author(s): Dr. Gina Tripicchio

Department: *Social and Behavioral Sciences*
School/College: *Public Health*

Faculty Mentor: Gina Tripicchio

Background and Purpose. Adolescents have the highest intake of added sugar (AS), increasing their risk of chronic disease (e.g. diabetes). The factors that influence AS intake are understudied. Ecological Momentary Assessment (EMA) is a method that collects data in real-time. EMA captured teen AS food/drink occasions and examined associations with contextual factors (e.g., locations, mood, activities, social interactions). Methods. Data were collected from April-August 2023. Six EMA surveys were sent via text-message every 2-3 hours over two weeks. Participants reported food/drink intake since the last survey along with contextual influences. Descriptive statistics (%, mean (SD)) described teens' self-reported drinks/snacks and categorized snacks and drinks as sugary/non-sugary. Chi-square test examined associations between sugary vs. non-sugary food/drinks and contextual factors. Data were analyzed using SAS 9.4; significance was indicated by $p< 0.05$. This study was approved by Temple University's IRB. Results/Outcomes. Participants (n=40) were 14.6 (1.5) years, 55% female, 65.0% as Black/African American; 25.0% reported food insecurity, and 20% had obesity. Teens reported 1,336 eating (n=547) and drinking (n=789) occasions; 67.1% of foods and 25.7% of beverages were sugary. Sugary foods and drinks were more common when at a friend's house ($\chi2=9.23,p<0.05$), feeling anxious ($\chi2=4.9374,p<0.05$), playing video games ($\chi2=8.93,p<0.05$), and with friends/family ($\chi2=10.69,p<0.05$). Conclusion. Adolescent AS intake is impacted by certain settings (e.g. being with family and friends), location (e.g. friend's house), and moods (e.g. anxious). Discussion. Effective interventions on teen's AS intake should focus on contextual factors to change teens' eating habits.

34

Health Literacy and its Impact on HIV Viral Load

Presenter: **Woodbine Ostagne**

Co-author(s):

Department: *Nursing*
School/College: *Public Health*

Faculty Mentor: Bernadette Sheeron

Purpose: Controlling HIV prevalence remains a global issue despite improvements in antiretroviral therapy (ART), increased accessibility to ART, and enhanced understanding of the disease. However, few studies examine the prevalence of low health literacy in the PLWH patient population in Philadelphia. The purpose of the project is to examine the average level of health literacy in the TUH PLWH patient population and correlate it with their corresponding HIV viral load to determine if there is a relationship between PLWH health literacy and their ability to manage their HIV.

Design: A convenience sample consisting of 20 participants was utilized for the study. All subjects who meet inclusion criteria are asked to participate in study at the beginning of their routine patient visit in the clinic. Following patient consent for study participation, the participant completes the SAHL-E assessment. Their score is recorded. A chart review is then conducted to retrieve the most recent HIV viral load and CD4 count results.

Results: Data was analyzed for statistical correlation using the Pearson Correlation analysis. Though there was a negative correlational relationship between health literacy and HIV viral load suppression, correlation and statistical significance was weak (Pearson Coefficient: -.125, sig (2-tailed): .599.

Discussion: The negative correlational relationship between health literacy and HIV load suppression suggests that strong health literacy can promote HIV viral load suppression. However, future studies are needed to examine other variables, such as medication adherence and socioeconomic status, that may have greater influence on HIV viral load management.

35

Eliminating Language Barriers by Improving Access to Professional Medical Interpreters

Presenter: **Ana Cristina Pichardo Furman**

Co-author(s):

Department: *Nursing*
School/College: *Public Health*

Faculty Mentor: Amy Bieda

Background: Limited English proficiency (LEP) affects healthcare access for 8% of the U.S. population. In Pennsylvania, where 33% of naturalized citizens speak English less than "very well," Spanish is the predominant non-English language. Title VI of the Civil Rights Acts mandates healthcare facilities provide language services for LEP patients.
Purpose: This quality improvement project aimed to evaluate whether implementing a standardized EPIC Secure Chat template for interpreter requests would increase utilization of and satisfaction with in-person Spanish-speaking Professional Medical Interpreter services in emergency departments serving LEP patients.

Methods: A pre-post intervention study was conducted across two emergency departments from July 2023 to April 2024. The intervention consisted of implementing a standardized EPIC Secure Chat template for Spanish interpreter requests, coupled with comprehensive provider education and workflow integration strategies. Outcome measures included monthly interpreter request rates, provider adoption rates, and satisfaction scores. Data was collected through EPIC utilization reports and provider surveys.

Results: Following implementation, Temple University Hospital ED demonstrated an 11.6% increase in mean monthly Spanish interpreter requests ($p=0.038$, 95% CI [0.72-0.86]), while Episcopal Hospital ED showed a 6.7% increase ($p=0.045$, 95% CI [0.77-0.91]). Provider adoption of EPIC Secure Chat increased from 25% to 75%, with satisfaction rates improving from 69.7% to 88.6%. Notable barriers included time constraints (72%) and extended wait times (68%).

Conclusion: Implementation of a streamlined EPIC-based interpreter request system significantly improved both service utilization and provider satisfaction. These findings suggest that enhancing communication channels through standardized electronic requests can positively impact language service utilization.

36

Sleep as a Prognostic Factor for Sports-Related Concussion Management in Collegiate Athletes

Presenter: **Karly Kerod**

Co-author(s): Jane McDevitt, PhD, LAT, ATC, CSCS, and Karlee Burns, PhD, ATC

Department: *Physical Therapy*
School/College: *Public Health*

Faculty Mentor: Jane McDevitt

It is recommended that collegiate athletes sleep 7 to 9 hours nightly for optimal academic, athletic, and health outcomes. Though, the role that sleep plays in concussion assessment, management, and recovery, has not been thoroughly explored in research. Therefore, the primary aim of this study was to estimate the extent to which sex, mental health history, previous concussion history, and days to return to play are related to sleep history. We hypothesized that these characteristics will be significantly related to abnormal sleep history at baseline assessment. The study utilized a retrospective analysis of data from 34 athletes who sustained a concussion between August 2016 to 2022. Athletes participated in routine baseline concussion assessments and were also evaluated within 72 hours of sustaining a concussion. The study utilized a Health History Questionnaire and clinical outcomes to collect participant demographic and sleep data. This study found that the odds of having abnormal sleep for those with abnormal mental health are 21 times that of those with normal mental health. Additionally, for each previous concussion, odds of abnormal sleep increase by a factor of 5. This is an early contribution to the literature regarding sleep as a prognostic factor in clinical concussion management. Considering the existing relationship between sleep and concussion outcomes in the literature, promoting sleep hygiene should be a priority for providers, athletic programs, and public health leadership to potentially mitigate the long-term effects on concussion.

37

Among University Students in the United States, Is There an Observed Association between GAD7-assessed Anxiety Levels and Academic Performance when Considering Self-assessed Stress Perception

Presenter: **Birat Raj Kafle**

Co-author(s): Chelsea Vazquez, Michelle Botyrius, and Morgan Naylor

Department: *Biostatistics and Epidemiology*
School/College: *Public Health*

Faculty Mentor: Hoda Jradi

Background: Anxiety is among the most prevalent mental health conditions in the United States, often impacting the well-being of college students. Elevated anxiety and stress can negatively impact academic performance by reducing students' ability to concentrate, complete coursework, and learn effectively. This study aims to investigate the relationship between GAD7-assessed anxiety levels and academic performance when considering self-assessed stress perception among undergraduate college students across the United States over the 2023-2024 academic year. Our hypothesis, based on cognitive appraisal theory, is that undergraduate students with any anxiety level who view stress positively will outperform those with a negative stress perception. Methods: To test this hypothesis, we conducted a secondary analysis of cross-sectional data from the 2023-2024 University of Michigan Healthy Minds Study, shared with Temple University by request. This survey assesses college students' mental health and service use. Results were analyzed using univariate and bivariate methods, with planned logistic regression to examine passing grade odds based on anxiety, stress perception, and other factors. Results: The current analysis focused on undergraduate students (N = 62547; 71.70% female, 28.2% male, 0.1% intersex). Bivariate analysis showed significant associations between anxiety, stress perception, and academic outcomes. Chi-square tests confirmed these relationships: anxiety ($\chi 2 = 4813.2$, df = 8, $p < 2.2e\text{-}16$) and stress perception ($\chi 2 = 78.093$, df = 8, $p = 1.182e\text{-}13$). Further analysis will explore their interactions and the influence of demographic, environmental, and social factors.

38

The Impact of Social Worker Engagement on Primary Care Utilization Among High-Risk Medicare Advantage Members in Southeastern Pennsylvania

Presenter: **Rose Omia**

Co-author(s): Alexandra Rhoads

Department: *Epidemiology and Biostatistics*
School/College: *Public Health*

Faculty Mentor: Hoda Jradi

The Medicare high-risk population faces various barriers related to the social determinants of health, such as lack of transportation and financial hardships that may complicate their healthcare access and decision-making. The purpose of this study is to assess the impact of social worker engagement as an intervention addressing barriers to primary care provider (PCP) utilization among these vulnerable populations in five southeastern Pennsylvania counties.

This study is a randomized controlled trial. The identified high-risk population was randomly assigned to either the social worker intervention group (n=1234) or the control group (n=284) from January 2024 to June 2024. PCP utilization patterns were tracked for 6 months before and after the intervention period using Medicare claim data. Descriptive statistics were reported for all study variables. A t-test was used to assess any significant change in the number of primary care utilization visits across the two arms. The generalized Linear model was used to assist in further understanding the relationship between transportation and financial barriers, social worker intervention, and PCP utilization within this population.

The intervention led to a statistically significant increase in PCP utilization [$p<2.2e-16$]. Additionally, in analyzing the impact of addressing specific barriers, there is a statistically significant increase in PCP utilization ($p<0.00$ for financial and $p<0.03$ for transportation).

The social determinants of health barriers imposed a significant hindrance to healthcare utilization among vulnerable populations. This is a call for policymakers to formulate policy that addresses these barriers, with a focus on financial and transportation barriers. In turn, the expected impact would be an increase in PCP utilization, further encouraging early disease identification and a reduction in emergency hospitalization among vulnerable populations.

39

Assessing Vitamin D Knowledge and Intake within Temple University's Women's Basketball Team

Presenter: **Iris Walker**

Co-author(s): Jacquline Cotumaccio RDN LDN CDN

Department: *Social and Behavioral Sciences*
School/College: *Public Health*

Faculty Mentor: Alissa Smethers

Purpose/hypothesis: The goal of this research is to assess vitamin D knowledge and intake within Temple University's Women's Basketball Team. Vitamin D deficiency is a prevalent public health issues, and increased awareness and consumption of vitamin D food sources within women's basketball players may help with decrease stress fractures and improve performance.

Number of Participants: Fifteen women's basketball student athletes

Methods: Temple University women's basketball players were recruited from McGonigle Hall. Assessments include a pre- and post-survey related to dietary behaviors, knowledge, and lifestyle practices and a food frequency questionnaire (FFQ) through Qualtrics. After participants took the pretest and FFQ a 5-minute education piece on vitamin D was given. The post survey and the FFQ were given to them a week later. An Independent t-test was used for the pre-and post-survey and a paired t-test was used for the FFQ. This research was approved by IRB (#31899).

Results: A sample of 15 athletes, predominately Black/African American (93%), completed the surveys. There were no significant changes in dietary intake of vitamin D sources, supplementation use, or outdoor exposure($p>0.05$). There was also no significant consumption change in the frequency or amount of Vitamin D consumption ($p>0.05$). A single education session is not an effective intervention to increase vitamin D intake or awareness within a collegiate women's basketball team.

Clinical Relevance: These data suggest that student athletes' knowledge about vitamin D, including its importance in injury prevention, remains a potential area for targeted education. The need for improved educational interventions to enhance vitamin D intake and awareness is highly important. Addressing this gap may support better nutritional outcomes and potentially reduce injury risk.

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Advanced Nitrile-Based High-Concentration Electrolytes: Achieving Superior Thermal Stability, High Conductivity, and Enhanced Lithium-Ion Transference for Next-Generation Batteries

Presenter: **Shujit Chandra Paul**

Co-author(s): Stephanie Wunder

Department: *Chemistry*
School/College: *Science and Technology*

Faculty Mentor: Michael J. Zdilla

Highly concentrated electrolyte (HCE) offers better thermal stability, reduced flammability, improved lithium-ion transference, and better electrochemical stability compared to conventional liquid electrolytes. Here, we report the development of a novel HCE system utilizing Tris-C-cyanaoethyamine (TEA) as a solid ligand and lithium bis(trifluoromethanesulfonyl)imide (LiTFSI) as the lithium salt. This HCE demonstrates exceptional thermal stability compared to conventional HCEs, which typically rely on volatile and flammable solvents. The incorporation of TEA, a solid trinitrile ligand, significantly enhances both thermal and electrochemical properties. Notably, the electrolyte achieves an impressive lithium-ion transference number of 0.95 at a concentration of 5 M, which is substantially higher than conventional liquid-based HCEs. This remarkable transference number can be attributed to the presence of uncoordinated nitrile groups in the TMA matrix, which play a critical role in facilitating selective lithium-ion transport while suppressing anion mobility. Electrochemical stability testing reveals a wide electrochemical window of 4.3 V, ensuring compatibility with high-voltage cathodes. Furthermore, the electrolyte exhibits excellent cycling stability in symmetric Li/Li cells, indicating its ability to support stable lithium plating and stripping processes. Performance evaluation in Li/Cu cells further confirms the electrolyte's capacity to enable efficient lithium deposition with minimal dendrite formation, contributing to prolonged cycle life. The combination of non-flammable nature, high thermal stability, superior lithium-ion selectivity, and broad voltage stability makes this solid-ligand-based HCE a highly promising candidate for next-generation lithium metal batteries.

43

An Exploration of Banding Success in Hibernating Bats of Pennsylvania, Ohio, and West Virginia

Presenter: **Olivia Aguiar**

Co-author(s): Olivia Aguiar and Brent Sewall

Department: *Biology*
School/College: *Science and Technology*

Faculty Mentor: Brent Sewall

Many hibernating bat species in North America have experienced precipitous declines following the introduction and spread of the fungal pathogen Pseudogymnoascus destrucans. Central to the conservation and management of affected species is regular sampling of bat hibernacula for not only infection prevalence but also relative abundance. Banding bats allows for research into movement behavior and trends in the prevalence and severity of white-nose syndrome infection. However it remains to be seen whether banding of bats is an effective tool for scientists and managers in long-term, individual-based studies. In my study I investigate the likelihood of recapture of banded individuals in annual studies of hibernating bats in Pennsylvania, Ohio, and West Virginia from 2018 to present.

44

Proteomics Approach to Discover Acetylation Substrates in T- cell Activation Signaling

Presenter: **Parmila Kafley**

Co-author(s): Ben Prather, Anneliese Faustino, and Rongsheng (Ross) Wang

Department: *Chemistry*
School/College: *Science and Technology*

Faculty Mentor: Rongsheng (Ross) Wang

Acetylation, a post-translational modification (PTM), attaches an acetyl functional group onto proteins and is catalyzed by acetyltransferases. Dysregulation of acetylation is linked to various diseases, including autoimmune diseases. Currently, identifying new acetylation substrates is limited. Click chemistry is commonly used in proteomics to identify these PTM substrates, often referred to as biomarkers, where the PTM site is labeled with an alkyne or azide tag. Following the click reaction, the PTM site is tagged with a biotin affinity probe for proteomic analysis. However, click chemistry tags have limitations because their bulky size restricts broader applications. To develop a steric-free labeling approach on PTM substrates, we have invented a novel Fluorine Selenium Displacement Reaction. By hijacking the metabolic incorporation of an acetyl group from acetyl CoA with fluorinated acetyl CoA, we introduced a fluorine tag to acetylated substrates. Reacting with the selenium probe that has a biotin handle allowed the attachment of an affinity handle to these acetylated substrates. Pulldown and quantitative proteomics using LC-MS/MS studies led to the identification of approximately 3,000 differentially acetylated substrates in activated and naïve T-cells. Future directions will focus on exploring the mechanistic impact of acetylation on these proteins during T-cell activation. This research will help elucidate mechanisms that can contribute to the onset of autoimmune diseases and provide new avenues for therapies.

45

Nuclease MutS2 Suppresses Homologous Recombination in H. pylori- Unwinding or Hydrolyzing?

Presenter: **Yasmine Sakinejad**

Co-author(s):

Department: *Chemistry*
School/College: *Science and Technology*

Faculty Mentor: Carol Manhart

MutS homologs are proteins found in all domains of life and play key roles in DNA repair processes. In prokaryotes, MutS is a mismatch detection protein with roles in both initiation of mismatch repair and suppressing homologous recombination by recognizing mismatches during the strand invasion step. Many prokaryotes that lack the mismatch repair pathway undergo high rates of mutagenesis and recombination to adapt to local environments and can develop antibiotic resistance. The highly recombinant and pathogenic organism, H. pylori, has a nuclease-containing MutS homolog called MutS2, that suppresses homologous recombination in vivo. This enzyme is conserved in other organisms including B. subtilis and T. thermophilis but plays supportive and suppressive roles in homologous recombination processes, respectively. The reason why MutS2 has different roles in recombination processes depending on the organism and the specific MutS homolog involved is unknown. Our goal with this project is to understand the mechanism of MutS2 inhibition of homologous recombination in H. pylori. I hypothesize that H. pylori MutS2, due to its nuclease activity, both cleaves and unwinds homologous recombination-DNA intermediates, disrupting the pathway by dissolving the structures and thereby preventing the completion of homologous recombination. Herein, I present the tools I am developing to test this hypothesis, including the creation of MutS2 mutants, substrate design, and a set of assays.

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Acetylation in SH-SY5Y Cells during Retinoic-Acid induced Differentiation

Presenter: **Hailey Lightle**

Co-author(s): Parmila Kafley, Ben Prather, and Rongsheng (Ross) Wang

Department: *Chemistry*
School/College: *Science and Technology*

Faculty Mentor: Rongsheng (Ross) Wang

Acetylation of proteins is a commonly identified post-translational modification in neurons as has been implicated in neurodegenerative diseases such as Alzheimer's disease and Parkinson's disease. The knowledge of acetylated proteins in neurons is growing, but the complete proteome is unknown. A neuroblastoma cell line, SH-SY5Y, is commonly used to study neurodegenerative diseases due to its accessibility compared to mouse models or primary neuron cells. In experimental methods, SH-SY5Y cells are commonly modified to a differentiated state to mimic mature neurons. The retinoic-acid based differentiation method induces physiological and morphological changes to the cells which can be tracked using biomarkers tyrosine hydroxylase and β-III Tubulin. Using SILAC-based proteomics, identification of the acetylated proteome of retinoic-acid differentiated SH-SY5Y can be studied. Previously the lab developed a fluorine-selenium displacement reaction (FSeDR) which is used to tag acetylated proteins for further purification and analysis. After inducing retinoic-acid differentiation of SH-SY5Y, a change in the acetylated proteome of the cell line can be expected. Identification of varying acetylated proteins in differentiated SH-SY5Y cells will provide more knowledge into the differentiation-induced changes in the cell environment, as well as potential new acetylation targets for neurodegenerative disorder.

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Investigating the Effects of PFOS on Living Cell Membrane Structure and Fluidity: A Liposome-Based Approach to Membrane Interaction and Transport

Presenter: **Tutun Das Aka**

Co-author(s): Graham Dobereiner

Department: *Chemistry*
School/College: *Science and Technology*

Faculty Mentor: Stephanie Wunder

Perfluorooctane sulfonic acid (PFOS) is a significant environmental hazard that enters living cells through their membranes. However, the mechanisms of PFOS interaction with and transport across membranes, as well as the kinetics of this process, are not yet fully understood. This knowledge is essential for understanding PFOS toxicity, developing effective remediation strategies, and identifying vulnerable populations. To investigate PFOS-membrane interactions, a model vesicle composed of dipalmitoylphosphatidylcholine (DPPC) was used. Neat large unilamellar vesicles (LUVs) were prepared and exposed to PFOS solutions at various lipid/PFOS ratios (75:1 to 1:1). The effects of PFOS on the vesicles were assessed by monitoring the phase transition temperature (Tm) via nano-differential scanning calorimetry, size and zeta potential (ZP) using dynamic light scattering, and chemical interactions through NMR. Results showed a decrease in Tm with increasing PFOS concentration. Specifically, for LUV/PFOS ratios of 75:1, the Tm was 40.52°C, while for ratios of 2.5:1, it dropped to 36.07°C at room temperature, indicating alterations in membrane structure and functionality. The size and ZP increased with higher PFOS concentrations (e.g., for a 1:1 ratio, the ZP was -53.9 mV, while for a 75:1 ratio, the ZP was -33.8 mV), further supporting PFOS-membrane interaction. NMR analysis demonstrated that PFOS interacts with and is transported into the vesicles within 30 minutes, providing insights into its entry mode and kinetics in the absence of protein transporters. Further investigation of key parameters, such as temperature and pH, is essential to gain deeper insights into environmental influences on PFOS-membrane interactions.

48

The mismatch repair factor Mlh1-Pms1 uses ATP to compact and remodel DNA

Presenter: **Bryce Collingwood**

Co-author(s): Amruta Bhalkar

Department: *Chemistry*
School/College: *Science and Technology*

Faculty Mentor: Carol Manhart

In eukaryotes, mismatch repair begins with MutS homolog (MSH) complexes, which scan newly replicated DNA for mismatches. Upon mismatch detection, MSH complexes recruit the PCNA-stimulated endonuclease Mlh1-Pms1/PMS2 (yeast/human), which nicks the DNA to allow downstream proteins to remove the mismatch. Past work has shown that although Mlh1-Pms1 is an ATPase and this activity is important in vivo, ATP is not required to nick DNA. Our data, using yeast as a model, suggests that Mlh1-Pms1 forms oligomeric complexes that drive DNA conformational rearrangements using the protein's ATPase activity. Experiments with non-B-form DNA structures, common in microsatellite regions, show that these structures inhibit Mlh1-Pms1's activities, likely through impeding Mlh1-Pms1-dependent DNA conformational changes. This could explain an additional mode for instability in these regions of the genome. These findings highlight the importance of DNA compaction and topological rearrangements in Mlh1-Pms1's function and provide insight into how mismatch repair relies on DNA structure to coordinate events.

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Mlh1-Pms1 ATPase activity is regulated distinctly by self-generated nicks and strand discrimination signals in mismatch repair

Presenter: **Jonathan Piscitelli**

Co-author(s): Yasmine Sakinejad

Department: *Chemistry*
School/College: *Science and Technology*

Faculty Mentor: Carol Manhart

In eukaryotic post-replicative mismatch repair, MutS homolog complexes detect mismatches and in the major eukaryotic pathway, recruit Mlh1-Pms1/MLH1-PMS2 (yeast/human) complexes, which nick the newly replicated DNA strand upon activation by the replication processivity clamp, PCNA. This incision enables mismatch removal and DNA repair. Beyond its endonuclease role, Mlh1-Pms1/MLH1-PMS2 also has ATPase activity, which genetic studies suggest is essential for mismatch repair, although its precise regulatory role on DNA remains unclear. Here, we use an ATP-binding and hydrolysis-deficient yeast Mlh1-Pms1 variant to show that ATP hydrolysis promotes disengagement from Mlh1-Pms1-generated nicks, with hydrolysis in the Mlh1 subunit driving this activity. Our data suggest that the ATPase-deficient variant becomes trapped on its own endonuclease product, suggesting a mechanistic explanation for observations in genetic experiments. Additionally, we observed that Mlh1-Pms1 selectively protects DNA from exonuclease degradation at pre-existing nicks, which may act as strand discrimination signals in mismatch repair. Together, our findings suggest that Mlh1-Pms1 exhibits distinct behaviors on its own endonuclease products versus substrates with pre-existing nicks, supporting two distinct modes of action during DNA mismatch repair.

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Nonlinear Optical Characterization of Heavy Fermion Compound URu2Si2 to Investigate Symmetry Breaking Phenomena Below the Hidden Order Transition Temperature

Presenter: **Awadhesh Das**

Co-author(s):

Department: *Physics*
School/College: *Science and Technology*

Faculty Mentor: Darius Torchinsky

URu2Si2 has been a subject of great interest since its discovery, primarily due to its unique hidden order state. This material undergoes a phase transition at temperatures below 17.5 K to an unknown state, the origins and symmetry changes of which are challenging to explain using existing theories. A variety of experimental methods have been employed to investigate this hidden order phase, yet none have conclusively elucidated the mechanism behind it or identified its order parameter (OP). Therefore, new and more sensitive methods are needed to detect symmetry changes in the material. Here, we present a robust, non-destructive diffraction technique called Rotational Anisotropy Nonlinear Harmonic Generation (RA-NHG). This approach aims to study this heavy fermion material and attempt to uncover the underlying mechanisms below the transition temperature of 17.5 K, focusing on any symmetry changes in the lattice, spin density wave (SDW), or charge density wave (CDW).

51

Phylogenetic Corrections and Higher-Order Sequence Statistics in Protein Families: The Potts Model vs MSA Transformer

Presenter: **Kisan Khatri**

Co-author(s): Ronald M. Levy and Allan Haldane

Department: *Physics*
School/College: *Science and Technology*

Faculty Mentor: Allan Haldane and Ronald Levy

Recent generative learning models applied to protein multiple sequence alignment (MSA) datasets include simple and interpretable physics-based Potts covariation models and other machine learning models such as MSA-Transformer (MSA-T). The best models accurately reproduce MSA statistics induced by the biophysical constraints within proteins, raising the question of which functional forms best model the underlying physics. The Potts model is usually specified by an effective potential including pairwise residue-residue interaction terms, but it has been suggested that MSA-T can capture the effects induced by effective potentials which include more than pairwise interactions and implicitly account for phylogenetic structure in the MSA. Here we compare the ability of the Potts model and MSA-T to reconstruct higher order sequence statistics reflecting complex biological sequence constraints. We find that the model performance depends greatly on the treatment of phylogenetic relationships between the sequences, which can induce non-biophysical mutational covariation in MSAs. When using explicit corrections for phylogenetic dependencies, we find the Potts model outperforms MSA-T in detecting epistatic interactions of biophysical origin.

POSTER SESSION B: 2:45–4:15 PM

1

Social capital as a measurement for trust and civic engagement: A case of South Africa and Sweden

Presenter: **Anu Olagunju**

Co-author(s):

Department: *Media and Communication*
School/College: *Klein College of Media and Communication*

Faculty Mentor: Meghnaa Tallapragada

Social cohesion, trust, and collective efficacy (engagement) is at the core of social capital theory, and identified as good indicators of a functioning democracy. Democracy provides an environment for the protection and effective realization of human rights. A fundamental idea behind democracy is that citizens should have the opportunity to be able to exercise their civic duty through full participation of matters regarding their country. A functioning democracy is thereby defined by an active civil 'association' in the society. Therefore, individuals who are connected to their communities or countries are more likely to engage and participate in the processes and decisions regarding their countries, and feel a sense of connectedness to their country's democracy. This paper employs the use of secondary data from Pew Research Center. The study examines how social capital contribute to the level of satisfaction of democracy in two different countries: South Africa and Sweden. This study found out that social capital indicators such as closeness to country (bridging), and view representation within political parties are significantly associated to the feeling of being satisfied with democracy. While closeness to local communities (bonding) is significantly associated with the feeling of being satisfied with democracy in Sweden, it is otherwise negatively associated in South Africa.

2

My Eyes Deceive: Witness An Afrosurrealist Dance

Presenter: **Kayla Owens**

Co-author(s):

Department: *Media Studies and Production*
School/College: *Klein College of Media and Communication*

Faculty Mentor: Osei Alleyne

Deep within the culture of Black American Arts, Afro-surrealism has made its rise within major Black led works. Its multifaceted nature has caused Afro-surrealism to be overlooked or miscategorized. It is often labeled as dream-like or whimsical, but also symbolic to the experiences of Black people across the diaspora. Afro-surrealism can take many forms, including the genres of filmmaking and dance. In modern Black works, dance and film have been constantly experimenting with the art of Afro-surrealism. The objective of this project is to find the connections between the three art genres to gain a deeper understanding of Black creative works.

This project will be a qualitative autoethnography, using peer-reviewed sources from a group of prestigious scholars across the Fine Arts academic field. The research will also include interviews with Terri Francis and Reynaldo Anderson, who are well established scholars that specialized in Afro-surrealism or related art movements. I will combine my findings with my own experiences to conduct a qualitative analysis for my project's conclusion.

Throughout my research, I have found that art created within an Afro-surreal lens is fluid and can be difficult to pinpoint due to said fluidity. The outcome of an Afro-surreal dance depends on the artist's personal and Black experience. Two of the more common ways dance and film accentuate Afro-surrealism is either to amplify the relatability of Black people or to recognize the absurdity within being in a "white-dominated" space. Both of these approaches accentuate the bizarre life of Black people.

3

Psychedelics in the Media: A Documentary and Research Exploration

Presenter: **Joelle DelPrete**

Co-author(s):

Department: *Media Studies and Production*
School/College: *Klein College of Media and Communication*

Faculty Mentor: Osei Alleyne

Media has shaped public perception of psychedelics for decades, from early enthusiasm in the 1950s to fear-driven narratives fueled by the ongoing War on Drugs. Today, amid a psychedelic renaissance, conversations about their therapeutic potential remain fragmented, often shaped by reactionary or polarized reporting. This research examines how legacy news media has historically influenced public understanding of psychedelics, how contemporary media frames their therapeutic potential, and how advocates use media to shape narratives.

Combining written analysis with documentary, this project examines the media's role in shaping attitudes toward psychedelic therapy. The written portion traces psychedelic narratives during the counterculture era, analyzing their effects on policy and public opinion before examining how they manifest today. The documentary features six interviews with creators, advocates, and therapists in the field, using participatory and ethnographic filmmaking to humanize the subject and challenge misconceptions.

This research argues that media coverage remains largely reactionary and often overlooks the complexities of psychedelic therapy. It calls for more strategic, community-centered media efforts and highlights gaps in representation, particularly BIPOC perspectives. By integrating media analysis with documentary storytelling, this project aims to create a more informed and balanced public conversation about psychedelics as a therapeutic tool.

4

The Aestheticization of Sociality: Consequences of a Society Devoid of Struggle

Presenter: **Matt Lavine**

Co-author(s):

Department: *Media Studies and Production*
School/College: *Klein College of Media and Communication*

Faculty Mentor: Jan Fernback

The internet has grown to become a simultaneous means for both public expression and the extraction of capital. This research examines the internet's role as a private-public surveillance apparatus through a critical historical perspective. In three parts, I provide an historical context towards understanding the internet's present ramifications on human autonomy and civil rights. First, by examining the internet's history, from its cybernetic origins as a military communications apparatus in the 1960s into the 21st century, I look to develop a succinct understanding of how it has developed into a massively privatized and unregulated control infrastructure. Second, I challenge the notion that the internet once held the capacity to be a great equalizer against inequality by demonstrating instances of its earliest proponents using it to ultimately support western totality. In this part, the transformation of the phenomenon of the public sphere into a social-mediatized "digital public sphere," maintained and mediated by perceptibly ambient and private institutions, is examined. Third, the term Aestheticized Sociality, which builds upon Walter Benjamin's theory of fascism being the Aestheticization of Politics, is proposed. The term describes the effects of private social platforms' abilities to mend political and social polarization across cultural lines.

5

Peer, I'm Your Leader Now: How Internally Promoted Leaders Change Their Role Relationships with Prior Peers into Leader-Follower Relationships

Presenter: **Xuting Jiang**

Co-author(s):

Department: *Management*
School/College: *Fox School of Business*

Faculty Mentor: Crystal M. Harold and Ravi Kudesia

Given the strategic importance of leadership, organizations invest heavily in developing leadership pipelines and internally promoting leaders. Although internally promoted leaders have the advantage of firm-specific knowledge – a human capital resource set them apart from externally hired leaders, their transition comes with a unique and significant challenge: leading former peers. This challenge arises because it requires transforming the peer relationship (PR), an equal and reciprocity-based relationship, into a leader-follower relationship (LFR), a hierarchical, authority-based relationship. This role relationship change can create uncertainty and even conflicts. Decades of leadership research consistently emphasize the importance of high-quality LFRs to leader effectiveness. However, extant research, such as leader-member exchange theory, rarely considers the pre-existing relationships between leaders and followers, offering limited insights into how internally promoted leaders navigate this role relationship transition. To address this puzzle, I interviewed 49 leaders whose direct reports had been their former peers (peer-followers) and attempted to develop a process theory of how internally promoted leaders transition PRs into LFRs. Six major patterns of the role relationship transition emerge in the preliminary data analysis. They start with different PRs (i.e., role-based or relational), feature different leaders' actions and occurrences in the process, and yield different end states of their relationships with peer-followers (e.g., role-based or relational LFR, a combination of PR and LFR, or breakdown). These findings contribute to leadership and workplace relationship research and provide actionable knowledge for internally promoted leaders.

7

Investor Attitude and Sentiment: A Unified Framework for Definition and Measurement

Presenter: **Hanyu Zhang**

Co-author(s):

Department: *Finance*
School/College: *Fox School of Business*

Faculty Mentor: Oleg Rytchkov

Investor sentiment and its impact on the stock market have long been subjects of interest for both academics and practitioners. Many researchers in finance try to measure investor sentiment and examine its relationship with stock returns. However, there is no consensus on its definition or measurement. This research is motivated by the mismatch between various definitions and measurements, which can lead to model misspecification and result misinterpretation.

To address this issue, I propose a framework that distinguishes between investor attitude and investor sentiment. Investor attitude is determined not only by information and risk preferences but also by a set of behavioral factors well-documented across various disciplines. In contrast, investor sentiment is the portion of investor attitude that deviates from a rational benchmark. I argue that much of the literature measures investor attitude rather than true investor sentiment.

Based on this definition, I construct an investor attitude proxy for individual stocks at 15-minute intervals using messages from StockTwits, a social media platform for investors. I extract investor attitude from messages using ChatGPT. I find that current investor attitude explains contemporaneous stock returns, past investor attitude predicts intraday stock returns, and historical prices influence investor attitude.

Building on these findings, I categorize investor attitude into different types based on their relationship with returns and decompose the attitude proxy accordingly—without relying on a rational benchmark. This decomposition yields two types of investor sentiment that align well with the proposed definition. I further validate that these two series represent true investor sentiment.

8

Corporate Governance in Virtual Shareholder Meetings: Disengagement, Deception, and Challenges

Presenter: **Simin Xie**

Co-author(s): Lalitha Naveen

Department: *Finance*
School/College: *Fox School of Business*

Faculty Mentor: Lalitha Naveen

This study draws on media richness theory and recent literature to argue that shifting from in-person to virtual shareholder meetings (VSMs) may impair corporate governance. Since the COVID-19 pandemic, many firms have adopted virtual shareholder meetings as a long-term cost-effective alternative to traditional in-person meetings. In this study, we explore two potential channels through which this shift may lead to weaker governance. First, the disengagement hypothesis states that shareholders become more disengaged in VSMs relative to in-person meetings. This would predict a diminished sensitivity of post-meeting social media sentiment to in-meeting disclosed information. Second, the deception hypothesis states that managers downplay negative news during VSMs. This predicts that the interaction between ex-post news negativity and the virtual meeting format should offset the increase in management's in-meeting negative tone. We will empirically test these hypotheses using regression analysis. Results are expected to show a statistically significant reduction in sensitivity under the disengagement hypothesis and a negative, significant coefficient for the interaction term under the deception hypothesis. These findings would suggest that virtual meetings hinder effective corporate governance practices by reducing shareholder attention and allowing management to downplay negative information. Future research includes investigating the factors driving firms to revert to in-person meetings as shown in recent studies.

9

The Impact of Realism and AI Disclosure on Virtual Influencer Effectiveness: A Large Field Experiment

Presenter: **Meixian Wang**

Co-author(s): Ravi Bapna

Department: *Management Information Systems*
School/College: *Fox School of Business*

Faculty Mentor: Jaehwuen Jung

Influencer marketing has become an essential component for brand strategies, and the adoption of AI-generated virtual influencers is accelerating with advancements in generative AI. However, these emerging practices raise challenges related to transparency and ethical concerns. This study examines how AI generated virtual influencers' anthropomorphism and AI identity disclosure affect consumer engagement.

We hypothesize: (H1) Higher anthropomorphism enhances perceived humanness and affinity, which increased engagement. (H2) AI disclosure reduces perceived humanness and affinity, which decreased engagement. (H3) Participants' prior AI experience moderates the negative effect of AI disclosure.

A randomized field experiment involving over 1.8 million users tested five different types of influencers: human influencers, undisclosed high- and low- anthropomorphism virtual influencers, and disclosed high- and low- anthropomorphism virtual influencers. The videos were identical except for the influencer type and were deployed via Meta's A/B testing platform. A subsequent online study and mediation analysis further explored the underlying mechanisms that led to these results.

The results show that higher anthropomorphism levels enhance engagement metrics, while AI identity disclosure reduces link clicks and short video views, particularly for highly realistic virtual influencers. Mediation analysis revealed anthropomorphism enhances perceived humanness and affinity, boosting purchase intentions, while disclosure disrupts these perceptions and evokes negative feelings. Importantly, the negative effects of disclosure are mitigated for consumers with prior experience interacting with virtual influencers. Our findings provide theoretical and practical insights into the design and development of AI agents, emphasizing the need to strategically manage anthropomorphism and transparency to optimize consumer engagement.

11

Encouraging Political Engagement Among Generations Y & Z: A Case Study and Proposed Solutions

Presenter: **Veronica Yeakel**

Co-author(s):

Department: *Communication for Development and Social Change*
School/College: *Klein College of Media and Communication*

Faculty Mentor: Clemencia Rodriguez

This project follows my efforts to increase political engagement among young people in my hometown via partisan community building. The project begins in August 2024 with initial attempts to reach people through the aftermath of the presidential election. The case study includes insights of my own as well as some data to illustrate the population of young people I'm working with. This paper finishes with proposed solutions to declining political engagement with young people on a partisan basis and avenues for further research.

12

Commit to quit! A role for communities of practice in smoking cessation interventions.

Presenter: **Jayalakshmi N Alagar**

Co-author(s): Brian Tuohy

Department: *Urban Bioethics*
School/College: *Lewis Katz School of Medicine*

Faculty Mentor: Brian Tuohy

Communities of Practice (COPs) can address clinical challenges through collaboration and peer support. However, their role in creating successful healthcare intervention trainings outside of the clinic remains unclear. We conducted a systematic review across four electronic databases to evaluate the salience of COPs to medical education, and more specifically, as it pertained to healthcare providers receiving training on smoking cessation interventions.

We extracted data from 27 studies published between 2012 and 2024. The majority (59%) of trainings targeted medical students. The only 2 studies intentionally designed to create a COP targeted physicians in continuing medical education programs. One other was deemed to meet the core tenants of a COP and targeted residents. Among remaining studies, 50% included participants with a shared interest in smoking cessation, 13% fostered peer-to-peer learning, and 63% incorporated groupwork.

Our findings suggest that application of COP principles to smoking cessation training interventions has been scarce and is predominant post-licensure. Since recent years have seen an uptick in interventions targeting medical students, we believe medical students represent an untapped population for curricular reform. Smoking cessation is an ongoing public health challenge that needs novel strategies. Past reviews have found that medical curricula fail to provide adequate, consistent information to medical students, residents, and physicians on the topic of smoking cessation and delivery of interventions. Based on our study, we believe that reforming and refitting curricula as COPs may improve collaboration skills among medical students, and turn, inspire students' earlier commitment, knowledge, and interest towards smoking cessation.

13

Condylar Osseous Abnormalities for Signs of temporomandibular Joint Disorder Utilizing CBCT

Presenter: **Chan Kwon Chung**

Co-author(s): Dr. Susan M. Chialastri and Dr. Jie Yang

Department:
School/College: *Maurice H. Kornberg School of Dentistry*

Faculty Mentor: Yueh Hsiao

The temporomandibular joint (TMJ) is one of the most commonly used joints in human body and it is primarily used for the masticatory system. It consists of anatomical structures such as condyle, articular disc, retro discal tissue, synovial membrane, and joint capsules which demonstrates complex, but organized movements1. Temporomandibular joint disorder (TMD) is when there are disorganization of this joint which the etiology is poorly understood. There are many tools that can be utilized to aid in diagnosis of the TMD, which includes CBCT. By taking the CBCT, it will show the condylar osseous changes, such as flattening of articular surface, irregularity, osteophyte, and decreased joint space2. The purpose of this study is to evaluate the condylar osseous abnormalities and measure the angulation from the neck of condylar notch to head in comparison to the normal TMJ condyle using CBCT scans. Other variables such as gender, ethnicity, age, dentition status, and systemic considerations that can affect condylar changes will also be evaluated.

14

Phylogenetic Corrections and Higher-Order Sequence Statistics in Protein Families: The Potts Model vs MSA Transformer

Presenter: **Kisan Khatri**

Co-author(s): Ronald M. Levy and Allan Haldane

Department: *Physics*
School/College: *Science and Technology*

Faculty Mentor: Ronald M. Levy and Allan Haldane

Recent generative learning models applied to protein multiple sequence alignment (MSA) datasets include simple and interpretable physics-based Potts covariation models and other machine learning models such as MSA-Transformer (MSA-T). The best models accurately reproduce MSA statistics induced by the biophysical constraints within proteins, raising the question of which functional forms best model the underlying physics. The Potts model is usually specified by an effective potential including pairwise residue-residue interaction terms, but it has been suggested that MSA-T can capture the effects induced by effective potentials which include more than pairwise interactions and implicitly account for phylogenetic structure in the MSA. Here we compare the ability of the Potts model and MSA-T to reconstruct higher order sequence statistics reflecting complex biological sequence constraints. We find that the model performance depends greatly on the treatment of phylogenetic relationships between the sequences, which can induce non-biophysical mutational covariation in MSAs. When using explicit corrections for phylogenetic dependencies, we find the Potts model outperforms MSA-T in detecting epistatic interactions of biophysical origin.

15

Understanding Proton Structure through Numerical Simulations in Lattice QCD

Presenter: **Joshua Miller**

Co-author(s): Shohini Bhattacharya, Krzysztof Cichy, Martha Constantinou, Andreas Metz, and Fernanda Steffens

Department: *Physics*
School/College: *Science and Technology*

Faculty Mentor: Martha Constantinou

The parton model was proposed in 1969, and it was originally thought the proton was composed of the partons two up quarks, a down quark, connected by gluons. Today, we know that the internal structure of the proton is much more complicated due to these partons forming and annihilating, as known by Einstein's energy-mass relation. With the Electron-Ion Collider in the works, the proton structure can be numerically studied to form predictions by using simulations in Lattice QCD (LQCD). Recent developments in theory have allowed us to extract the 3D distribution equations, Generalized Parton Distribution functions (GPDs), directly from LQCD. Quarks have a fundamental property called spin, and depending how the spin is aligned to the spin of the proton, we have different GPDs. We study the process where the spin of a quark is normal to the spin of the proton, giving us 4 GPDs: H_T, E_T, Etilde_T, Htilde_T. We extract the momentum fraction (x) dependence for all of the GPDs for different momentum transfer-squared (-t) at zero-skewness (xi). Calculations presented use N_f = 2+1+1 with twisted-mass fermions and a clover-improvement. The simulated quark masses lead to a pion mass of 260 MeV.

16

3D Tomography (3DT) of Fundamental Particles

Presenter: **Joseph Torsiello**

Co-author(s): Joshua Miller and Martha Constantinou

Department: *Physics*
School/College: *Science and Technology*

Faculty Mentor: Martha Constantinou

Atomic nuclei and nucleons comprise more than 99% of the mass of visible matter. Given the role of nucleons in nature, understanding their structure is among the most important and active research areas in hadronic physics. Nucleons contain quarks and gluons (partons), which govern their structure and properties. Partons are bound by the strong force, described by the theory of quantum chromodynamics (QCD). QCD is very complex and cannot be solved analytically. The only known theoretical approach to comprehensively study hadron structure is lattice QCD (LQCD). LQCD is a space-time discretization with billions of degrees of freedom, and one requires numerical simulations on supercomputers. Hadron structure is described in terms of distribution functions that provide a wealth of information on partons in terms of their position and momentum within the hadron. This constitutes 3D tomography.

The research presented will be on the 3D tomography of the pion and kaon from LQCD, which is part of my thesis research. Such information is obtained through generalized distribution functions (GPDs), complemented by transverse-momentum dependent distributions; both are limitedly studied. We aim to advance knowledge on GPDs using LQCD, based on a novel approach to fully determine GPDs in the 3D parameter space. This is non-trivial and demands cutting-edge fast algorithms and access to large-scale computing resources. Such a project will impact our understanding of hadrons from first principles, which remains a long-term goal of Nuclear Physics. Results from this project will contribute in several areas where experimental data are limited or non-existing.

17

The Muon Scattering Experiment at Paul Scherrer Institute

Presenter: **Nazmus Sayadat Ifat**

Co-author(s): Hamza Atac, Suman Shrestha, and Nikos Sparveris

Department: *Physics*
School/College: *Science and Technology*

Faculty Mentor: Nikos Sparveris

The proton radius puzzle arises from the discrepancy between the measurements of the proton charge radius by muonic hydrogen spectroscopy and electron-proton scattering experiments. The muonic hydrogen spectroscopy result in 2010 showed a significantly smaller radius (~5σ deviation from the CODATA value at the time) than from electron-proton scattering experiments. The Muon Scattering Experiment (MUSE) at the Paul Scherrer Institute (PSI) aims to address this puzzle by performing simultaneous measurements of elastic electron-proton (ep) and muon-proton (μp) scattering from a liquid hydrogen target. Using the πM1 mixed secondary beam of electrons, muons, and pions at PSI with momenta of 115, 160, and 210 MeV/c, MUSE compares the electron-proton (ep) and muon-proton (μp) cross sections to test lepton universality. MUSE also studies two-photon exchange effects by using both positive and negative beam of leptons. Two-photon exchange causes differences in the cross sections for positive and negative polarities and affects form factors and radius extraction. MUSE covers a Q^2 range of 0.016–0.0820 $(GeV/c)^2$ for electrons and 0.016–0.0799 $(GeV/c)^2$ for muons, which is sensitive to the proton charge radius. The MUSE setup includes several detectors, specifically GEMs (Gas Electron Multipliers) and STT(straw tube trackers), to reconstruct incoming and scattered particles, respectively, as well as a calorimeter to test radiative corrections. Currently, MUSE is in the data production stage. The presentation will provide an overview of the experiment's progress, setup, and current status.

This work was supported by the US Department of Energy Office of Science, office of Nuclear Physics under contract no. DE-SC0016577.

18

Genomic and Functional Divergence in Temperate Strains of Photobacterium mandapamensis

Presenter: **Hannah Osland**

Co-author(s): Alison Gould

Department: *Biology*
School/College: *Science and Technology*

Faculty Mentor: Alison Gould

The bioluminescent bacterium Photobacterium mandapamensis is a mutualistic symbiont of cardinalfish (Siphamia spp.), yet its genomic and functional diversity has only been characterized in tropical and sub-tropical environments. To investigate how P. mandapamensis varies across environments, we used long-read genomic sequencing to construct whole-genome assemblies of 40 P. mandapamensis strains isolated from the light organs of two temperate Siphamia species (S. roseigaster, S. cephalotes). Our phylogenetic analysis using 2,425 core genes revealed two distinct clades that correspond to host species, despite all samples originating from a single site. Additionally, temperate strains were genetically distinct from their tropical counterparts, further supporting a high degree of host-symbiont specificity within this system. Our pangenome analysis identified host-associated variation in the lux-rib operon, primarily in the luxF and lumP genes, which are linked to enhanced luminescence. However, luminescence measurements showed that these genes did not consistently correlate with higher light production, suggesting additional regulatory influences. The pangenome analysis also revealed a higher number of transposase genes in S. roseigaster-associated strains, which may indicate increased genomic plasticity. These findings provide new insights into the strain-level diversity of P. mandapamensis and its potential adaptations to different host species and environmental conditions.

19

The Impact of Invasive Spotted Lanternfly on U.S. Hymenoptera Community Dynamics

Presenter: **Lee Zimmerman**

Co-author(s): Tracy Leskey and James Hepler

Department: *Biology*
School/College: *Science and Technology*

Faculty Mentor: Matthew Helmus

The spotted lanternfly (Lycorma delicatula, Hemiptera) is an invasive planthopper from Asia that has spread across the U.S. since its introduction to Pennsylvania in 2014. When feeding, spotted lanternflies produce honeydew, a sugar-rich excretion that may influence the feeding behavior of insect communities, particularly order Hymenoptera. Although the impacts of spotted lanternfly on U.S. Hymenoptera families remain unclear, we hypothesize that higher spotted lanternfly abundance would attract taxa that feed on honeydew, such as ants (Formicidae) and bees (Apidae). To test this hypothesis, we established 12 forested study plots (7 × 7 m) across a 45 km² region in Virginia and West Virginia, selecting sites based on visually surveyed lanternfly abundance: low (0–10), moderate (10–100), and high (100–1000). Plots, spaced at least 0.9 km apart, were sampled biweekly during the 2022 growing season using sweep netting across the entire plot, as well as pitfall and blue-vane flight-intercept traps in the center of each plot to ensure standardized sampling. Hymenoptera were identified to the family level to assess community composition in relation to spotted lanternfly abundance. Results indicate that Hymenoptera community composition varies with spotted lanternfly density. Formicidae abundance increased with higher spotted lanternfly numbers, while Apidae correlated more strongly with the presence of Ailanthus altissima (tree of heaven), the spotted lanternfly's preferred host tree, than with spotted lanternfly abundance. Given the ecological importance of Hymenoptera as keystone pollinator taxa, our findings suggest that spotted lanternfly honeydew is altering U.S. insect communities, potentially driving cascading ecosystem effects.

20

Visible-Light Driven Desulfurization using Partially Oxidized TiN as a Photocatalyst

Presenter: **Matas Simukaitis**

Co-author(s): Shea Stewart

Department: *Chemistry*
School/College: *Science and Technology*

Faculty Mentor: Yugang Sun

Desulfurization represents an important process in chemical synthesis that produces new molecules and access to useful carbon radicals. Photocatalytically driving the reactions under broadband visible light illumination is still challenging due to the high cost of noble metal complex photocatalysts and controlled inert atmospheres widely used in the reported methods. This work uses partially oxidized TiN nanoparticles comprising of earth-abundant elements as a heterogenous photocatalyst to drive the desulfurization of methyl thioglycolate in the ambient atmosphere with a visible-light LED lamp. The yield of the desulfurization product, methyl acetate, is up to 73% after reacting for 18 h. The generation of accessible carbon radicals is confirmed by forming C-C coupling products with styrene. The results shed light on the promise of modified TiN nanoparticles, which possess strong broadband optical absorption originating from localized surface plasmon resonances (LSPRs), to facilitate chemical synthesis using light.

21

STAT v.s. Routine: Lie about service urgency

Presenter: **Jingyi Peng**

Co-author(s): Miao Bai

Department: *Statistics, Operations, and Data Science*
School/College: *Fox School of Business*

Faculty Mentor: Guangwen Kong

Misuse of STAT in diagnostic medical services undermines its purpose, often reflecting system inefficiencies rather than true urgency. Our research explores the mechanisms behind false STAT reporting and proposes solutions to address priority inflation, ensuring timely care for genuinely urgent cases.

22

Measurement of Transverse Spin Dependent Azimuthal Correlations of Charged hadrons Pairs in $p^\uparrow p$ Collisions at $\sqrt{s}$ = 200 GeV at STAR

Presenter: **Anuja Khanal**

Co-author(s):

Department: *Physics*
School/College: *Science and Technology*

Faculty Mentor: Bernd Surrow

Transversity, $h_1^{q}(x)$, a leading twist parton distribution function, describes the transverse spin distribution of quarks in a transversely polarized proton. It is a fundamental component of nucleon spin structure and is loosely constrained by global fits. As a chiral odd function, $h_1^{q}(x)$ can only be accessed when coupled with another chiral odd partner, such as interference fragmentation function (IFF). This coupling of $h_1^{q}(x)$ and IFF leads to a measurable azimuthal correlation asymmetry (A_{UT}) of hadron pairs in final state. The STAR experiment at RHIC has measured non-zero A_{UT} for $\pi^+\pi^-$ in polarized proton-proton ($p^\uparrow p$) collision, using data from 2006 and 2015 at $\sqrt{s} = 200$ GeV and from 2011 and 2017 at $\sqrt{s} = 500/510$ GeV. The precise determination of A_{UT}, along with unpolarized di-hadron cross section in $p^\uparrow p$ collisions, can aid in constraining $h_1^{q}(x)$ in global analysis.

Measurements of di-hadron A_{UT} and cross section with other hadron species provide additional flavor sensitivity; measurements with K^+K^- provide access to $h_1^{q}(x)$ of strange quarks. We will present an update on A_{UT} for hadron pairs based on 2015 $p^\uparrow p$ dataset at $\sqrt{s} = 200$ GeV in the mid-pseudorapidity region $(|\eta|<1)$.

23

Findings from the High-Altitude Water Cherenkov (HAWC) Gamma-Ray Observatory

Presenter: **Renée Kirk**

Co-author(s): Miguel Mostafá

Department: *Physics*
School/College: *Science and Technology*

Faculty Mentor: Miguel Mostafá

The High-Altitude Water Cherenkov (HAWC) Gamma-Ray Observatory is a large field of view, multi-TeV, gamma ray observatory that has been continuously operating at 14,000 ft since March 2015. Designed to observe gamma and cosmic rays between energies of 100 GeV - 100 TeV, HAWC serves as an invaluable tool for high-energy particle astrophysicists probing cosmic accelerators, including extreme environments like supernovae, active galactic nuclei, gamma ray bursts. The observatory has also facilitated research into the decay and annihilation of theorized dark matter particles. The facility, consisting of a closely packed grid of 300 water tanks, each containing four photomultiplier tubes (PMTs), has an order of magnitude better sensitivity, angular resolution, and background rejection than the previous generation of water-Cherenkov arrays. Energetic gamma rays interacting with the upper atmosphere decay into a cascade of relatively lower energy particles, which upon interfacing with the water in the tanks, produce Cherenkov light. The Cherenkov light is detected by the PMTs, producing electrical signals legible to computers. Over 90 papers have since been produced by the collaboration, and the ongoing collection of data ensures HAWC will contribute to the scientific process long after the facility is dismantled. I will present the most recent results from the HAWC observatory, and discuss the physics motivation and the exciting perspectives for building a next-generation gamma-ray experiment in the southern hemisphere.

24

Investigating the Role of VPS35 in High Glucose-Induced Blood-Brain Barrier Dysfunction and Neurodegeneration

Presenter: **Chafika Moussaoui**

Co-author(s): Nicholas Lyssenko

Department: *Bioengineering*
School/College: *Engineering*

Faculty Mentor: Domenico Pratico

Alzheimer's disease (AD), a leading cause of dementia, has no cure and is projected to affect 1 in 85 people worldwide by 2050. This study investigates the role of endo-lysosomal sorting dysfunction in brain endothelial cells (BECs) under metabolic stress, hypothesizing that impaired degradation of hyperphosphorylated tau contributes to its aggregation into insoluble fibrillary tangles, a hallmark of AD, while also compromising blood-brain barrier (BBB) integrity. The vacuolar protein sorting 35 (VPS35) components of the retromer complex is critical for protein trafficking and cellular homeostasis. Using human brain microvascular endothelial cells (hCMEC/D3), we assessed the effects of high glucose (HG) exposure on VPS35, VPS26, and VPS29 expression, total and phosphorylated tau levels, and BBB integrity. Tight junction proteins (ZO-1, Claudin-5) were analyzed, and trans-endothelial electrical resistance (TEER) was measured. HG significantly downregulated VPS35, VPS26, and VPS29, leading to increased total and phosphorylated tau and reduced ZO-1 and Claudin-5 expression. TEER measurements confirmed BBB dysfunction, with further impairment observed in VPS35 knockdown cells. These findings suggest that retromer dysfunction exacerbates tau pathology and BBB instability under metabolic stress. Pharmacological chaperones targeting the retromer complex may restore proper protein trafficking, reduce pathological tau accumulation, and improve BBB integrity, offering a potential therapeutic strategy for AD.

25

Accurate Position Estimation from Geophysical Signals for Marine Navigation

Presenter: **James Brodovsky**

Co-author(s):

Department: *Mechanical Engineering*
School/College: *Engineering*

Faculty Mentor: Philip Dames

Inertial measurement units consist of sensors that measure 3-axis rotational rate and specific forces, sometimes further aided with a magnetometer for direct yaw measurement. Integrating these values over time with an accompanying software package creates an Inertial Navigation System. Due to the noise inherent in IMUs, errors build up over time in the INS's estimate of the true state. To correct these errors, an INS must incorporate some sort of state feedback, typically using the global navigation satellite system for position and velocity measurements.

However, reliance on satellite-based corrections is not ideal. The GNSS has limited coverage and is reliant on having a line of sight for radio communication, thus signals can be disrupted or lost when operating in urban environments, underground, or underwater. Reliance on GNSS position feedback can also limit platform operational capabilities in these areas. For instance, a submarine must periodically resurface to obtain a position fix before diving again and resuming its mission thus limiting its stealth capabilities. Additionally, GNSS signals can be actively blocked or spoofed via electronic warfare techniques which poses a safety risk to commercial air traffic and maritime freight.

The author of this project has developed a particle filter framework capable of real-time autonomous position estimation based on maps of bathymetry, gravity anomaly, and magnetic anomaly. These phenomena are globally available and are able to accurately estimate position within the drift error of an INS indicating that they can be used to recover or sustain an accurate navigation solution without GNSS.

26

Inflammatory Response to Hypoxia in a 3D Adipose Tissue Model of Obesogenesis

Presenter: **Julieta Rios Vergara**

Co-author(s): Evangelia Bellas, PhD

Department: *Bioengineering*
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Faculty Mentor: Evangelia Bellas

Obesity is a major public health crisis associated with health conditions such as insulin resistance, heart disease, hypertension, and type II diabetes. It is characterized by excess adipose tissue (AT), which leads to decreased oxygen levels in the tissue (hypoxia) and disrupts tissue function, promoting metabolic dysfunction. AT's resident immune cells, macrophages, play a crucial role by embracing a pro-inflammatory phenotype, contributing to chronic inflammation, which worsens tissue and metabolic dysfunction.

This study explores the role of AT resident macrophages, focusing on inflammation and metabolic changes, in early obesity. We hypothesize that, under hypoxic conditions, macrophages cause structural changes, remodeling the extracellular matrix (ECM) and increasing inflammation, contributing to insulin resistance and obesity-related complications. Human adipocytes and macrophages were encapsulated in a 3D collagen hydrogel and exposed to hypoxia for one week. Gene expression, imaging, and metabolic assays assessed changes in tissue structure, inflammation, and function.

Preliminary findings show that hypoxia enhances gene expression in cellular architecture; however, the presence of macrophages does not exacerbate these effects. While ECM remodeling genes respond similarly with hypoxia regulating these changes regardless of macrophage presence, factors involved in tissue reorganization increased expression in co-culture conditions. Interestingly, while macrophages are known to regulate cytokine expression, there are no changes in cytokine gene expression in hypoxia and co-culture conditions.

Understanding how macrophage-driven inflammation is essential for elucidating the mechanisms underlying metabolic dysfunction in obesity. Targeting these pathways might provide new therapeutic strategies to mitigate chronic inflammation, enhance AT function, and reduce obesity-related comorbidities.

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A Comparative Analysis of Display and Shopping Ads on Social Media Platforms

Presenter: **Jiayu Fan**

Co-author(s): Subodha Kumar

Department: *Statistics, Operations, and Data Science*
School/College: *Fox School of Business*

Faculty Mentor: Subodha Kumar

Social media platforms increasingly use shoppable ads, blending e-commerce with traditional ads, yet it remains unclear if these ads are more profitable than pure ads. Our study compares the profit, pricing, and ad volume between pure and shoppable ads, considering factors like commission rates and user preferences. We find that shoppable ads can yield higher profits, even when users prefer pure ads or when product value is low. Interestingly, platforms might still price pure ads lower or display more of them, especially when their market size is larger or user aversion crosses a threshold. These insights guide platforms in optimizing ad revenue and pricing strategies.

28

Strategic Adoption of Returnless vs. Regular Refund Policies: A Game-Theoretic Analysis of Competitive Firm Behavior

Presenter: **Lei Song**

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Faculty Mentor: Subodha Kumar

This study investigates how duopoly firms strategically select refund policies (Regular vs. Returnless) in markets where consumers value price, convenience, and refund utility. We hypothesize that asymmetric policy adoption emerges in equilibrium, driven by trade-offs between operational costs, consumer sensitivity to convenience, and price competition.

A two-stage Hotelling-Bertrand game is developed. Firms first choose refund policies (Regular: requiring product returns; Returnless: refunds without returns) and then set prices. Consumer utility incorporates price, transportation costs (differentiation), and refund convenience. Nash equilibria are derived under policy symmetry (both Regular/Returnless) and asymmetry (one Regular, one Returnless).

Asymmetric equilibria dominate when consumer convenience sensitivity is moderate: one firm adopts Returnless Refunds while the other retains Regular Refunds. High convenience sensitivity triggers symmetric Returnless adoption, raising industry prices but lowering aggregate profits.

Refund policy choice is a critical strategic lever in competitive markets. While Returnless Refunds enhance consumer appeal, they risk price wars and profitability erosion.

Future empirical validation using e-commerce transaction data and controlled experiments will test model predictions. Further research could also explore dynamic policy adjustments and cross-industry variances.

29

Optimization of a Syngeneic, Orthotopic Mouse Model of Oral Squamous Cell Carcinoma for 4 Cell Lines

Presenter: **Hani Alshareef**

Co-author(s): Nezar Al-Hebshi

Department: *Oral Health Sciences*
School/College: *Maurice H. Kornberg School of Dentistry*

Faculty Mentor: Nezar Al-Hebshi

Background: Orthotopic mouse models serve as crucial tools for studying tumor behavior and evaluating therapeutic strategies. Many studies have established murine orthotopic OSCC models. In this study, we provide a detailed account of the entire procedure. We aim to establish an optimal orthotopic protocol based on previous findings and our outcomes using four murine cell lines: MOC1, MOC2, 4MOSC1, and 4MOSC2.

Methods: C57BL/6 mice aged 6–8 weeks underwent orthotopic tongue injections with each individual cell line at varying concentrations (1.65x104 -1x106). Cell suspensions were prepared in Matrigel and PBS to maximize tumor engraftment success, ensure cell retention at the injection site, and enable accurate tumor measurements. A Mickey helmet was utilized to secure the mice, maintaining airway patency, facilitating accurate tumor induction, and minimizing the need for prolonged general anesthesia. Tumor number and size were measured over 30 days. Male and female mice were equally represented.

Results: A high success rate (100%) was observed with 106 cells compared to lower concentrations. The tumor growth rate was higher in MOC2 tumors compared to MOC1 tumors, which was reflected on the survival curve for both strains. Males showed a higher volume tumor than the females with the same concentration of cells injected.

Conclusion: Factors such as cell line properties, injection parameters, and animal characteristics significantly influence tumor formation, emphasizing the importance of meticulous procedural adherence. The described experiments provide a valuable platform for advancing OSCC research, enabling a comprehensive analysis of OSCC progression in the context of 4 independent cell lines.

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Biocompatibility and Bioactivity of a Novel Piezoelectric Hydrogel as a Pulp Capping Material

Presenter: **Varun Solanki**

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Faculty Mentor: Maobin Yang

Pulp capping aims to facilitate the healing of injured pulp by using bioactive materials to ensure the formation of mineralized tissue or dentin bridge.

Objective: This study introduces an injectable bioactive piezoelectric hydrogel, PiezoGEL, created by combining gelatin methacryloyl (GelMA) with piezoelectric fillers of barium titanate. PiezoGEL generates electrical charges in response to biomechanical vibrations, enabling its therapeutic potential.

Methods: The effect of PiezoGEL on human dental pulp stem cells was evaluated through cell viability, mineralization, and gene expression analyses. Cell viability was assessed using the AlamarBlue assay, mineralization was measured with Alizarin Red staining, and expression of key odontogenic markers, including DSPP, DMP1, ALP, and COL1A1,were evaluated by qRT-PCR. One way ANOVA was used to analyze the difference among groups.

Results: PiezoGEL demonstrated significant enhanced cell viability after stimulated with masticatory loading by day 10 compared to control. Also, PiezoGEL initiated mineralization earlier with higher levels as evidenced by increased ALP activity on days 5 and 10. DSPP expression was significantly upregulated for PiezoGEL under static conditions on day 10, and DMP1 expression peaked for PiezoGEL under cyclic loading on day 10.

Conclusion: We successfully developed an injectable piezoelectric hydrogel for direct pulp capping. PiezoGEL promoted cell viability, mineralization and upregulated the expression of genes related to dentin regeneration. These findings suggest that PiezoGEL exhibits superior biocompatibility and bioactivity compared to Biodentine, making it a promising alternative for pulp capping.

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Evaluation Of Hydration Protocols for Human Cortical Mineralized and Demineralized Particulate Allografts

Presenter: **Aljowhara Faraidy**

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School/College: *Maurice H. Kornberg School of Dentistry*

Faculty Mentor: Ronaldo Santana

Objective: Bone graft hydration is a critical yet underexplored factor influencing the handling and performance of allograft materials in regenerative procedures. Most manufacturers suggest that biomaterials should be hydrated for at least 30 minutes before use. However, despite widespread clinical use, no standardized hydration protocol exists, and the impact of hydration on the chemical composition, mineralization, and structural integrity of graft materials remains unclear. This study aims to evaluate the physicochemical alterations of mineralized and demineralized particulate bone grafts following hydration at varying concentrations and time points.

Methods: Six commercially available human allograft materials (SM, SD, GM, GD, ZM and ZD) from three different manufacturers, with particle sizes ranging from 250–1000 μm, were examined. The granules were hydrated in 0.9% saline at concentrations of 100 mg/mL and 1 g/mL and incubated for 1, 10, and 30 minutes. Scanning Electron Microscopy (SEM) was employed to assess hydration-induced structural changes. Chemical composition and molecular alterations were analyzed using Fourier Transform Infrared (FTIR) Spectroscopy and spectral data were processed using second-derivative analysis to improve peak resolution, allowing for the quantification of vibrational bands.

Results: SEM analysis revealed no significant differences in surface morphology between demineralized and mineralized grafts after hydration. FTIR analysis showed chemical homogeneity across graft materials, with variations in peak intensities reflecting differences in molecular concentrations, mineralization, and collagen integrity. Biomaterial hydration promoted significant selective spectral band increases for all the time points evaluated. Prolonged hydration times did not produce significant or proportional spectral shifts, suggesting a saturation threshold after 1 minute of hydration.

Conclusions: Increasing hydration time did not result in significant changes in vibrational bands, suggesting that hydration times longer than 1 minute have minimal impact on the molecular structure of the particulate allografts evaluated.

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Sinus Pathology Detection in Panoramic Radiographs Verified by CBCT Imaging

Presenter: **Katie Yang**

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Faculty Mentor: Mustafa Badi

Accurate identification of maxillary sinus pathology plays a critical role in dental diagnostics, as these conditions can significantly impact treatment outcomes. PR are frequently used due to accessibility and lower radiation dose compared to CBCT. However, questions remain about reliability in detecting various sinus pathologies. This study seeks to evaluate the diagnostic accuracy of PR for identifying sinus abnormalities, using CBCT and oral radiologist evaluation as reference standards. Maxillary sinus conditions include mucosal thickening, retention pseudocysts, opacification, antral polyposis, sinus border detachment, and odontogenic lesions. PR and CBCT from patients seen at TUKSOD were extracted and inclusion criteria consisted of patients aged 18 or older, having PR and CBCT taken within six months apart. Exclusion criteria involved PR with technique error, or missing sinus anatomy on the CBCT. All images had a unique identifier and viewed on WEASIS DICOM Version 4.5.1. Three residents were calibrated and served PR readers, with CBCT diagnoses confirmed by two radiologists. After reviewing each PR, residents indicate the presence or absence of abnormality and characterize the disease type without time constraints. One hundred forty two PR were identified, only ninety-one met inclusion criteria. The Kappa value was calculated to determine inter-rater agreement. Analysis showed varying agreement levels among readers and PR is variable in detecting sinus conditions. While comparing PR assessment with the CBCT gold standard findings, the agreement was 73%. We discovered 23% false positives/false identification of sinus pathology in PR. Maxillary sinus conditions were able to be diagnosed in PR to an extent.

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The Potential of Virtual Reality in Orofacial Neuralgia Treatment: Current Evidence and Challenges

Presenter: **Adetola Babalola**

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Faculty Mentor: Yuan Liu

Objective: To evaluate the potential of virtual reality (VR) technology as a non-pharmacological intervention for managing orofacial neuralgias, considering its role in pain modulation and patient outcomes through immersive environments and haptic feedback.

Methods: This review followed PRISMA guidelines to ensure methodological rigor. Five databases (PubMed, Cochrane, DOAJ, ScienceDirect, and Google Scholar) were systematically searched until November 16, 2024. Three independent reviewers screened articles based on predefined criteria. Six studies on VR and orofacial neuralgias were included, and a narrative synthesis approach was used.

Results: Sample sizes ranged from three to 71 participants across studies conducted in Germany, Spain, China, and Switzerland. VR interventions included 3D VR imagery, multimodal VR, Dextroscope VR, VR-assisted percutaneous controlled radiofrequency trigeminal rhizotomy (RFTR), and VR-based therapeutic sessions. VR interventions demonstrated efficacy in reducing pain severity and improving clinical outcomes. Studies also showed VR's ability to identify neurovascular structures and trigeminal nerves for surgical planning. VR exhibited a favorable safety profile, with no reported mortality or long-term complications.

Conclusion: VR interventions show promise as adjunctive treatment options for orofacial neuralgia. However, further research with larger sample sizes and longer follow-ups is needed to fully assess their benefits and limitations.

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The protein kinase TNIK sustains cell proliferation and partial EMT in squamous cell carcinoma likely by regulating MYC/EZH2

Presenter: **Mohaddase Hamidi**

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Faculty Mentor: Pedro Torres-Ayuso

Lung squamous cell carcinoma (LSCC) is the second most prevalent lung cancer in the US. LSCC treatments have minimally improved patient outcomes in the last three decades. Thus, strategies that enhance treatment efficacy are needed.

Our team has identified the protein kinase TNIK (TRAF2- and NCK-interacting kinase) as a promising target in LSCC. Our RNAseq analysis of TNIK-depleted LSCC cells showed downregulation of transcriptional programs associated with pEMT and cell survival. Thus, we hypothesized that inhibiting TNIK is a strategy to suppress pEMT and improve treatment efficacy in LSCC.

Our results showed that depleting TNIK in LSCC cells increased the levels of epithelial markers and reduced mesenchymal markers. Furthermore, depleting TNIK reduced LSCC cell clonogenic potential and key pEMT-associated phenotypes, including cell migration and invasion. These changes were accompanied by increased beta-galactosidase activity, suggesting that TNIK-depleted cells may become senescent. We are currently investigating how TNIK sustains pEMT and survival in LSCC cells. We found that TNIK depletion reduced not only MYC expression, but it also decreased EZH2 expression, a known MYC target. Interestingly, in a high-throughput screen, we found that inhibiting TNIK may synergize with the EZH2 inhibitor tazemetostat to increase LSCC cell death. The exact mechanisms by which TNIK regulates MYC and EZH2 in LSCC are under investigation.

Our results support a model in which TNIK sustains pEMT in LSCC cells by activating MYC-EZH2. Our next goal is to assess the antitumor activity of targeting the TNIK signaling network in LSCC organoids and xenograft models.

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Functional Roles of Chemokine Signaling in Lymphatic Development and Cardiac Repair

Presenter: **Long Do**

Co-author(s): Esteban Delgado, Liam Flynn, Sarah Fallouh, and Xiaolei Liu

Department: *Lemole Center for Integrated Lymphatics and Vascular Research-Cardiovascular Sciences*
School/College: *Lewis Katz School of Medicine*

Faculty Mentor: Xiaolei Liu

The lymphatic vasculature is essential for fluid homeostasis, immune surveillance, and lipid absorption. Lymphatic dysfunction contributes to diseases like lymphedema, myocardial infarction (MI), and atherosclerosis. However, the molecular mechanisms governing lymphatic development and function remain poorly understood. The chemokine receptor CXCR4 primarily signals via its ligand CXCL12, inducing intracellular signaling cascades critical for cell proliferation, migration, and survival. While CXCR4/CXCL12 is well studied in angiogenesis, its role in lymphangiogenesis remains unclear. Our recent work demonstrated that CXCL12/CXCR4 signaling is crucial for lymphatic vessel development. Our results showed that embryos with CXCR4 specific deletion in LECs exhibited severe edema and defective lymphatics, mirroring defects in CXCL12 mutants. We further determined that CXCL12 is primarily expressed by Schwann cells residing in peripheral nerves, and CXCL12 signals through CXCR4 in LECs to regulate lymphangiogenesis by activating VEGFC-mediated VEGFR3/PI3K/AKT signaling. These data strongly suggest CXCL12/CXCR4 regulates VEGFC/VEGFR3/PI3K/AKT signaling to regulate lymphatic development (Do, et al., Development, 2024).

Therapeutic lymphangiogenesis, such as VEGFC administration, enhances cardiac lymphatics and improves post-MI heart function. We hypothesized that LEC-CXCR4 is critical for this process. Mice lacking CXCR4 in LECs displayed reduced lymphangiogenesis and cell proliferation post-MI, leading to impaired cardiac function, as shown by echocardiographic decline and increased fibrosis. These findings highlight LEC-CXCR4's role in cardiac lymphangiogenesis and repair. Future studies will investigate how CXCR4/CXCL12 signaling regulates post-MI lymphangiogenesis and assess its therapeutic potential in improving heart function. Our results offer key mechanistic insights into lymphatic-mediated tissue repair and may guide new treatments for lymphatic-related diseases.

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Education in the Operating Room: A Grounded Theory Analysis of Otolaryngologic Resident Learning

Presenter: **Megan Noonan**

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School/College: *Lewis Katz School of Medicine*

Faculty Mentor: Glenn Isaacson

Otolaryngology resident education often takes place in the unique and high-stakes setting of the operating room. However, there is no current consensus on what qualities contribute to a positive operative learning experience. This study uses grounded theory methodology to investigate those qualities.

Purposive sampling was used to select a heterogeneous cohort of twenty-one participants from Stanford's Otolaryngology department. A trained interviewer conducted semi-structured interviews until thematic saturation was reached. Constant comparative analysis using coding, memoing, categorization, and theoretical integration was conducted using grounded theory methodology. Interviewees were categorized into subgroups along two dimensions as Attending or Trainee and Senior or Junior.

Three themes emerged as essential in the creation of a positive learning experience: "Investment in Education," "Teacher-Student Relationship," and "Learning Practices." "Investment in Education" refers to a learner's motivation to improve and seek learning opportunities. "Teacher-Student Relationship" reflects the impact of reciprocal trust and respect on learner success. "Learning Practices" represents methods learners use to further personal and professional development. Subanalysis revealed that while subgroups valued many similar theme qualities, there were nuances to how themes were understood and prioritized within each group.

Using grounded theory methodology, this study identified three core themes that contribute to the otolaryngologic resident learning experience. There are key differences in how the themes are approached and valued based on level of training. This research provides a framework for otolaryngologic learners and educators to optimize operative learning experiences. Further research is needed to understand how these concepts interact in diverse surgical educational settings.

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The Functional Roles of Transforming Growth Factor Beta Signaling in Regulating Cardiac Lymphangiogenesis and Cardiac Repair after Myocardial Ischemia

Presenter: **Esteban Delgado**

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School/College: *Lewis Katz School of Medicine*

Faculty Mentor: Xiaolei Liu

Heart failure caused by myocardial infarction (MI) and ischemia reperfusion injury (IRI) remain leading causes of mortality worldwide. Recent studies show that stimulation of lymphatic growth (lymphangiogenesis) after ischemic heart disease improves cardiac function and structure, linking lymphangiogenesis as a novel target for treating cardiovascular disease. Intriguingly, post-MI cardiac lymphatics in rodent models or MI patients exhibit abnormal structure and function, leading to prolonged cardiac inflammation. However, molecular and cellular mechanisms promoting lymphatic dysfunction during cardiovascular disease are unknown. Transforming growth factor beta (TGFβ), is a known player in driving cardiac fibrosis during cardiovascular disease. However, whether TGFβ signaling affects post-MI cardiac lymphangiogenesis and lymphatic function is unknown. My preliminary data showed that lymphatic endothelial cell (LEC)-specific TGFβR2 deficient mice (TGFβR2ΔLEC/ΔLEC mice) exhibit improved post-MI cardiac function, structure, increased cardiac lymphangiogenesis, LEC proliferation, and macrophage clearance. Strongly suggesting TGFβ negatively regulates post-MI cardiac lymphangiogenesis and cardiac function. In vitro, TGFβ significantly reduced LEC proliferation, migration, increased apoptosis, and disrupted junction and cytoskeleton organization. RNAseq analysis showed enriched metabolic pathways, significantly downregulating CPT1A and Fatty-Acid Oxidation (FAO) in TGFβ treated LECs. Interestingly, enhancing CPT1A function greatly rescued TGFβ mediated LEC activities in vitro, suggesting TGFβ negatively regulates LEC activities by downregulating CPT1A-mediated FAO in LECs. These data highlight a possible mechanism which TGFβ signaling modulates LEC metabolism, impeding lymphangiogenesis to promote cardiac dysfunction following MI. Inhibition of TGFβ signaling in LECs may provide a novel therapeutic strategy to improve lymphatic vascular integrity and lymphangiogenesis, thereby improving cardiac function following MI.

39

Association of Temporomandibular Disorder Symptoms with Parafunctional Behaviors, Sleep Quality, Stress, and Anxiety Among Dental Educators and Students

Presenter: **Amal Fatima**

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Faculty Mentor: Shabnam Seyedzadeh Sabounchi

Objective: This cross-sectional study aimed to explore the association of oral parafunctional behaviors, sleep quality, anxiety, and stress with temporomandibular disorder (TMD) symptoms among dental students, residents, and faculty at Temple University's Kornberg School of Dentistry.

Methods: The participants were screened using the TMD symptom questionnaire, oral behavioral checklist, PROMIS, General Anxiety Disorder-7 (GAD-7), and Perceived Stress Scale (PSS). Descriptive analysis, Chi-square, one-way ANOVA, and multivariable analyses were conducted to examine associations between TMD symptoms and various factors such as age, gender, school year, sleep quality, stress, anxiety, and oral parafunctional behaviors.

Results: Younger participants and dental students reported higher rates of positive TMD symptoms compared to dental faculty ($P<0.05$). Although no significant differences were found between groups in sleep quality, anxiety, stress, and parafunctional behavior scores ($P>0.05$). Participants with increased parafunctional behavior had a 1.2 times higher likelihood of experiencing TMD symptoms ($P<0.05$).

Discussion: This study found that younger participants, particularly dental students and residents, had a higher prevalence of TMD symptoms. No significant differences were found in sleep, anxiety, stress, and parafunctional behaviors, but increased parafunctional behavior significantly predicted TMD symptoms. Managing parafunctional behaviors could help prevent TMD.

Future Direction: Future research should focus on developing reliable screening tools for identifying patients at risk for TMD due to psychosocial factors. Such tools could help clinicians implement psychological interventions for at-risk individuals. Potential future research could involve investigating the correlation between posture and the prevalence of TMD, as posture may be a significant predictor for the disorder's development.

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Assessment of Peri-Implant Bone Microarchitecture in D4 Bone: An Ex Vivo MicroCT Analysis

Presenter: **David Sabbah**

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Faculty Mentor: Ronaldo B. Santana

Objective: This study aimed to assess the impact of different implant designs on primary stability, peak insertion torque (PIT), implant stability quotient (ISQ), and peri-implant bone microarchitecture in low-density bone (D4). Three Straumann implant systems were evaluated: Bone Level Tapered (BLT), Bone Level X (BLX), and Tissue Level (TL).

Materials and Methods: An ex vivo model using porcine tibia bone was employed. Thirty-three osteotomies were performed, and implants were placed according to manufacturer instructions. PIT was measured with a digital torque meter, ISQ was recorded using Osstell® Mentor, and micro-computed tomography (μCT) analyzed peri-implant bone volume (BV), total volume (TV), bone volume fraction (BV/TV), and surface characteristics. Data were analyzed using ANOVA, with significance set at $p < 0.05$.

Results: ISQ values showed no significant differences among the groups ($p = 0.801$), indicating comparable initial stability. However, PIT was higher in the BLX group (34.9 ± 14.5 Ncm) compared to BLT (23.0 ± 8.1 Ncm, $p = 0.04$) and TL (21.2 ± 8.6 Ncm, $p = 0.01$). μCT analysis revealed BLT implants had higher BV and BV/TV in multiple regions compared to BLX and TL ($p < 0.0001$). Surface analysis showed greater bone contact in BLT ($p < 0.0001$).

Conclusion: BLX implants showed higher PIT, indicating greater mechanical engagement, while BLT implants demonstrated higher peri-implant bone volume and surface contact. TL implants showed lower bone compression, potentially affecting primary stability. These findings inform implant design's role in primary stability and bone adaptation.

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Development of a Novel Physiologically Based Pharmacokinetic (PBPK) Model in Rats for Enhanced Drug Concentration-Time Predictions

Presenter: **Yifan Gong**

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Department: *Pharmaceutical Science*
School/College: *Pharmacy*

Faculty Mentor: Swati Nagar

Purpose: The purpose of this study is to develop a rat PermQ model to evaluate mechanisms of distribution kinetics of drugs.

Methods: This permeability- and perfusion-limited model was developed using the human PermQ framework. Drugs can reversibly distribute between capillaries and interstitial fluid by discontinuities in capillaries or transcellular diffusion through endothelial cells. Passive membrane permeability and transporters are considered. Drugs also can partition into intracellular phospholipids and neutral lipids. For midazolam and glyburide, in vitro data were collected in-house. Pharmacokinetic (PK) profiles were modeled for 7 drugs using the same experimental inputs for three different models: Rodgers and Rowland (RR), a perfusion-limited membrane-based model (MemPBPK), and rat PermQ. Models were built and evaluated using Mathematica 13.1.

Results: For atorvastatin and glyburide (acids), all models predicted atorvastatin PK profiles well, and rat PermQ predicted glyburide PK profiles better compared to the other 2 models. For the neutral drug digoxin, all 3 models predicted digoxin PK equally well, with the RR model resulting in a slightly better compared to rat PermQ. The MemPBPK model predicted midazolam well, followed by rat PermQ. Rat PermQ resulted in the best prediction of C-t profiles for all three bases tested compared to RR and MemPBPK.

Conclusion: Overall, for the 7 drugs tested, PK predictions with rat PermQ were the best for 4 of 7 drugs, with MemPBPK performing better for 2 of 7 drugs. Rat PermQ model improved the prediction of rat C-t profiles for basic drugs.

Funding: Grants NIGMS 2R01GM104178 and 3R01GM114369.

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Fatty Acid Derivatization of Tissue Plasminogen Activator for Half-Life Extension

Presenter: **Kishore Pathivada**

Co-author(s): Patrick M. Glassman

Department: *Pharmaceutical Sciences*
School/College: *Pharmacy*

Faculty Mentor: Patrick M. Glassman

Purpose: Tissue-type plasminogen activator (tPA) is FDA-approved for the treatment of acute thrombotic disorders. Its poor pharmacokinetics (PK) and severe side effects, namely bleeding complications and aberrant vascular remodeling necessitate improvements in its pharmacologic properties. Several FDA-approved drugs are engineered for prolonged exposure through coupling to serum albumin. Fatty acid derivatization of tPA will confer it with improved in vivo pharmacology through reversible binding to albumin.

Methods: The potency of tPA to both prevent (prophylactic) and lyse (therapeutic) clots in vitro was assessed using a plate-based assay. PK of total protein and activity were assessed in mice following IV injection of 0.9 mg/kg tPA. tPA was fatty acid derivatized with palmitic and arachidic acids and activity was tested in vitro and in vivo.

Results: The potency of tPA was assessed in vitro in prophylactic (IC50: 13.1 ± 1.0 nM) and therapeutic (IC50: 5.48 ± 0.87 nM) settings. Coupling of palmitic (Therapeutic: 1.96 ± 0.35 nM) or arachidic (Prophylactic: 21.10 ± 2 nM; Therapeutic: 2.62 ± 0.48 nM) acid to tPA had minor effects on IC50. Following IV injection, palmitic acid-tPA had an 28% increase in exposure vs. unmodified tPA.

Conclusions: Fatty acid derivatization of tPA had a minor effect on potency; however, palmitic acid-tPA trended towards improved exposure vs. tPA. This suggests that fatty acid derivatization is a viable strategy for improving the in vivo pharmacology of tPA. Future studies will focus on molecular characterization and PK, safety, and efficacy of fatty acid-derivatized tPA.

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A Multiplex Cellular Model of Niemman-Pick Type C Rare Genetic Disease for Live Cell High-Content Imaging Drug Discovery

Presenter: **Nader Afifi**

Co-author(s): Dennis Colussi

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School/College: *Pharmacy*

Faculty Mentor: Oscar Perez

Rare genetic diseases present unique challenges for understanding their pathophysiology and developing potential treatments due to limited access to patient cells and lack of cellular or animal models to study these conditions. Niemann–Pick type C (NPC) disease is a rare and fatal neurodegenerative disorder (1:150,000) caused by mutations in the gene encoding the NPC1 protein, which is responsible for intracellular lipid trafficking. These mutations lead to large lysosomal accumulation of unesterified cholesterol and cellular damage that can be detected by high-content imaging technologies.

We recently developed a plasmid technology for CRISPR/Cas9 genome editing that facilitates the generation of cellular models of human diseases. The system allows the multiplex insertion of labeling tags into endogenous genes for protein detection and the insertion of targeted mutations at specific genomic regions. In this study, we created a cellular model of NPC disease using HeLa cells. We introduced the most common mutation of NPC1 and tagged three endogenous proteins with fluorescent markers to detect subcellular structures for cellular segmentation and quantification of changes in the lysosomes of live cells.

We confirmed large phenotypic differences in modified HeLa cells with the NPC1 mutation compared to wildtype cells. We used the novel NPC cellular model to screen a library of autophagy modulators and identified promising compounds.

In conclusion, we have demonstrated the utility of our new plasmid technology for generating a novel cellular model. Our study highlights the potential of this approach for understanding the pathophysiology of rare genetic diseases and identifying new therapeutic candidates.

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Modeling Kinetic Data from In Vitro Propranolol Metabolism Assays

Presenter: **Xinyue You**

Co-author(s): Ken Korzekwa and Swati Nagar

Department: *Pharmaceutical Sciences*
School/College: *Pharmacy*

Faculty Mentor: Swati Nagar

Purpose: Enterohepatic recirculation of beta-blockers like propranolol raises concerns, necessitating a comprehensive understanding of its metabolism. Various enzyme kinetic models were evaluated to fit in vitro kinetic datasets for propranolol 4-hydroxylation, propranolol glucuronidation, and 4-hydroxypropranolol glucuronidation in rat liver and intestinal microsomes. Propranolol incubation with enzyme co-factors was studied to assess the contribution of different metabolic pathways.

Methods: Hydroxylation reactions were initiated by adding the NADPH regeneration system and incubated at 37°C before termination with acetonitrile (with internal standard, IS). For glucuronidation assays, substrates were incubated in alamethicin-activated microsomes at 37°C, with UDPGA initiating and acetonitrile (with IS) terminating the reactions. Incubation time varied from 5 to 30 minutes, depending on the enzyme source. Equilibrium dialysis was performed at 37°C with 5% CO_2 for 6 hours to determine the unbound fraction in microsomes. Samples were then analyzed by LC-MS/MS. Different enzyme kinetics models were evaluated using explicit equations and fitted by nonlinear regression analysis, with the best fit determined by Eadie-Hofstee plots and corrected Akaike Information Criteria.

Results: In rat liver and intestinal microsomes, propranolol metabolism exhibited atypical kinetics for both hydroxylation and glucuronidation. Co-incubation in rat liver microsomes (RLM) confirmed 4-hydroxypropranolol as the dominant metabolite, while the relative abundance of propranolol glucuronide and 4-hydroxypropranolol glucuronide varied with substrate concentration. Detailed kinetic data will be presented. The unbound fraction of propranolol (0.91) and 4-hydroxypropranolol (0.87) in 0.23 mg/mL RLM was determined. Unbound fractions in rat intestinal microsomes will be analyzed and presented.

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Design and synthesis of 5-HT7 antagonists for the treatment of Cocaine Use Disorder

Presenter: **Lauren Morelli**

Co-author(s): Dr. Benjamin Blass

Department: *Pharmaceutical Sciences*
School/College: *Pharmacy*

Faculty Mentor: Benjamin Blass

Cocaine Use Disorder (CUD) is one of the biggest epidemics to impact the US in the 21st century. Not only does this disorder affect an individual's brain and behavior, inducing an inability to control their substance use, this disorder also affects families, communities, and healthcare systems. Importantly, cocaine use carries a significant risk of neurotoxicity, heart attacks, strokes, and overdose related death. As the number of patients impacted by CUD continues to rise, novel CUD therapies have the potential to improve the lives of millions. Cocaine produces euphoria via the mesocorticolimbic dopamine (MCL-DA) system, also known as the reward system. It has been previously demonstrated that there is substantial interplay between MCL-DA activity and serotonergic 5-HT receptors. Specifically, the 5-HT7 receptor, has been found to have the ability to regulate dopaminergic activity in the reward system, has been linked to alcohol dependance, and can improve attention set shifting, reversal learning, and extinction in preclinical assays. There are no FDA approved treatments for CUD. Temple University has developed highly potent and efficacious 5-HT7 antagonists (Ki < 100nM, Kb < 100 nM) that are selective, orally bioavailable compounds capable of producing statistically significant improvements in mouse models of CUD. Here, we focus on the expansion of this previously developed 5-HT7 antagonist technology by exploring the chemical space and biological activity of a closely related series by modifying four regions of a substituted lactone: the aryl region, lactone β-substituents, bioisosteric piperazine replacement, and linker size changes for future in vivo pharmacokinetic studies.

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DuplicA: A user-friendly software for the comprehensive analysis of duplicate genes

Presenter: **Nathan Duda**

Co-author(s): Stella Wang and Ali Vali

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School/College: *Science and Technology*

Faculty Mentor: Rob Kulathinal

Studying duplicate genes in assembled genomes is crucial for understanding how new genetic variants are generated and functions become diversified. However, the lack of bioinformatics skills and coding knowledge often prevents researchers from fully leveraging available analytical tools. To address this, we developed a software solution, DuplicA (Duplicate gene Analysis), which offers a user-friendly graphical user interface (GUI) that eliminates the need for coding expertise. DuplicA compares a wide range of pre-existing duplication models for analyzing small-scale and whole-genome duplications within populations and across species. Key functionalities include the assessment of selective pressures and evaluation of coding sequence or gene expression divergence. By streamlining these powerful analytical tools into an accessible platform, DuplicA expands access to sophisticated genomic analyses, allowing more researchers to explore and interpret complex genomic data without coding. This tool aims to significantly enhance the efficiency of genomic research in the study of duplicate genes and their evolutionary implications, thus, providing a deeper understanding of genomic complexity and innovation.

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Predictive Modeling of the Impact of Half-Life Extension on Pharmacokinetic Parameters

Presenter: **Paige Morris**

Co-author(s): Paige Morris and Patrick Glassman

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School/College: *Science and Technology/Pharmacy*

Faculty Mentor: Patrick Glassman

Half-life extension (HLE) strategies enhance the pharmacokinetics (PK) of peptide and protein therapeutics by reducing clearance rates, enabling less frequent dosing, and improving patient adherence. Common HLE methods include albumin and Fc fusion, PEGylation, XTENylation, and PASylation, each designed to prolong drug circulation.

This study examines the impact of HLE on key PK parameters such as clearance, half-life, volume of distribution, and mean residence time (MRT). Using statistical analyses and machine learning models, we explore correlations between molecular weight, administration routes, and PK behavior across species. Principal Component Analysis (PCA) and non-linear regression will identify critical predictors of half-life extension success.

By developing predictive models, this research aims to optimize HLE strategies and guide the design of next-generation therapeutics with improved efficacy and usability. These insights will contribute to the advancement of more effective, patient-friendly peptide- and protein-based treatments for clinical applications.

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Retrospective CBCT Analysis of Dimensions and Angle of the Nasopalatine Canal in a United States Dental School Population

Presenter: **Kenneth Tang**

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Faculty Mentor: Yueh Hsiao

The nasopalatine canal is a bony canal in the maxilla midline, at the anterior hard palate, connecting the nasal cavity superiorly to the oral cavity inferiorly. The canal houses the nasopalatine nerve and is where sphenopalatine arteries and the greater palatine arteries anastomose. The nasopalatine canal and the nasopalatine canal angle are integral anatomical landmarks that should be analyzed prior to dental implant site augmentation and placement of dental implants in the maxillary regions, especially in esthetic zones. While there is a growing body of literature research on the shapes and branching of the nasopalatine canal, there is scant evidence on effects of physiologic variables on the nasopalatine angle, the angle that bisects the line that connects both anterior and posterior nasal spina and midline of the nasopalatine canal. Cone beam computed tomography (CBCT) is an image modality in dentistry that is standard of care and is a safe and accurate method to identify and examine vital maxillofacial anatomic landmarks and structures for diagnostic and pre-surgical purposes. Proper identification of these anatomic landmarks prior to dental implant surgery is essential to avoid damaging neurovascular bundles that can influence the success of surgical procedures. The objective of this study is to evaluate the morphological variations of the nasopalatine canal and nasopalatine angle in a dental school population using cone beam computed tomography in CBCT sections. Other variables that may have effect on the nasopalatine canal and angle to be evaluated include age, gender, ethnicity, dentition status of maxillary incisors, smoking status, and history of trauma and/or infection of maxillary incisors.