

ARCH SCHOLARS RESEARCH SYMPOSIUM



October 2, 2026
2:00-4:00pm

Norris Student Center
Evanston Campus

POSNER RESEARCH FELLOWS

Nanees Abakar (Poster #1)

Faculty Mentor: Sylvester Johnson

Department: Black Studies

“The Intersection Between Global Humanitarian Neglect Towards Sudan and Local Community Resilience Developed in the Absence of Formal Aid” - Sudan is the world’s fastest-growing displacement crisis and largest humanitarian crisis. However, Sudan faces limited media attention, donor funding, and political incentives. While current research acknowledges Sudan as one of the world’s most underfunded crises and that community-based methods are effective for delivering aid, research on the informal survival networks Sudanese civilians build in the absence of formal aid remains scarce. This research project explores the intersection between global humanitarian neglect in Sudan and local community networks developed in the absence of formal aid.

Alex DaCorte (Poster #3)

Faculty Mentor: Ian Savage

Department: Economics

“Demand Shocks, Debt Burdens, and Railroad Safety During the Great Depression” - My research examines how the Great Depression affected railroad maintenance and safety. I study whether the large decline in railroad demand and revenue between 1928 and 1932 was associated with changes in maintenance spending, and whether those changes were subsequently associated with railroad safety outcomes. Using historical data from the Interstate Commerce Commission, I collected financial, maintenance, and safety data for 132 Class I railroads. I find that the Great Depression produced a substantial decline in railroad activity, but the relationships between financial pressure, maintenance reductions, and safety outcomes were generally weak or inconsistent. These findings suggest that railroads may have continued to prioritize safety despite financial pressure.

Cora Ellison (Poster #8)

Faculty Mentor: Adia Benton

Department: Anthropology

“Student-Athlete Mental Health & Performance” - This research examines how Northwestern student-athletes experience performance pressure, injuries, and institutional support systems while balancing athletic and academic responsibilities. It explores how these factors may influence stress, well-being, coping, and help-seeking across different competition levels. I used an anonymous Qualtrics survey to gather student-athletes’ firsthand perspectives on pressure, injury, support resources, and mental health. Optional follow-up interviews were intended to further explore athletes’ experiences and perceived gaps in support.

Ashley Flores (Poster #2)

Faculty Mentor: Katherine Collison

Department: The Family Institute

“Obsessive-Compulsive Personality Disorder and Victimization of Sexual Coercion” - My research over the summer focused on obsessive-compulsive personality disorder (OCPD), and whether it has a connection with experiencing sexual coercion. Specifically, people with OCPD have similar relationship struggles as people with avoidant attachment style, including intimacy avoidance and withdrawal tendencies. People with this style of attachment suffer greater risk of experiencing sexual coercion in a relationship because of demand/withdrawal situations. Therefore, it was my hypothesis that partners with OCPD had a high risk of experiencing sexual coercion in their relationships. My research process included a background literature review, running correlational exams using my mentor Dr. Katherine Collison's previously collected data, and writing a research paper.

Alexandria Hampton (Poster #7)

Faculty Mentor: Rebecca Ewert

Department: Sociology

“Beyond the Doctors' Office” - My research examines why people with long COVID turn away from traditional medical professionals and seek support in online health communities. By analyzing posts from the r/longcovid subreddit, I explored how users share advice, form collective identities, and respond to the stigma they face in their daily lives. The findings show that many individuals experience dismissal from doctors, employers, and even family members, which leads them to rely on online spaces for validation and guidance. Within the subreddit, members and moderators shape strong norms around recovery that influence how people talk about their illness. This project highlights how digital communities can reshape health beliefs and provide support for those navigating chronic conditions.

Genesis Hernandez Cabrera (Poster #4)

Faculty Mentor: Myrna Garcia

Department: Latina and Latino Studies

“Sin Fronteras Politics: Puerto Rican-Mexican Solidarity Work for Immigration Activism” – This project delved into understanding the political ideology of the Puerto Rican Socialist Party. Understanding this political ideology in connection to Centro de Acción Social Autónoma would contribute to understanding the solidarity work that was done between the Puerto Rican and Mexican/Latine communities in Chicago. These communities worked in solidarity against the Immigration and Naturalization Service in the 1970s. The specific curiosity arises as the Centro de Acción Social Autónoma highlighted Sin Fronteras politics that focused on uniting Mexicans and Latine communities regardless of legal citizenship. This brings the connection as to why we are looking at the Puerto Rican Socialist Party and Centro de Acción Social Autónoma

Eunice Idani (Poster #5)

Faculty Mentors: Peter J. Carroll

Department: History

“Fear and Life: How to Live After the One-Child Policy Policy” – With all restrictions on birth removed as of 2021, its effects are still yet to fully be seen. During the course of 8 weeks, this project focused on how people's perceptions have changed in response to fears caused by the One-Child Policy. Specifically, how did people decide to conduct their lives, and how did their views of themselves, their neighbors, and the role of their government change in response to the introduction of this policy.

Alisande Jaiserrisingh (Poster #12)

Faculty Mentor: Mary McGrath

Department: Political Science

“The Impact of Digital Propaganda regarding ICE Operations on Affective Polarization in the United States” - In a contemporary political climate characterized by increasing affective polarization, it has become pertinent to explore how digital propaganda impacts partisan attitudes and behavior. The rise in Immigration and Customs Enforcement (ICE) activity across the United States has been depicted in digital propaganda, including videos posted on official social media pages that support deportation conducted by ICE. My research project aimed to answer the question: ‘Does digital propaganda about Immigration and Customs Enforcement (ICE) operations increase out-group animosity?’ This project aims to contribute to a broader understanding of the effects of propaganda consumption and to reduce affectively polarizing actions in socio-political contexts.

Adeyemi Kasali (Poster #13)

Faculty Mentor: Abigail Barefoot

Department: Legal Studies

“Synthetic Media, Real Harms: The Limits of U.S. Internet-Based Sexual Abuse Law” - Feminists have long been concerned about the dissemination of nonconsensual intimate imagery (NCII) or "revenge porn" on the internet. Being a victim of NCII can often have disastrous effects on one's life, with victims commonly suffering from prolonged mental health issues, harm to their professional careers, and social marginalization. The emergence of deepfakes, artificial intelligence technology capable of generating images and videos, has only exacerbated the issue, now making it possible to create synthetic NCII. Using a mixed-methods approach, this project aimed to explore how U.S. NCII laws have evolved in recent years, particularly with the advent of synthetic NCII. The research found that the legal landscape around NCII remains fractured, with states often taking vastly different approaches to regulating the issue. Ultimately, although the widespread adoption of NCII laws is an encouraging sign, the laws themselves have changed little over the years, raising questions about how equipped they are to address the ever-evolving nature of the technology that powers the dissemination of NCII.

Isabella Machado (Poster #6)

Faculty Mentor: Sarah B. Rodriguez

Department: History and Global Health

“The 1994 International Conference on Population Development (ICPD) and El Salvador: How ICPD impacted El Salvador's Reproductive Care Access in the 1990's” - This summer, I conducted historical global health research with my mentor, Sarah B. Rodriguez. I focused on a landmark conference that took place in 1994: the International Conference on Population and Development (ICPD). More specifically, I researched the conference's impact on El Salvador's healthcare sector and how the country approached reproductive care and access following the ICPD. I began my research in the late 1980s, when sterilization rates among women were high and access to birth control was limited. I concluded my research in 1999, five years after the ICPD, when El Salvador enacted one of the world's strictest abortion laws. I analyzed various archival sources to build a timeline of this period, examining not only the impact of the ICPD but also the roles of the government and nongovernmental organizations in shaping these changes.

Diana Oliver (Poster #11)

Faculty Mentor: Nicolette Bruner

Department: Legal Studies

“Progression of Corporate Religious Rights: The Afterlife of Burwell v. Hobby Lobby Stores, Inc.” – Following the 2014 Burwell v. Hobby Lobby Stores, Inc. Supreme Court decision, corporations were granted the right to religious expression given specific criteria met. This was an unprecedented expansion of the religious rights of corporations and my research aims to track the cases afterlife in the legal world. Focusing on cases which cite Burwell as a significant , I analyzed the main precedents and arguments used to track how legal field applies Burwell. After, I evaluated whether the religious rights of corporations have expanded or stayed stagnant and specific unique cases that challenged conventional approaches to the law.

Temilola Olorunsola (Poster #15)

Faculty Mentor: Akin Ogundiran

Department: History

“Mapping Connectivity in the Oyo Empire through Neighborhood Analysis of Potters Marks in Ede-Ile” – I performed archeology research at the University of Ibadan, Nigeria. My research consisted of ceramic analyses on 16th century artifacts from the Old Oyo Empire.

Lucia Patterson (Poster #14)

Faculty Mentor: Sanford Goldberg

Department: Philosophy

“The Epistemology of Political Polarization” - My project explores how philosophical tools can be used to evaluate and inform the problem of political polarization. I drew on existing political science and sociological literature to characterize the epistemic practices exhibited by different American political communities, determining how they assign trust to sources and why. I then read philosophical work in epistemology to assess which of those practices are philosophically defensible. Research for understanding rather than belief, combined with source understanding and intellectual humility, surfaced as a practice that lets citizens engage in democratic deliberation without falling into the credibility errors of either party.

Carridee Raymundo (Poster #10)

Faculty Mentor: Matt Pryor

Department: Political Science

“Microtargeting Personalities in Political Advertisements” - Whatever one’s opinions on AI are, it is undeniable that we are in a time of unprecedented change. In political advertising, or campaigning, the use of algorithmic microtargeting using Big Data is becoming more and more common. What makes this different from the TV ads or the door-to-door campaigning of the past? The introduction of Big Data means that each individual can be identified at a precision and efficiency never before seen, right down to one’s unique personality. Whether privacy or individuality is your concern, this research attempts to examine the impact of transparency and disclosure on the unprecedented effectiveness of personality-based microtargeting in campaigns.

Angelica Urquiza (Poster #9)

Faculty Mentor: Jesse Yeh

Department: Legal Studies

“The Intersectionalities of Latina Individuals” – Family and school are essential pillars in the life of a Latina youth, especially since they spend most of their time in both places. Thus, my research seeks to understand how internal factors and external factors lead or discourage Latina youth from entering the school-to-prison pipeline. Understanding how internal factors such as family dynamics and cultural stigmatization, in turn with external factors such as school policies, affect them and their decisions will provide a better understanding of how to offer support within the school and home environment. It will also support and acknowledge their own intersectionalities that are present in both places.

Sabrina Zhang (Poster #16)

Faculty Mentor: Jesse Yeh

Department: Legal Studies

“Partisan Loyalty and the Acceptance of Democratic Norm Violations” - This study examines whether partisan identity shapes how people evaluate potential violations of democratic norms by a president. Using a survey experiment, 198 U.S. adults evaluated 10 hypothetical presidential actions attributed to either a Democratic or Republican president. The study compares responses based on whether the president’s party aligns with the participant’s own political identification. By holding the presidential actions constant while changing the president’s party, the experiment isolates the role of partisan alignment in judgments of political behavior. The project contributes to research on partisanship, democratic norms, and political decision-making.

NU BIOSCIENTISTS

Arwa Abukchm (Poster #22)

Faculty Mentor: Katherine Sadleir

Department: Neurology (FSM)

Effect of Annexin A6 Genetic Deletion on Alzheimer’s Disease-like Pathophysiology – My research investigates how the loss of Annexin A6, a protein that helps repair damaged cell membranes, may contribute to Alzheimer’s disease (AD) progression. Using mouse models of AD, I examine whether removing Annexin A6 leads to greater damage to neurons and increased accumulation of abnormal tau protein. I compared brain tissue at different stages of disease and use microscopy to measure changes in neuronal and brain cell health. This work may help clarify how damage caused by amyloid plaques contributes to the progression of AD and identify potential targets for future therapies.

Precious Adedokun (Poster #19)

Faculty Mentor: Keren Sneh

Department: Biomedical Engineering

“Validating the Secretion of Clinical Biologics in an Engineered Lactobacilli Delivery System for Psoriasis Therapy” - The project focuses on engineering probiotic bacteria to deliver targeted biologics for inflammatory skin conditions like psoriasis. Current biologic treatments require systemic injections that can cause broad immunosuppression, so our goal is to create a localized, non-invasive topical alternative. We designed therapeutic constructs to neutralize key inflammatory cytokines (IL-17, IL-23, and TNF- α) directly within the outer skin layer. Using synthetic biology techniques like Gibson Assembly, we built expression plasmids and confirmed active biologic secretion from bacterial cultures. Overall, this work provides proof-of-concept for living biotherapeutics capable of managing skin inflammation directly at the surface.

Delia Akyea (Poster #40)

Faculty Mentor: Monica Laronda

Department: Pediatrics - Endocrinology (FSM)

“Determining Effects of PLOD1 Depletion in Bovine Ovary-Derived, Extracellular Matrix Hydrogels on Murine Follicle Growth, Survival, and Maturation” - Ovarian tissue cryopreservation (OTC) and subsequent transplantation (OTT) is a fertility preservation option for pediatric and young adult cancer patients undergoing chemotherapy or radiation. OTT, however, is associated with limited pregnancy success rates and a relatively short hormonal lifespan. Researchers are alternatively developing a bioprosthetic ovary that mimics the ovarian extracellular matrix (ECM), the environment that supports follicle development. This project explores the role of the ECM protein PLOD1 in regulating follicle growth, survival, and maturation.

Ruby Becerra (Poster #17)

Faculty Mentor: Richard Smith

Department: Pharmacology (FSM)

“KCNQ2 Localization and Electrophysiology” – This summer I was given the opportunity to work at the Smith Lab down in Feinberg, our medical school. While there, I was focused on the KCNQ2 gene responsible for a voltage-gated potassium channel family, which has been known to be a contributor to seizures in newborns and infants. While there, through many difficult trials, I was able to run immunohistochemistry experiments and assist in running patch-clamp electrophysiology. Both procedures were meant to aid in my understanding of the localization and function with regards to electrical activity within the cell. While the immunohistochemistry experiments, I ran rendered good results, I was left wanting to run a few more to gain a better understanding of this gene's expression across later stages of fetal development. With the patch-clamp experiment, we were unable to actually gather data the first time around, so the goal is for further attempts to collect proper data.

Michaela Bridges (Poster #18)

Faculty Mentor: Daniel Martin Watterson

Department: Pharmacology (FSM)

“Why Microglial States Matter for p38 α MAPK Inhibitors: Resolving the IL-1 β Mechanism Gap” – My research project was writing a literature review about p38 α MAPK Inhibitors and the p38- α /IL1- β pathway. During my project I discovered that there was little known about how microglial states play a role in p38 α inhibition. Based on this gap in knowledge, I wanted to know what experiments can experts conduct to understand if inhibiting p38 α reduces IL-1 β levels by acting directly on microglial signaling or by shifting microglial state distribution? To address this gap in knowledge, I proposed three experiments experts can run to resolve this gap. Doing so can help researchers know if patients should be separated by microglial state in future clinical trials.

Sammy Cantu (Poster #20)

Faculty Mentor: Sarah Mangia and Diego Santana

Department: Field Museum of Natural History

“Organizing Taxonomic Classifications of South American Amphibians Through Museum Science & Bioacoustical Analysis” - During my 8 weeks of research, I contributed to 2 separate projects, including the creation of a digital, illustrated catalogue of South American amphibian type specimens from the Field Museum of Natural History, and the bioacoustical analysis of advertisement calls of an undescribed species of horned frogs from Brazil. The creation of the illustrated catalogue was for the purpose of improving access researchers around the world have to wet collections, which are important in the field of taxonomy. Specifically, this wet collection at the field museum houses several type specimens, historically significant specimens that have been preserved in ethanol and used to describe their species once they are discovered. For my second project, I analyzed over 650 recordings taken from audio traps placed in the Templo dos Pilaes municipal natural park in Brazil. For each recording, I determined whether or not the advertisement call of interest was present, allowing us to understand what times of the day are the frogs most active and what other conditions contribute to this. Additionally, these recordings can be used to formally describe the frog call in a publication, bringing this new species to science.

Roddic Chen (Poster #23)

Faculty Mentor: Brian Popko

Department: Neurology (FSM)

“PERK-Initiated ISR Activation on Myelin Regeneration in Mice with Vascular Dementia” - Vascular dementia (VaD) accounts for 15-20% of all dementia cases, making it the second most abundant type of dementia behind Alzheimer's disease. VaD leads to the production of PERK, a protein with a normally protective function against cytotoxic stress. However, the opposite effect is seen in PERK for oligodendrocytes—glia cells that myelinate neuronal axons for accelerated signal transfer in the central nervous system. When mice fed with a high fat & high blood pressure diet (to induce VaD) for 5 weeks stop producing PERK, there were greater myelination of axons in the corpus callosum. To better represent human fat content as long term, we did the same experiment for 10 weeks of diet. We saw a decrease in protection when allowing the diet to extend, hinting that PERK may not be the only factor contributing to the degradation of oligodendrocytes.

Sherman Flores (Poster #25)

Faculty Mentor: Heather Pinkett

Department: Molecular Biosciences

*“Structural Characterization of the Dimerization Domain of the Zinc Cluster Transcription Factor Pdr3” - Zinc cluster transcription factor Pdr3 increases the expression of ATP Binding Cassette (ABC) transporters. These ABC transporters, more specifically ABC exporters, extrude harmful compounds from certain infectious yeast such as *Saccharomyces Cerevisiae*, otherwise known as Baker's yeast, that increases its pleiotropic drug resistance. I specifically looked at determining how to improve the crystallization of Pdr3 as it has been elusive to find a consistent crystal tray condition that crystallized Pdr3's binding domain. I learned the preparatory work needed to obtain a pure sample of protein, and I began to optimize the conditions for Pdr3's binding domain to crystallize with DNA and itself. This is in hopes to obtain the structure of the protein and, in the future, learn how to inhibit the protein.*

Fatima Gbenro (Poster #24)

Faculty Mentor: Atique Ahmed

Department: Neurological Surgery (FSM)

“Exploring Aberrant Vimentin Expression and Localization in Glioblastoma” – Glioblastoma (GBM) is a fast-growing and aggressive brain tumor that starts in astrocytes, star-shaped cells on the brain and spinal cord. TMZ is typically used alongside radiation and surgery as the standard of care to treat GBM. Vimentin (VIM) is an intermediate filament protein typically found in the cytoplasm, but previous studies at my lab indicated its presence in the nucleus of GBM cells. This led to the hypothesis that temozolomide (TMZ), a type of chemotherapy, induces nuclear localization of vimentin. My project seeks to further explore the mechanism by which nuclear VIM may contribute to chemoresistance in GBM.

Juveriya Ghouri (Poster #32)

Faculty Mentor: Justyna Dobrowolska Zakaria

Department: Neurology (FSM)

“Validation of BACE Inhibition-Induced AETA and Soluble Amyloid Precursor Protein Elevation by SDS-PAGE and Western Blot” – Alzheimer's disease (AD) has long been studied through the amyloid hypothesis, which proposes that amyloid-beta ($A\beta$) accumulation contributes to plaque formation and neuronal death. $A\beta$ originates from the cleavage of amyloid precursor protein (APP) by BACE1, leading BACE1 inhibitors to be investigated as potential therapeutics for AD. However, clinical trials of BACE1 inhibitors demonstrated unexpected, non-progressive, and reversible cognitive worsening, while studies in vitro and in mouse models found elevated levels of A η peptides (AETAs) following BACE1 inhibition. My project aimed to characterize conditioned media from H4APPwt cells and optimize an immunoprecipitation (IP) protocol to isolate and enrich AETAs.

Emory Kearns (Poster #21)

Faculty Mentor: Neha Kamat

Department: Biomedical Engineering

“Evaluating the Stability and Function of Artificial Cells for Biosensing Applications” – This summer, I conducted research in Dr. Neha Kamat's lab investigating the stability and function of artificial cells (aCells), which consist of cell-free systems encapsulated within synthetic lipid vesicles. I evaluated how conditions such as alginate concentration, temperature, and mechanical stress affected vesicle stability and protein expression. I also tested a fluoride-responsive riboswitch as a step toward developing aCells capable of biosensing. Ultimately, this work contributes to the broader goal of incorporating aCells into hydrogel-based materials that can sense and respond to their environment.

Sahand Khavari (Poster #39)

Faculty Mentor: Andrew Fink

Department: Neurobiology

“Acute Recording of Piriform Cortex to Determine Functional Differences Between Neurons with Unimodal and Bimodal ISI Distributions” – We performed an acute recording experiment on the piriform cortex in the brain in mice. We used extracellular recording to continuously extract spike times while 4 second of six types of odor were presented to the mouse. Spike train analysis was performed from the spike times. The analysis showed units with a bimodal Interspike interval peaks were more selective to odorants, and had lower average firing rate.

Emily Meija (Poster #26)

Faculty Mentor: Matt Goldrick & Erika Exton

Department: Linguistics

“Speech indicators of psychomotor disturbances in Major Depressive Disorder” - Previous literature suggests that there are different speech features between people with Major Depressive Disorder and people without depression. In order to understand Psychomotor Disturbance in speech we conducted a study where participants completed the Map task (neutral free response speech task). This summer was focused on finding the best way to process our data and start some initial analysis. We finalized a pipeline that automatically transcribes and force aligns our files. Our initial analysis suggests there are minimal pitch differences between depressed and healthy participants.

Silvino Miranda (Poster #27)

Faculty Mentor: Xiaomin Bao

Department: Molecular Biosciences

“Assessing the Role of SUPT16H in Skin Stem Cell Gene Regulation” - Acetyl-CoA Synthetase Short Chain Family Member 2 (ACSS2) is involved in transcriptional regulation in human skin stem cells, but the mechanism through which it influences gene expression remains unclear. Preliminary protein interaction data identified SUPT16H which is a subunit of the FACT complex as a potential link between ACSS2 and transcriptional regulation. We hypothesized that SUPT16H may contribute to ACSS2-associated transcriptional regulation through its role in FACT complex function and RNA Polymerase II pause-release. To investigate this, SUPT16H was knocked down in human keratinocytes using shRNA constructs, and knockdowns were validated at both the mRNA and protein levels. SUPT16H knockdown reduced its expression to approximately ~12% of control levels and generally increased expression of several genes associated with ACSS2-dependent transcriptional regulation. Future RNA sequencing and comparison with existing ACSS2 knockdown data will help determine whether SUPT16H and ACSS2 regulate overlapping transcriptional pathways.

Khaliah Muhammad (Poster #29)

Faculty Mentor: Monica Laronda

Department: Pediatrics-Endocrinology (FSM)

“Follicle Density and Composition of the Human Ovary Across the Life Span” – This study aims to understand how the body develops and loses fertility naturally without intervention, as well as the natural progression of ovarian aging. I will examine healthy ovarian tissues across the lifespan- including pre-pubertal, post-pubertal, and post-menopause to quantify follicle amount and qualify the follicle stages. I performed data analysis on a digital scan of H&E-stained tissue using software called Ovopath. This allows me to analyze the amount of follicles, and their oocytes and granulosa cells, in order to calculate follicle density and classify the follicles in stages of folliculogenesis.

Hiba Mhadhbi (Poster #47)

Faculty Mentor: David Victorson

Department: Medical Social Sciences (FSM)

“Components of Traditional Arabic and Islamic Medicine (TAIM) in Cardiovascular Care for Arab Americans: A Narrative Review” - Cardiovascular disease (CVD) disproportionately affects Arab American communities, highlighting the need for culturally responsive approaches to prevention and care. This narrative review examines Traditional Arabic and Islamic Medicine (TAIM) as a potential culturally integrative approach to CVD prevention among Arab Americans. Literature on medicinal herbs, dietary practices, applied therapies, mind-body therapies, and spiritual healing was examined for their relevance to cardiovascular health.

Jake Nañez (Poster #28)

Faculty Mentor: Gal Finer

Department: Pediatrics-Nephrology (FSM)

“From Gene Variants to Clinical Interpretation in Bardet-Biedl Syndrome” - My research focused on Bardet-Biedl syndrome (BBS), a rare genetic disorder affecting the primary cilia. I worked with Dr. Finer from Lurie Children's and Feinberg to co author a review paper on BBS for Genes journal. The review covered the history of BBS and its gene discovery, modules of the primary cilia and the genes that influence ciliary trafficking and signaling, and variant interpretation of genetic testing results. My contributions included source identification, summary, and classification; citation management; table organization; and figure creation.

Neilson Ngadiman (Poster #44)

Faculty Mentor: Karl Scheidt

Department: Chemistry

“Synthesis and Evaluation of Repin-Based Protein Degraders (RepTACs)” - The ubiquitin-proteasome system (UPS) helps maintain homeostasis by using E3 ubiquitin ligases to specifically tag proteins with ubiquitin, marking them for proteasomal degradation. Although there are over 600 E3 ligases in the human body, current targeted protein degradation only utilize a small fraction. The most prevalent examples, Von Hippel-Lindau (VHL) and cereblon (CRBN), are widespread throughout the body, which can lead to off-target side effects and drug resistance. This project focuses on DCAF2, an unexplored E3 ligase, and utilizes repin, a natural product isolated from Russian knapweed, as a novel E3 ligase recruiter. A set of repin-derived PROTACs (RepTACs) was synthesized and subsequently evaluated for target engagement and protein degradation. Experimental results confirmed DCAF2 engagement by repin, and that JQ1-based RepTACs effectively induced the targeted degradation of BRD4.

Rayan Nur (Poster #33)

Faculty Mentor: Joseph Bass

Department: Endocrinology (FSM)

“Circadian Regulation of Metabolism and Immune Function in Adipose Tissue” - This project looked at how PER2, a circadian clock protein, may affect T-cell function and metabolism. We used a T cell-specific Per2 knockout mouse model to study immune changes and how the mice responded to a high-fat diet. Preliminary results showed more IL-10-producing CD4+ T cells, increased regulatory T-cell proliferation in adipose tissue, and less weight gain in the knockout mice. Overall, the project helped show how the body's internal clock may connect immune function with metabolic health.

Jose Ovalle (Poster #49)

Faculty Mentor: Nyree Zerega

Department: Plant Biology and Conservation

“Investigating floral visitors of wild Jackfruit relatives, Artocarpus species” - The genus Artocarpus (Moraceae) encompasses many important food crop species such as Jackfruit and Breadfruit, yet little is known about their pollination mechanisms. Species in Artocarpus are often called a “miracle crop” in areas with high food insecurity worldwide because of their potential to prevent mass hunger. However, little scientific knowledge exists about the floral visitors of these jackfruit trees. Dr. Nyree Zerega’s lab (Chicago Botanic Gardens & Northwestern University) aims to conserve Artocarpus trees by investigating their insect visitors and identifying their putative pollinators.

Janice Phung (Poster #46)

Faculty Mentor: Jason Miska

Department: Neurological Surgery (FSM)

“ApoD as an Immune Evasion Mechanism in Glioblastoma” – My research explores whether glioblastoma (GBM) resists tumor immunity by upregulating Apolipoprotein D (ApoD) in response to inflammatory stress. Previous work from my lab suggested that ApoD may protect GBM cells against immune system attacks by sequestering arachidonic acid, a lipid needed for ferroptotic cell death. We investigated this mechanism by treating ApoD knockdown mouse tumor cell lines with the ferroptosis inducer RSL3. Our results showed that ApoD knockdown significantly sensitized cells to RSL3-induced ferroptosis, suggesting ApoD may be a therapeutic target for GBM.

Amta Pirzada (Poster #35)

Faculty Mentor: Heather Pinkett

Department: Molecular Biosciences

“Identification of Optimal Buffer Conditions for PepT Substrate-Binding Protein Peptidomimetic Complexes Using Absorbance Assays” - Non-typeable Haemophilus influenzae (NTHi) is a bacterium that causes several respiratory infections and relies on ABC transporters to obtain essential nutrients. My research focused on substrate-binding proteins (SBPs) associated with these transporters and explored the use of peptidomimetics as potential tools for targeting them. I used thermal shift assays to examine how different pH and salt conditions affected protein stability and investigated results using UV-Vis absorbance assays to assess aggregation. Buffer conditions were identified that could be used to improve future experiments studying protein–ligand interactions and crystallization.

Tijauna Powell (Poster #30)

Faculty Mentor: Laura Magaña-Hernández and Alicia Guemez-Gamboa

Department: Neuroscience (FSM)

“Establishing a molecular cloning workflow for the functional characterization of PCDH19 pilot variants” – This study focuses on the generation and assessment of PCDH19 variants. We looked at 17 PCDH19 variants in total: seven benign, seven pathogenic, and three nonsense. We took several necessary steps to allow the variants to be studied in a mammalian cellular environment. This included site-directed mutagenesis to generate the 17 variants and sequencing to confirm the proper mutation was incorporated. Finally, bacterial cultures produced sufficient DNA, and transfection allowed those variants to be studied in a cellular environment.

Aaron Robinson (Poster #37)

Faculty Mentor: Han Peng

Department: Dermatology (FSM)

“NLE Ang (1-7) Protein-Like Polymers (PLP) Attenuates Inflammation and Epidermal Hyperproliferation in Imiquimod-Induced Dermatitis” - This research looked at whether NLE Ang (1-7) PLP could help reduce inflammation and excessive skin cell growth in dermatitis. The PLP was used to make NLE Ang (1-7) more stable and protect it from being broken down too quickly. We found that the treatment reduced inflammation, disease severity, and skin thickening in the model. It also increased markers like loricrin and K10, which are important for normal skin cell development. Overall, these results suggest that NLE Ang (1-7) PLP could have potential as a treatment for inflammatory skin conditions.

Júlia Graziela Rocha do Nascimento (Poster #31)

Faculty Mentor: Omar Farha

Department: Chemistry

“Post-Synthetic Exchange of NU-3001 by Chemically Diverse Metals” - NU-3001 is a metal-organic framework reported by the Farha Lab that has strong potential for metal exchange through a process called post-synthetic exchange, or transmetalation. In this project, I attempted to transmetalate the NU-3001 framework with chemically diverse metals, including Gadolinium, Neodymium, Cobalt, Lanthanum, and Manganese.

Sara Simmons (Poster #48)

Faculty Mentor: Daniel J. Brat

Department: Pathology (FSM)

“Spatial Transcriptomic Mapping of the Tumor Microenvironment in a Mouse Model of Glioblastoma Using MERFISH” - This project examines how the hypoxic tumor microenvironment shapes glioma and immune cell behavior in glioblastoma (GBM), an aggressive brain tumor, as part of ongoing work in the Brat Lab. The study establishes a spatial transcriptomics workflow using multiplexed error-robust fluorescence in situ hybridization (MERFISH) on the Vizgen MERSCOPE platform, which measures gene expression while preserving each cell's location within the tissue. Using two mouse GBM tissue samples, more than 500,000 cells and 550 million transcripts were processed, imaged, and analyzed, with unsupervised clustering identifying transcriptionally distinct cell populations organized across the tumor. These results show that MERFISH can resolve spatially organized glioma and immune-cell states in this model, laying the groundwork for future work assigning biological identities to these populations and studying their relationship to hypoxic and necrotic regions. Looking ahead, this workflow will support comparisons between untreated tumors and those exposed to chemotherapy and radiation to understand how treatment reshapes the tumor microenvironment.

Christian Velazquez (Poster #34)

Faculty Mentor: Fumiaki Ito

Department: Microbiology-Immunology (FSM)

“Understanding and Analysis of HIV-1 Vif Interactions” - For this presentation, I will give a brief description of how our goal as a lab was to understand and analyze the interactions HIV-1's Vif has with host cells. I will offer information on HIV-1 and host proteins like APOBEC3, and explain their importance. I will later share my experience in the lab and share my experiences. To conclude, I will discuss what is to be expected in the future.

Landon Warner (Poster #36)

Faculty Mentor: Claire Bertrand and Jay Mittal

Department: Psychology

“Turn-Taking Behavior as an Objective Marker of Symptom Severity in Current and Remitted Major Depressive Disorder” - This project studied how delays between turns in conversation may relate to symptoms in people with current or remitted Major Depressive Disorder. Using linguistics software, we annotated the demographic and medical history section of clinical interviews with participants with cMDD or rMDD, coding for question difficulty, answer complexity, and Between Turn Delay. Correlational tests were then done to test for associations between BTDL length and symptom severity.

NU NANOSCIENTISTS

Rickaiya Bernard (Poster #41)

Faculty Mentor: Stefan Zeiske

Department: Chemistry

“Enhancing SWIR Photodetection Using Varying ETLs in InAs CQD Photodetectors” - In this study, InAs CQD photodetectors were fabricated and characterized to investigate the impact of ETL design on device performance. The results demonstrated that ETL concentration, annealing conditions, and material selection all influence charge extraction, quantum efficiency, and dark current. Overall, ZnO-based devices exhibited the strongest performance, with higher ZnO concentrations generally improving carrier extraction and EQE, while moderate annealing conditions helped suppress dark current and improve device consistency. In contrast, the degraded behavior observed in the SnO₂ devices highlighted the importance of ETL stability, film uniformity, and processing conditions. These findings show that ETL engineering is a critical tool for optimizing InAs CQD photodetectors and advancing low-cost, environmentally friendly SWIR detection technologies. Future work can focus on device stability, aging studies, dark-current reduction, and the evaluation of alternative ETL materials such as AZO.

Matthew Myszka (Poster #43)

Faculty Mentor: Lauren Martin

Department: Chemistry

“Time-Dependent Second Harmonic Generation Reveals Pulse-Length-Dependent Interfacial Dynamics at Nickel Electrodes” - My research used time-dependent second harmonic generation (SHG), a surface-sensitive optical technique, to probe how the interface of nickel electrodes responded to changing electrical potentials. I systematically varied the duration of alternating potential pulses and monitored the resulting SHG response. Preliminary results showed that pulse timing affected the optical response and that the interface did not appear to reorganize instantaneously after a change in potential. Further analysis focused on quantifying these relaxation dynamics and understanding how they may contribute to more efficient pulsed electrochemical processes.

Jorge L. Pano (Poster #45)

Faculty Mentor: Julio C.V. Chagas

Department: Chemistry

“Linear, Classical, and Entangled Two-Photon Excitation Pathways in Hoechst Dyes.” - This project investigated how three fluorescent Hoechst dyes—Hoechst 33258, Hoechst 33342, and Hoechst 34580—respond to one-photon, classical two-photon, and entangled two-photon excitation. Computational chemistry methods were used to model their absorption spectra and analyze the electronic states involved in each excitation process. The calculated one-photon spectra were broadly similar across the three dyes, while two-photon excitation emphasized higher excited states and produced stronger dye-dependent differences. Hoechst 33258 showed the clearest change in the dominant excited state between classical and entangled two-photon excitation, whereas Hoechst 33342 and Hoechst 34580 retained the same dominant state under both. These results suggest that entangled light can change the relative contributions of molecular excited states and may help inform future quantum-light spectroscopy and imaging studies.

Ojas Sharma (Poster #42)

Faculty Mentor: William Salvia

Department: Chemistry

“Magnetic Field Effects in Isolated FMN-Cysteine Radical Pair System” - Previous research in the Han lab(the lab I work in) has shown significant evidence that AsLOV2 proteins are sensitive to magnetic fields. Under pulsed magnetic fields, AsLOV2 has been shown to have a magnetic field Effect (MFE). Further research showed that a chromophore called FMN and a residual Cysteine amino acid form a radical pair which allows for this MFE to exist. My research was analyzing whether this MFE is possible in an isolated system without the whole protein scaffold and only the FMN-Cys residual core.

Julius Sweiss (Poster #38)

Faculty Mentor: Ethan Ashbrook

Department: Chemistry

“Structural and Optical Characterization of Perovskites Containing Separate Ethylenediamine Derivatives with Varying Ring Size” – My research was a segment of my mentor’s paper. He is researching a new perovskite called hollow perovskites. They have organic in them called hollowing agents that replace octahedral and organics in the perovskite structure while maintaining the same framework. I was tasked with derivatives if a certain hollowing agent and they were varying ring sizes of ethylenediamine.

Faculty and Staff

Luke Flores – Director
Rebecca Siroky – Assistant Director
Carissa Thalmann – Program Coordinator

Veronica Berns – Nanoscientist Faculty
Bill Leonard – Bioscientist Faculty
Michele McDonough – Bioscientist Faculty
Zach Nissen – Posner Fellowship Faculty

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