

SROP

Summer Research Opportunity Program

June 15 – August 7, 2026



A Message from the Dean

The Summer Research Opportunity Program (SROP) is a signature activity hosted by The Graduate School at Northwestern University. SROP was launched at Big Ten Academic Alliance universities in 1986 as a gateway to graduate education. It represented a way for prospective students from an array of backgrounds and experiences to engage in scholarly research and learn more about what it means to attend graduate school. Over the past nearly four decades, it has grown into a supervised, research-intensive experience, complemented by academic enrichment activities and exposure to graduate school as a post-baccalaureate option. And over this time, we have expanded the disciplinary scope and faculty engagement so that students with broad-ranging future interests may benefit from the program.

The Graduate School spans a wide variety of programs and disciplines across Northwestern and provides comprehensive academic and professional development for our graduate students. We are stronger as an institution and as a society when we can learn from and consider a broad range of ideas, experiences, and perspectives. These important aspects of engagement are a hallmark of the SROP program, and I hope that you have enjoyed interacting with and learning from other program participants as well as those in your research sites over the course of the summer.

I am also pleased that SROP continues to offer student participants a wide-ranging series of academic activities and professional development workshops to aid in preparing each of you for your steps toward graduate education. I greatly appreciate and admire your perseverance and commitment to your scholarly pursuits. I have had the pleasure of mentoring and working with a number of SROP students, and it has always been extremely rewarding to watch their careers develop.

Congratulations to all our student participants, faculty and student mentors, and staff who have made this experience possible. We hope that SROP inspires your continued learning and exploration, at Northwestern, your home institutions, and beyond.

Sincerely,

Kelly E. Mayo

Walter and Jennie Bayne Professor of Molecular Biosciences
Dean of The Graduate School and
Associate Provost for Graduate Education
Northwestern University



A Message from the **Associate Dean**

Thank you for joining us for our 41st Annual Research Forum for Northwestern's Summer Research Opportunity Program (SROP). We are extremely proud of our SROP participants who will be sharing their summer research projects through oral presentations and poster presentations.

SROP intentionally champions a multitude of perspectives, ideas, and experiences to foster innovation and academic excellence. To remain competitive as a research university of the first rank, we must recommit, restructure, and reframe discussions that tie a humanistic perspective to admission, matriculation, retention, academic progress, and mentoring.

We welcomed our SROP students eight weeks ago with orientation programming including workshops on mentoring, research, and writing skills. Our SROP participants networked with current graduate students and administrators, participated in our virtual graduate school professional development series led by campus partners, and enjoyed socializing and coaching in our Purple Table Talks hosted by the SROP group leaders who are current Northwestern PhD students.

The success of SROP would not be possible without the partnership of many Northwestern colleagues. I would like to extend a sincere thank you to Dean Mayo, The Graduate School, SROP faculty mentors, SROP group leaders, Northwestern campus partners, and the entirety of The Graduate School's Office of Graduate and Postdoctoral Success. I want to give special thanks to Brittany Young whose leadership of SROP and dedication to cultivating an enriching academic experience have been invaluable to the continued success of the program. We look forward to continuing to sponsor this wonderful program in the years to come.

Congratulations to our scholars on this milestone accomplishment!

Sincerely,

Sheehan D. Fisher

Associate Professor of Psychiatry and Behavioral Sciences
Associate Dean for Academic Environment and Success
The Graduate School, Northwestern University



A Message from the Director

Thank you for joining us today as we celebrate the achievements and research of our 41st Summer Research Opportunity Program (SROP) cohort. The Graduate School's Office of Graduate and Postdoctoral Success (GPS) team, including GPS staff, interns, and collaborators, have had the honor of engaging with the SROP students to create a high-quality, research-intensive, and community-focused summer.

I am continually impressed with the high caliber, resilience, and drive of our students as they participate in this process, resulting in a cohort of forward-thinking scholars, innovators, and changemakers. I speak on behalf of myself and the entire team when I say that we have had the pleasure of learning from such gifted individuals. I am waiting in awe of the contributions they will make to the academy and society in their future endeavors.

Our success this year would not have been possible without the partnership of many Northwestern colleagues and the commitment, dedication, and focus of our students. I extend my deepest gratitude and thanks to the core SROP team, the GPS staff, The Graduate School (TGS) staff, SROP faculty mentors and their program administration, postdoctoral scholars, graduate students, and lab teams. I also want to extend a sincere thank you to all our campus partners and external facilitators, and guest speakers. It truly takes a village and SROP would not be successful without all of you. I look forward to upholding and strengthening our partnerships and continuing this work together, enhancing this amazing program for many years to come.

Sincerely,

Brittany C. Young

Director of the Summer Research Opportunity Program and the Office of Graduate and Postdoctoral Success
The Graduate School, Northwestern University

SROP Participants



Adiyah Obolu

Ethnicity, Race, and Migration

Yale University

Faculty Mentor: Barnor Hesse, PhD • Black Studies

Adiyah Obolu is a rising senior at Yale University majoring in Ethnicity, Race, and Migration and pursuing a Certificate in Education Studies. Raised in Sacramento, California, Adiyah's experiences have shaped her research interests in Black studies, migration, education, diaspora, and the ways communities imagine and build more just futures. Adiyah is broadly interested in questions of Black identity, belonging, and liberation across time and place. This summer, she is working with Dr. Barnor Hesse to explore Ethiopia's place within Pan-African thought and the Black diaspora. She is especially focused on how Black solidarity and sovereignty has been constructed and debated throughout history. At Yale, Adiyah is a Mellon Mays Undergraduate Research Fellow, works at the Good Life Center, and performs with WORD, Yale's oldest spoken word group. After graduation, she hopes to pursue a PhD and continue

researching questions about diaspora and collective freedom. In her free time, she writes poetry, explores new cafes, and spends time with friends.

Abstract:

"Grandchildren Beyond the Seas": Ethiopia and Black Diasporic Solidarity during the Harlem Renaissance

During the Harlem Renaissance, Ethiopia occupied a unique place within Pan-African and Black diasporic thought, as a powerful symbol of Black sovereignty. Focusing on the period from 1920 to 1937, this research paper examines how, following Ethiopia's successful defeat of Italian invaders in the Battle of Adwa of 1896, Ethiopia was transformed from a geographic nation-state into a source of racial dignity and Black unity. The country served as a wellspring of diasporic imagination amid European colonialism and U.S. segregation. Through archival, literary, and semiotic engagement, I trace how Ethiopia's symbolism was presented in political, religious, and cultural acts of solidarity. I argue that Ethiopia occupied such a unique place in Pan-African imaginaries due to the convergence of sovereignty, sacredness, and solidarity. At times, this imagination required symbolism and simplification and did not always account for the complexities of Ethiopian imperialism or identity formations. While scholars have traced Ethiopia's symbolic representation during the Harlem Renaissance, this research revisits these moments of solidarity to examine what they reveal about how diasporic communities forge collective identity across geographic and cultural distances. More broadly, this research contributes to conversations on collective memory, Pan-Africanism, and the formation of diasporic identities beyond national borders.

SROP Participants



Anabelle Jimenez

Psychology

Northeastern Illinois University

Faculty Mentor: Michael Kraus, PhD • Psychology

Anabelle Jimenez (she/her) was born and raised in Chicago, Illinois. As a rising senior in psychology at Northeastern Illinois University, she has worked as the lab manager for the psychology department for the past two years. At her home institution, she is recognized as a full-ride Presidential Scholar, Honors Scholar, and McNair Scholar. Inspired by her Dominican grandmother's pursuit of higher education during an era of sociopolitical instability, she is particularly interested in how ever-changing cultural narratives contribute to social inequality across intersecting identities and how they influence bias against marginalized groups. With this legacy in mind, Anabelle intends to pursue a PhD in social psychology and work in academia as a tenure-track professor and flourishing researcher. In line with these aspirations, Anabelle has spent the previous semester formulating her Honors thesis using geographical

psychology to highlight how racial-ethnic disparities can uniquely influence weight bias in the "Ozempic era." This summer, she will be working with Dr. Michael Kraus in the Contending with Societal Inequality Lab to advance the research on the societal costs of AI. In her free time, she loves to listen to her favorite 80s and 90s hits, explore new restaurants, and watch dramatic telenovelas.

Abstract:

The Impact of Critical AI Messaging on AI Attitudes

Artificial intelligence (AI) develops rapidly, introducing new advancements and consequences exacerbating inequality through structural harm. While previous research has identified that AI perception is nuanced, no study has explored whether AI attitudes can shift through critical AI messaging using video interventions—particularly those that highlight the harms of AI to society. We hypothesized that video interventions would effectively shift attitudes, and structural impacts would produce greater effects than non-structural harms of AI. Approximately 444 participants aged 18–25 completed a Qualtrics form assessing their attitudes on AI before and after an intervention. Two conditions featured a news segment reporting structural harms of AI (i.e., AI's environmental impact on specific communities and how AI has increased unemployment), while the control showcased AI customer service issues. Mixed 2x3 factorial ANOVAs revealed that although video interventions shifted AI attitudes in the expected direction, differences across video conditions were only present for future AI usage. These findings indicate that environmental consequences of AI were especially salient when considering individual AI use and impact. Results elucidate how structural harms can effectively change AI perception, and may inform how information about AI is disseminated to raise awareness on a broader scale.

SRQP Participants



Anicia Miller

Biomedical Engineering and Neuroscience

Harvard University

Faculty Mentor: Steven Gard, PhD • Physical Medicine and Rehabilitation

Anicia Miller is a rising senior from Chicago, pursuing a joint concentration in biomedical engineering and neuroscience at Harvard College. Her research interests are in assistive devices and traumatic brain injury recovery and prevention. She is currently working on her senior thesis in Dr. Alice Lam's lab at Massachusetts General Hospital and Harvard Medical School, investigating whether sleep EEG recordings can predict cognitive impairment in patients with Late-Onset Unexplained Epilepsy. Last summer, Anicia participated in Northwestern Comprehensive Transplant Center's Summer Student Immersion Program working in Dr. Jenny Zhang's lab focused on pre-clinical post-kidney-transplant fibrosis in the mouse animal model. This summer, Anicia will be working with Dr. Steven Gard at the Prosthetics-Orthotics Center to analyze gait and standing stability for transfemoral amputees to find the most

suitable foot and ankle stiffness combinations in prosthetics. After completing her Bachelor's, Anicia intends on pursuing a PhD in either biomedical engineering or neuroscience and mentoring young students who have a passion for STEM. In her free time, Anicia loves cooking, spending time with friends and family in the city, and caring for animals, including her pet snake.

Abstract:

Effects of Prosthetic Foot and Ankle Stiffness on Quiet Standing Balance in Unilateral Transfemoral Prosthesis Users

Lower-limb prosthesis users are affected by loss of or change in balance when standing, walking, and changing terrain or activity level. Proper configurations in the foot and ankle components of prosthetic devices could offer increased stability, especially in standing. This study aims to determine the effects of different foot-ankle stiffnesses in balance during quiet standing, specifically in unilateral transfemoral prosthesis users. Previous studies have shown that stiffer components allow for better balance in transtibial prostheses and we hypothesize that the same will be true for transfemoral prostheses. Standing analyses were performed on eight subjects fitted with the College Park Venture Foot. Each subject stood on immovable force platforms for 30 seconds with both eyes closed and eyes opened, while using five different foot keel and ankle bumper stiffness combinations. On average, Hard-Hard stiffness had the lowest excursion from the center of pressure when tested with eyes closed and the Medium-Medium stiffness had the lowest excursion with eyes open. Soft-Soft stiffness had the least symmetrical weight distribution between legs 50% of the time. This revealed that stiffer combinations may offer more stability and showed greater reliance on the sound leg in quiet standing.

SROP Participants



Annie Wu

Neuroscience and Art History

Brown University

Faculty Mentor: Alicia Guemez Gamboa, PhD • Neuroscience

Annie Wu is a rising senior at Brown University studying neuroscience and art history. She is based in the Chicagoland area. At Brown, she has worked in the Badre Lab to study how multitasking training impacts neural representations of the brain. Last summer, at MaineHealth Institute for Research, in the Motyl Lab, she focused on the Adrb1 receptor and its connection to age-dependent bone loss. Her research interests include the role of neuroinflammation in neurodegenerative diseases, as well as how aging affects the nervous system. This summer, Annie is working under the mentorship of Dr. Alicia Guemez-Gamboa to better understand the cellular and molecular mechanisms behind PACS1 Syndrome, a neurodevelopmental disorder linked to a single genetic substitution in the PACS1 protein. Outside of the lab, Annie is an instructor for Brain Bee, teaching neuroscience to high schoolers in preparation for the

international competition under the same name. In her free time, she is also passionate about film and digital photography, and is likely to be found with friends at a museum or cafe. After completing her undergraduate education, she hopes to pursue a PhD in neuroscience.

Abstract:

Uncovering Pathogenic Mechanisms in PACS1 Syndrome Models

Patients with PACS1 Syndrome present with intellectual disabilities, craniofacial abnormalities, epilepsy, autism spectrum disorder, and other health issues. This neurodevelopmental condition is linked to a single point mutation variant (p.R203W) in phosphofurin acidic cluster-sorting protein-1 (PACS1). Previous work in the lab has shown in induced pluripotent stem cells (iPSCs) that mature glutamatergic neurons had impaired expression relating to synaptic signaling, and neurons showed increased GABAergic synaptic density. The purpose of this study is to determine if Pacs1 R201W conditional knock in mice are a valid disease model for PACS1 Syndrome. Since this is a newly developed transgenic mouse line, the cellular mechanisms behind PACS1 Syndrome have not been previously studied in animal models. By quantifying cell composition and number through immunostaining brain tissue sections and fluorescent microscope imaging, we hypothesize that Pacs1 R201W conditional knock in mice will show similar synaptic defects in glutamatergic neurons and GABAergic neurons as seen in iPSCs. Results from this project will improve how we understand the cellular and molecular mechanisms behind this understudied condition. Studying PACS1 Syndrome additionally has the potential to reveal research strategies that can benefit research for other rare disease therapies.

SROP Participants



Arrielle Henderson

Psychology, Clinical Psychology

University of Illinois Urbana-Champaign

Faculty Mentor: David Johnson, PhD • Psychiatry and Behavioral Sciences

Originally from Des Plaines, Illinois, Arrielle Henderson is a rising senior at the University of Illinois Urbana-Champaign studying psychology with a clinical concentration. Her research interests center on child and adolescent mental health, trauma, and school-based psychological services. As a student in the Psychology Honors Program, Arrielle is conducting an honors thesis examining the relationship between race-related stress and academic engagement among Black adolescents. She is also actively involved on campus as an Advanced Counseling Center Paraprofessional and President of the National Association of Colored Women's Clubs, Inc. This summer, Arrielle is working under the mentorship of Dr. David Johnson on multiple research initiatives related to school-based mental health and implementation science, including the evaluation and refinement of assessment tools, implementation

quality measures, and research protocols supporting behavioral health services in Chicago Public Schools. Following graduation, Arrielle plans to pursue a PhD in Clinical Child Psychology and hopes to advance equitable mental health care for children and adolescents through research, clinical practice, and systems-level change. In her free time, she enjoys attending live music events, reading, and exploring films.

Abstract:

Unequal Teams: Examining Behavioral Health Team Implementation Across Chicago Public Schools by School Characteristics

Since the 1990s, school mental health has evolved from the Expanded School Mental Health Model's foundational best-practice principles to Chicago Public Schools' Behavioral Health Team (BHT) model, launched through Lurie Children's Hospital to provide coordinated, multidisciplinary, all-tier support (Raviv et al., 2022). The Key Components Assessment (KCA) was developed to evaluate BHT implementation quality, yet its relationship to school characteristics remains unexamined. This gap holds equity implications as youth are at high risk for mental health disorders before age 14, and disadvantaged and minority students face barriers to care outside school, making schools a critical access point for 70–80% of youth receiving services (Reardon et al., 2017; National Association of School Psychologists, 2023). Using KCA 2.0 data from 147 CPS schools, correlational and regression analyses in R examined whether school characteristics explained variation in BHT implementation quality. Contrary to the hypothesis, school demographic composition, socioeconomic disadvantage, disability status, English learner status, attendance, discipline, and school climate measures were not significant predictors of KCA scores. Instead, implementation quality was significantly associated with referral process indicators: higher student engagement following assignment predicted higher KCA scores, while a greater proportion of students requiring additional support predicted lower scores. These findings suggest that BHT implementation quality is driven by service delivery processes rather than school population characteristics, highlighting referral and engagement practices as key levers for improving implementation quality.

SROP Participants



Daniel Few

Psychology

North Carolina Agricultural and Technical State University

Faculty Mentor: Faith Summerset-Williams, PhD •

Psychiatry and Behavioral Sciences

Daniel Few is a rising senior psychology student at North Carolina Agricultural and Technical State University and a member of the February One Honors Program. Originally from Chicago, Illinois, Daniel is spending the summer at Feinberg School of Medicine where he is working with Dr. Faith Summersett Williams in the I+HEAL Lab. His research focuses on substance use prevention among adolescents with chronic medical conditions through projects examining electronic health records, provider implementation of evidence-based interventions, and community factors influencing prevention efforts in Chicago Public Schools. At North Carolina A&T, Daniel serves as a Peer Facilitator at the Student Health Center, where he educates students on sexual health, mental health, and overall wellness. As a Preconception Peer Educator, he supports

campus health promotion initiatives, assists with outreach and educational campaigns, and collaborates on efforts to expand mental health resources and wellness programming for college students. These experiences have strengthened his passion for advancing health equity through research and clinical practice. Following graduation, Daniel plans to pursue a Ph.D. in Clinical Psychology with aspirations of becoming a clinical psychologist and researcher dedicated to reducing mental health disparities and improving outcomes.

Abstract:

Neighborhood Opportunity and School-Identified Priorities: Informing Equitable Substance Use Prevention in Chicago Public Schools

Adolescent substance use (SU) remains a significant public health concern that can negatively affect students' academic achievement, mental and physical health, and overall well-being. Schools play a central role in prevention, yet an important gap remains in understanding how school-reported SU prevention needs align with neighborhood opportunity and other contextual factors that may shape implementation. This study examined SU prevention strengths, priorities, and needs among Chicago Public Schools that either self-selected into a district-supported prevention initiative or were prioritized because of identified SU prevention Needs. This mixed-methods, cross-sectional study was guided by health equity and implementation science frameworks. School Needs Assessment data from the 2024–25 and 2025–26 academic years were analyzed alongside Child Opportunity Index (COI) 3.0 scores, CPS Opportunity Index scores, geographic location within Chicago using CPS network groupings as a proxy, and school-reported fatal and non-fatal overdose incidents. Descriptive statistics characterized schools' perceptions of student SU, prevention capacity, implementation practices, and prevention priorities. Open-ended responses were analyzed thematically to identify recurring implementation needs and recommendations.

SROP Participants



Diti Patel

Biochemistry and Mathematics

University of Illinois Chicago

Faculty Mentor: Heather Pinkett, PhD • Molecular Biosciences

Diti Patel is a rising junior at the University of Illinois Chicago (UIC), pursuing a double degree in biochemistry and mathematics. Born and raised in Chicago, her passion in research is exploring human disease through the lens of biochemistry and genetics. At UIC, she's an undergraduate researcher at Thomas Lab. Thomas Lab focuses on nitric oxide's impact on the etiology and progression of chronic diseases, from cancer to cardiovascular diseases. The current focus is the impact of nitric oxide levels on global N6-methyladenosine methylation levels in human aortic endothelial cells in the context of cardiovascular disease. This summer, under the mentorship of Dr. Heather Pinkett, Diti will be researching the impact of nitric oxide on ATP binding by PepT nucleotide binding domains, which furthers our understanding of transporter proteins. Diti plans to pursue a PhD in biochemistry with aspirations

of becoming a biomedical researcher that studies the mechanisms of diseases in hopes of improving human health. During her free time, she enjoys baking, reading, and trying new cafes around the city.

Abstract:

Exploring the regulatory role of [4Fe-4S] clusters in ATP hydrolysis within PepT Nucleotide Binding Domains

Bacterial ATP-Binding Cassette (ABC) transporters play key roles in cellular survival and pathogenesis by actively importing nutrients or antimicrobials into the cell. Specialized nucleotide binding domains (NBDs) in ABC transporters reside in the cytosol where they pair up to bind and hydrolyze ATP, providing energy for substrate transport. Bacterial NBDs often have C-terminal regulatory domains (CRDs) that often serve to shut transport off when substrate accumulation becomes toxic. PepT ABC transporters, which import heme and peptides, contain CRDs with clusters whose role in regulating transporter activity remains unknown. While this conserved feature may serve a purely structural purpose, we hypothesized that the [4Fe-4S] cluster enables regulation of ATP hydrolysis rates by sensing the cytosolic redox state or binding a ligand. To test this hypothesis, we monitored ATP hydrolysis by the PepT NBDs from *E. coli* DppD and DppF via a continuous NADH- coupled ATPase assay in presence or absence of suspected ligands or reducing agents. We further wished to co-crystallize both protein targets with the most promising ligands to understand the structural basis of regulation. Our results show hydrogen peroxide, sulfate and glutathione have no effect on ATPase rates, while histidine, cysteine, methionine and alanine likely play a regulatory role.

SROP Participants



Elyse King

Philosophy

Northwestern University

Faculty Mentor: Baron Reed, PhD • Philosophy

Elyse King is a rising junior from Evanston, Illinois, majoring in Philosophy with a minor in Political Science at Northwestern University. Her passions lie in restorative justice, care ethics, and the examination of the moral foundations underlying punishment and legal responsibility. She is participating in SROP as part of the Mellon Mays Undergraduate Fellowship program, centering her research on Indigenous peace circles and restorative justice practices and what these practices reveal about the assumptions underlying Western punishment theory. A significant part of her project involves working with students and faculty affiliated with Northwestern's Prison Education Program (NPEP), centering the perspectives of incarcerated and formerly incarcerated people as students who understand firsthand the value of education. She has also previously participated in an indigenous philosophy course, which

formed her interest in restorative approaches to conflict and accountability. Elyse hopes to use this research to bridge her interest in law and philosophical investigation, to better understand how the legal system deals with punishment and consequences — and what alternative, more relational models might offer instead.

Abstract:

Repair, Not Removal: Care Ethics and the Moral Foundations of Punishment

Indigenous communities continue to develop and nurture practices that prioritize care in addressing crime and conflict. Indigenous peace circles, for instance, are community-facilitated spaces where victims, family members, and perpetrators come together toward resolution, repair, and reintegration rather than removal. A substantial body of scholarship, including prison abolition literature, critiques the shortfalls of the U.S. legal system and argues for alternatives to punitive punishment. Yet less attention has been paid to what these critiques reveal about punishment itself: the presumed right to punish, its intended purpose, and the form—confinement—that punishment has come to assume as default. This paper examines restorative justice practices not simply as alternatives to incarceration, but as a means to expand scholarship that questions what the U.S. legal system can absorb, given its focus on the individual offender-state relationship. Drawing on care ethics—a feminist philosophy grounding moral responsibility in relationships—I argue that Indigenous peace circles embody a distinct relational, community-oriented model of responsibility centered on repair. To ground this argument, I draw on interviews with a student and faculty member associated with Northwestern University's Prison Education Program (NPEP), centering the voice of a formerly incarcerated person. I contend that education, like peace circles, is fundamentally at odds with imprisonment: while confinement isolates, education depends on relationship, presence, and reintegration. Together, these perspectives show that the state's right to punish and its purpose rest on a conception of responsibility that care ethics and lived experience urge us to reject.

SROP Participants



Gavyn Lewis-Richmond

Black Studies and Creative Writing (Poetry)

Northwestern University

Faculty Mentor: Mark Lockwood, PhD • Black Studies

Gavyn Lewis-Richmond is a rising Junior from Philadelphia, Pennsylvania majoring in Black Studies and Creative Writing with a concentration in Poetry at Northwestern University. Her passions lie in educational equity, social justice, and examining how Black individuals maintain agency in the spheres they populate. She is participating in SROP as a part of the Mellon Mays Undergraduate Fellowship program and is centering her research around ‘how Black families/residents in Evanston’s Fifth Ward survive, thrive, and combat redlining and gentrification.’ As a Northwestern student, she believes it necessary to engage with the Evanston community and try to facilitate camaraderie and acknowledgment in a relationship that has not always been altogether positive. As such, she has also worked with Evanston’s Family Focus after-school program throughout the ‘25-’26 academic year as a K-8 tutor

in mathematics and poetry, and plans to continue volunteering here in the future. She hopes her research will allow her to better understand the neighborhood she now calls home and shine a light on the lives of individuals who are too often forgotten.

Abstract:

Redlined, not Sidelined: Black Women’s Agency in Evanston’s Fifth Ward, 1930s-1940s

This paper examines how Black Women in Evanston’s fifth ward—a group facing the brunt of many of the repercussions of housing segregation and discrimination on behalf of their visible racial and gender identities during the 1930s and ‘40s—demonstrated an ability to resist forces of domination and preserve their community. Through a historiographical analysis and critical fabulation of three primary source materials, it interrogates the supposed dichotomy between finding agency through the politics of respectability and deviance as resistance. Findings indicate that, ultimately, these individuals resisted and persevered by having a relationship with both frameworks, revealing that the two can coexist.

SROP Participants



Johnathon Marston

**Physics with a minor in Astronomy and Mathematics
Knox College**

Faculty Mentor: Giles Novak, PhD • Physics and Astronomy

Johnathon Marston is a rising senior at Knox College studying Physics with minors in Astronomy and Mathematics. He is a first-generation college student from small-town central Illinois and a McNair Scholar. His fascination with astronomy began during nights spent outside looking up at the stars, sparking a long-standing curiosity about the universe. This interest has strongly shaped his research goals, and he plans to pursue a PhD in astronomy, astrophysics, or astronomical instrumentation. Johnathon's previous research experience includes condensed matter research using Mössbauer spectroscopy, as well as work related to post-common-envelope binary systems and Be stars. Over the next year, he plans to pursue an Honors Project centered on the analysis of the O star Zeta Puppis. He is involved in several areas across campus, including serving as president of Knox's engineering club and treasurer of

the Physics and Astronomy Club. Johnathon also works as a Physics and Mathematics tutor for the Center for Teaching and Learning, where he supports students in their coursework. This summer, he will be working with Dr. Giles Novak to analyze new data from the Large Millimeter Telescope collected using the TolTEC camera.

Abstract:

Characterization of TolTEC's Continuously Rotating Half-Wave Plate Using Polarization Measurements

Continuously rotating half-wave plates (CRHWP) have been implemented in millimeter and submillimeter wavelength telescopes to modulate incoming polarized flux. This is done in order to reduce low-frequency 1/f noise that can be produced by changes in both atmospheric-originating flux as well as instrumental effects. These CRHWPs often rotate at rates upwards of two rotations per second. One such CRHWP was originally installed on the Large Millimeter Telescope's TolTEC camera in 2022, with a major upgrade performed in 2025. Nine observations of the quasar 3C 286 were taken to verify the performance of the CRHWP after the upgrade. Raw data was reduced via a combination of the Citlali and Topol data reduction pipelines to produce polarization-specific fit images. These images were analyzed via the AperPol photometry pipeline to find the measured Stokes polarization parameters of each observation. We describe the results produced from each of these observations and how they compare to values found from measurements made in 2022. The average of our nine observations suggests that the CRHWP is performing as expected following the 2025 upgrade. The measured value is in reasonable agreement with both the 2022 measurements and accepted literature values for the Stokes parameters of 3C 286. We find that there is a large amount of variation between the individual measurements that cannot be explained solely by instrumental effects and should be investigated in a future work.

SROP Participants



Josh Rascón

English & Flute Performance

Northwestern University

Faculty Mentor: Jennifer Comerford, PhD • English

Josh Rascón is a Mellon Mays Fellow and rising third-year undergraduate at Northwestern studying English and flute performance in the Weinberg-Bienen dual degree program. Growing up between Chihuahua, Mexico, and Colorado, his experiences as a multinational student and musician shaped his interests related to physical labor, class disparity, and material culture in literature and music. This summer, Josh will work with Dr. Jennifer Comerford, researching and recreating 18th-century British recipes. The project will focus on compiling confectionery recipes from recipe books and archives, which, through literary and material considerations, will help reveal the social, material, and economic culture of the 18th-century British kitchen. This project aims to highlight the extensive labor and consumption practices in the English kitchen, especially as they relate to sugar, preservation, and the artistic nature of

confectionery. Aside from his literary interests, Josh performs regularly with Northwestern's Baroque Music Ensemble and Northwestern's Bands, and has appeared as a featured soloist on Colorado Public Radio and NPR's From the Top. In the future, Josh hopes to continue performing and researching, likely taking the shape of a PhD program to become an educator.

Abstract:

Baking History: Re-creating recipe timelines in Mrs. Mary Eales' *The Complete Confectioner* (1717)

Whether you're a pastry-chef or amateur cook, you've probably followed a recipe with relative ease. However, before the age of five-minute mug-cakes, Britain's first published confectionery collection, Mrs. Mary Eales's *The Complete Confectioner* (1717), asks 18th-century makers to collapse, extend, and generally rework time itself. Through textual and material considerations like sentence structure and sugar, this (re)working of time complicates the modern recipe-to-table narrative and positions 18th-century makers as powerful, creative, and transformative propellers of knowledge in the kitchen-space. Taking inspiration from Wendy Wall's *Recipes for Thought* (2015), which touches on early modern temporalities in early modern recipes and poetry, this project will extend the current conversation on historical recreation to Mrs. Eales's recipe collection. Further, drawing on Sara Pennell's and Wall's approach to archival analysis, the project will employ close-reading analysis of a recipe for orange clearcakes from *The Complete Confectioner* (1717), which will be enriched by a historical recreation of the confection to supplement the project with experiential knowledge/practice. Results combine close-reading analysis with experiences from the recreation to identify how makers rework(ed) time to cement themselves as active knowledge producers and creators in the 18th-century British kitchen.

SROP Participants



Jude Rischpater

Biochemistry

Dickinson College

Faculty Mentor: Kynon Benjamin, PhD • Psychiatry and Behavioral Sciences

Jude Rischpater is a rising junior at Dickinson College in Carlisle, Pennsylvania, where he is pursuing majors in both Neuroscience and Philosophy. With a hometown of Naples, New York, Jude plans to attend medical school with aspirations toward psychiatry. His long-term interests center on the neurobiological mechanisms underlying psychiatric disorders, particularly state dysregulation in adolescent depression and its connection to shifts in mood and behavior. This summer, Jude is contributing to a gene expression computational neuroscience project in the HEART-GeN lab at the Feinberg school of Medicine. This project uses weighted gene co-expression network analysis (WGCNA) to investigate transcriptional programs associated with Alzheimer's disease and related dementias, with a focus on sex, ancestry, and aging-related patterns of gene expression. Jude is also

passionate about his service as President of Alpha Phi Omega at Dickinson College and volunteers at the Carlisle CARES Homeless Shelter. He also works as a Patient Care Technician on a dementia-focused medical-surgical unit at Thompson Hospital. An avid endurance athlete, Jude recently placed sixth overall at the Worlds End 50K ultramarathon and enjoys strength training. He is passionate about connecting with his community, and developing a holistic understanding in the overlap between neuroscience and mental health through both research and clinical care.

Abstract:

Sex-Dependent Brain Gene Networks: Alzheimer's Risk Factors in Black American Women

Alzheimer's Disease and Alzheimer's Disease Related Dementias (AD/ADRD) is characterized by a decline in cognitive ability and independence. Black American women carry a disproportionate AD/ADRD burden, yet its biological roots remain poorly characterized in this population. To address this disparity, this study applies weighted gene co-expression network analysis (WGCNA) to bulk brain RNA-sequencing from three AD/ADRD-relevant regions (hippocampus, caudate, DLPFC) to test whether sex modulates the effects of AD risk factors – genetic ancestry and aging – on gene expression. WGCNA clustered co-expressed genes into modules, fitted per region to two interaction models – sex-by-ancestry and sex-by-nonlinear-aging – yielding 11 to 15 modules per region-model combination. These modules were annotated for hub genes, pathway enrichment, and brain cell-type marker overlap. Modules were tested for Alzheimer's and related-trait GWAS enrichment via MAGMA. A cross-model-convergence test yielded 15 pairs of modules with substantial gene overlap. While no convergent modules were significantly associated with their interaction models, the sex by aging green and sex by ancestry red module overlapped substantially, showing enrichment for AD heritability and microglial/immune cell-types within the caudate. These findings suggest that sex-modulated programs and Alzheimer's genetic risk occupy distinct gene networks, and that the caudate's reproducible AD-linked microglial program is not itself sex-dependent.

SRQP Participants



Lekan Aleshe-Shittu

**Africana Studies with a minor in Politics and Religion
Oberlin College**

Faculty Mentor: Robert Launay, PhD • Anthropology

Lekan Aleshe-Shittu is a rising senior at Oberlin College from Lagos, Nigeria. At Oberlin, he studies Africana Studies, Politics and Religion, and his research interests are concerned with the ways in which religious beliefs affect political and legal participation in sub-Saharan Africa. This summer, with support from Dr. Robert Launay and the Institute for the Study of Islamic Thought in Africa, Lekan will explore the role of West African indigenous traditions in shaping a unique conception of Islamic practice (with a focus on Sufism and mysticism) on the continent. He will also explore the socio-political significance of this distinct Islam. Outside of academics, Lekan is involved in a variety of activities: he DJs a weekly radio show, is a member of his university's Interfaith Council, and teaches classes about African literature. He is enamored with reading and writing fiction and has been published in a variety of literary magazines, most

recently *Transition* and the *African Writer*. After graduating from Oberlin, Lekan plans to pursue a joint JD/PhD degree, subsequently working as an attorney and law professor specializing at the intersection between African politics, religions and human rights.

Abstract:

On Black Sufism: Exploring Questions of Power, Indigeneity, Decolonization and the Need for an “African Islam”

Numerous Africanists argue that the label of “African Islam” is one which marginalizes African identities because of its colonial origins. They postulate that such a distinction denies African Muslims their right to belong to a global religious tradition without fear of differentiation. Yet, it is undeniable that an abundance of African communities have and continue to incorporate their endogenous frameworks of faith into Islamic practice. Moreover, Islam's role in legitimizing and empowering Black identity, as well as resisting the Trans-Atlantic Slave Trade is situated squarely against an African backdrop. What then do we call this Islam that concerns itself with certain aspects of African identity—particularly Blackness, enslavement, and cultural syntheses, if not an African one? We repudiate notions of “African” or “Black Islam” because of its avowedly colonial history, yet, one could argue that its abject rejection is in a sense a capitulation to Eurocolonial ideas regarding the perceived “inferiority” of Black identity. Through an analysis of Ibrahim Niasse and the *Fayda Tijannaya*—a Sufi West African recasting of a global Islamic tradition, I assert that we must reassess our conception of “African Islam,” creating avenues through which we may theorize an Islam influenced by, and in constant conversation with Blackness.

SROP Participants



Mark Martinez

Philosophy & Latine Studies

Northwestern University

Faculty Mentor: Baron Reed, PhD • Philosophy

Mark Alexander Martinez is a rising third-year student from Southern California, pursuing his undergraduate degree at Northwestern University in Philosophy and Latine Studies. With a minor in Native American and Indigenous Studies (NAIS), Mark seeks to integrate his interests in music, philosophy, Latine, and Indigenous cultures throughout his academic career. As a Mellon Mays Undergraduate Fellow, Mark strives to continue his studies and obtain a PhD in philosophy. Mark's current project focuses on how reality is formed through sonics and can create a shared meaning among communities. Outside of research, Mark is actively involved in Northwestern's Latine and Indigenous community as the Vice President of Alianza, Pow Wow Co-Chair for the Native American and Indigenous Student Alliance (NAISA), and as an executive board member of the Alpha Omega chapter Alpha Psi Lambda National, Inc. Additionally, Mark works

as a debate coach for Damien High School in California and will begin working with Family Focus this upcoming fall. In his free time, you can find Mark listening to music, talking with friends, or playing with a deck of cards.

Abstract:

A World in Harmony: Exploring Music in the Nahua Worldview

How does music create and sustain reality? The Mexica (Nahuas) believed that reality is in constant motion, that when reality is static, we cease to exist. That motion of reality being pulled is often described as a pull between two distinct, often polar opposites (Maffie 2014), forces whose constant pull constructs each other—the relationship between the two forces is referred to as Inamic Unity, where the forces that are pulling at each other are composing each other in the relationships, without one there isn't the other. I argue that music has this potential to create reality under the frame of Inamic Unity. The understanding of music must contain two forces, that I have identified as song and dance, together song and dance create realities for people to experience. Song can act as the vessel for the creation of a metaphysical reality, while dance acts as a vessel for physical reality. Together they can create retrospective and prospective experiences that bend time and create connections to community, place, and memory. However, this experience is a temporary reality whose essence is tied to the interactions and interpretation of the listener, performer, and artist.

SROP Participants



Mrinmayee Sama

Molecular Genetics & Psychology

University of Rochester in New York

Faculty Mentor: Lisandra Vila-Ellis, PhD • Cell and Developmental Biology

Mrinmayee Sama is a senior at the University of Rochester in New York pursuing a Bachelor of Science in Molecular Genetics and a Bachelor of Arts in Psychology. Originally from Fremont, California, she is passionate about understanding how molecular and environmental factors shape child development and health. This summer, she is conducting research investigating the role of axon guidance genes in lung vascular development and disease during neonatal hyperoxic lung injury. Through this work, she hopes to contribute to the development of therapies that improve outcomes for vulnerable newborns. Mrinmayee loves to explore different research areas, so she has worked at stem cell biology, clinical research, and developmental psychology laboratories. She also serves as a medical assistant at Elmwood Pediatrics in Rochester. She is a child life volunteer at Golisano Children's Hospital and an elderly

life volunteer at Highland Hospital. She takes a great passion in mentoring students with intellectual and developmental disabilities through the TOUR program at school. Her long-term goal is to become a physician-scientist specializing in pediatric translational research, integrating patient care with laboratory discoveries to improve children's health. Outside of academics, she enjoys choreographing Indian dance as the co-president of Rochester Rangoli, reading mystery novels, and exploring new cities.

Abstract:

Role of Axon Guidance Genes in Lung Vascular Development and Disease

Bronchopulmonary dysplasia (BPD) is a chronic lung disease affecting premature infants, often caused by mechanical ventilation and high oxygen levels that damage the developing lung. Endothelial cell dysfunction is recognized as a key driver of impaired lung repair after this injury, yet the mechanisms involved remain unclear. Axon guidance genes, originally identified for their role in nerve growth, are now known to regulate blood vessel formation, but their role in neonatal lung repair is understudied. Using a BPD mouse model where they are exposed to neonatal hyperoxia, this project investigates how a hyperoxic environment alters endothelial expression of axon guidance genes. We use immunofluorescence staining for endothelial markers and analysis of single-cell RNA sequencing data to compare axon guidance gene expression between normal and hyperoxic lung tissue. Although we initially hypothesized that hyperoxia would suppress axon guidance gene expression, increased expression may reflect activation of compensatory endothelial remodeling pathways following injury. However, endothelial dysfunction in BPD suggests that increased axon guidance signaling may reflect a maladaptive repair response rather than successful restoration of normal vascular development. As premature birth rates continue to rise, understanding how hyperoxia affects these pathways could identify potential molecular targets and help improve long-term respiratory outcomes.

SROP Participants



Mya Booth

Biomedical Engineering with a minor in Chemistry
Duke University

Faculty Mentor: Lisa Volpatti, PhD • Biomedical Engineering

Mya Booth is a rising senior from Charlotte, North Carolina, studying biomedical engineering with a biomolecular and tissue engineering concentration and a chemistry minor at Duke University. Her research interests include cardiology, targeted drug delivery, biomaterials, and engineering treatments that improve patient care. At Duke, she conducts research in cardiovascular regenerative medicine, leads the engineering of a urology surgical training device, and studies congenital heart disease care for children in conflict zones. Last summer, she investigated RNA stability in archived cancer tissues at MaineHealth and interned in R&D clinical research at IDEXX Laboratories. This summer, Mya will work in Dr. Lisa Volpatti's laboratory under the mentorship of Gabriela Berniac to investigate an engineered IL-10 therapy for vascular inflammation in atherosclerosis. She is very grateful for the opportunity to contribute

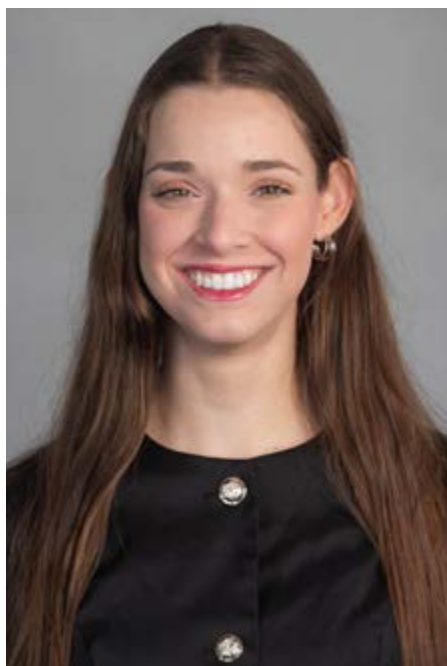
to the lab and learn more about cardiovascular immunology. She plans to pursue a MD/PhD and combine medicine, engineering, and research to make treatments safer, more effective, and more accessible. Outside of research, Mya serves as president of Duke Ballet & Books, where she leads free ballet instruction for elementary students, volunteers at Duke University Hospital, and enjoys dancing, traveling, and spending time with loved ones.

Abstract:

Quantitative Immunofluorescence Analysis of Engineered IL-10 Therapies in Atherosclerotic Plaques

Atherosclerosis is a chronic inflammatory disease characterized by lipid accumulation and immune-cell activity within the arterial wall. Engineered interleukin-10 (IL-10) therapies may improve delivery of anti-inflammatory signals to atherosclerotic plaques, but their evaluation requires a reproducible method for quantifying therapy localization and inflammatory-marker expression. This project developed a standardized QuPath-based immunofluorescence analysis pipeline using aortic root sections from ApoE-deficient mice treated with 2D03-IL-10, wild-type IL-10, IRR-IL-10, or phosphate-buffered saline. Sections were stained for CD68 and either IL-10, inducible nitric oxide synthase (iNOS), or matrix metalloproteinase-9 (MMP9). The workflow included manual plaque annotation, area-weighted fluorescence analysis, matched negative-control background correction, DAPI-based cell detection, panel-specific threshold selection, and automated classification of CD68-positive and marker-positive cells. Both cell-based percentages and plaque-level fluorescence intensity were evaluated. Percentage-based measurements showed limited separation among groups for iNOS and MMP9 because nearly all CD68-positive cells exceeded the selected thresholds, whereas plaque-level intensity better captured differences in signal strength and extracellular staining. The study established a reproducible analytical framework for future studies using larger cohorts, later time points, and additional engineered IL-10 constructs.

SROP Participants



Najua Strooband-Said

Chemistry

University of Puerto Rico, Arecibo Campus

Faculty Mentor: Gayle Woloschak, PhD • Radiation and Oncology

Najua J. Strooband-Said will begin her fourth year at the University of Puerto Rico, Arecibo Campus, majoring in Microbiology and minoring in Biomedical Sciences. Her research experience includes participating in the project “Determining Levels of Heavy Metals in Button Mangrove from the Caño Tiburones Wetland” and “Taxonomic Biodiversity Assessment of Insects in a Livestock Agroecosystem Using DNA Barcoding: Development of a Local Reference Library in Arecibo, Puerto Rico”. Her professional experience includes her work on-campus at ISMuL-AEL, where she served as an assistant for the ISMuL Summer STEM Academy 2024 and 2026, as well as a student worker during the academic semester. She is an active member of the Neuroboricuas UPRa association, where she serves as vocal, of the Red Cross Association, where she serves as vice-president, of the SOT Undergraduate Affiliate, and of the Honor Program

at her University. Additionally, she enjoys baking and dancing, forming part of the university’s dance team, representing the institution by participating in various activities like 2024 and 2026 LAI Interuniversity Games. This summer, Najua will be under the mentorship of Dr. Gayle E. Woloschak and research assistant professor Jelena Popovic, where she will be working with miRNA isolated from archival dog tissue.

Abstract:

miRNA Expression Profiles in Archival Canine Lymph Nodes Following Internal Radiation Exposure: Evaluation of Candidate Biomarkers

The biological consequences of ionizing radiation are frequently delayed and may not become evident immediately following exposure. Although ionizing radiation causes rapid DNA damage, the resulting effects take time to manifest. The demand for sensitive biomarkers capable of detecting radiation-induced changes many years after exposure remains high. Following the Cold War, the U.S. government sponsored a series of long-term studies in dogs to investigate the lifelong biological effects of radiation exposure. The tissues collected from these studies were preserved in one of the biggest tissue archives in the world located at Northwestern University (Northwestern University Radiobiology Archives: NURA). The aim of this project was to study miRNAs expression in irradiated beagle dog lymph nodes and correlate their expression with experimental conditions. miRNAs were isolated from tissue samples, subjected to cDNA synthesis, and their expression was assessed using qPCR. The aim was to correlate miRNA expression levels with radiation exposure and with subsequent disease development in dogs. Identification of miRNA expression signatures may help earlier detection of radiation-induced response and improve diagnostic and therapeutic strategies. Additionally, the same tissue samples were screened and imaged at the Advanced Photon Source (APS) at Argonne National Laboratory to assess their elemental content and distribution.

SROP Participants



Oluwapemisola Ogunjimi

Biology with a minor in Spanish

Indiana University Bloomington

Faculty Mentor: Jennifer Kearney, PhD • Pharmacology

Oluwapemisola “Pemi” Ogunjimi is a Biology and Spanish student at Indiana University-Bloomington. Thus far, she has investigated sexual health care for disabled persons, examined the intricacies of brain injuries through BDNF, and bioengineered enzymes for bioplastics. These studies coupled with her experiences growing up as a Nigerian American in the Chicagoland area contributed to her research interests in the genetics—specifically epigenetics—of marginalized communities experiencing healthcare, research, or other systemic disparities. This summer Pemi will be working under the mentorship of Dr. Jennifer Kearney and Dr. Gina Vuchkovska collecting data on KCNB1—a rare gene known to contribute to epilepsy— and determining its impact on protein function. Once done with her undergraduate education, Pemi hopes to get a Masters in Genetic Counseling where she will combine her passion for cultural awareness

and genetics to advocate for a wide array of patients. Additionally, she plans on getting a PhD focused on the epigenetics of intergenerational trauma to further the field and encourage others to never stop learning. In her free time Pemi enjoys crafting, movie nights with friends, reading, and language learning. These hobbies, as well as those in her corner, aid Pemi’s development as a curious and well-rounded researcher.

Abstract:

Under Pressure: Investigating Endoplasmic Reticulum Stress and Calcium Stores in KCNB1-Related Disorder

Developmental and Epileptic Encephalopathies (DEEs) are a spectrum of severe conditions characterized by developmental impairments and seizures. Existing treatment options are inadequate for the one in almost six hundred children diagnosed with DEEs due to the complex relationship between their symptoms and the mutated genes causing them. One such gene is KCNB1 which encodes for Kv2.1, a protein that is made in the Endoplasmic Reticulum (ER) and transported to the Plasma Membrane (PM) where it plays a critical role in regulating potassium flow for action potentials—signals that are essential for communication in the brain. It has been found that some disease-associated KCNB1 variants produce Kv2.1 that fails to reach the PM, leading to the development of DEEs. Our hypothesis is that this mutated Kv2.1 is getting stalled in the ER and causing ER stress. To investigate this hypothesis, I introduced the KCNB1-Q423P variant into HEK293T cells, stained for ER stress markers and imaged with confocal microscopy. Expression of stress markers was compared between Q423P and WT using FIJI software. Results suggest Q423P produces more ER stress than WT at baseline. Understanding the effects of this mutation on cells will aid the development of effective treatment options for DEEs.

SROP Participants



Pablo Gonzalez-Villasaca

Chemical & Biomolecular Engineering

Georgia Institute of Technology

Faculty Mentor: Chad Mirkin, PhD • Chemistry

Pablo Gonzalez-Villasaca is a rising senior from Minnetonka, Minnesota, studying Chemical & Biomolecular Engineering at Georgia Tech. Driven by his mother's survival of stage 4 breast cancer through a clinical trial, his research interests center on engineering drug delivery systems to treat patients like his mother. This summer, Pablo will work with Dr. Chad Mirkin in his nanomedicine subgroup within Northwestern's Chemistry department to advance the Lipid Nanoparticle-Spherical Nucleic Acid (LNP-SNA) platform, building on his prior industry experience at Moderna, Eli Lilly, and Beam Therapeutics. Furthermore, his undergraduate research at Georgia Tech, optimizing ssDNA synthesis in the Styczynski Group, has prepared him for his first full-time intensive research experience. At Georgia Tech, Pablo leads the American Cancer Society as founding president, has served as Executive Corporate Liaison for the American

Institute of Chemical Engineers, and serves as a Shell Ambassador representing Georgia Tech in recruitment and retention. Outside of academics, he is an avid soccer player, supporter of Checo Perez in Formula 1, and a distance runner. Following graduation, Pablo plans to pursue a PhD to gain independent scientific training, contribute to R&D discovery as a director in the pharmaceutical industry, and later return to academia as a principal investigator.

Abstract:

Investigating the Impact of Antigen Copy Number In mRNA on Therapeutic Efficacy

Messenger RNA (mRNA) vaccines encapsulated in lipid nanoparticles (LNPs) have emerged as powerful platforms for inducing robust antigen expression, T-cell activation, and protective immune responses, as exemplified by COVID-19 vaccines. However, following systemic administration, LNPs predominantly accumulate in the liver, and delivery to other organs requires extensive engineering. Lipid nanoparticle spherical nucleic acids (LNP-SNAs), composed of LNPs densely functionalized with surface oligonucleotides, exhibit enhanced cellular uptake and preferential accumulation in the spleen and lungs, making them a promising platform for mRNA vaccine delivery. Nonetheless, the influence of mRNA antigen design on immune responses remains largely unexplored. I hypothesize that increasing the number of encoded antigen epitopes per mRNA molecule will proportionally enhance MHC class I antigen presentation and CD8⁺ T-cell activation, providing a strategy to improve mRNA vaccine efficacy. mRNA constructs encoding 1, 5, or 10 repeats of the model antigen SIINFEKL were synthesized by in vitro transcription and encapsulated in LNP and LNP-SNA formulations. The resulting nanoparticles were analyzed for size, mRNA encapsulation efficiency, and DNA functionalization. Further evaluation for cellular uptake, antigen presentation, and T-cell activation was done in cell culture models. Results showed that antigen presentation can differ in part due to the total amount of mRNA translated, but further in vitro and chemical (MS) studies are required to prove our proposed hypothesis. Overall, this work aims to establish design principles linking mRNA antigen architecture to the magnitude of the immune response. These findings will inform the rational design of next-generation mRNA vaccines and provide a framework for optimizing epitope architecture in therapeutic vaccine platforms.

SROP Participants



Reggie Blue

Communication Studies & Music

University of North Carolina at Chapel Hill

Faculty Mentor: Rayvon Fouché, PhD • Communication Studies

Reggie Blue (he/they) is a rising senior from Durham, NC. He is studying Communication Studies and Music at the University of North Carolina at Chapel Hill (UNC). Reggie's research interests include Black and queer fan communities and the societal norms that govern them. Reggie's participation in predominantly white digital spaces has motivated his focus on Black fan creations. Through his research, he aims to make fan spaces safer for Black participants. Under the mentorship of Dr. Rayvon Fouché, he is developing a framework for analyzing fan creations that portray nonblack characters as Black. After graduation, he intends to pursue a PhD in either rhetoric or media studies. In his free time, Reggie enjoys watching movies with his family, going to the pool, and playing video games.

Abstract:

We've Got Our Own Thing: Communication Strategies of Hood Jujutsu Kaisen's Fan Communities

Digital creator RabSoPetty's parody series Hood Jujutsu Kaisen is popular for its witty comedy and expert translation of the anime Jujutsu Kaisen into a storyline reminiscent of hood films of the 1990's. For Black fans the race changing – changing a character's race in fan depictions – that RabSoPetty engages in is a common part of fan experiences with media ecosystems that do not cater to them, such as anime and manga. While fan works often explore identity through the confines of the fan object, Black identity exploration is treated as something extraordinary. Hood Jujutsu Kaisen's popularity disrupts nonblack fandom norms by creating a space where Blackness is centered. Existing frameworks for discussing race changes within fan works either fail to consider the specific ways that antiblack racism negatively impacts representation and fan experiences. This means it is necessary to center Blackness in the analysis of Black fan practices. By analyzing the language of Hood Jujutsu Kaisen: Shibuya Incident, and comments on YouTube, I show that Black fans are attracted to and engage with Black race changes with the purpose of uplifting Black fan spaces.

SROP Participants



Sarah Louis

International Studies & Political Science

Northwestern University

Faculty Mentor: Tabitha Bonilla, PhD • Political Science

Sarah Louis (she/her) is a rising third year at Northwestern University majoring in Political Science and International Studies with a thematic concentration in Global Law and Society. She currently lives on the Jersey Shore but is originally from Charleston, South Carolina. For her first summer as a Mellon Mays Undergraduate Fellow, Sarah's research will examine political party fragmentation and political polarization in contemporary US politics. Her broader research interests include decolonial studies, Black political thought, legal historical studies and political order. While at Northwestern University, Sarah is an undergraduate research assistant for Dr. Katrina Quisumbing King, exploring the relationship between race, territorial status and naturalization. In addition to being a research assistant, Sarah is also a peer mentor for the Emerging Scholars Program. Most recently, she was

awarded the Gilman-McCain Scholarship to study international law in Switzerland. In the future, Sarah plans on pursuing a political theory PhD with aspirations of becoming a law professor. Sarah's favorite pastimes include biking, baking, and listening to music.

Abstract:

Fractured: Political Party Fragmentation, Political Polarization and Their joint Effects on Congressional Gridlock

This study investigates how fragmentation within parties combined with polarization between parties impacts the voting behavior of U.S. elected officials. I argue that the co- occurrence of these two phenomena lead to a significant amount of political gridlock which limits the ability of federal legislators to pass bills. The past two decades have seen an increase in political polarization between the Democratic and Republican parties. However, within these parties, separate factions have also emerged changing the political landscape of the country. Due to political gridlock within and between both parties, voters may not have a viable alternative to vote for candidates who would uphold their interests in Congress. To identify changes in political behavior over time, I conducted a literature review examining what we know about party polarization, party fragmentation, and how these have affected Congressional grid lock. Then, the study compared literature regarding the political party fragmentation that began in the 2016 presidential election with previous cases of fragmentation in order to compare legislative behavior. This study will yield important implications for how polarization and fragmentation can impair democratic outcomes.

SROP Participants



Sophia Veranga

Biochemistry & Statistics

University of Illinois Urbana-Champaign

Faculty Mentor: Yan Liu, PhD • Hematology and Oncology

Sophia Veranga is a rising sophomore at the University of Illinois Urbana-Champaign studying biochemistry and statistics. She is originally from Chicago and worked in the Yan Liu Laboratory at Northwestern University while she was in high school. During that time, she investigated the correlation between mutant p53 and inflammation in hematological cancers. Work in the Yan Liu Laboratory exposed her to scientific research and she has had a passion for it ever since. Upon entering university, she decided to expand her areas of scientific exploration and joined the Manesis Laboratory where she studies the structural components necessary for electron transfer within the diheme protein MbnH. This summer, Sophia is back in the Yan Liu Laboratory further exploring the various molecular pathways mutant p53 affects in order to discover novel treatments for leukemia patients with p53 mutations. In her free

time, Sophia is a volunteer ballet teacher, an active member of the American Cancer Society, and a writer for an undergraduate research journal. Her values of scientific communication and teaching drive her to pursue a PhD in molecular biology and a career as a professor.

Abstract:

Identifying Novel Therapeutic Targets for TP53-mutated Myelodysplastic Syndromes

Mutations in the tumor suppressor gene TP53 are found across cancer subtypes, often leading to difficult to treat cancer diagnoses within patients. TP53 mutations encode for mutant p53 proteins, resulting in the dysregulation of cell metabolism, division, and death, and ultimately driving disease development. More specifically, within hematological malignancies, TP53 mutations in pre-leukemic states such as myelodysplastic syndromes (MDS) are associated with an increased risk of leukemia development and often poorer prognosis. High-throughput small-molecule screens and genome-wide CRISPR-Cas9 screens were used to identify novel therapeutic targets that disrupt molecular pathways mutant p53 interacts with within MDS cell lines. 49 compounds were identified from the small-molecule screen that significantly decreased TP53-mutated MDS cell proliferation while having little to no effect on control cell lines. Most compounds identified are known to disrupt the cell cycle and cell metabolism, however few influenced inflammation, epigenetic and transcriptional regulation, and alternative splicing. Interestingly, four identified compounds are protein-protein interaction modulators that disrupt unidentified protein-protein interactions. The variety of targets discovered through the small-molecule screen reflects the many functions of p53. Preliminary data collected on the effects of knocking down a key spliceosome protein, SNRDP3, and epigenetic regulator, JMJD6, in TP53-mutated MDS cells suggests alternative splicing and epigenetic regulation as key components of mutant p53 cell expansion. Future research may utilize these results to develop more effective targeted therapies for patients with TP53-mutated MDS to forestall or prevent the development of leukemia.

SROP Participants



Warren Bingcang

English with an American Studies concentration
Grinnell College

Faculty Mentor: Justin Mann, PhD • English

Warren Bingcang (they/them) is a rising fourth-year student at Grinnell College where they are majoring in English with a concentration in American Studies. Their research interests lay in 20th and 21st century American literature, queer and trans studies, and speculative fiction. This summer, as an extension of their research as a Mellon Mays Undergraduate Fellow, they'll be working with Dr. Justin L. Mann to explore how supernatural horror offers tools for expressing and exploring queerness, and how marginalized readers confront a literary inheritance that is hostile to their existences. After graduation, they plan to continue their studies and obtain a PhD in English Literature. On campus, they co-founded and serve as the outreach coordinator for the 2D Art Club, they contribute articles to GOGUE fashion magazine. In their free time, they enjoy drawing and writing, liking to blend these interests into multimedia projects. Their work has appeared in the Grinnell Review and Apparition Literary Magazine.

Abstract:

“Weird Transgender”: Cross-Gender Body-swapping in Lovecraft’s “The Thing on the Doorstep”

In this essay, “‘Weird Transgender:’ Cross-gender Bodyswapping in Lovecraft’s ‘The Thing on the Doorstep,’” I engage in a trans reading of H.P. Lovecraft’s 1937 short story of the same name to show how it contemplates and tests boundaries used to define gender. The story tells of a wizard, Ephraim, who switches bodies with his daughter Asenath and later her husband Derby. Prior scholarly discussion overprivileges a biographical approach, assessing the validity of a queer reading of this story based on what is known about the author's intentions or identity. This overlooks how contemporary interpretation allows readers to glean queer meaning from texts that may have been written from a queerphobic point of view. A few critics have, on occasion, uncritically identified characters as “transgender.” In my essay, rather than reading to recognize an identity, I argue that cross-gender bodyswapping in “The Thing on the Doorstep” presents a scenario in which cisgender characters move away from their born sex, and that in order to preserve their gender identity, the characters must recalibrate their system for categorizing gender in a way that does not proceed directly from sex, offering a more capacious, “weird” understanding of gender.

SROP Graduate Student Team Leads



Tiffany Mays

PhD Candidate, Driskill Graduate Program in the Life Sciences

Tiffany Mays is a PhD candidate in the Driskill Graduate Program in Life Sciences (DGP) at Northwestern University. She studies the role of mutant p53 in Leukemogenesis. TP53 is mutated in most cancers, and while it has been extensively studied in solid tumors the same cannot be said for hematological malignancies. Under normal physiological conditions, p53 regulates several processes including cell cycle arrest, DNA repair, and apoptosis. Given such roles, a disruption to p53's normal function undermines a key defense mechanism against malignant transformation. Tiffany received her bachelors of science in Human Biology and masters of science in Stem Cell Biology and Regenerative Medicine from the University of Southern California. While there, she completed a master's thesis studying the "Molecular role of EZH2 overexpression in early Colorectal Cancer progression". In her time at Northwestern, Tiffany has been involved in the Alliance of Chicago Minority Students (ACMS), Cancer Biology Cluster, DGP Student Council, Summer Research Opportunity Program (SROP), and the Black Graduate Student Association (BGSA). She has also been the recipient of a T32 Carcinogenesis Training Grant, RO1 Diversity Supplement, an internal fellowship through her academic program, and inducted into the Northwestern Chapter of the Bouchet Graduate Honor Society. In her free time Tiffany enjoys playing with her West Highland White Terrier and exploring the city.



Naomi Murata

PhD Student, Northwestern University Interdepartmental Neuroscience (NUIN)

Naomi Murata is a PhD candidate in the Northwestern University Interdepartmental Neuroscience (NUIN) program. She studies molecular neuroscience and investigates nucleo-cytoplasmic transport defects in genetic Amyotrophic Lateral Sclerosis (ALS). Naomi graduated with her bachelor's degree in Neuroscience and Psychology from Smith College, where she also began her passion for mentoring young women in STEM through the Achieving Excellence in Mathematics, Engineering, and Science (AEMES) program. As an international student from Indonesia, Naomi has a strong interest in community engagement with an emphasis on highlighting different cultural events.

SROP Group Leaders



Kayla Boyden

PhD Candidate, English

Kayla Boyden (she/they) is a PhD candidate in Literature at Northwestern University. Her current research interests include contemporary Black poetry, Black literature, Black feminist thought, and Black critical theory more generally. Her dissertation, entitled *Interstitial Reading: Uncovering Silence in Black Women's Writing*, explores the role of silence as an innovative method to undermine the violence of representation. She is a fellow in the Poetry and Poetics Mellon Cluster as well as a graduate intern for Northwestern's Office of Graduate and Postdoctoral Success.



M Romanova

PhD Candidate, Comparative Literary Studies and Asian Languages and Cultures

Moe Romanoff (they/them) is a PhD Candidate in Comparative Literary Studies with a Mellon Fellowship in the Critical Theory Cluster. Their research explores aesthetic mediation of energy and resource extraction at the Sino-Siberian borderlands in North Asia. Throughout their undergraduate and graduate studies in the UK, China, and Hong Kong, Moe has worked as a tutor, mentor, and student representative, providing individualized support to students in their admissions process to higher education institutions. At Northwestern, they served as a group leader during the Summer Research Opportunity Program (SROP) through GPS in the summer of 2025. Passionate about student-oriented programming and the arts, they guest-curated a film program for the Block as a Chicago Public Humanities Initiative fellow, and currently serve on the editorial board of *Lime*, a digital journal dedicated to Environmental Humanities that they co-founded. In their free time, they enjoy going biking around Chicago and going to the beach.



Manny Obisie-Orlu

PhD Candidate, Clinical Psychology

Manny Obisie-Orlu (she/her) is a rising 5th-year PhD candidate in Clinical Psychology at Northwestern University Feinberg School of Medicine. She works in the Study of OCD, Anxiety, and Related Disorders (SOAR) Lab, where she investigates core features and transdiagnostic constructs related to the development, maintenance, and treatment of obsessive-compulsive and related disorders. Clinically, she is a graduate student therapist at The University of Chicago Medicine's Obsessive-Compulsive and Related Disorders (OCD) Clinic. Manny received a bachelor's degree in psychology and a certificate in American Sign Language from the University of Pittsburgh. As a former NU SROP student (2021) and group leader (2024, 2025) passionate about demystifying graduate school for underrepresented folks in particular, Manny is excited to return as a group leader this summer. In her spare time, you can find her enjoying all that Chicago has to offer, getting involved in sports leagues, and reading outdoors.

SROP Group Leaders



Marcia Maxson

PhD Student, Human Development & Social Policy

As an interdisciplinary mixed-methods scholar, I draw on both quantitative and qualitative approaches, linking large-scale data, surveys, and in-depth fieldwork. My studies began at the University of Colorado Denver, where I earned a Bachelor's in Public Service with minors in Behavioral Cognitive Neuroscience and Human Development and Family Relations, followed by a Master of Public Administration focused on education policy. Which led me to working in higher education, teaching, consulting on equity-focused initiatives, and engaging in work across international contexts (Spain, Jordan, Greece, Ukraine, and Guatemala). My current research examines how former foster youth navigate higher education and campus-based support programs. I study how support is experienced by students and how state/federal policies are interpreted and enacted by campus-based administrators. My work moves beyond asking whether programs work to focus on how support is experienced, and how it shapes belonging, dignity, and future aspirations. I carry this work into the public through the Kaplan Humanities Institute, creating digital storytelling projects and collaborative zines that return knowledge to the communities it comes from and resist extractive research. Additionally, I contribute to research teams at the Buffett Institute for Global Affairs and the Institute for Policy Research, studying the use of DNA for family reunification in contexts of conflict and forced displacement. Across all of this, my work is driven by a commitment to building policies and systems that are accountable to the people they are meant to serve.



Tina Fu

PhD Candidate, Interdisciplinary Biological Sciences (IBiS)

Jiayu (Tina) Fu is a fourth-year PhD candidate in the Interdisciplinary Biological Sciences (IBiS) Program. In the Lucks Lab, she studies how nascent RNA folding and upstream RNA structures regulate transcription termination in prokaryotes using high-throughput sequencing and computational modeling. Beyond her research, Tina is an active mentor in The Graduate School's Peer Mentor Program and serves on the Programming Committee of The Association for Women in Science (AWIS), where she helps design events to support the professional growth of women in STEM. She also served as the President of the Northwestern Chinese Students and Scholars Association (CSSA) and is passionate about building supportive communities for students and early-career scientists.

The Office of Graduate and Postdoctoral Success

The **Office of Graduate and Postdoctoral Success** (GPS) is dedicated to the academic progress, optimal success, and holistic experience of all TGS graduate students and postdocs to ensure they thrive and attain their full potential. GPS engages with postdocs and graduate students by hosting peer mentorship opportunities, the Bouchet Honor Society, quarterly community events, and HBCU Hangouts.



Sheehan Fisher, PhD

Associate Dean for
Academic Environment
and Success
The Graduate School



Brittany Young, PhD

Director, Office of Graduate
and Postdoctoral Success
The Graduate School



Cindy Florence

Assistant Director,
Office of Graduate and
Postdoctoral Success
The Graduate School

Special Thanks

The Graduate School
Northwestern University

Big Ten Academic Alliance

Office of the Fellowships
Mellon Mays Undergraduate Fellowship Program
Northwestern University

Office of the Registrar
Northwestern University

All Guest Speakers and Panelists

SROP Faculty Mentors and Alumni

We would also like to thank all of the graduate students, postdoctoral scholars, and faculty members whose guidance and support were of great importance to our SROP participants.