

STANFORD SAPP FAMILY CS BIO-X UNDERGRADUATE SUMMER RESEARCH PROGRAM



Cohort of 2026



"There is no question that the Bio-X grant was a key facilitator of my professional success. Particularly because I was a first-generation college goer, I really needed that extra time with Dr. Schnitzer and his group to learn about academic and research culture."

—2005 USRP Participant Allison Waters, now an Assistant Professor of Psychiatry and Neuroscience at Mount Sinai

STANFORD SAPP FAMILY CS BIO-X UNDERGRADUATE SUMMER RESEARCH PROGRAM



2025 Undergraduate Summer Research Program (USRP) Participants

In Summer 2026, the Stanford Sapp Family CS Bio-X Undergraduate Summer Research Program (Bio-X USRP) enthusiastically welcomed our full cohort of 86 exceptional Stanford students to research in laboratories across the campus. Since 2006, Stanford Bio-X has provided a ten-week summer research opportunity to a total of 1,157 students, fostering a strong interdisciplinary training for these up-and-coming scientists and ensuring that each of our undergrads has a fulfilling summer which enhances their research skills and helps prepare them for future careers in science and medicine.

With the goal of creating a vigorous, valuable, and fulfilling in-person research experience to fast-track the sharpening of students' skills and techniques, 47 Faculty, Bio-X postdocs, graduate students, researchers, Bio-X USRP alums, and senior-level undergraduates from 24 departments and the Stanford Bio-X Institute contributed their time and effort to the talks, workshops, journal clubs, and other events that enriched the 22nd year of the Bio-X USRP.

These members of the Bio-X community helped to facilitate fulfilling new connections and networks and to enrich the students' learning experience. Structured components of the program include:

30 Faculty Talks (3 talks each Wednesday during the 10-week program), see pages 6-7:

These talks expose students to a variety of scientific fields and enrich their summer interdisciplinary research experience. Faculty share their personal academic journeys as well as their research with students, providing them the opportunity to hear more about the broad range of research within Stanford. Students meet faculty in a variety of scientific fields and have the chance to network with each other as potential future collaborators and colleagues at the lunches hosted by the Stanford Bio-X Institute after the talks.

4 Workshops (offered in the spring and summer quarters), see pages 56-57:

Throughout the program, workshops explore research-related skills to prepare for, and enrich, the ten-week immersive experience. These workshops include how to analyze scientific manuscripts, mastering research design, how to give oral presentations, and poster design. In addition to the undergraduate cohort receiving valuable training, the Bio-X community

members who develop these workshops gain the opportunity to practice their teaching and presentation skills. The workshops also become a resource for the summer cohort for broader career and research advice by expanding their network of colleagues at Stanford.

5-Week Journal Club Series (9 groups exploring different topics), see pages 58-59:

The journal club series facilitates critical thinking among the students as they work in small groups to lead intellectually rigorous discussions regarding recent publications, innovations, and challenging scientific problems. Reading, understanding, and sharing insights from published manuscripts is a critical part of involvement in any research community, and practicing these skills during the Undergraduate Summer Research Program will serve these bright young researchers well as they continue their research careers. Like the workshops, this educational program also offers the postdocs, graduate students, and researchers leading the clubs a unique opportunity to develop their teaching skills, share their research insights, improve their mentorship capabilities, and expand their interactions with undergraduate students, enhancing their own career development as well as the student cohort's summer experience.

Professional Panel Discussion, see page 60:

Recognizing that our undergrads who confirm their love of research this summer are already contemplating what is next, we invite three Bio-X USRP alumni—Dr. Cheri Wu, a double board-certified adult psychiatry and child & adolescent psychiatrist; Dr. Allison Waters, a professor at the Icahn School of Medicine at Mount Sinai; and Everett Frost, an MBA grad currently engaged in public equities across several sectors—to discuss and answer questions about their professional journeys during a panel discussion.

Exploring Medical & Graduate School Pathways, see page 61:

For high-achieving undergraduates navigating research for the first time, Dr. PJ Utz engages our students in a talk that touches upon long-term career outcomes, detailing the different application strategies required for medical and graduate school, and giving them an insider roadmap on careers in bioscience and medicine.

Poster Session, see page 63:

At the conclusion of the program, students apply the different skills they learned from Bio-X workshops and throughout the program to create and present a scientific poster summarizing the results of their summer research. This highly-attended event also allows students to discover new fields, learn about the breadth of work supported by the program, and network with colleagues, faculty members, and even professionals from other fields, as well as refining their skills at visual and verbal research presentation.

We are deeply grateful to the generous donors, including the Sapp family, who have meaningfully invested in the Stanford Sapp Family CS Bio-X Undergraduate Summer Research Program. Many of these gifts were made to honor the 25th anniversary of Bio-X and Dr. Carla Shatz at the end of her tenure as Bio-X director. We are so appreciative of the community of supporters who make this program possible year after year.



2024 Undergraduate Summer Research Program (USRP) Participants

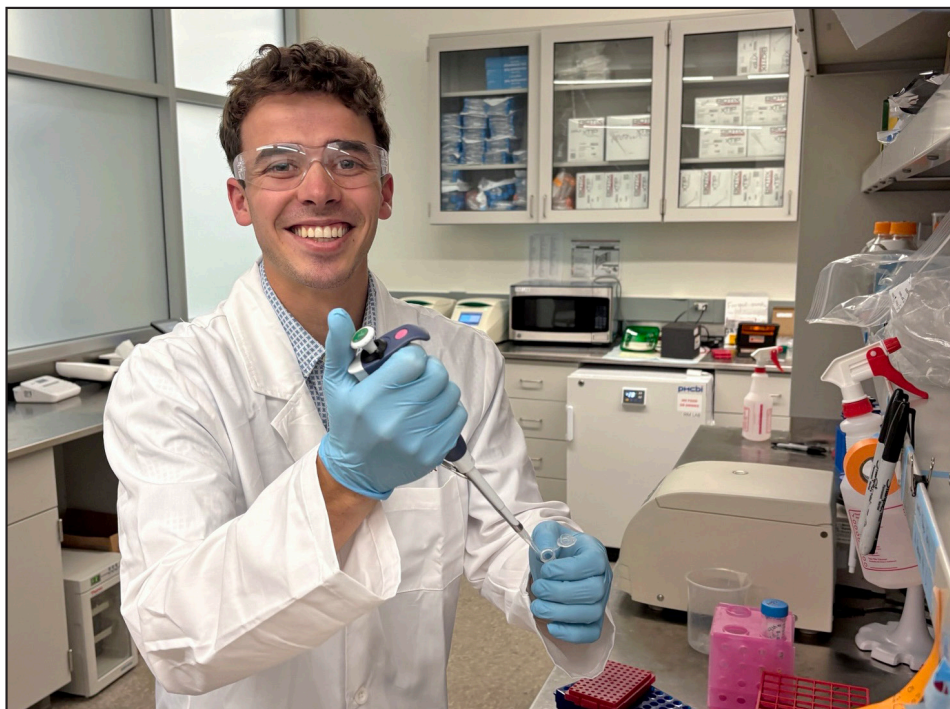
Bio-X USRP Alumni:

Countless students who have participated in the Bio-X USRP have indicated that the experience changed the course of their time at Stanford and influenced their future careers. Alumni of the program are extremely successful. They have gone on to:

- pursue doctorates and medical degrees all over the world, at dozens of institutions
- become faculty members in the sciences at leading universities and hospitals
- publish in high-impact journals including *Cell*, *Science*, *Nature*, *Nature Medicine*, *Neuron*, *PNAS*, and dozens more
- receive awards and scholarships like NSF Graduate Fellowships, the Rhodes Scholarship, the Churchill Scholarship, the Gates Cambridge Scholarship, the Soros Fellowship for New Americans, the David M. Kennedy Honors Thesis Prize, the Firestone Medal for Excellence in Undergraduate Research, and countless others
- accept exciting positions in industry and beyond, at dozens of biotech, pharmaceutical, and healthcare companies
- start their own companies, including NeuCures, THEON Therapeutics, shimmer, Kinsol, Y-Trap, Difféo, Taste, Epitairo Biosciences, Fancy That, Benchling, Stronger Brains, and many other innovative startups and non-profits at the intersection of science, technology, and health



2021 and 2022 USRP Participant Isaac Applebaum's research with Drs. Robert M. Waymouth, Grant Rotskoff, and Ronald Levy used machine learning to design polymers for gene delivery, with implications for mRNA-based vaccines and cancer immunotherapy. After working at Kriya Therapeutics, a biotech startup developing innovative gene therapies, Isaac is now a medical student at Stanford.



Curran Jacobus completed his Stanford Bio-X summer research training with Dr. Ellen Rim

Bio-X USRP Alumni:



2023 Undergraduate Summer Research Program (USRP) Participants



David Cox, 2007 cohort (left), is an Assistant Professor of Genetics at Stanford University and a Chan Zuckerberg Biohub Investigator. He earned his MD from the Harvard-MIT program in Health Sciences and Technology and his PhD in biology from MIT. David completed his internal medicine residency and a clinical fellowship in hematology at Stanford, where he concurrently conducted postdoctoral research with Rhiju Das. David's Stanford lab develops new technologies to measure, predict, and design molecular interactions, leveraging predictive models to uncover the principles governing molecular specificity, how this specificity enables biological regulation, and how its disruption contributes to disease.

Ankur Gupta, 2009 cohort (right), earned a master's degree in biological sciences from Stanford and a medical degree from UT Southwestern. Following work in healthcare venture capital, Ankur pursued clinical training as an ophthalmologist, completing residency rotations across the National Eye Institute, the University of Chicago, Geisinger, and Stanford Medicine. Applying his specialized medical expertise, he has founded three distinct companies and actively mentors several emerging founders in the medtech space. His most recent venture, Spect Inc., is a telemedicine startup company that leverages artificial intelligence to diagnose eye diseases in patients, which secured \$3.5 million in funding from investors.



Kaeli Yuen, 2010 cohort (left), is the Acting Deputy Director of Artificial Intelligence for the U.S. Department of Veterans Affairs (VA) within the Office of the Chief AI Officer. She previously served the VA as its Data & AI Health Product Lead and was selected for the White House Presidential Innovation Fellowship. In the private sector, she has held director-level enterprise product management roles at digital health leaders like Accolade and Ambience Healthcare, in addition to founding AltMD to empower medical students to transition into digital health.

Dana Yeo, 2011 cohort (right), is a legal professional and business operations leader currently serving as Associate Counsel at the University of California, San Francisco Office of Legal Affairs. Previously, Dana was the Chief of Staff and Head of Business Operations at Meliora Therapeutics, a machine learning therapeutics company developing novel cancer drugs. Dana earned a J.D. from Berkeley Law and has integrated her legal and scientific training in all of her endeavors. Dana also founded a non-profit that connects emerging experts with public defenders for pro bono technical consultations.



Matthew Millett, 2014 cohort (left), earned a master's degree in bioinformatics from Stanford and an medical degree from Washington University School of Medicine in St. Louis. Matthew worked as a software engineer at several tech companies and startups before becoming a resident physician at the University of Chicago Medical Center Department of Anesthesia and Critical Care. These experiences inspired Matthew to become the Founder and CEO of Caralyst, which matches healthcare workers with vetted mental health providers across 200+ compatibility factors, to improve physician well-being and reduce burnout.

Jennifer Hamad, 2024 cohort (right), earned the 2025 J. E. Wallace Sterling Award for Scholastic Achievement, a 2025 Firestone Medal for Excellence in Undergraduate Research for her honors thesis, and a 2026 Churchill Scholarship to pursue graduate study at the University of Cambridge. Over the course of her Stanford research at the interface of chemistry and biology, she co-authored papers in *Science Advances*, *Nature Communications*, and *Cell* on improvements to CAR-T cell cancer therapies and an innovative HIV therapy. Jennifer hopes to pursue a MD/PhD and become a physician scientist with her own research lab at the intersection of immunology, chemistry, and translational medicine.



2026 Faculty Talks:

June 24

Lu Chen (Neurosurgery and Psychiatry & Behavioral Sciences - Interdisciplinary Brain Sciences), “Synaptic Plasticity and Memory Formation in Health and Diseases”

Robert Malenka (Psychiatry & Behavioral Sciences), “Neuroscience and Psychiatry: My 50 Year Journey”

Anthony Wagner (Psychology), “On Academic Careers”

July 1

Rebecca Pinals (Chemical Engineering), “Engineering Neuro-Models and Nano-Tools to Uncover Neurodegenerative Disease Mechanisms”

Matthew Porteus (Pediatrics - Stem Cell Transplantation), “Creating Precision Engineered Cells to Treat Rare and Common Diseases”

Joseph Wu (Medicine - Cardiovascular Medicine and Radiology), “New Approach Methodologies (NAMs): Stem Cells, Genomics, and AI for Drug Discovery”

July 8

Florentine Rutaganira (Biochemistry and Developmental Biology), “How a Unicellular Organism Can Teach Us About the Origin of Animals”

Paul Wang (Medicine - Cardiovascular Medicine), “A Career in Academics and Innovation: Change the World and Your Life by Innovating”

Paul Bollyky (Medicine - Infectious Diseases and Microbiology & Immunology), “Engineering Phage Therapy For Antibiotic Resistant Infections”

July 15

James Ford (Medicine - Oncology and Genetics), “Genetics of Hereditary Cancer Risk”

Ravi Majeti (Medicine - Hematology), “Stem Cells in Human Acute Myeloid Leukemia”

James Brooks (Urology), “Prostate Cancer, Sugar, and Immunity”



Calvin Kuo,
Maureen Lyles D'Ambrogio Professor,
Professor of Medicine (Hematology)

July 22

Calvin Kuo (Medicine - Hematology), “Using Organoids to Model Human Disease”

Jill Helms (Surgery - Plastic & Reconstructive Surgery), “Biomimicry in Action”

Matteo Molè (Obstetrics & Gynecology - Reproductive Biology), “Exploring Human Embryo Implantation: Paving the Way to Improve Pregnancy Outcomes”

July 29

Martha Cyert (Biology), “Discovering New Calcium-Dependent Signaling Pathways”

Ehsan Adeli (Psychiatry & Behavioral Sciences), “A Multidimensional Odyssey into the Human Mind: Building a Brain Foundation Model”

Annelise Barron (Bioengineering), “Mental Illnesses (& MS, AD, PD) Can Be Caused by Polymicrobial Infections that Weaken & Dysregulate Immunity, Leading to Neuroinflammatory Viral Reactions”



Florentine Rutaganira, Assistant Professor of Biochemistry and of Developmental Biology



2026 USRP participants Baran Daliri, Lily Zou, Christopher Owens, Ronny Abdullah, Logan Wang, Raza Ali, Saikiran Motati, Marta Pambukhchyan, Vienna Panossian, and Catherine Yue enjoying lunch with Dr. Jill Helms



2026 USRP participants Zina Vidalakis, Diba Dindoust, Griffin Lee, Chris Lopez, Jacob Chen, Evan Park, Alan Huang, Haley Chu, Luna Romero, and Kenza Ngatchou enjoying lunch with Dr. Anthony Wagner

August 5

Timothy Durazzo (Psychiatry & Behavioral Sciences), “Effects of Low-Level Alcohol Consumption on the Human Brain”

Ashwin Ramayya (Neurosurgery), “The Surprising Link Between Brain Injury and Chronic Pain”

Zhenan Bao (Chemical Engineering), “Skin-Inspired Electronics for Health Sensors”

August 12

Sherri Rose (Health Policy), “Health Policy Data Science Lab”

Jonas Cremer (Biology), “Quantifying Metabolite Exchange in the Human Gut Microbiome”

Andreas Tolias (Ophthalmology), “Decoding the Brain with AI”

August 19

Siddharth Krishnan (Electrical Engineering), “Bioelectronics for Closed Loop Therapy Delivery”

Anusha Kalbasi (Radiation Oncology - Radiation Therapy), “Decoding the Language of T Cells for Cancer Immunotherapy”

Michael Zeineh (Radiology), “The Path to Advanced Neuroimaging in Neurodegenerative Disorders”

August 26

Fiona Baumer (Pediatric Neurology), “Non-Invasive Neurostimulation for Pediatric Epilepsy”

Ellen Rim (Chemical Engineering), “Directed Evolution of Plant Proteins for Crop Resilience”

Maya Kasowski (Pathology and Medicine - Pulmonary, Allergy & Critical Care Medicine), “Reading the Regulatory Code of Thyroid Disease Risk”



Ashwin Ramayya,
Assistant Professor of Neurosurgery

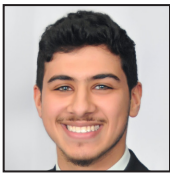


Martha Cyert,
Dr. Nancy Chang Professor, Professor of Biology

“I loved getting to hear the faculty talks and then discuss further with them at lunch alongside my peers - I have never had the opportunity to hear firsthand from so many amazing researchers before. This really expanded my sense of what research can be, and how fields can collaborate. There are no limits to what we can think up! I am more interested in collaborative interdisciplinary research after this experience... Thank you so much!”

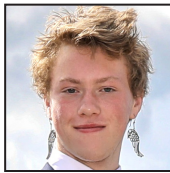
—2025 USRP Participant Weston Keller

2026 Stanford Sapp Family CS Bio-X Undergraduate Summer Research Program Participants:



Ronny Abdullah, Electrical Engineering
Mentor: Alexander Veziridis (Radiology)
Catheter-Based Electrochemical Sensing for Safer Minimally-Invasive Procedures

Doctors currently rely on repeated X-ray imaging to determine when blood-flow-blocking procedures are complete. Ronny's project explores using tiny electrical sensors inside microcatheters to measure blood flow directly within vessels. This approach could reduce radiation exposure while providing more accurate, real-time feedback during procedures.

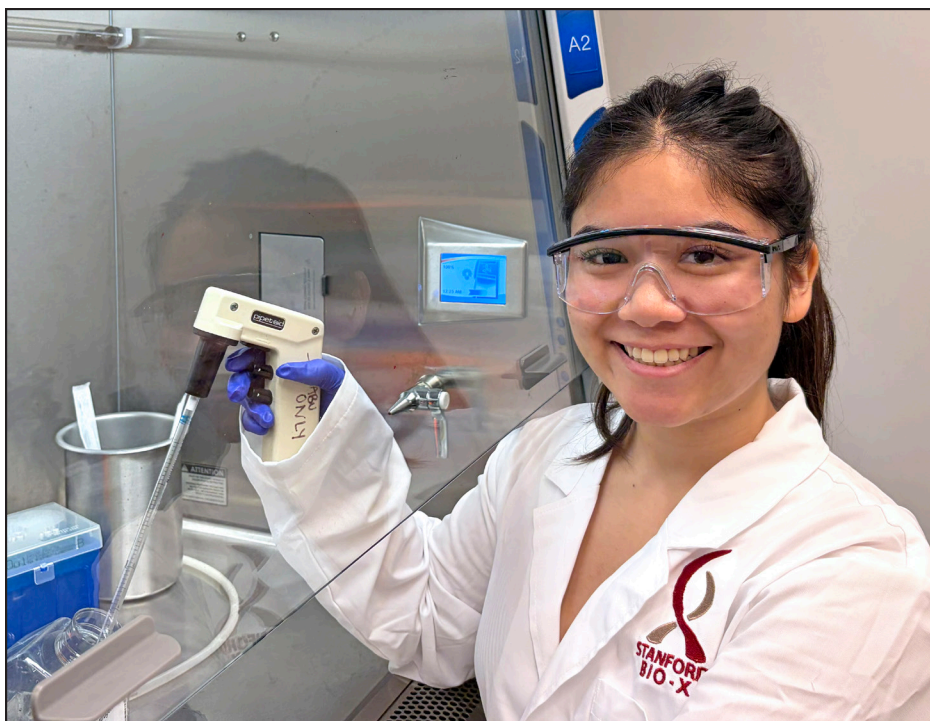


Nathan Adam, undeclared
Mentor: James Ford (Medicine - Oncology)
CDH1: Drug Effectiveness and Cancer Targets

Many gastric cancers (and some breast cancers) involve mutations in the CDH1 gene, which normally helps cells bind. When CDH1 doesn't function properly, cancer is more likely to spread and develop. Nathan's project studies how these mutations affect cells and tests which drugs can specifically target CDH1-deficient cancer cells while sparing healthy ones.



James Ho completed his Stanford Bio-X summer research training with Dr. Craig Levin



Devyn Sasai completed her Stanford Bio-X summer research training with Dr. Monther Abu-Remaileh



Raza Ali, undeclared

Mentor: Phillip Yang (Medicine - Cardiovascular Medicine)
Validating Preclinical Efficacy of Mitochondria-Rich EVs from Expanded HSPC-Derived Erythrocyte Progenitor Cells

Heart failure affects about 6.7 million U.S. adults and occurs when heart cells can't produce enough energy to function properly. Raza's project explores using engineered blood cell precursors to create vesicles that deliver healthy mitochondria to damaged heart cells, helping restore energy. It will also evaluate safety for potential large-scale treatment, aiming to address heart failure at its source.



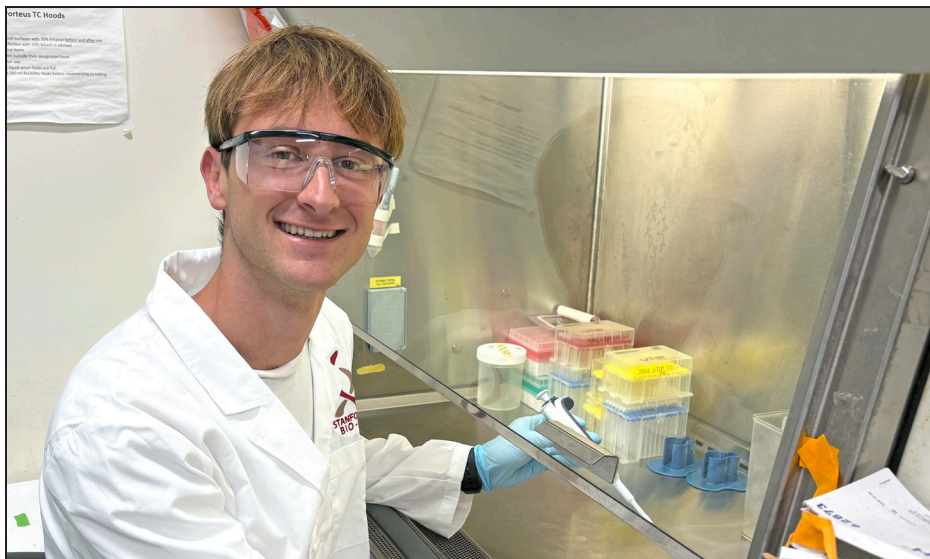
Riya Anand, Bioengineering

Mentor: Laura Gwilliams (Psychology)
Effects of Interictal Epileptiform Activity on Language Processing in Children with Epilepsy

Epilepsy affects about 500,000 U.S. children and can impair language development and learning. Riya's project studies how brain activity between seizures may disrupt speech comprehension. Riya will analyze neural data to understand how these patterns affect children's ability to process speech.

"Bio-X really helped develop my passion for research and scientific discovery. Being able to work in a lab full time and try to find answers to scientific questions was very fulfilling and grew my critical thinking as well as my experimental techniques. The workshops and speakers helped develop a wonderful intellectual environment where I could learn about advances outside of my field and fully see how interconnected scientific research can be."

—2025 USRP Participant Elyse Hwang



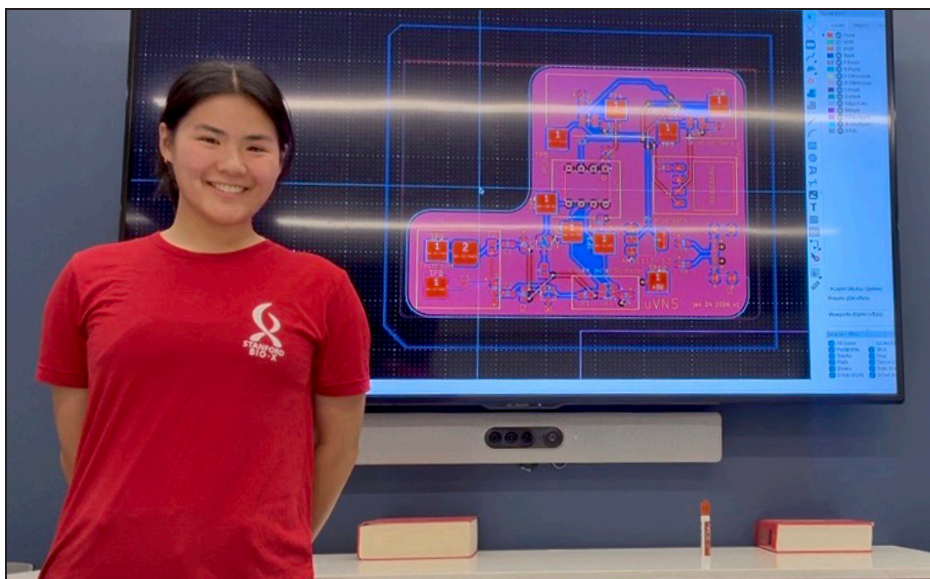
Griffin Lee completed his Stanford Bio-X summer research training with Dr. Matthew Porteus

Roberto Andrade, Human Biology

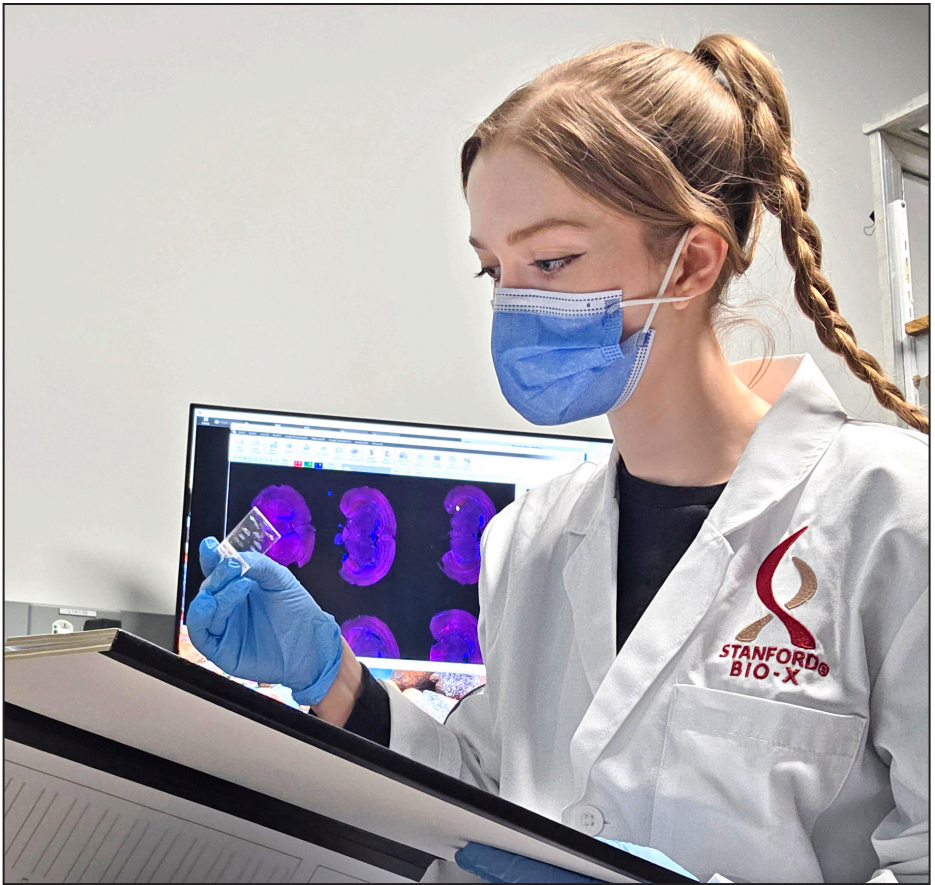
Mentor: Timothy Durazzo (Psychiatry & Behavioral Sciences)

Differences in Brain Metabolism and Treatment Response in Alcohol Use Disorder as a Function of APOE4 Genotype

As life expectancy rises, Alzheimer's disease is a growing concern for Veterans, especially those with Alcohol Use Disorder (AUD). Roberto's project studies how a genetic risk factor (APOE4) affects memory, brain structure, and metabolism using clinical data, alongside mouse studies of energy dysfunction and inflammation. His goal is to better understand risk and guide more personalized prevention strategies.



Chloe Zhong completed her Stanford Bio-X summer research training with Dr. Todd Coleman



Melody Dailey completed her Stanford Bio-X summer research training with Dr. Robert Malenka

Ojaswee Aryal, Bioengineering

Mentor: Ravi Majeti (Medicine)

Protein Engineering to Investigate Developmental and Leukemic Phenotypes in ASXL1 Mutant Disease

Mutations in the ASXL1 gene cause a rare developmental disorder and are also common in aggressive blood cancers. Ojaswee's project tests whether removing the mutant ASXL1 protein can reverse disease effects. Using targeted methods in stem cells developing into neurons and blood cells, the goal is to identify potential treatment strategies and better understand how these mutations drive disease.



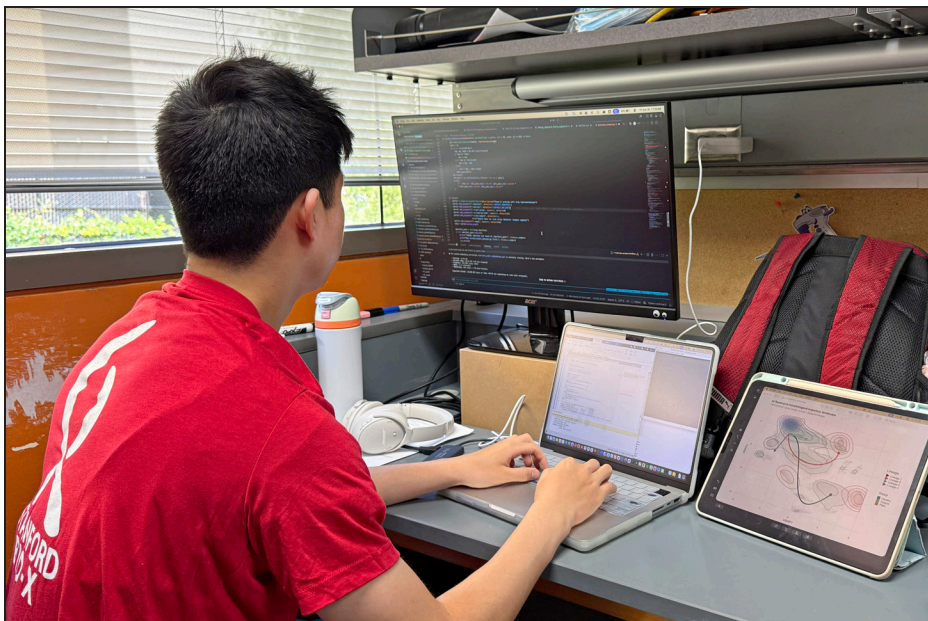
Emma Ayala, Bioengineering

Mentor: Jonas Cremer (Biology)

Beyond Canonical Carbon Catabolite Repression: Strain-Dependent Carbon Hierarchy in Commensal *E. coli* Strains

Microorganisms must constantly adapt to changing food sources. Emma's research examines how different strains of beneficial *E. coli* in the human gut prioritize available sugars. Understanding these preferences may reveal how gut bacteria adapt to changing environments and help maintain a healthy balance in the gut.





Alan Huang completed his Stanford Bio-X summer research training with Dr. Euan Ashley

Ghazal Azhdari Mamooreh, Biology

Mentor: Anusha Kalbasi (Radiation Oncology - Radiation Therapy)

Investigating IL-7 and IL-15 Delivery Systems for T Cell Immunotherapy

Cytokines are key regulators of the immune system and can enhance the effectiveness of cancer immunotherapy. However, when delivered throughout the body, they can cause serious side effects. Ghazal's project investigates new methods to deliver cytokines more precisely to specific immune cells and examines how these approaches affect immune signaling. Her findings could help guide the development of safer and more effective cancer treatments.



Sophia Barnard, undeclared

Mentor: Julia Kaltschmidt (Neurosurgery)

Investigating the Impact of Pregnancy on Enteric Neurons in the Gut

Constipation affects nearly 40% of pregnant women, but the underlying causes are not well understood. Sophia's project investigates how pregnancy-related hormones affect the gut's nervous system, which helps regulate digestion and bowel movements. Understanding these changes could lead to new therapies to improve maternal health during and after pregnancy.



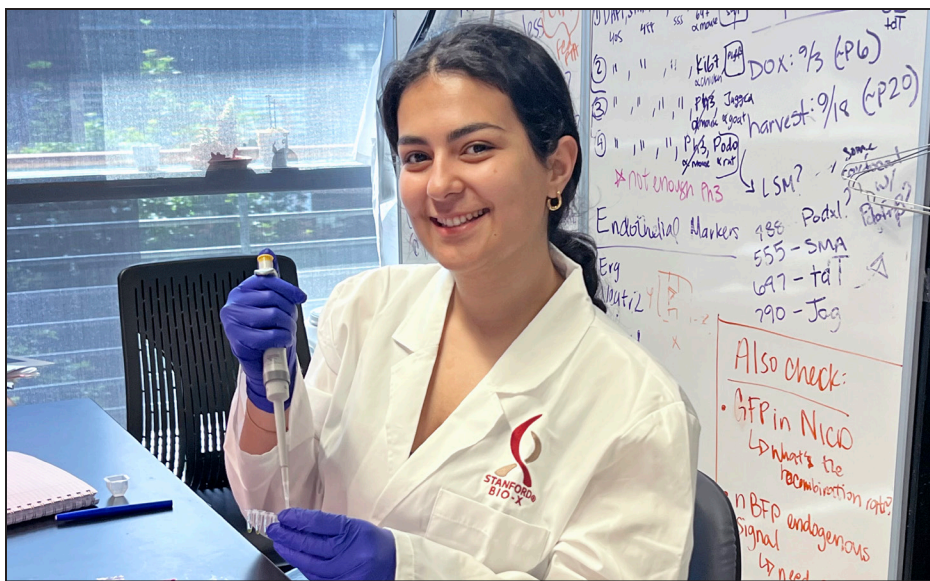
Talia Besikof, Design

Mentor: Kara Davis (Pediatrics - Hematology/Oncology)

Metabolic Targeting of Chemotherapy-Resistant Acute Lymphoblastic Leukemia

Acute lymphoblastic leukemia (ALL) can become resistant to chemotherapy, making relapsed disease difficult to treat. This project investigates a new approach that targets dihydroorotate dehydrogenase (DHODH), an enzyme leukemia cells need to produce pyrimidines, the building blocks required for DNA and cell growth. By testing a drug that blocks this pathway, Talia aims to identify a weakness in drug-resistant leukemia cells and help develop more effective treatments for patients with limited options after relapse.





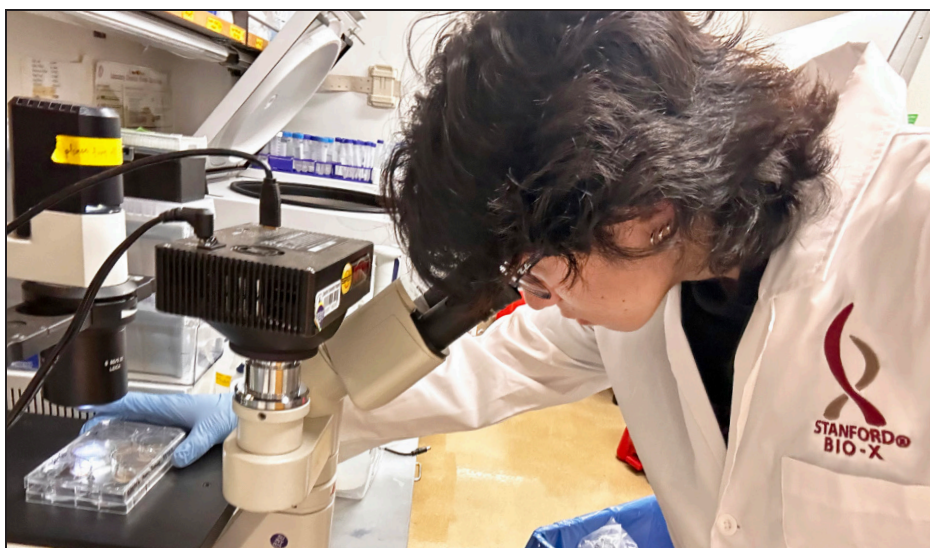
Marta Pambukhchyan completed her Stanford Bio-X summer research training with Dr. Kristy Red-Horse and Dr. Mark Skylar-Scott

Jacob Chen, undeclared

Mentor: Joseph Wu (Medicine - Cardiovascular Medicine)

Microplastics, Macro-Impacts: Defining Exposure Thresholds for Vascular Impairment in Human Induced Pluripotent Stem Cell-Derived Endothelial Cells

Micro- and nanoplastics are increasingly recognized as potential health risks, but their effects on blood vessels remain poorly understood. Jacob's project studies how these particles affect the cells that line blood vessels and maintain cardiovascular health. This research could reveal how plastic pollution contributes to heart disease and why some individuals may be more vulnerable than others.



Alex Ninomiya completed his Stanford Bio-X summer research training with Dr. Calvin Kuo

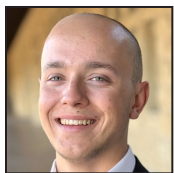


Jacqueline Chen, Chemical Engineering

Mentor: Jennifer Brophy (Bioengineering)

Screening Environmental Inputs for Multi-Input Synthetic Logic Gates in Plants

Plants respond to environmental signals. Jacqueline's project develops genetic "logic gates" that allow plants to respond to specific environmental cues in a controlled and predictable way. By testing sensors that are activated by signals, for example heat, she aims to create more precise tools for controlling gene activity in plants. These advances could help scientists engineer crops that are more resilient, productive, and sustainable in changing environments.

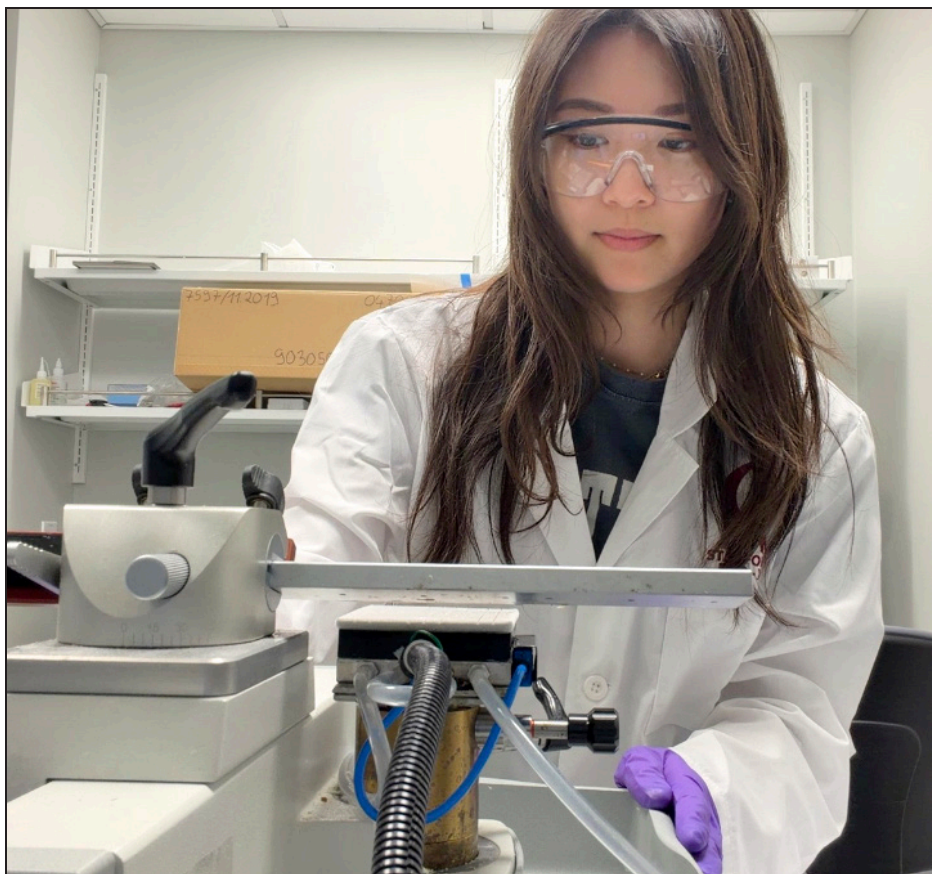


Peter Childs, Data Science

Mentor: Sherri Rose (Health Policy)

Towards a Rigorous Framework for Analyzing the Social Impact of Healthcare Algorithms

Artificial intelligence is increasingly being used in healthcare to help guide decisions about patient care, but these systems are often adopted without fully understanding their real-world effects. Peter's project uses advanced statistical and machine learning methods to evaluate whether healthcare algorithms improve patient outcomes, access to care, quality, and costs, or unintentionally introduce bias and inequities. The findings could help ensure that AI tools are implemented safely, effectively, and fairly for all patients.



Ava Yeh completed her Stanford Bio-X summer research training with Dr. Tony Wyss-Coray



Samson Raskin completed his Stanford Bio-X summer research training with Dr. Tracey McLaughlin



Haley Chu, Human Biology

Mentor: Anthony Wagner (Psychology)

Attentional Rhythmicity with a 100% Valid Cue

Attention is essential for learning and everyday tasks, yet scientists still do not fully understand how the brain maintains focus over time. Haley's project uses EEG to study how brain activity influences sustained attention. The findings could improve our understanding of attention and help inform future treatments for attention-related disorders.



Melody Dailey, Human Biology

Mentor: Robert Malenka (Psychiatry & Behavioral Sciences)

Effects of Early Life Stress on Neural Plasticity and Behavioral Flexibility through Norepinephrine

Early life stress, including neglect and trauma, can have lasting effects on learning, emotional regulation, and mental health. This project investigates how developmental stress alters norepinephrine circuits, which help regulate attention, arousal, and brain plasticity. Using mouse models, Melody's research will examine how these changes affect anxiety, emotional learning, and cognitive flexibility in adulthood. The findings may identify new targets for therapies that help restore healthy brain function following childhood adversity.



Baran Daliri, undeclared

Mentor: Jill Helms (Surgery - Plastic & Reconstructive Surgery)

A Step Toward Longer Lasting Implants: Using Increased Wnt Protein Signaling for Better Attachment of the Implant to the Surrounding Peri-Implant Epithelium

Infections around dental implants are a common cause of implant failure and are often linked to a weak seal between the gum tissue and the implant surface. Baran's project aims to strengthen that protective barrier by enhancing Wnt signaling, a pathway that helps maintain tissue attachment around natural teeth. By promoting the formation of hemidesmosomes, specialized structures that anchor gum tissue to the implant, her research could improve implant stability and reduce the risk of infection.



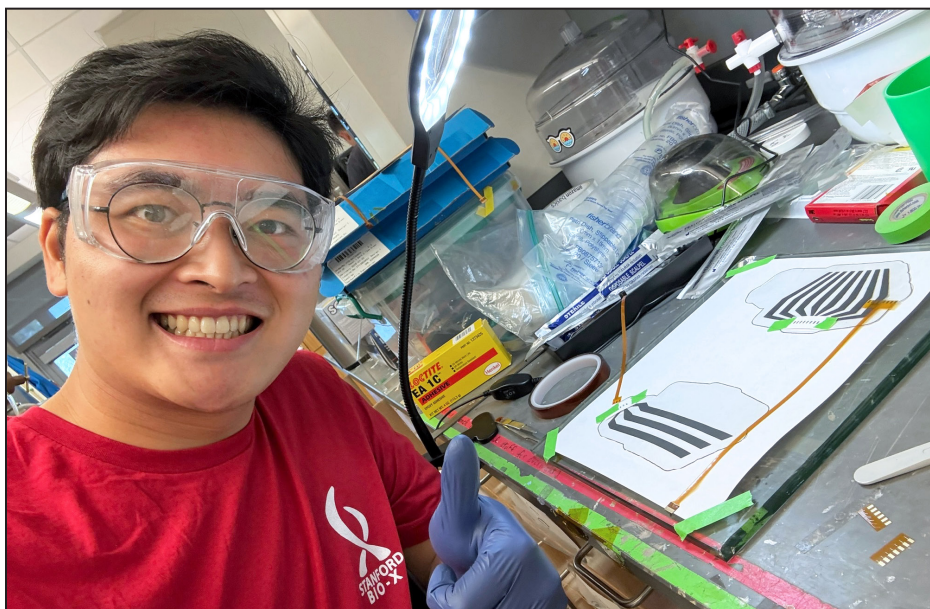
Emily Linder completed her Stanford Bio-X summer research training with Dr. Aaron Gitler

Isabella Dang, Human Biology

Mentor: Justin Annes (Medicine - Endocrinology)

Optimizing Zinc-Chelating GNF Compounds for β -Cell-Targeted Drug Delivery and Regeneration

Diabetes develops when the body loses insulin-producing beta cells in the pancreas. Isabella's project tests a new strategy to selectively stimulate beta-cell regeneration by targeting their unusually high zinc content. Using specially designed compounds and mouse models, her research aims to promote beta-cell growth while minimizing effects on other cell types. The findings could help advance more precise regenerative therapies for diabetes.



Joseph Ho completed his Stanford Bio-X summer research training with Dr. Zhenan Bao



Jaydon Deras, Chemical Engineering

Mentor: Rebecca Pinals (Chemical Engineering)

Assessing Blood-Brain Barrier Integrity and Neurotoxicity in Human Brain Cells Induced by PFAS Exposure

Polyfluoroalkyl substances (PFAS), often called “forever chemicals,” are widespread in the environment and have recently been detected in the human brain. Jaydon’s project investigates how these chemicals affect the brain’s protective barrier and brain cells. This research could help reveal the potential health risks of PFAS exposure and their impact on brain function.

Diba Dindoust, Bioengineering

Mentor: Gary Darmstadt (Pediatrics - Neonatology)

LLM Benchmarking for Improved Maternal and Neonatal Care in Bangladesh and Zimbabwe

Large language models are increasingly being considered for healthcare applications, but they often perform poorly when medical recommendations depend on region-specific diseases, treatment guidelines, and clinical practices. Diba’s project evaluates AI models using maternal and newborn care scenarios from Bangladesh and Zimbabwe and tests ways to improve their performance in these settings. Diba’s findings could help ensure that future healthcare AI tools provide accurate and reliable information tailored to local medical needs rather than relying on generalized recommendations.



Nailah Donatto completed her Stanford Bio-X summer research training with Dr. Laura Dassama



Jacqueline Chen completed her Stanford Bio-X summer research training with Dr. Jennifer Brophy



Nailah Donatto, Chemical Engineering

Mentor: Laura Dassama (Chemistry and Microbiology & Immunology)
Exploring Delivery Strategies for Enhanced Targeting and Uptake of Biologics by Erythroid Precursors to Treat Sickle Cell Disease

Sickle cell disease is a genetic blood disorder that impairs oxygen transport and shortens lifespan. Nailah's project explores new ways to deliver therapies to blood-forming cells, overcoming a major challenge in current treatment approaches. This work could help advance more effective treatments for sickle cell disease.



Ashley Dong, undeclared

Mentor: Andreas Tolias (Ophthalmology)
DeepLabCut for Behavioral Phenotyping in Epilepsy

Epilepsy affects millions of people. Many people with epilepsy continue to have seizures despite medication, and current brain stimulation treatments do not work consistently. Ashley's project uses artificial intelligence to identify more precise physical signs of seizures in a rat model. By improving the ability to detect when a seizure is occurring, Ashley's research could help guide the development of more effective brain stimulation therapies for epilepsy.

"Being exposed to a great amount of research at Stanford helped me to understand what research areas I felt interested and passionate about, as well as my relationship with research in my future career."

—2025 USRP Participant Arin Vansomphone



John Eden-Sung, Physics

Mentor: José Dinneny (Biology)

Engineering Genetically Encoded Ethylene Receptors in Plants

Ethylene is a natural plant hormone that controls growth and helps plants respond to environmental changes. Because it is a gas, it has been difficult to track within living plants. John's project will develop new sensors to detect and visualize ethylene activity, providing researchers with valuable tools to better understand plant growth and adaptation, and could ultimately contribute to the development of more resilient and productive crops.



Tia Evans, Human Biology

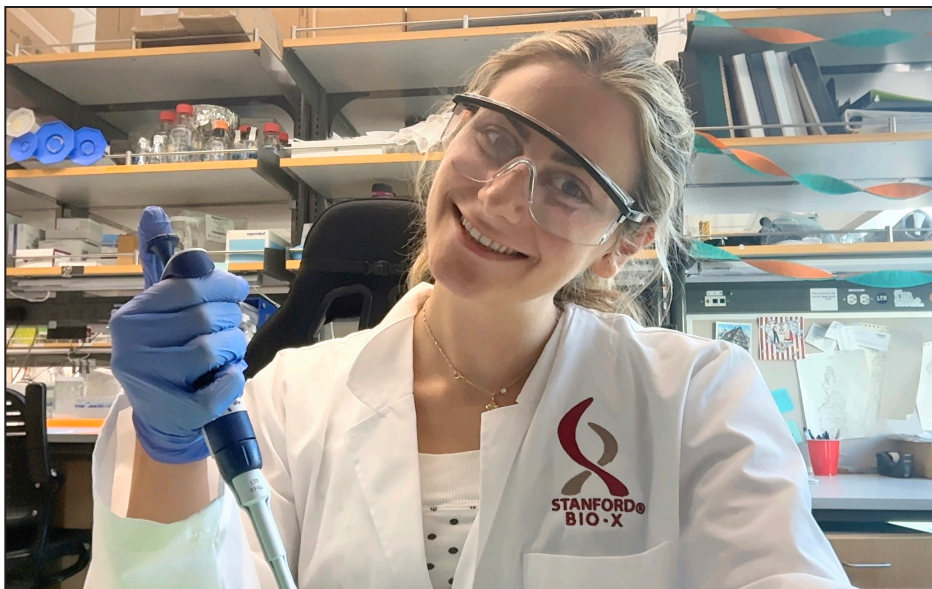
Mentor: Paul Bollyky (Medicine - Infectious Diseases and Microbiology & Immunology)

Evaluating AI-Generated Bacteriophages for Enhanced Treatment of Antibiotic-Resistant *E. coli*

Urinary tract infections caused by *E. coli* are becoming increasingly difficult to treat because of antibiotic resistance. Tia's project will test whether AI-designed bacteriophages—viruses that selectively kill bacteria—can improve the treatment of drug-resistant infections. This work could help advance new alternatives to antibiotics for difficult-to-treat UTIs.



Kian Salimi completed his Stanford Bio-X summer research training with Dr. Calvin Kuo and Dr. Guosong Hong



Talia Besikoff completed her Stanford Bio-X summer research training with Dr. Kara Davis

Nicolette Fierro, Psychology

Mentor: Carolyn Rodriguez (Psychiatry & Behavioral Sciences)

Neurocircuitry of Unwanted and Intrusive Sexual/Religious Obsessions in OCD

Obsessive-compulsive disorder (OCD) can involve perseverative thoughts (obsessions) and repetitive behaviors (compulsions) that often do not respond well to current treatments. Nicolette's project analyzes brain imaging data to examine how ketamine affects these symptoms and the brain circuits involved in cognitive control. The findings could improve understanding of OCD and help identify new treatment approaches for patients with difficult-to-treat symptoms.



Gabriella Fish, undeclared

Mentor: Paul Wang (Medicine - Cardiovascular Medicine)

Novel Cardiac Mapping Signal Analysis

Atrial fibrillation (AF) is the most common heart rhythm disorder and can lead to serious complications, including stroke and heart failure. Gabriella's project uses a novel high-density electrode technology to record detailed electrical activity across the heart. By developing automated methods to analyze these signals, her research aims to improve the ability to identify the sources of AF and guide more effective diagnosis and treatment.



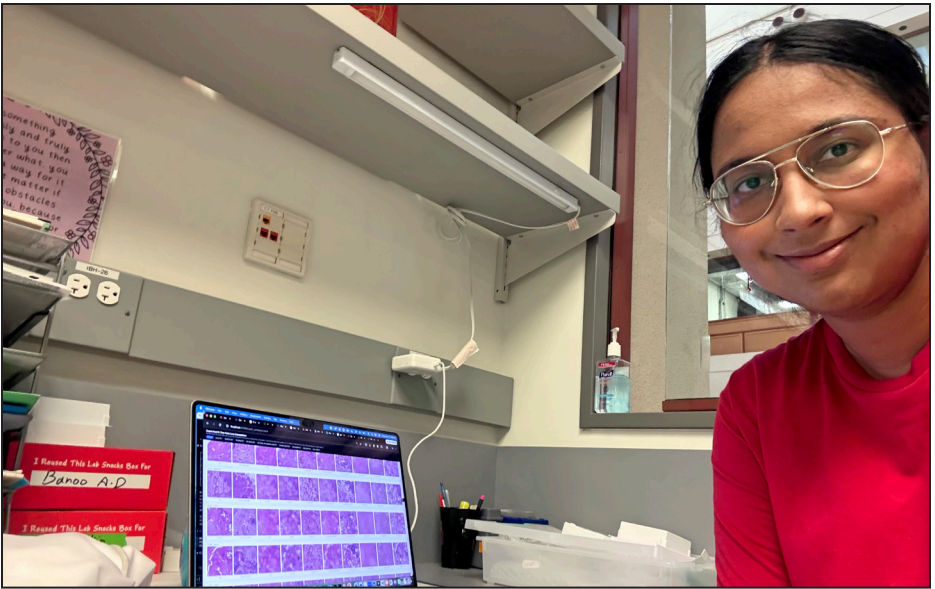
Theo Frano, Bioengineering

Mentor: Kabir Peay (Biology and Earth Systems Science)

Building a Protoplasting-Based Transformation Toolkit for the Ectomycorrhizal Model Fungus *Suillus pungens*

Ectomycorrhizal fungi are vital to ecosystems but difficult to study genetically because researchers lack reliable ways to modify their DNA. Theo's project addresses this by developing a genetic transformation method for the model fungus *Suillus pungens*. By optimizing cell wall removal and tissue regeneration, this work will enable genetic editing and deepen our understanding of how these fungi support ecosystems.





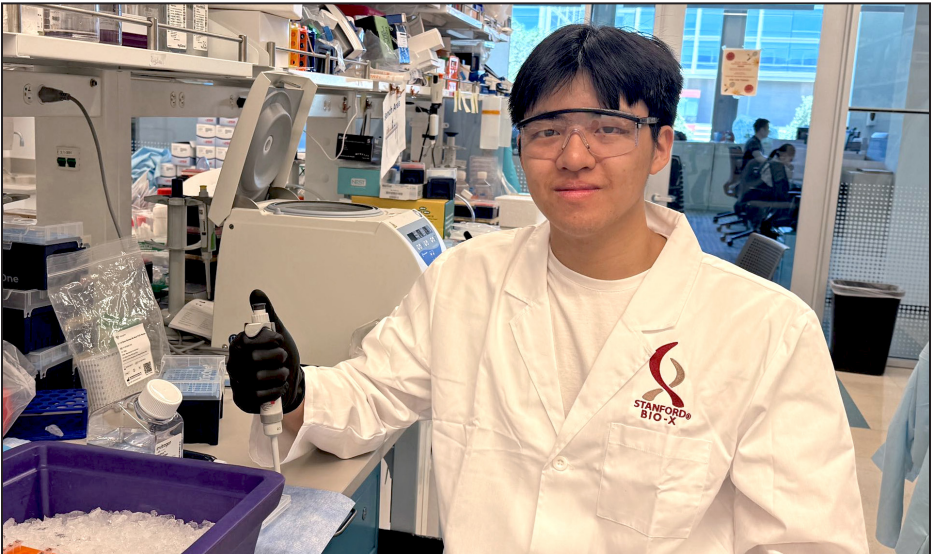
Arshmeet Kaur completed her Stanford Bio-X summer research training with Dr. Kavita Sarin

Macy Gong, Biology

Mentor: Michael Longaker (Surgery)

Modulating DLK1 Profibrotic Scar-Depositing Fibroblasts *in vitro* Using a 3D Hydrogel Culture System

Scarring can impair healing and lead to long-term medical and cosmetic problems. Macy's project studies how mechanical forces cause fat cells to transform into scar-forming fibroblasts and investigates whether blocking the protein DLK1 can redirect these cells toward a more regenerative, healing-promoting state. Macy's findings could identify new ways to reduce scarring and improve tissue repair after injury or surgery.



Jacob Chen completed his Stanford Bio-X summer research training with Dr. Joseph Wu

Nicholas Hadi, undeclared

Mentor: James Brooks (Urology)

Identification of Blood-Based Protein Biomarkers for Clear Cell Renal Cell Carcinoma Using Patient-Derived Xenograft Models

Clear cell renal cell carcinoma is the most common form of kidney cancer, but it can be difficult to detect and monitor using imaging alone. Nicholas's project investigates whether three tumor-derived proteins found in the blood can serve as biomarkers for the disease. By identifying blood-based indicators that track tumor growth, his work could improve early diagnosis, distinguish cancerous from non-cancerous tumors, and help physicians monitor treatment response more accurately.

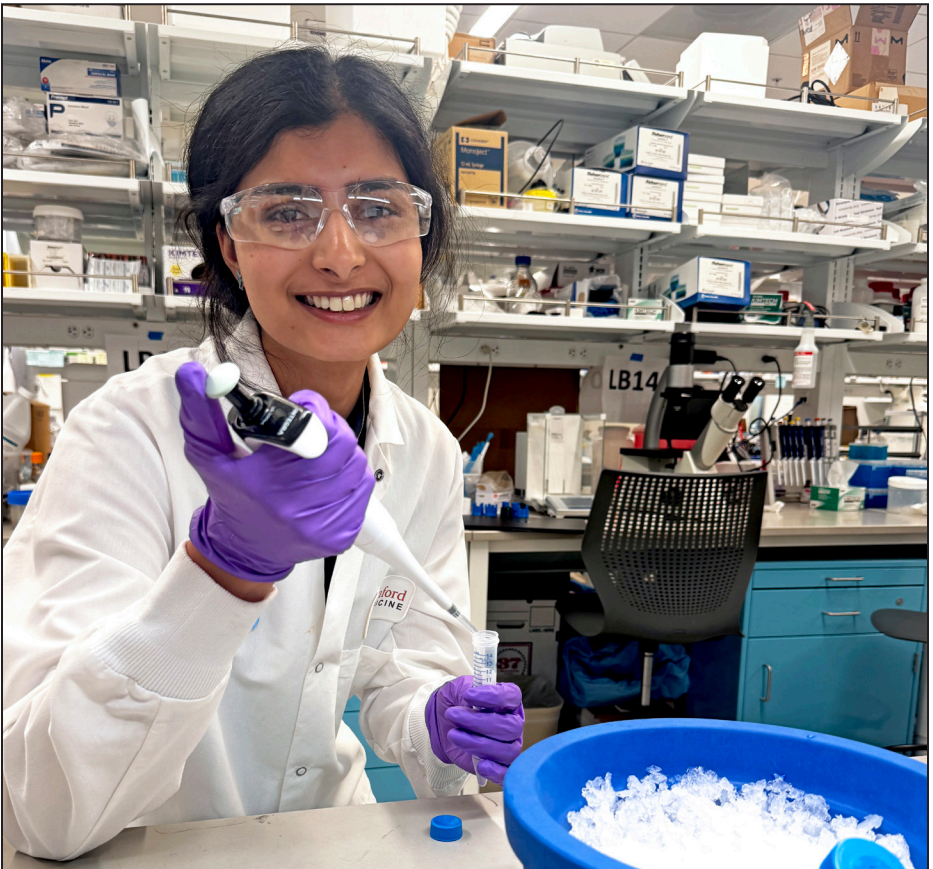


Troy Harris, Biology

Mentor: Neir Eshel (Psychiatry & Behavioral Sciences)

Investigating How Subdivisions of the Lateral Septum Exert Opposing Control Over Aggression

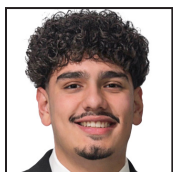
Aggression is a common behavior that can have serious consequences. Troy's project investigates how different regions of the brain's lateral septum communicate with aggression-related neurons in the hypothalamus to either increase or suppress aggressive behavior. By mapping and testing these neural circuits, Troy's work could provide new insights into the biological basis of aggression and help guide future treatments for disorders involving uncontrolled violence.



Raina Singh completed her Stanford Bio-X summer research training with Dr. Fan Yang



Joseph Shelby completed his Stanford Bio-X summer research training with Dr. Marius Wernig



Nathan Herrera, undeclared

Mentor: Aaron Gitler (Genetics)

Fast and Slow-Firing Motor Neurons: Insights into Selective Vulnerability in ALS

Amyotrophic lateral sclerosis (ALS) is a devastating disease that causes progressive loss of motor neurons and paralysis. Nathan's project compares vulnerable and resilient motor neurons to identify the genes and pathways that help some cells survive. His findings could reveal new targets for therapies that slow the progression of ALS.

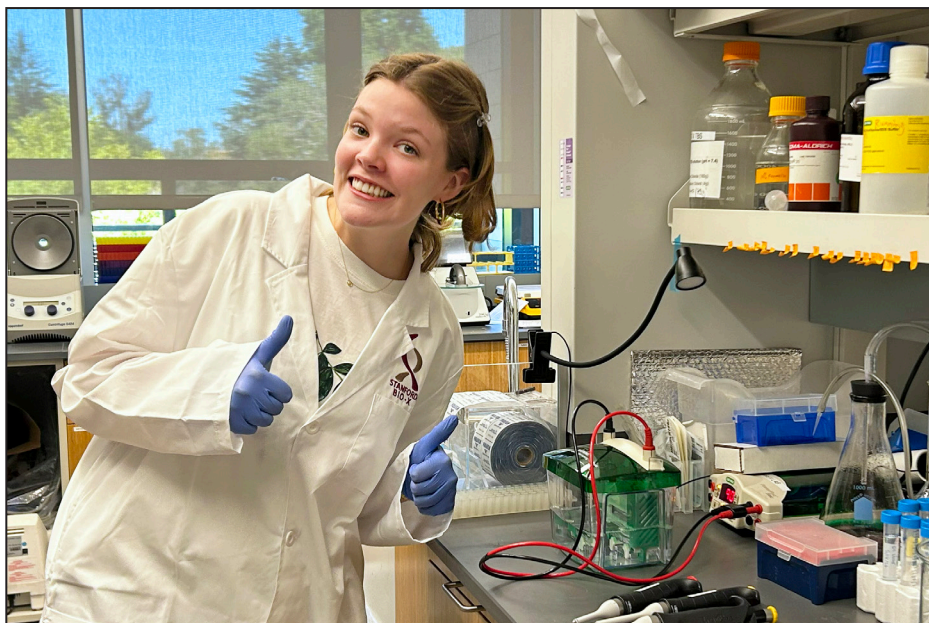


James Ho, Physics

Mentor: Craig Levin (Radiology)

Exploring a Novel Calibration Approach to Achieve <250 Picosecond Temporal Resolution for a Brain-Dedicated Time-of-Flight Positron Emission Tomography (PET) Scanner

PET-MRI is a powerful imaging technology used to study neurological diseases, but image quality depends on extremely precise timing measurements. James is developing and testing a new calibration method for a next-generation PET-MRI system that improves synchronization across thousands of detector channels. By increasing image accuracy and signal quality while simplifying the calibration process, his work could enhance researchers' ability to detect and study brain disorders.



Emma Kennedy completed her Stanford Bio-X summer research training with Dr. Annelise Barron

Joseph Ho, undeclared

Mentor: Zhenan Bao (Chemical Engineering)

Development of Unobtrusive Wearable Strain Sensor for Long-Term and Continuous Lactation Volume Monitoring

Breastfeeding is an important part of maternal and infant health, yet there are few reliable ways to continuously monitor milk production. Joseph's project develops a soft, wearable sensor that measures changes in breast volume over time using stable capacitive sensing technology. By providing real-time, long-term monitoring of lactation, the device could help support personalized breastfeeding care and enable earlier identification of potential feeding challenges for new mothers.



Kaitlyn Hong, undeclared

Mentor: Thomas Südhof (Molecular & Cellular Physiology)

Functional Dissection of LRP3 in ApoE Isoform-Dependent Neural Pathways Relevant to Alzheimer's Disease

Alzheimer's disease is the most common form of dementia, and the APOE4 gene is its strongest known genetic risk factor. Kaitlyn is studying LRP3, a poorly understood receptor that may play a role in how APOE4 affects brain cells. Using gene-editing technology to remove LRP3 from human neurons, she will examine its effects on neuronal connections and communication. The findings could help identify key pathways involved in Alzheimer's disease and guide the development of future treatments.

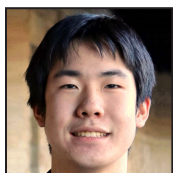


Alan Huang, undeclared

Mentor: Euan Ashley (Genetics and Biomedical Data Science)

AAV-Mediated Genetic Therapies for the Heart

Cardiomyopathy is a major cause of heart failure, but many promising gene therapies cannot effectively target the heart without affecting other organs. Alan is helping develop new adeno-associated virus (AAV) gene delivery vehicles that are better able to deliver therapeutic genes specifically to heart tissue while minimizing delivery to organs such as the liver. His work could improve the safety and effectiveness of future gene therapies for heart disease.





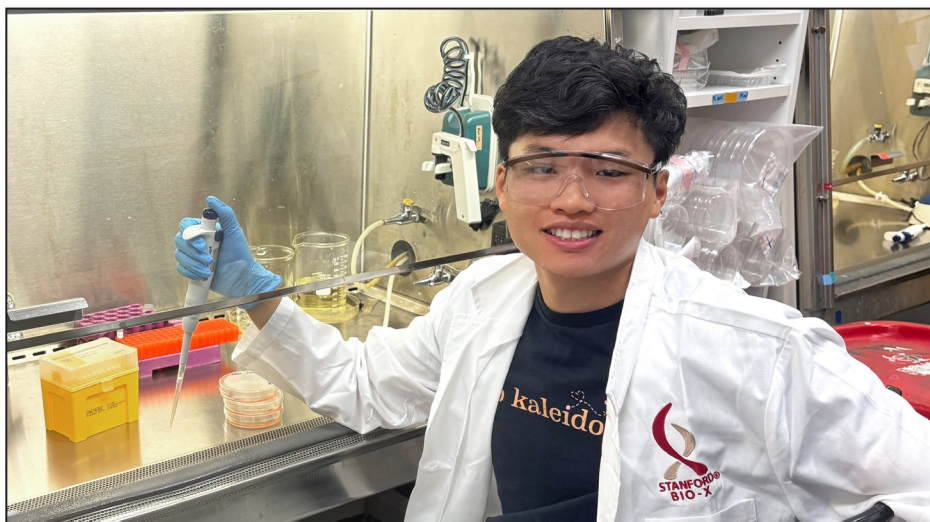
Nicolette Fierro completed her Stanford Bio-X summer research training with Dr. Carolyn Rodriguez

Curran Jacobus, Chemical Engineering

Mentor: Ellen Rim (Chemical Engineering)

Directed Evolution of a Strigolactone-Degrading Enzyme to Combat Striga Infestations in African Cereals

Striga is a parasitic weed that causes major crop losses across Africa, threatening food security for millions of people. Curran is developing engineered proteins and microbes that can selectively remove excess strigolactones, the chemical signals that trigger Striga seed germination, while preserving their beneficial role in supporting healthy plant-microbe interactions. His approach could provide a sustainable way to protect crops from Striga and improve agricultural productivity in affected regions.



Ryan Lee completed his Stanford Bio-X summer research training with Dr. Julien Sage



Gabriella Fish completed her Stanford Bio-X summer research training with Dr. Paul J. Wang

Caden Jiang, Human Biology

Mentor: Lu Chen (Neurosurgery and Psychiatry & Behavioral Sciences)
Investigating Retinoic Acid Signaling in Neuropathic Pain

Neuropathic pain can develop after nerve injury and is often difficult to treat because the underlying biological mechanisms are not well understood. Caden is studying how retinoic acid signaling alters communication between nerve cells following injury and contributes to the development of chronic pain. By identifying the genes and pathways involved, including BDNF and TrkB, his research could reveal new targets for therapies that prevent or reduce neuropathic pain.



Jaemon Jumpawong, Symbolic Systems

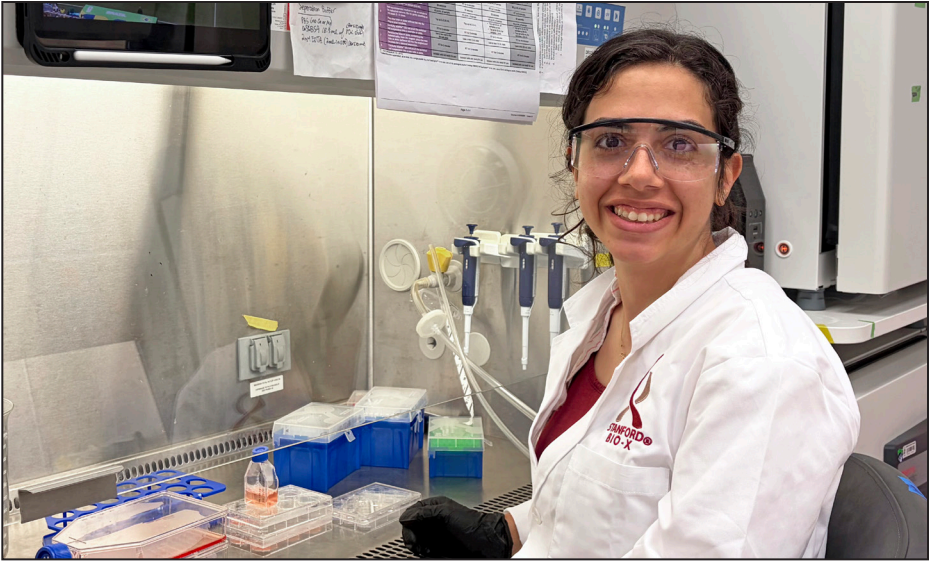
Mentor: Luis de Lecea (Psychiatry & Behavioral Sciences)
Impact of AKAP11 on Sleep Regulation in a Mouse Model of Bipolar Disorder

Bipolar disorder affects millions of people worldwide, but the biological causes of the disease are still not well understood. Jaemon is studying AKAP11, a gene linked to bipolar disorder risk, to determine how it influences brain cells involved in mood, behavior, and sleep regulation. By examining the effects of reducing AKAP11 activity in mice, his research could provide new insights into the mechanisms underlying bipolar disorder and identify potential targets for future treatments.



“Bio-X USRP challenged me to become more of an independent scientist. My Bio-X experience taught me that the best research is highly collaborative. Over the summer, I learned how to think more critically, read and discuss scientific papers critically, design and execute my own experiments, and communicate more effectively. This experience made me realize that I very much want to continue doing this in the future.”

—2025 USRP Participant Sanjay Palta-Hill



Ghazal Azhdari Mamooreh completed her Stanford Bio-X summer research training with Dr. Anusha Kalbasi

Hannah Kang, Symbolic Systems

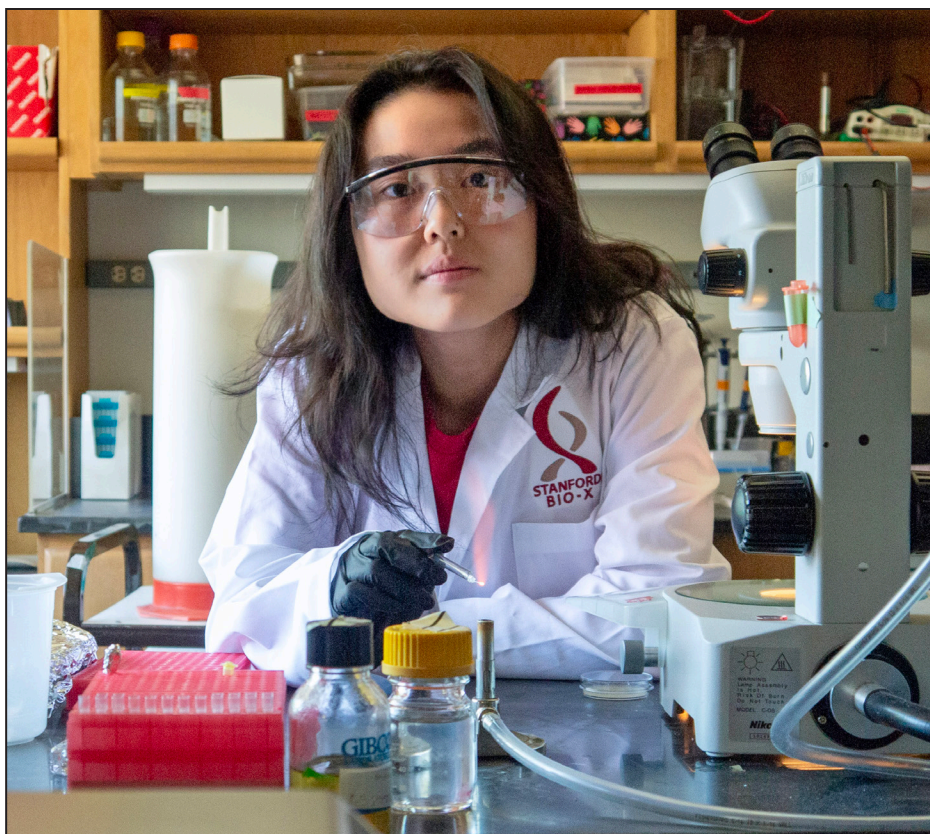
Mentor: Claudia Padula (Psychiatry & Behavioral Sciences)

When Coping Helps (and When It Hurts): Context-Specific Relapse Vulnerability and fMRI Markers of Craving and Control

Alcohol use disorder affects millions of people, and relapse remains common despite available treatments. Hannah is studying whether different coping strategies are linked to distinct patterns of brain activity involved in craving and self-control. Using fMRI brain imaging, she will examine how coping styles relate to neural networks that influence alcohol use. Her findings could help identify more personalized approaches to treatment and recovery by matching interventions to the brain processes most relevant for each individual.



Jack Quach completed his Stanford Bio-X summer research training with Dr. Maya Kasowski



Victoria Lin completed her Stanford Bio-X summer research training with Dr. Jessica Feldman

Arshmeet Kaur, Computer Science

Mentor: Kavita Sarin (Dermatology)

Noninvasive Biopsy: Virtual CKI6 Immunohistochemistry (IHC)-Staining of Virtual H&E Images

Atopic dermatitis (eczema) is a common skin disease, but diagnosis often requires invasive skin biopsies and specialized tissue staining. Arshmeet's project aims to create a fully noninvasive "virtual biopsy" by using artificial intelligence to transform optical coherence tomography (OCT) scans into images that closely resemble traditional pathology slides. If successful, this approach could make skin disease diagnosis faster, easier, and less invasive for patients while providing clinicians with the detailed information needed for accurate diagnosis.



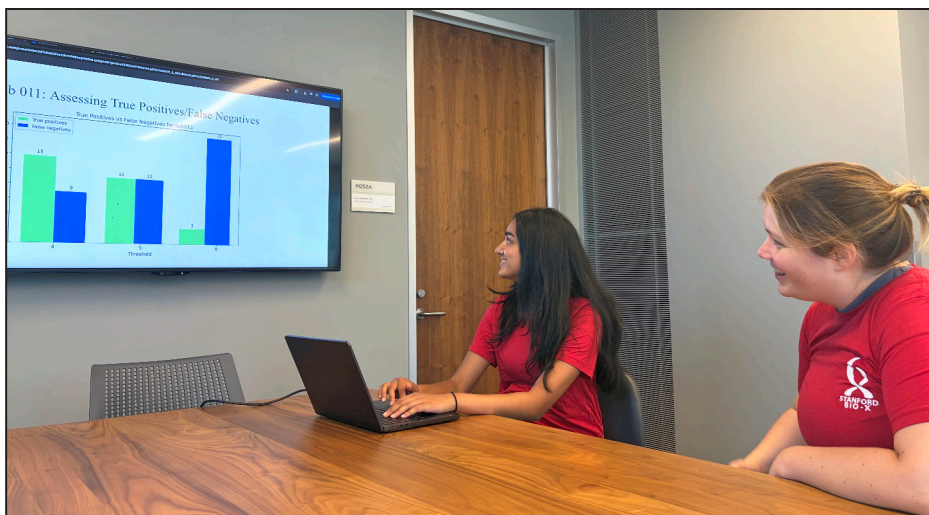
Bridget Keel, undeclared

Mentor: Jonas Cremer (Biology)

Protein to Carbohydrate Imbalance Drives Microbial Derived Toxin Production in Human Gut

Inflammatory bowel disease and colorectal cancer affect millions of people, and diet may play an important role in their development. Bridget's project investigates how the balance of dietary protein and fiber influences the production of harmful compounds by gut bacteria. By identifying how different nutrients shape bacterial metabolism and toxin production, her research could help guide dietary strategies to promote gut health and reduce the risk of intestinal disease.





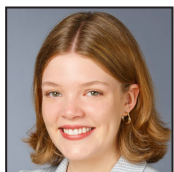
Riya Anand (pictured at left, with Dr. Jill Kries, right) completed her Stanford Bio-X summer research training with Dr. Laura Gwilliams

Emma Kennedy, Bioengineering

Mentor: Annelise Barron (Bioengineering)

Targeting the TLR4-NLRP3 Inflammatory Cascade with the Host Defense Peptide LL-37

Alzheimer's disease causes progressive memory loss and harmful brain inflammation, yet effective treatments remain limited. Emma's project investigates the TLR4-NLRP3 pathway, a specific inflammatory cascade that may accelerate Alzheimer's progression. Specifically, it examines whether the immune peptide LL-37 can block this harmful inflammatory pathway triggered by TLR4 and amyloid-beta, a hallmark of Alzheimer's disease. Her findings could identify a new strategy for protecting neurons and reducing inflammation in Alzheimer's patients.



Jaemon Jumpawong completed his Stanford Bio-X summer research training with Dr. Luis de Lecea



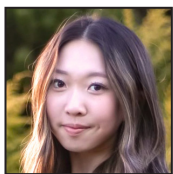
Weston Smith completed his Stanford Bio-X summer research training with Dr. Erinn Rankin

Joie Kim, Human Biology

Mentor: Michelle Monje (Pediatric Neurology)

The Role of Norepinephrine Signaling in Oligodendrocyte Precursor Cell Maturation During Perinatal Development

Preterm birth can interfere with normal brain development and increase the risk of lifelong neurological problems. Joie is studying how norepinephrine, a key brain signaling molecule, influences the development of oligodendrocytes, the cells responsible for forming white matter that connects different regions of the brain. By understanding how these cells mature during early life, Joie's research could help guide future therapies to improve brain development and outcomes for premature infants.



“My favorite part of the Bio-X USRP was being immersed in an interdisciplinary environment where I could learn directly from scientists and peers approaching similar problems from very different perspectives. That experience will help me moving forward by shaping how I design research questions, encouraging me to integrate multiple fields... into my own work so that I can tackle complex problems more creatively and effectively.”

—2024 USRP Participant & 2025 Cohort Lead Kristine Pashin

Kaitlyn Kwan, Computer Science

Mentor: Ian Gotlib (Psychology)

Mapping Stress-Brain Pathways: Multimodal MRI and Canonical Correlation Analysis to Predict Youth Psychopathology

Children experience many types of early-life stress, but different stressors may affect brain development in different ways. Kaitlyn is using advanced brain imaging and data analysis techniques to identify how specific patterns of stress are linked to changes in brain structure and function. By determining which brain changes predict later anxiety and depression, her research could help improve early identification of at-risk children and support more personalized approaches to prevention and treatment.

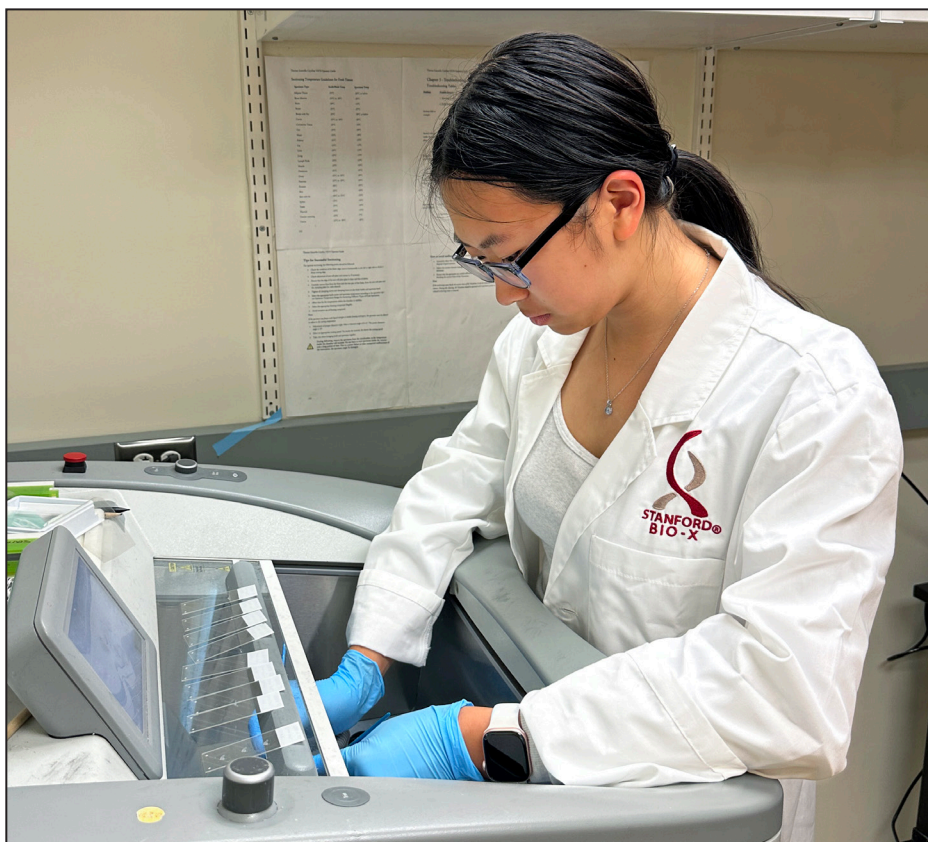
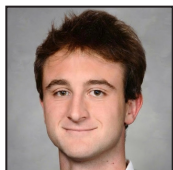


Griffin Lee, Bioengineering

Mentor: Matthew Porteus (Pediatrics)

Engineering a High-Capacity, High-Efficiency Genome-Editing Platform for ALD Therapy

X-linked adrenoleukodystrophy (ALD), caused by mutations in the ABCD1 gene, is a rare and often fatal genetic disease that causes toxic lipid buildup, leading to progressive damage of the brain and nervous system. Griffin is developing improved gene-editing methods to more efficiently insert a healthy copy of the ABCD1 gene into blood-forming stem cells. By increasing the precision and efficiency of gene correction while enabling tracking of treated cells, his research could help advance gene therapies for ALD and other inherited genetic disorders.

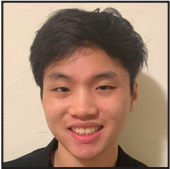


Macy Gong completed her Stanford Bio-X summer research training with Dr. Michael Longaker

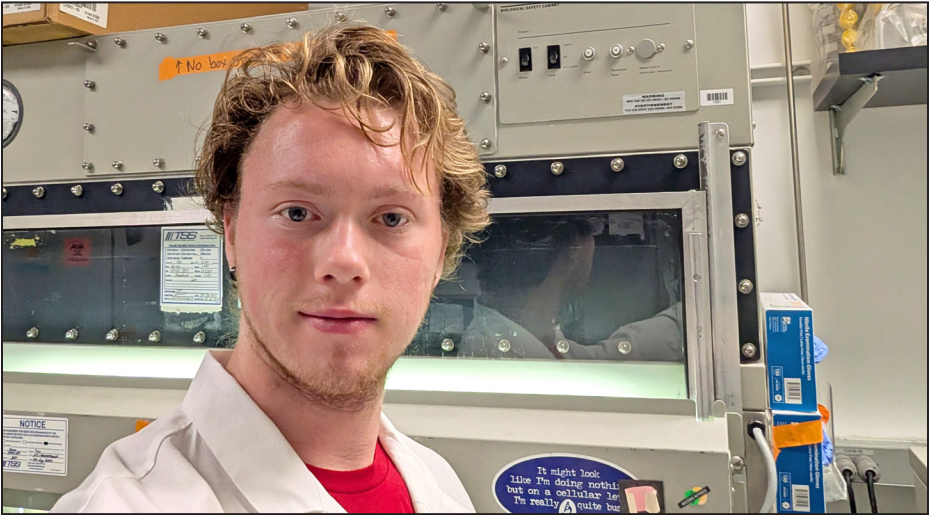


Logan Wang completed his Stanford Bio-X summer research training with Dr. Ehsan Adeli

Ryan Lee, Biology
Mentor: Julien Sage (Pediatrics - Hematology/Oncology)
Cell-State Interactions Underlying Tumor Heterogeneity in Combined Lung Cancer



Lung cancer remains the leading cause of cancer death worldwide, in part because tumors often contain diverse cancer cells that can resist treatment. Ryan's project studies how different lung cancer cell types interact and contribute to tumor growth and therapy resistance. His findings could help identify new strategies to improve lung cancer treatment.



Nathan Adam completed his Stanford Bio-X summer research training with Dr. James Ford

Victoria Lin, Biology

Mentor: Jessica Feldman (Biology)

Investigating Centriole-to-Cilia Development and Glial Regulation in *C. elegans*



Cilia are hair-like structures that help cells sense and respond to their environment and are essential for normal development. Defects in cilia can cause serious genetic disorders known as ciliopathies. Victoria is studying how cilia are built and maintained, including how neighboring support cells influence their growth and organization. By uncovering the mechanisms that control cilia formation, her research could improve understanding of diseases caused by ciliary dysfunction and help guide future therapeutic approaches.

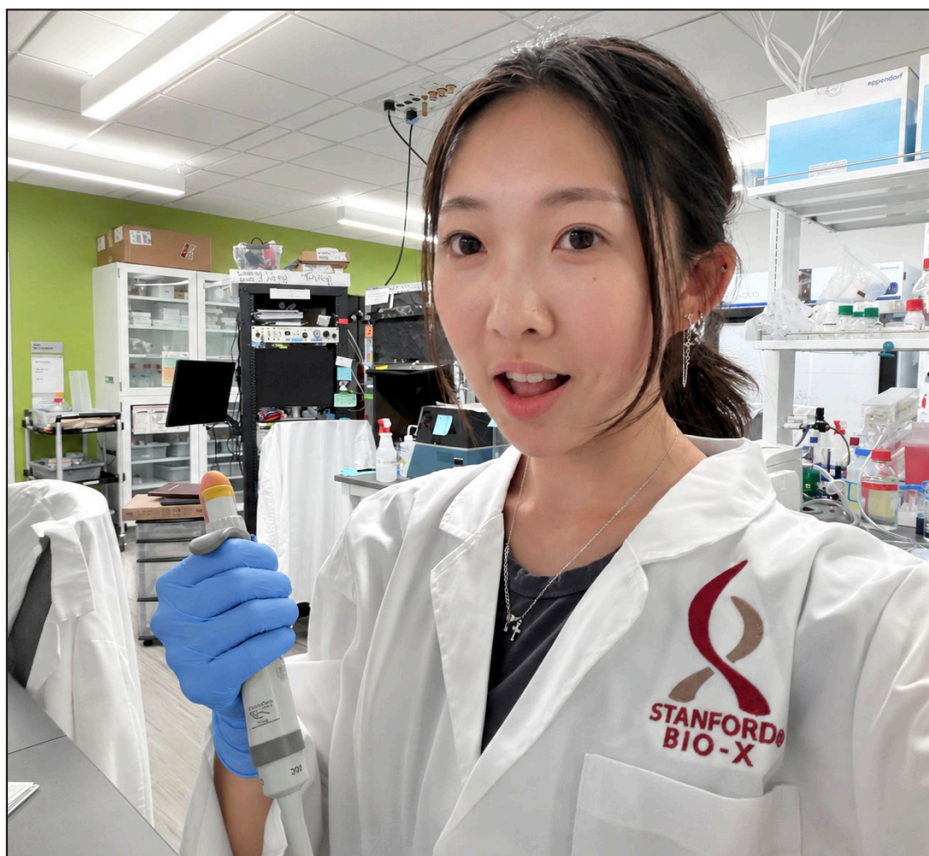
Emily Linder, undeclared

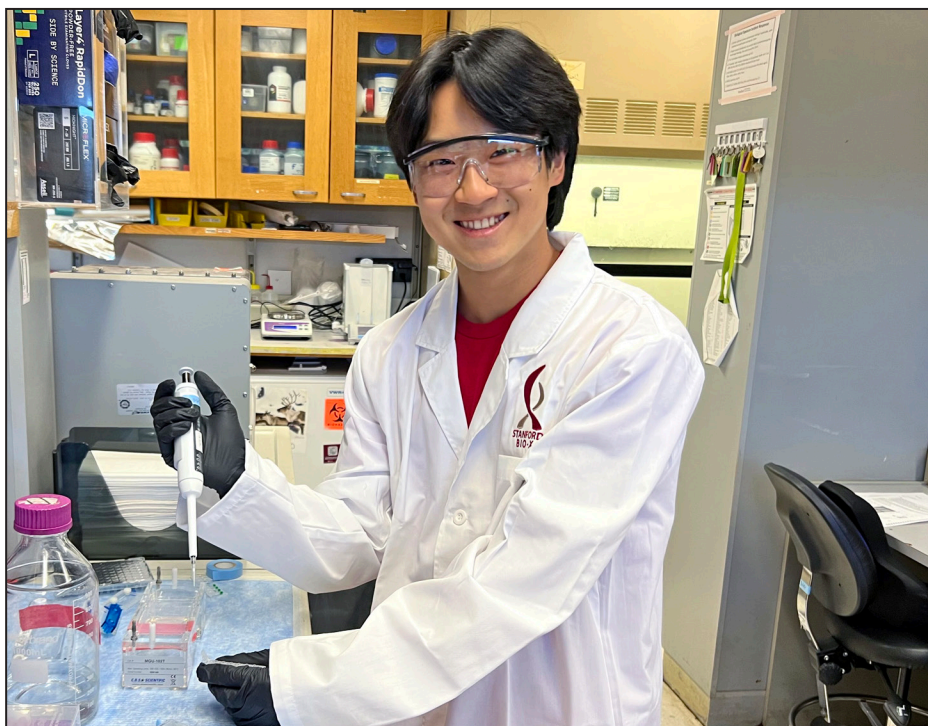
Mentor: Aaron Gitler (Genetics)

Investigating the Link between Viral Infection and Immune System Activity in ALS Pathogenesis: Can a Virus Cause ALS?



Amyotrophic lateral sclerosis (ALS) is a devastating neurodegenerative disease that destroys motor neurons, leading to progressive muscle weakness and paralysis. Emily is investigating whether past viral infections can trigger long-lasting immune responses that contribute to inflammation and motor neuron damage. By examining evidence of viral exposure and immune activation in ALS patients, her work could uncover a previously unrecognized viral-immune pathway involved in disease development and identify new targets for treatment.





Rhys Ota completed his Stanford Bio-X summer research training with Dr. Paul Bollyky

Chris Lopez, Biology

Mentor: Ashwin Ramayya (Neurosurgery)

Social Network Strength as a Predictor of Traumatic Brain Injury Patient Recovery

Recovery after a traumatic brain injury can vary widely from person to person. Chris's project investigates whether the strength of a patient's social network influences recovery outcomes. By better understanding the role of social support, this research could help guide more personalized approaches to improving recovery after brain injury.



Esmeralda Matias, Human Biology

Mentor: Anna Gloyn (Pediatrics - Endocrinology and Genetics)

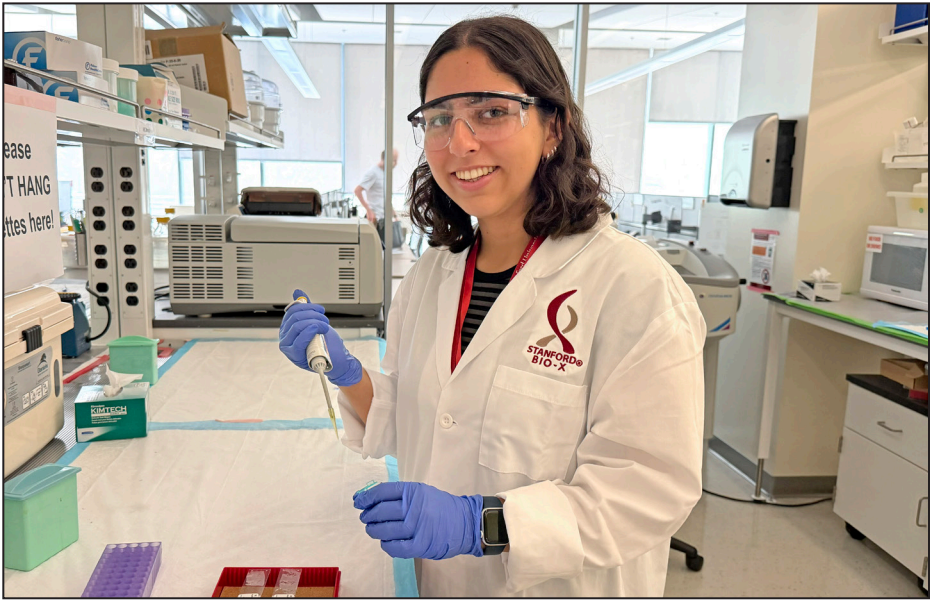
Functional CRISPRi Screening and Analysis of Custom Gene Library in Human Beta Cells

Diabetes affects more than 800 million people worldwide and occurs when the body cannot produce enough insulin to regulate blood sugar. Esmeralda's project will identify genes that are important for the health and function of insulin-producing beta cells. This work could uncover new targets for future diabetes therapies.



"Moving forward, I will use the skills I've gained not only from my time researching in the lab, but also from the workshops and interactive sessions where I've learned how to think from an interdisciplinary lens, effectively discuss research - both mine and others' - and engage with researchers at all levels."

—2025 USRP Participant Alice Finkelstein



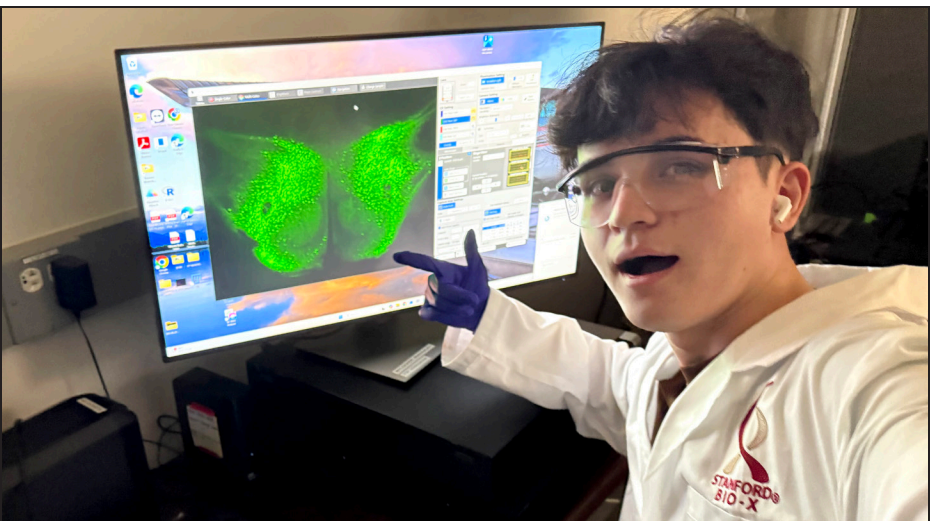
Baran Daliri completed her Stanford Bio-X summer research training with Dr. Jill Helms

Sarah Mian, undeclared

Mentor: Jason Andrews (Medicine - Infectious Diseases)

Developing CRISPR-Based Molecular Assays to Optimize Tuberculosis Treatment

Tuberculosis (TB) remains a major global health challenge, yet current treatments are often prescribed without accounting for genetic differences that influence how patients respond to medication. Sarah is developing a CRISPR-based genetic test to identify variants in the NAT2 gene that affect drug metabolism and risk of side effects. By enabling rapid, point-of-care genetic testing, her research could help personalize TB treatment, improve safety, and increase treatment success.



Troy Harris completed his Stanford Bio-X summer research training with Dr. Neil Eshel



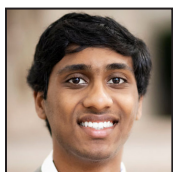
Taisho Shiono completed his Stanford Bio-X summer research training with Dr. Seung Kim

Saikiran Motati, Biology

Mentor: Brian Kobilka (Molecular & Cellular Physiology)

Probing Extracellular Domain Dynamics in Ligand Binding and Activation of the GLP-1 Receptor

GLP-1 receptors are the targets of widely used diabetes medications that help lower blood sugar in millions of patients. However, scientists still do not fully understand how these receptors change shape to activate signaling inside cells. Saikiran's project uses single-molecule imaging to track the movements of the receptor's extracellular domain and determine how ligand binding triggers receptor activation. The findings could improve understanding of how GLP-1 drugs work and help guide the design of more effective diabetes therapies.



Nathan Herrera completed his Stanford Bio-X summer research training with Dr. Aaron Gitler

Kenza Ngatchou, Bioengineering

Mentor: Matteo Molè (Obstetrics & Gynecology)

Investigating Signaling Mechanisms during Human Embryo Implantation

Successful implantation of an embryo into the uterus is essential for establishing pregnancy, yet implantation failure is a major cause of infertility and early pregnancy loss. Kenza's project investigates how the embryo and the uterine lining communicate through secreted signaling proteins during implantation. By identifying the signals that promote successful implantation, the research could improve fertility treatments and provide new insights into pregnancy complications such as preeclampsia.



Alex Ninomiya, Bioengineering

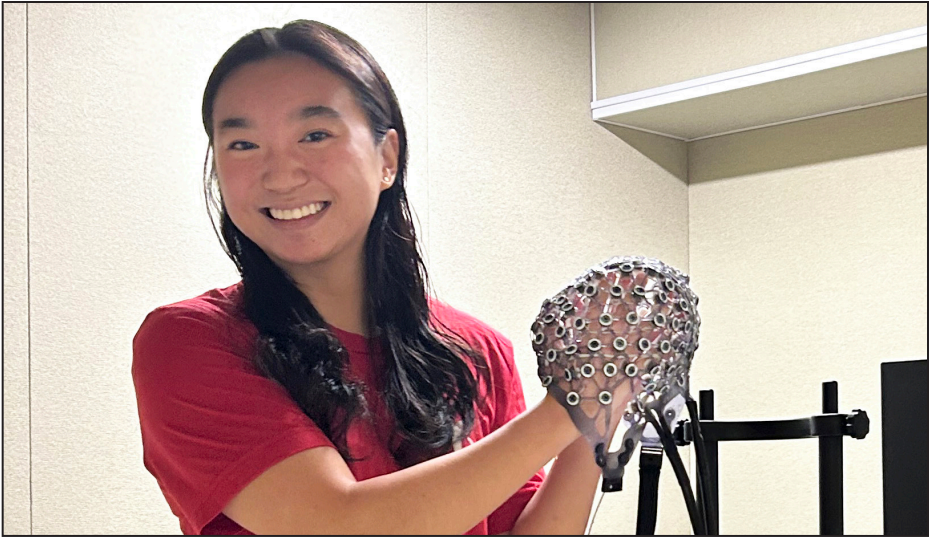
Mentor: Calvin Kuo (Medicine - Hematology)

A Patient-Derived Organoid Platform to Study Tumor Microenvironment-Mediated Drug Resistance in PDAC

Pancreatic ductal adenocarcinoma (PDAC) is one of the deadliest cancers, in part because its dense, fibrotic tumor environment can block drugs from reaching cancer cells. Alex is developing a patient-derived organoid model that more accurately mimics the tumor, including its surrounding stromal and immune cells. Using this model, he will study how the tumor environment affects the delivery and effectiveness of a KRAS-targeting drug. The findings could help improve treatment strategies and overcome a major barrier to treating pancreatic cancer.



Vienna Panossian completed her Stanford Bio-X summer research training with Dr. Fiona Baumer and Dr. Andrea Goldstein-Piekarski



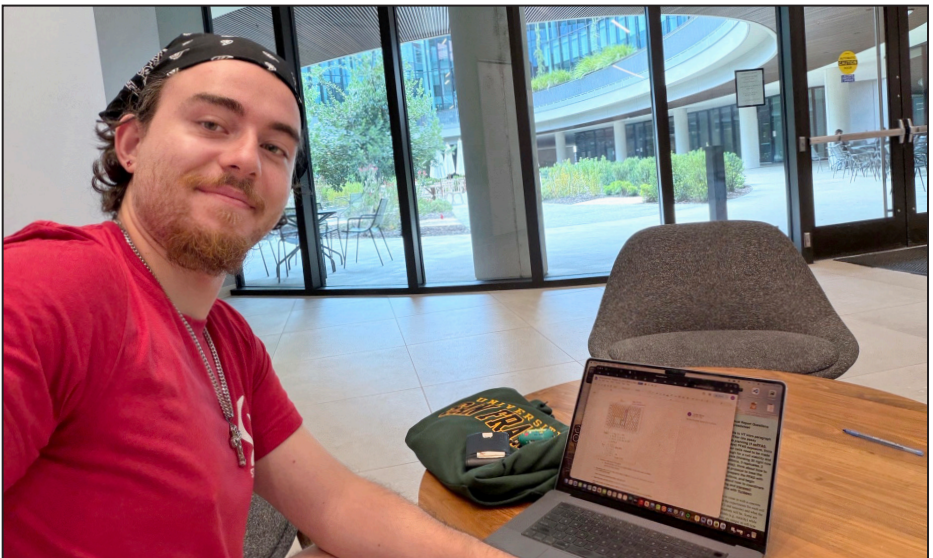
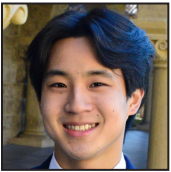
Haley Chu completed her Stanford Bio-X summer research training with Dr. Anthony Wagner

Rhys Ota, undeclared

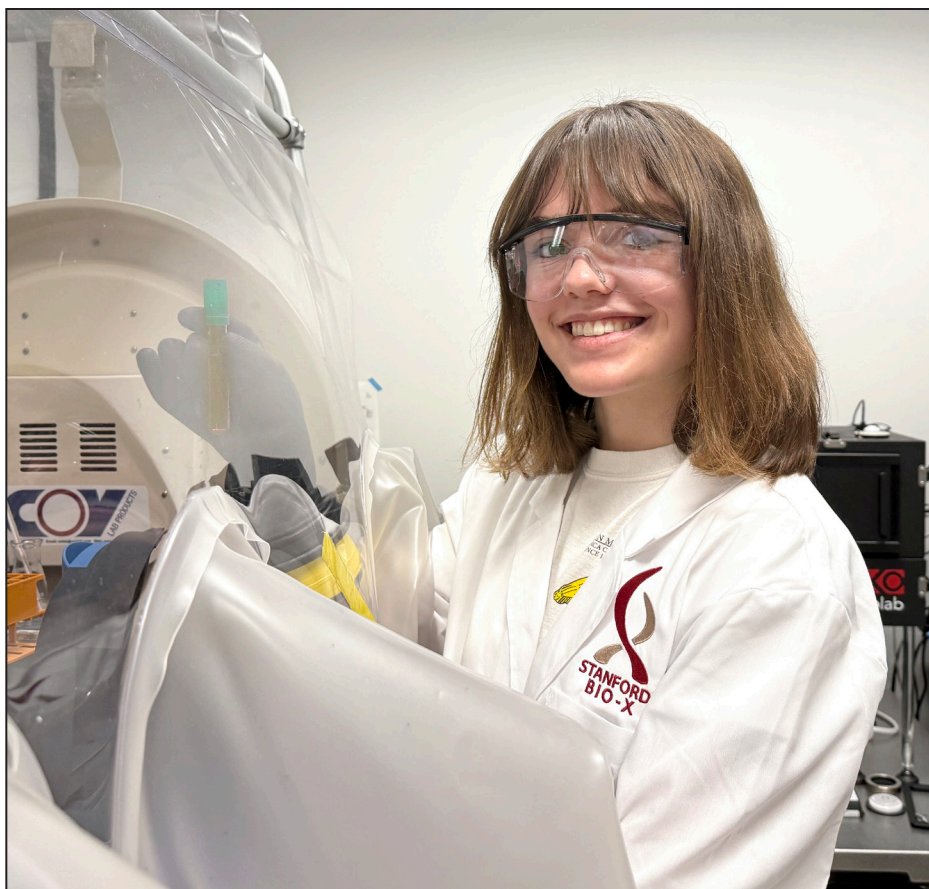
Mentor: Paul Bollyky (Medicine - Infectious Diseases and Microbiology & Immunology)

Evaluating Hydrogel-Based Delivery of Phage-Antibiotic Cocktails for Chronic *Pseudomonas aeruginosa* Wound Infections

Pseudomonas aeruginosa is a drug-resistant bacterium that commonly infects chronic wounds and can be difficult to treat with antibiotics alone. Rhys is studying HydroPhage, a hydrogel system designed to slowly release both bacteriophages (viruses that kill bacteria) and antibiotics directly into wounds over time. By optimizing the delivery of these therapies, the research could improve treatment of chronic infections and help combat antibiotic-resistant bacteria.



Jaydon Deras completed his Stanford Bio-X summer research training with Dr. Rebecca Pinals



Bridget Keel completed her Stanford Bio-X summer research training with Dr. Jonas Cremer



Christopher Owens, Symbolic Systems

Mentor: Jennifer Raymond (Neurobiology)

Understanding How Error Signals in the Cerebellum Control Learning

Learning often begins with recognizing and correcting mistakes, but scientists still do not fully understand how the brain turns a single error into lasting improvement. Christopher's project uses advanced tools to precisely control error signals in the brain and study how they shape learning. This research could reveal fundamental principles of how skills are acquired through practice.

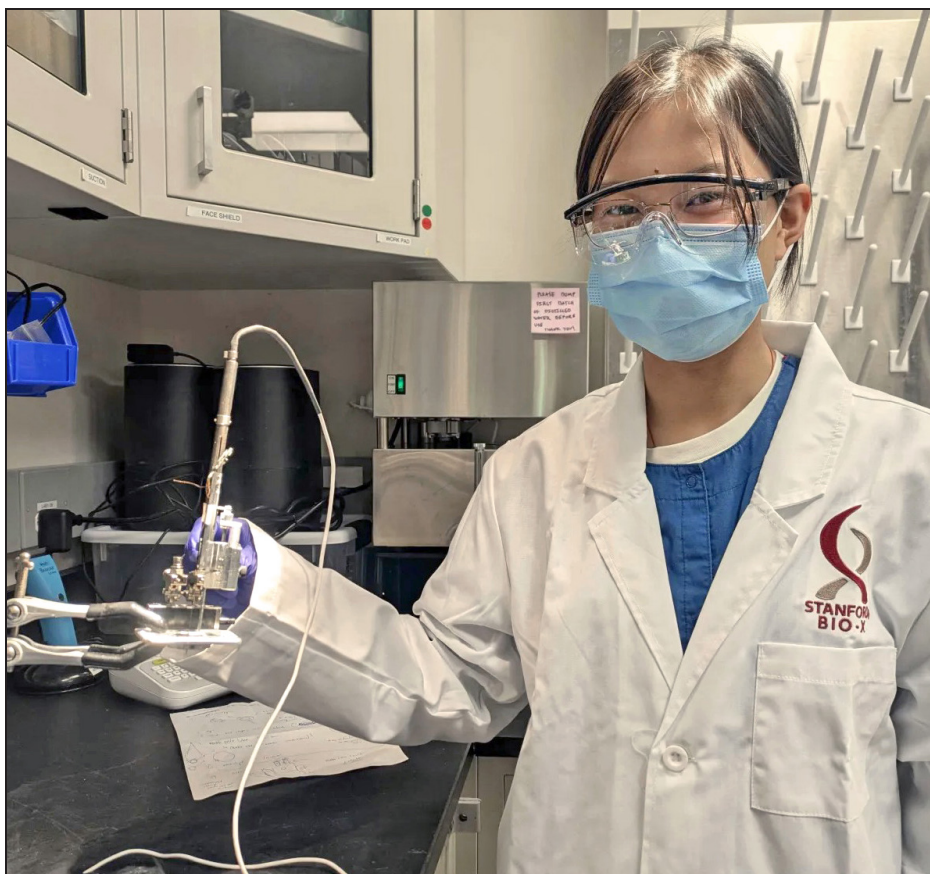


Vienna Panossian, Computer Science

Mentors: Fiona Baumer (Neurology - Pediatric Neurology) and Andrea Goldstein-Piekarski (Psychiatry & Behavioral Sciences)

Evaluating Competition Between Interictal Epileptiform Discharges and Sleep Microarchitecture in Lennox-Gastaut Syndrome

Sleep problems are common in epilepsy and may contribute to difficulties with memory, learning, and brain development. Vienna's project studies abnormal brain activity during sleep in children with a severe form of epilepsy called Lennox-Gastaut syndrome. Her research could improve our understanding of how epilepsy disrupts sleep and help guide future therapies.



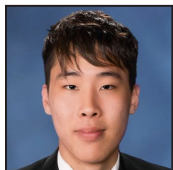
Catherine Yue completed her Stanford Bio-X summer research training with Dr. Tirin Moore

Yoojun (Evan) Park, undeclared

Mentor: Michael Zeineh (Radiology)

MRI, 3D Scatter Light Microscopy, and BBQ Histology to Investigate TBI-Induced Biomechanical Axonal Strain in Pig Models

Traumatic brain injuries (TBIs) account for 30-50% of injury-related fatalities in the U.S., yet current surveillance tools fail to properly diagnose severe symptoms like concussions or intracerebral hemorrhages. Understanding the microstructural neural changes induced by TBIs is imperative in improving their diagnosis and alleviating patient and community burden. Evan's project aims to investigate how TBIs affect brain connectivity and will work to discover new structural markers of TBIs.



Aahana Paul, undeclared

Mentor: Michelle Monje (Pediatric Neurology)

Role of Neuroligin3 in Myelin Health and Function

Myelin, the protective coating around nerve fibers, is essential for learning and brain function. Aahana's project studies Neuroligin3, a protein involved in brain communication that has been linked to autism. By investigating how Neuroligin3 influences myelin formation, her research could provide new insights into brain development and neurological disorders.





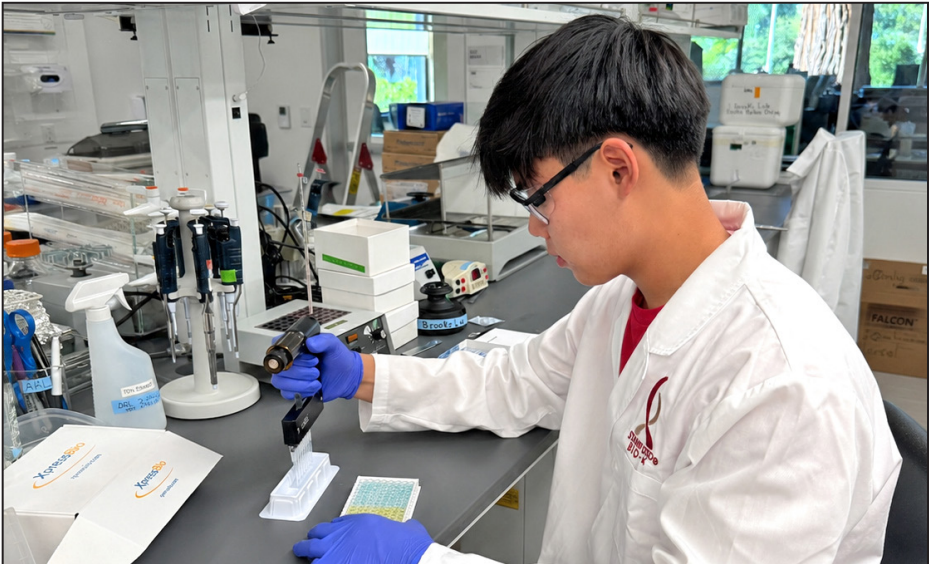
Raza Ali completed his Stanford Bio-X summer research training with Dr. Phillip Yang

Jack Quach, Computer Science

Mentor: Maya Kasowski (Pathology and Medicine - Pulmonary, Allergy & Critical Care Medicine)

Nominating Causal Variants of Thyroid Disease with Deep Learning

Thyroid disorders affect millions of people, yet many of the genetic factors that contribute to these diseases remain poorly understood. Jack's project uses artificial intelligence to identify DNA variants that increase thyroid disease risk. This work could help improve the diagnosis, prevention, and treatment of thyroid disorders.



Nicholas Hadi completed his Stanford Bio-X summer research training with Dr. James Brooks

Samson Raskin, Human Biology

Mentor: Tracey McLaughlin (Medicine - Endocrinology)

GLP-I–Based Modulation of Gastric Emptying and Insulin Secretion in Post-Bariatric Hypoglycemia

For many people, bariatric surgery is life-changing, helping treat obesity and diabetes. However, some patients experience frequent episodes of low blood sugar after surgery, a condition known as post-bariatric hypoglycemia. These episodes can be frightening and disruptive and there are currently no approved treatments. Samson's project will investigate whether commonly used GLP-I medications can help slow digestion and improve blood sugar control in these patients. His research could lead to new treatment options and better quality of life for people affected by this challenging condition.

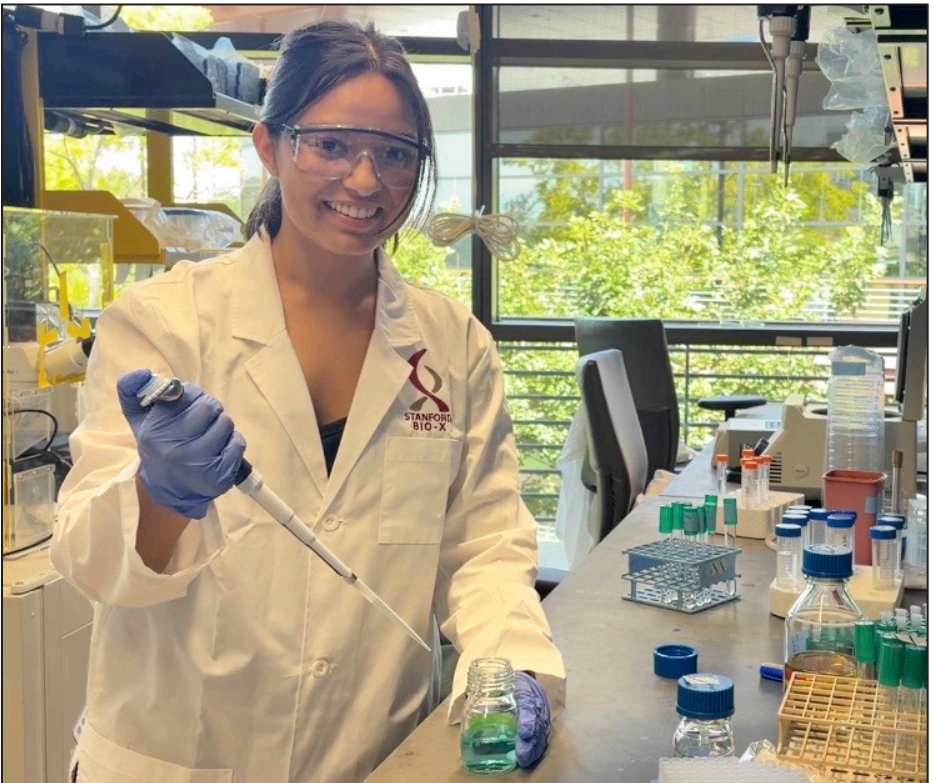


Anna Rodden, Biology

Mentors: Paul Bollyky (Medicine - Infectious Diseases and Microbiology & Immunology)

Do Bacteriophages Promote Antibiotic Diffusion Through Bacterial Biofilms?

Antibiotic-resistant bacterial infections are a growing threat to human health, especially when bacteria form protective biofilms that make them difficult to treat. Bacteriophages—viruses that naturally infect and kill bacteria—have shown promise in helping antibiotics work more effectively, but scientists do not yet understand why. Anna's project will investigate whether bacteriophages help antibiotics penetrate these protective biofilms more easily. By understanding how phages and antibiotics work together, this research could help improve treatments for a subset of drug-resistant infections.



Emma Ayala completed her Stanford Bio-X summer research training with Dr. Jonas Cremer



Caden Jiang completed his Stanford Bio-X summer research training with Dr. Lu Chen

Kyle Roh, Bioengineering

Mentor: Siddharth Krishnan (Electrical Engineering)

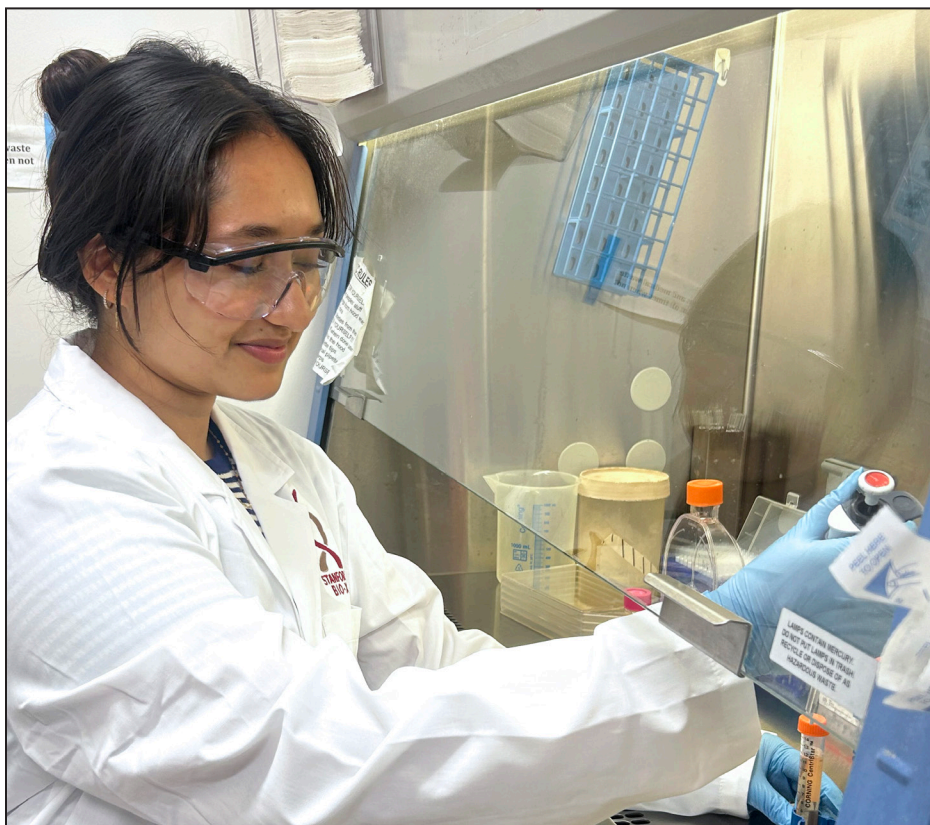
Implantable Bioelectronic Intratumoral Vaccine to Reprogram Immunorefractory Cold Tumors

Most cancers are classified as “cold tumors,” meaning they are able to hide from the immune system and resist current immunotherapies. Kyle will work to develop an implant that can be placed directly into a tumor and continuously release immune-activating therapies. The goal is to help the immune system recognize and attack the cancer, transforming these hard-to-treat tumors into ones that respond to immunotherapy. If successful, this approach could lead to more effective treatments for a wide range of cancers and potentially trigger a broader immune response throughout the body.



“I loved learning about all the diverse projects in the cohort... I now have many new contacts of people doing work I’m interested in.”

—2025 USRP Participant Nancy Zhang



Ojaswee Aryal completed her Stanford Bio-X summer research training with Dr. Ravi Majeti

Luna Romero, Biology

Mentors: Martha Cyert (Biology)

Investigating Calcimembrin/Calcineurin Interaction in Breast Cancer Cells



A protein called Calcimembrin has been linked to poor outcomes in several types of cancer, but scientists still know very little about what it does or how it contributes to tumor growth. Luna's project will investigate how Calcimembrin interacts with Calcineurin, an important cellular signaling protein, and how this relationship affects the growth and proliferation of breast cancer cells. By uncovering the role of Calcimembrin in cancer biology, this research could identify new targets for future cancer therapies.

Chelsea Salazar, undeclared

Mentor: Florentine Rutaganira (Biochemistry and Developmental Biology)
The Impact of pH and Temperature on Multicellular Development in the Closest Living Relative of Animals, the Choanoflagellates



Choanoflagellates are tiny aquatic organisms and the closest living relatives of animals, making them an important model for understanding how multicellular life first evolved. Chelsea's project studies how changes in environmental conditions, such as temperature and acidity (pH), affect the ability of these organisms to form simple multicellular structures. By exploring how environmental changes influence this process, her research could provide new insights into the origins of multicellular life and how living systems adapt to changing environments.



Kian Salimi, undeclared

Mentors: Calvin Kuo (Medicine - Hematology) and Guosong Hong (Materials Science & Engineering)

A Transparent Organoid Model for Allergy and Fibrosis

Eosinophilic esophagitis (EoE) is a growing food allergy that can cause severe inflammation and difficulty swallowing. Kian's project will create the first human organoid model of an allergic disease, allowing researchers to study how inflammation develops and leads to tissue damage. This work could help identify new approaches for preventing and treating EoE.

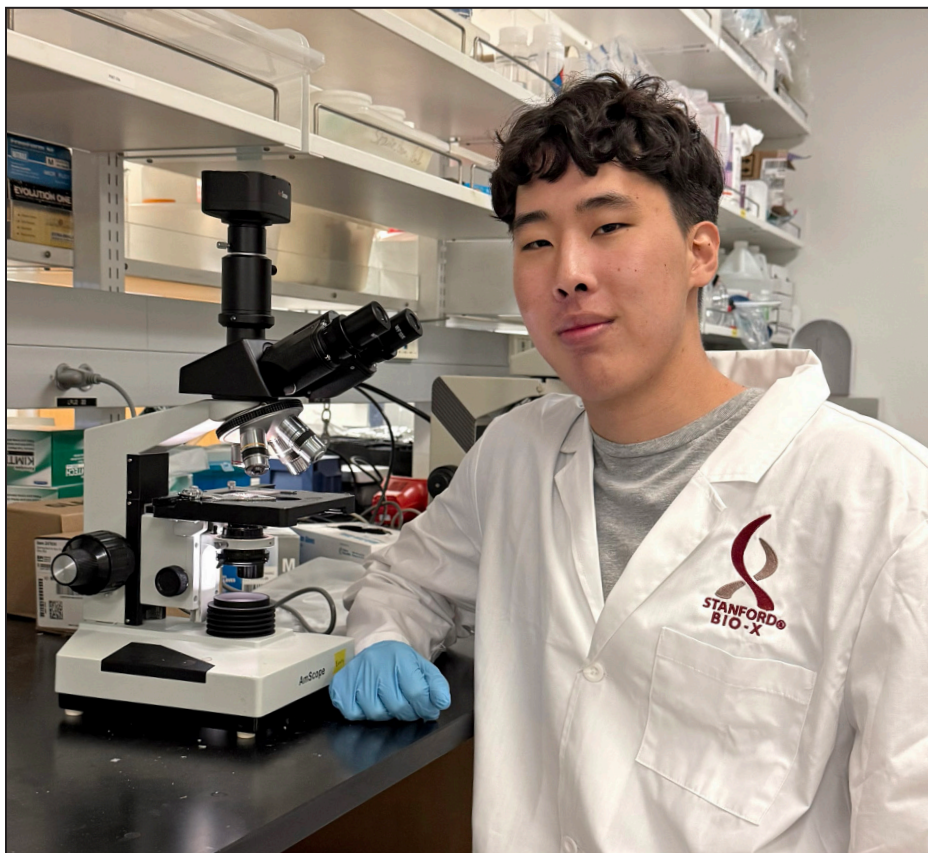


Devyn Sasai, Biology

Mentor: Monther Abu-Remaleh (Chemical Engineering and Genetics)

Discovery of Novel Modulators of CLN3 for Biological and Therapeutic Investigation

Juvenile Batten disease is a rare and devastating childhood neurodegenerative disorder caused by mutations in the CLN3 gene. Although the disease leads to progressive loss of neurological function, scientists still do not fully understand how these mutations damage cells. Devyn's project investigates how CLN3 helps maintain healthy lipid recycling within lysosomes, the cell's waste-processing centers. By studying how the loss of CLN3 disrupts lipid metabolism, her research aims to uncover key mechanisms driving Batten disease and identify potential pathways for future treatments.



Evan Park completed his Stanford Bio-X summer research training with Dr. Michael Zeineh



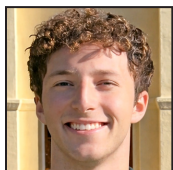
Coco Xia completed her Stanford Bio-X summer research training with Dr. Jesse Engreitz

Joseph Shelby, undeclared

Mentor: Marius Wernig (Pathology)

Developing a Machine Learning Tool to Evaluate *In Vitro* Microglial Health in Huntington's Disease

Huntington's disease is a devastating neurodegenerative disorder. Joseph's project is developing an artificial intelligence tool to automatically analyze how the brain's immune cells respond to disease-related protein aggregates. This approach could accelerate research and the development of new treatments for Huntington's disease.



Aniyah Shen, Human Biology

Mentor: William Giardino (Psychiatry & Behavioral Sciences)

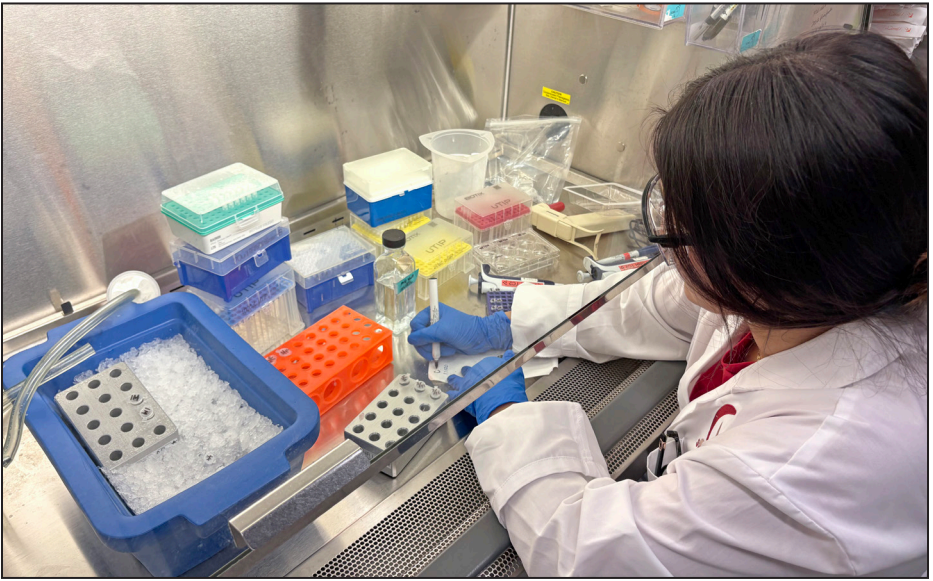
Sex-Specific Extended Amygdala Circuits Underlying the Impact of Early Life Stress on Morphine Reward and Pain Sensitivity

Adverse childhood experiences have lasting effects on health and increase the risk of substance use and chronic pain in adulthood. Aniyah's project investigates how early life stress alters brain circuits involved in opioid addiction and pain sensitivity. This research could help identify new strategies for preventing and treating opioid use disorder.



"I really enjoyed being able to place all of my focus on research this summer, and I feel like a more developed and capable scientist because of it. Additionally, I enjoyed the process of creating a poster, something I have never done before with my research. I most definitely feel more confident now when it comes to how I should organize and present my findings."

—2025 USRP Participant Ethan Kirgan



Chelsea Salazar completed her Stanford Bio-X summer research training with Dr. Florentine Rutaganira

Taisho Shiono, undeclared

Mentor: Seung Kim (Developmental Biology and Medicine - Endocrinology, Gerontology, & Metabolism)

Testing β -Cell-Specific Inactivation of HOPX in Transplanted Pancreatic Islets

Type 1 diabetes occurs when the body loses the insulin-producing cells needed to regulate blood sugar. Taisho's project studies a gene called HOPX that may play an important role in keeping these cells healthy and functional. This research could help improve future cell-based therapies for type 1 diabetes.



Saikiran Motati completed his Stanford Bio-X summer research training with Dr. Brian Kobilka



Raina Singh, undeclared

Mentor: Fan Yang (Orthopaedic Surgery and Bioengineering)

Optimizing Stem Cell and Macrophage Membrane Coatings to Improve Bone Regeneration in Aging

Bone fractures heal more slowly with age, partly because older tissues have a reduced ability to regenerate and are more prone to inflammation. Raina's project is developing biomaterials that mimic signals from young cells to promote bone repair and healthy immune responses. This research could lead to new therapies that improve healing and recovery in older adults.



Orion Singha, Chemistry

Mentor: José Dinneny (Biology)

How Do Plant Cells Decode Stress Hormone Dosages into Distinct Developmental Outcomes?

Plants rely on a hormone called abscisic acid (ABA) to respond to drought and other environmental stresses. Orion's project investigates how plant cells sense different levels of this hormone and adjust their behavior. This research could improve our understanding of plant adaptation and help guide the development of more climate-resilient crops.



Theo Frano completed his Stanford Bio-X summer research training with Dr. Kabir Peay



Hannah Kang (pictured at right, with Mia Gonzalez, left, completed her Stanford Bio-X summer research training with Dr. Claudia Padula

Weston Smith, undeclared



Mentor: Erinn Rankin (Radiation Oncology and Obstetrics & Gynecology)
Microphage EPOR Signaling Encourages an Immunosuppressive Microenvironment and Tumor Progression in Ovarian Cancer

High-grade serous ovarian cancer is one of the deadliest cancers affecting women. Weston's project investigates how immune cells within ovarian tumors help cancers evade the body's natural defenses and whether this process can be blocked. This research could identify a promising new strategy for improving ovarian cancer treatment.

Liz Tsai, Chemical Engineering

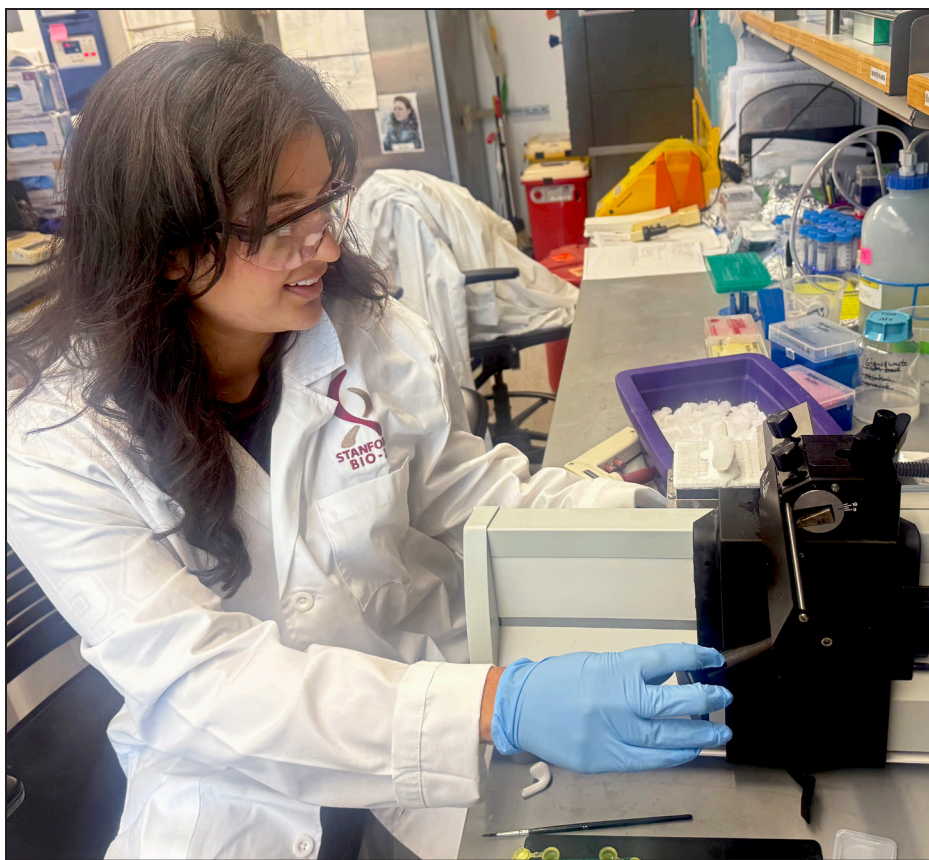


Mentor: Carolyn Bertozzi (Chemistry)
Computational Generative Design of Glycan Binders

Glycans are sugar molecules found on the surface of cells that play important roles in communication, immunity, and disease. However, they are difficult to study because of their complex structures. Liz's project uses artificial intelligence to design new tools that can recognize and bind specific glycans, helping researchers better understand their roles in health and disease.

"My favorite parts of this experience have been being able to design my own research project, learning from professionals in all fields during the faculty talks, and the positivity and responsiveness from the USRP team. Hearing about the myriad projects undertaken by the Bio-X PIs and having free rein over my own allowed me to integrate parts of several fields and experimental techniques [...] in my own study. This has helped me gain independence and confidence in the lab, while also driving me to reach out to experts across fields in designing my project... This was the best research experience I've ever had!"

—2025 USRP Participant Zainab Al-Atya



Aahana Paul completed her Stanford Bio-X summer research training with Dr. Michelle Monje

Zina Vidalakis, undeclared

Mentor: Shirit Einav (Medicine - Infectious Diseases and Microbiology & Immunology)

Deciphering Gene-Virus Interactions in Parkinson's Disease Pathophysiology

Parkinson's disease involves both neuronal dysfunction and brain inflammation, but it remains unclear how genetic risk and environmental factors contribute to disease progression. Zina's project uses human stem cell-derived brain models to study how viral infections, such as influenza, affect brain cells carrying Parkinson's-associated genetic variants. Understanding these interactions could identify new biomarkers and treatment targets for Parkinson's disease.



Logan Wang, undeclared

Mentor: Ehsan Adeli (Psychiatry & Behavioral Sciences)

Modeling Human Interaction to Enable Empathetic AI for Mental Health and Aging

Logan's project develops AI tools that learn from human interactions to create more natural and engaging virtual companions. These avatars could support mental health, assist older adults (including those with dementia), and help promote well-being and independence through conversation, companionship, and daily reminders.

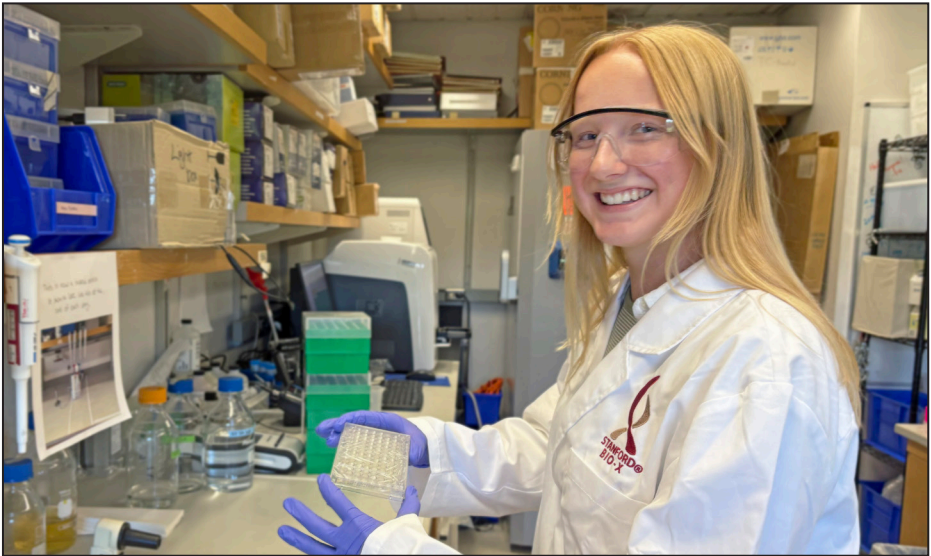




Kaitlyn Kwan completed her Stanford Bio-X summer research training with Dr. Ian Gotlib



Coco Xia, Engineering
Mentor: Jesse Engreitz (Genetics)
Mapping Noncoding Risk Variants of Coronary Artery Disease to Enhancers and Their Target Genes
 Coronary artery disease affects millions of Americans, yet many of the genetic changes that contribute to the disease are not well understood. Coco's project studies how these genetic variants alter gene regulation and contribute to heart disease. This work could uncover new therapeutic targets for preventing and treating coronary artery disease.



Anna Rodden completed her Stanford Bio-X summer research training with Dr. Paul Bollyky



Sajeda Yagoub, Bioengineering

Mentor: Joseph Wu (Medicine - Cardiovascular Medicine)

Modeling Mitochondrial Dysfunction in Hypertrophic Cardiomyopathy Using Patient-Derived Cardiac Cells

Hypertrophic cardiomyopathy is a common inherited heart disease and a leading cause of sudden cardiac death in young people. Sajeda's project studies how defects in the cell's energy-producing mitochondria contribute to the disease. This work could lead to new ways to diagnose and treat hypertrophic cardiomyopathy.

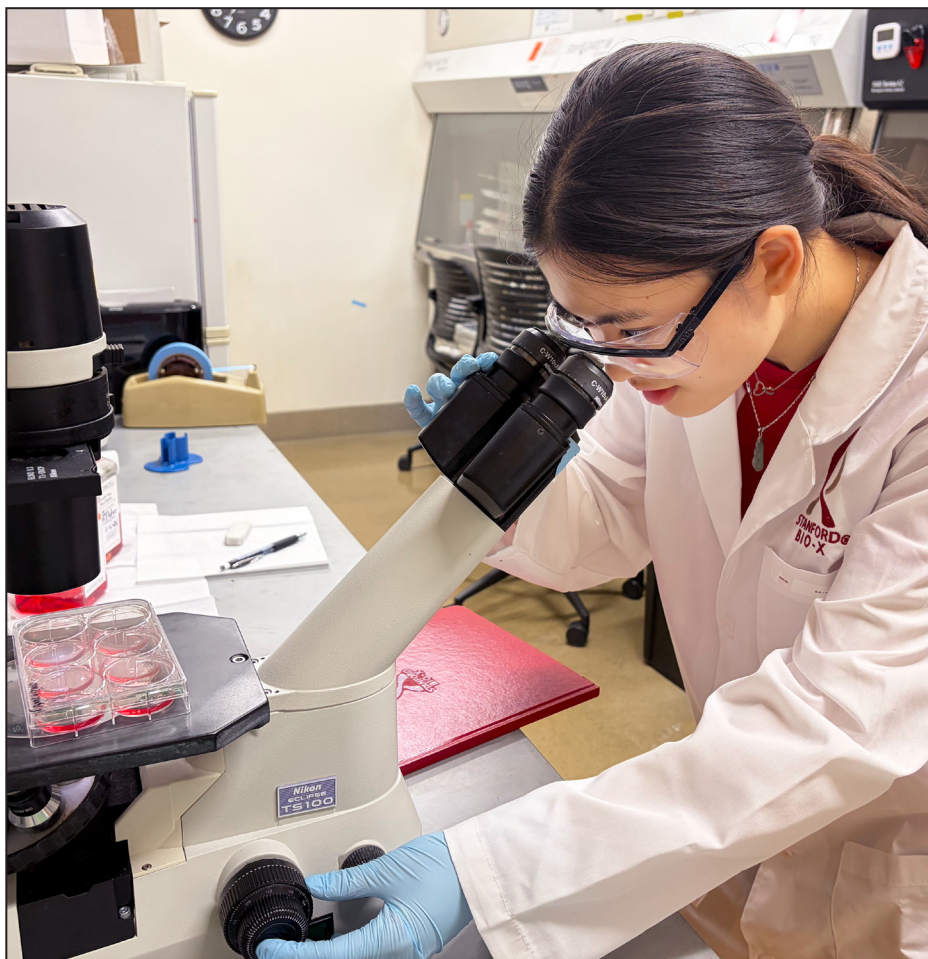


Ava Yeh, Biology

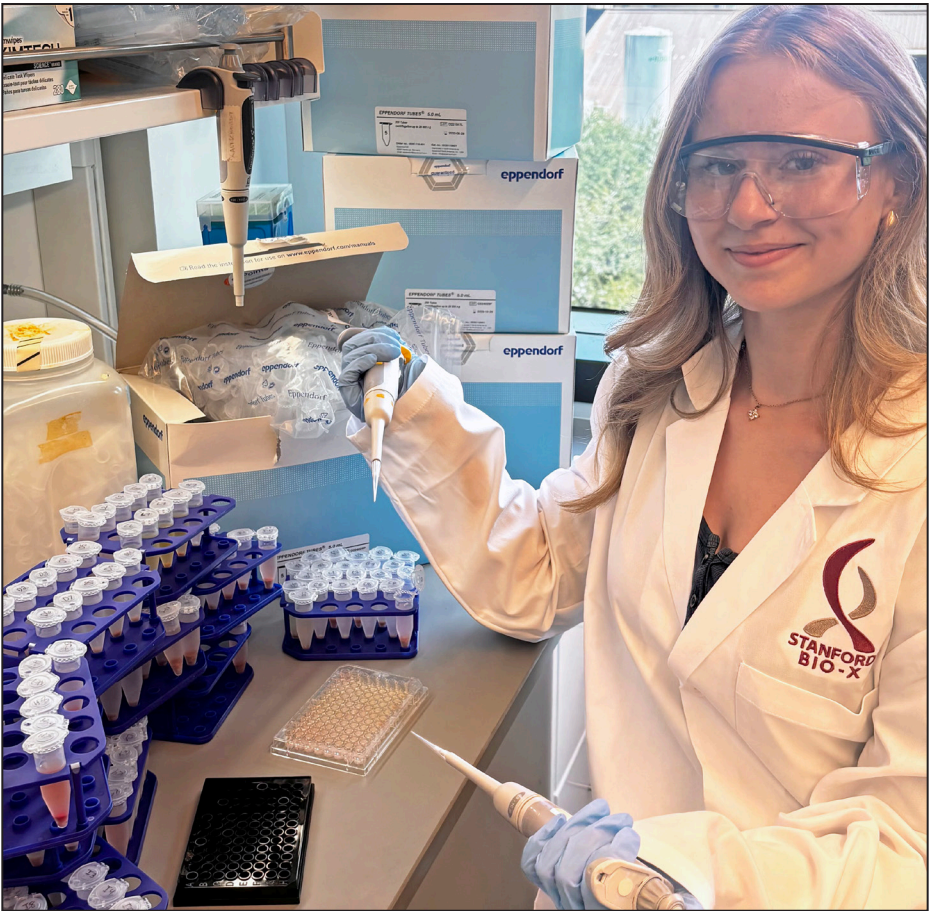
Mentor: Tony Wyss-Coray (Neurology & Neurological Sciences)

Identifying Age- and Region-Specific Microglial Resilience Mechanisms in Brain Aging

Microglia are immune cells that help keep the brain healthy, but their function declines with aging and Alzheimer's disease. Ava's project studies a genetic variant that appears to protect against Alzheimer's and may reveal new ways to slow brain aging and reduce disease risk.



Kaitlyn Hong completed her Stanford Bio-X summer research training with Dr. Thomas Südhof



Sophia Barnard completed her Stanford Bio-X summer research training with Dr. Julia Kaltschmidt

Catherine Yue, Computer Science
Mentor: Tirin Moore (Neurobiology)
High-Density Neural Recordings and Electrical Microstimulation
Uncover Corollary Discharge Circuits in the Visual System



The brain uses a process called corollary discharge to distinguish self-generated signals from those in the outside world. Catherine’s project investigates how this mechanism helps maintain a stable visual experience despite constant eye movements. Her research could provide new insights into how the brain processes sensory information.

Chloe Zhong, Electrical Engineering
Mentor: Todd Coleman (Bioengineering)
A Novel Ultrasound-Based Vagus Nerve Stimulator



Vagus nerve stimulation can help treat a variety of medical conditions, but current methods are often invasive and difficult to control precisely. Chloe’s project is developing a new ultrasound-based approach that allows for more targeted, noninvasive nerve stimulation with adjustable settings. This technology could improve future research and help advance safer, more effective therapies.



Zina Vidalakis completed her Stanford Bio-X summer research training with Dr. Shirit Einav

Aja Zou, Biology

Mentor: Gary Steinberg (Neurosurgery and Neurosciences)

Major Intracranial Arteries as Predictors of Collateral Formation

Stroke is a leading cause of death and disability, yet scientists still do not fully understand how the brain forms collateral blood vessels that can help protect against injury. Aja's project investigates how these vessels develop and whether genetic factors influence the process. This research could help identify new strategies to reduce the impact of stroke and improve outcomes for millions of patients.

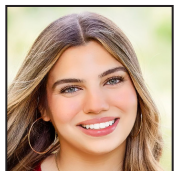


Louiza Zughbaba, undeclared

Mentor: Kavita Sarin (Dermatology)

KLEAR-PDT: Enhancing Blue-Light Photodynamic Therapy for Non-Melanoma Skin Cancer via Reversible Skin Optical Clearing

Skin cancer is one of the most common cancers, and treatment often requires surgery, which can leave scars and cause complications. Louiza's project is developing a way to improve a noninvasive light-based therapy by temporarily increasing skin transparency, allowing treatment light to reach deeper tumors. This approach could expand access to safer, more effective nonsurgical treatments for skin cancer.

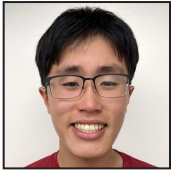


"I loved the opportunity to spend so much time in a lab setting and having the time to really dive into research. I feel even more interested in pursuing an academic career in research and this experience really solidified that."

—2025 USRP Participant Kasey Lassen

2026 Stanford Sapp Family CS Bio-X Undergraduate Summer Research Program Cohort Leads:

Colin Liu, Biology
Mentor: Ron Kopito (Biology)
Investigating How Knocking Out MYLIP Improves Corrector-Assisted Stabilization of CFTR-F508del



Cystic fibrosis (CF) is a genetic disease caused by defects in the CFTR protein, and current therapies do not work for all patients. Colin's project investigates how MYLIP, a protein involved in cholesterol regulation, affects the stability of the most common CF-causing CFTR mutation. By understanding this mechanism, Colin's research could identify new ways to improve existing treatments and help patients who do not currently benefit from available therapies.

Marta Pambukhchyan, Biology
Mentors: Kristy Red-Horse (Biology) and Mark Skylar-Scott (Bioengineering)
Quantitative Mechanical Drug Testing in CHD Cardiac Organoids



Congenital heart disease is the most common birth defect, yet many forms lack effective treatments. Marta's project uses patient-derived miniature heart tissues to measure heart function and test potential therapies. Her research could help identify new treatments and advance personalized care for children with congenital heart disease.

Eliza Schnitzer, Biology
Mentor: Ivan Soltesz (Neurosurgery and Neurosciences)
Dynamics of Hippocampal Axo-Axonic Cells in Temporal Lobe Epilepsy



Epilepsy affects approximately 65 million people worldwide, and about one-third of patients do not achieve seizure control with existing medications. Temporal lobe epilepsy is one of the most common and difficult forms of the disease to treat. Eliza's project will investigate a specialized group of brain cells that may play a critical role in controlling seizure activity. By understanding how these cells influence brain networks in epilepsy, her work could help identify new targets for more effective treatments for patients whose seizures cannot be controlled with current therapies.



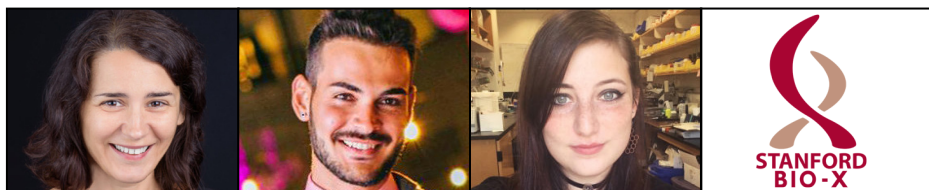
Sarah Mian completed her Stanford Bio-X summer research training with Dr. Jason Andrews

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Workshops on Research Skills:

Stanford Bio-X hosted 4 workshops for the Undergraduate Summer Research Program cohort in Summer 2026. The workshops are designed to help the students grow as researchers, discover new tools, and identify skills and techniques to help maximize their summer learning. The workshops, led by a team of Stanford Bio-X research scientists (pictured below), were scheduled throughout the program to guide and prepare the undergraduate students. The workshop moderators gain valuable teaching and presentation practice, as well as becoming a part of the student cohort's network, acting as a valuable resource for advice and future mentorship, both in terms of the topics covered and the students' future careers.

Workshop Mentors:



Workshop I – How to: Scientific Literature and AI

Led by Dr. Maja Djurisić

In this workshop, we will explore the use of AI tools for conducting efficient scientific literature search. We will then learn how to use the typical structure of scientific papers for fast but critical reading. Finally, we will discuss rules for proper citation, and tools to organize and manage search results.



Alex Van Elgort presenting "Telling the Story of Your Science: Oral Presentation"

Workshops (Continued):

Workshop 2 – Dive into Research: Building Strong Research Projects and Designing Rigorous Experiments to Test Your Hypothesis

Led by Dr. Andrea Cipriano

This workshop focuses on the fundamental principles and practical strategies involved in developing meaningful and well-structured research projects. Using real-world examples and interactive activities, students will strengthen their ability to think critically about research across a range of biological disciplines. Particular attention will be given to experimental design, crafting clear and persuasive abstracts, and defining focused and effective research aims.

Workshop 3 – Telling the Story of Your Science: Oral Presentation

Led by Alex Catherine-Nicole Van Elgort

Great science deserves great storytelling. In this workshop, we will learn how to turn complex scientific and engineering research into compelling stories that resonate with diverse audiences. Participants will practice crafting concise elevator pitches, design effective presentation slides, and develop strategies for delivering clear, engaging scientific talks. Through discussion and interactive exercises, we will learn how to communicate your research question, experimental approach, results, and interpretation (QuERI) in ways that are memorable, accessible, and impactful.

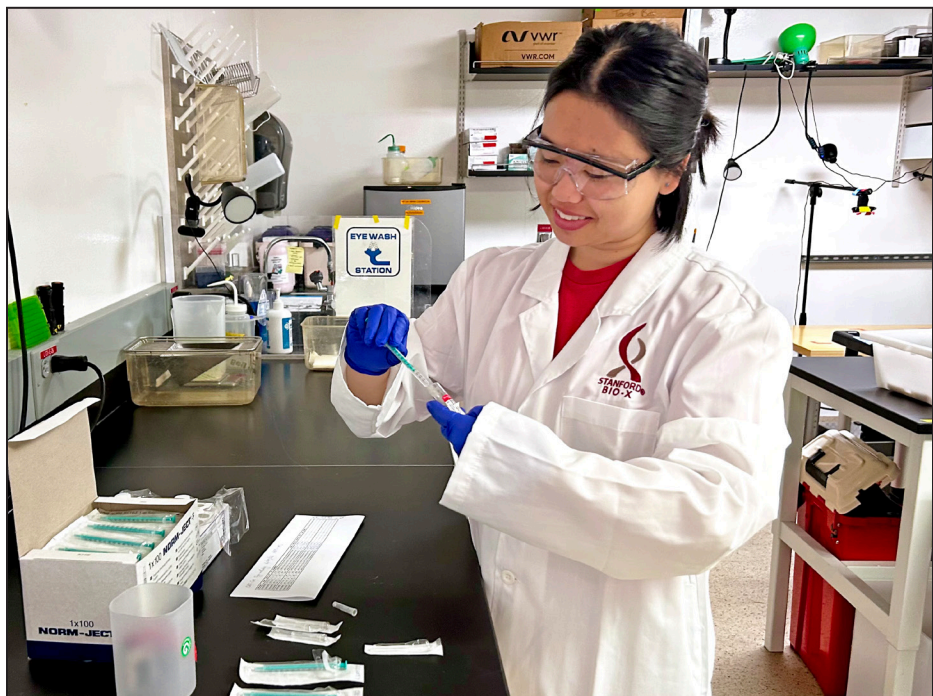
Workshop 4 – Creating Scientific Posters and Engaging Your Audience

Led by Alex Catherine-Nicole Van Elgort

In this workshop, we will explore how to design research posters that are visually engaging, easy to navigate, and effective at communicating your science. Participants will learn the principles of strong poster design, develop a storyboard for organizing their research into a clear narrative, and discuss strategies for highlighting key findings without overwhelming their audience. Whether you're presenting at a symposium, conference, or end-of-summer showcase, this workshop will help you create a poster that attracts attention, sparks conversation, and clearly communicates the story of your research.

"I really enjoyed the educational sessions and journal clubs, [which] taught me essential skills about the research process that I will use for the rest of my career."

—2025 USRP Participant Pedro De La Torre



Aniyah Shen completed her Stanford Bio-X summer research training with Dr. William Giardino

Journal Clubs:

The cohort students participated in journal club meetings to read and analyze scientific manuscripts related to their discipline of research. These 9 journal clubs also offered opportunities for them to collaborate in small groups and lead discussions about journal articles within their field of interest. The journal clubs are guided by Stanford graduate students, postdocs, and research scientists to provide intellectually challenging journal articles and to help facilitate high-level analysis, which also adds teaching and leadership experience to the journal club leaders' training at Stanford.

Journal Club Mentors:



From Waste to Food: Fungal Fermentation to Transform Food Systems

Led by Dr. Braydon Black

Each year, more than 1 billion tons of food are lost or wasted along the supply chain, costing over US \$1 trillion and generating more than 9 gigatons of CO₂ equivalents in emissions. Much of this waste occurs in the form of food or agricultural byproducts. Filamentous fungi, a diverse group of microorganisms including molds and mushrooms, offer a unique solution to the food waste problem. These organisms are nature's recyclers, capable of breaking down and transforming byproducts into nutritious, delicious, and sustainable foods through the power of fermentation. In this journal club, we will explore emerging strategies across genetics, microbiology, bioprocessing, and gastronomy that harness filamentous fungi as vehicles for converting waste into sustainable food.

Programming Immunity: Rational Design and Engineering of Cell-Based Therapies

Led by Dr. Jesus Miguens Blanco

Our journal club explores how quantitative, data-driven approaches and synthetic biology are transforming the design of cell-based therapies. We will examine how single-cell atlases, computational modeling, and systems-level frameworks are revealing the principles that govern T cell behavior, exhaustion, and therapeutic efficacy, providing a rational foundation for therapeutic design. Building on these insights, we will explore cutting-edge engineering strategies that leverage genetic circuits, synthetic receptors, and programmable cell logic to create cell therapies with enhanced precision, controllability, and therapeutic potency. Join us as we bridge the gap between biological understanding and engineering innovation to push the boundaries of what cell therapies can achieve.

Computational Methods in Human Movement Biomechanics

Led by Sydney Covitz

Movement impacts every aspect of our lives, and novel methods for recording, analyzing, and interpreting how and why we move the way we do are popping up every day. From tendon transfer surgical planning in patients with cerebral palsy to video-based analysis of Olympic sprinters, human movement biomechanics offers enormous potential for direct impact, especially as the field becomes increasingly integrated with computer vision. Our CS/AI journal club will focus on the rapidly evolving field of motion analysis with an emphasis on innovations and initiatives that are directly translatable to real-world applications. We will survey both traditional and novel methods for collecting and analyzing movement data and discuss how different motion capture technologies and musculoskeletal modeling techniques can help address critical need areas in both medical and sports performance domains.

Neuro-Immune Interfaces in Sensory Organs and the Periphery

Led by Dr. Maja Djuricic

Historically, the nervous and immune systems have often been studied as distinct and functionally independent systems. However, growing evidence shows that neural and immune cells engage in extensive bidirectional communication across many tissues. This journal club will examine recent studies on neuro-immune signaling in peripheral organs, with an emphasis on sensory systems and barrier tissues. Topics will include how immune cells influence sensory neurons and specialized sensory cells, how neuronal activity modulates local immune responses to injury or infection, and how shared molecular pathways coordinate communication among neurons, glia, epithelial cells, and immune cells. Together, these studies reveal neuro-immune interactions as a fundamental organizing principle of tissue physiology and pathology, extending well beyond the central nervous system.

Journal Clubs (Continued):

Insights in Immunology

Led by Jada Garzon

The immune system is one of biology's most sophisticated adaptive networks, and this journal club will explore the tools and discoveries that transform how we study and engineer it. We will explore cutting-edge immunology research including infection, vaccination, host-microbiome crosstalk, and systems-level immune regulation. We will also cover the technologies driving the field forward by showcasing papers that use single-cell sequencing, spatial omics, and computational immune profiling. From checkpoint blockade to CAR-T and engineered cytokines, we will examine how mechanistic studies are leading to the next generation of immunotherapies!

Understanding and Enhancing Human Movement

Led by Dr. Dawit Lee

Our Biomechanics Journal Club offers a specialized focus on cutting-edge computational and experimental methodologies driving advancements in understanding the biomechanics of human movement and improving performance. This segment delves into the capabilities of human movement and strategies for enhancing human performance. We will examine state-of-the-art research and explore the intricate interplay between biomechanical principles and human performance enhancement. Topics include the biomechanics of human movement, innovations in wearable technology for movement analysis, and the development of assistive devices.

Neurotechnology Tools for Stimulation and Recording

Led by Marigold Malinao

The brain is a fascinatingly complex organ with much of its inner workings still eluding researchers. Advances in neurotechnology have provided powerful tools for researchers to gain a deeper understanding of the brain and treat various neurological diseases. The neurotechnology journal club will focus on advances in technologies that interface, record, and stimulate in the brain. We will cover topics such as, but not limited to, optogenetics, electrophysiology, deep brain stimulation, and transcranial magnetic stimulation. We will analyze each technology for their unique advantages and potential drawbacks.

Adaptation and Disease

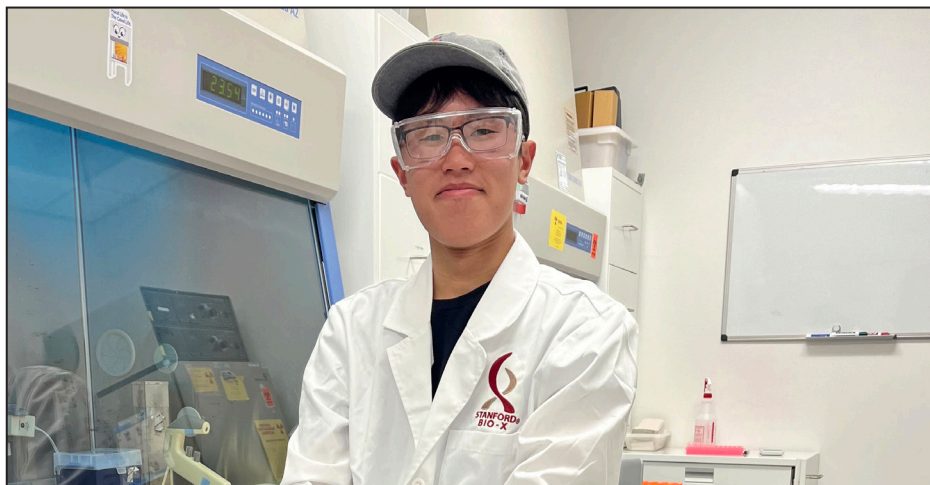
Led by Alex Catherine-Nicole Van Elgort

Explore how biological adaptations can both protect against and contribute to disease. This journal club will examine diverse examples—from cardiac remodeling and immune dynamics to microbial evolution and cancer drug resistance—highlighting how adaptive processes shape outcomes in health and pathology. Together, we'll evaluate experimental approaches, dissect key findings, and place them in the broader context of evolution and systems biology. If you're intrigued by the powerful—and occasionally counterproductive—ways organisms respond to challenge, join us for the discussion.

Frontiers in Cardiovascular Sciences

Led by James Zwierzynski

Our Cardiovascular Journal Club applies an interdisciplinary approach to understanding the cardiovascular system, using a comprehensive framework bridging embryonic development up through functional pathology. We will draw on a diverse array of fields, including evolutionary genetics, computational biology, and bioengineering. These insights will be paired with evaluations of how cutting-edge methodologies, such as advanced 3D whole-organ imaging, high-resolution sequencing, and precision genetic editing, have transformed our understanding of cardiovascular development, health, and pathology. Topics will include the molecular drivers of vascular architecture, genomics of structural heart defects, and translation of foundational biology into novel cardiovascular therapeutics.



Colin Liu completed his Stanford Bio-X summer research training with Dr. Ron Kopito

Professional Panel Discussion:

Three Bio-X USRP alumni – in academia, medicine, and industry – were invited to have a conversation with our cohort, to answer questions, and to share ideas.

Panelists:

Everett Frost, USRP 2011 and 2012, is now a Portfolio Manager and Founder. Everett graduated from Stanford with a BS in Bioengineering, where he received the Firestone Medal for excellence in undergraduate research. He holds an MBA from Harvard Business School. Everett founded Mabery Investment Partners, an investment firm that runs a concentrated public equities portfolio focused on technology, healthcare, and financial services businesses.



Dr. Allison Waters, inaugural USRP 2006, is a clinical neuroscientist and licensed health psychologist. She leads a human brain electrophysiology lab at the Icahn School of Medicine at Mount Sinai, (New York), where her research focuses on developing neurotechnologies to treat severe neuropsychiatric disorders such as depression, OCD, and Tourette syndrome. After majoring in Biological Sciences at Stanford University, Allison completed her PhD at the University of Oregon, clinical training at University of Arizona, and postdoctoral fellowship in deep brain stimulation at Emory University. Her work bridges science and care, aiming to translate insights from brain circuitry into real-world therapeutic innovation.

Dr. Cheri Wu, Dr. Cheri Wu, MD, a member of the 2010 Bio-X USRP cohort, is a Child, Adolescent, & Adult psychiatrist, a licensed physician in California, and double board-certified in Adult Psychiatry and Child and Adolescent Psychiatry. She completed medical school in San Antonio, Texas, followed by her Adult Psychiatry residency and Child and Adolescent Psychiatry fellowship at Stanford. After training, Dr. Wu spent one year with Bay Area Clinical Associates (BACA), where she served the San Jose community. In 2023, she opened her own private practice to provide high-quality, personalized care while achieving a better work-life balance. In her practice, she diagnoses a variety of conditions, including ADHD, Anxiety, Depression, and OCD, and treats patients using therapy and/or medication as appropriate. Outside of work, she enjoys traveling and spending time with her husband and three young children. She also enjoys speaking with and mentoring Bio-X USRP students who are considering future careers in medicine and mental health.



John Eden-Sung completed his Stanford Bio-X summer research training with Dr. José Dinneny

Special Talk by Dr. PJ Utz:

Dr. PJ Utz is a physician-scientist and professor at Stanford University whose research focuses on understanding vaccines, immunodeficiency disorders, and autoimmune diseases like lupus and rheumatoid arthritis. He is also a dedicated leader in medical education and mentorship; he is director emeritus of the Stanford Medical Scientist Training Program and Founder and Faculty Director of the SIMR Summer High School Research Program.

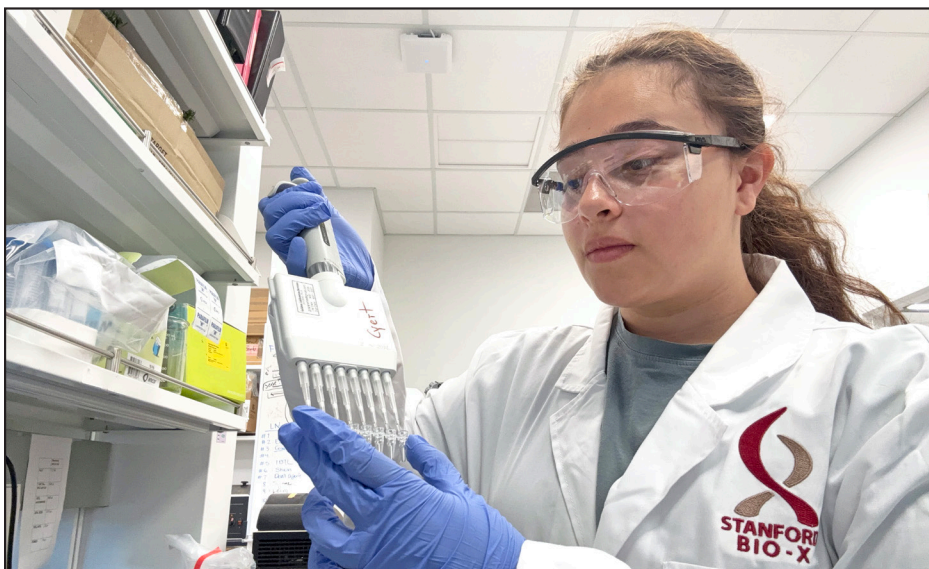
His talk provides a broad overview of careers in bioscience and medicine, focusing specifically on the physician-scientist pathway. He also shares valuable insights and advice on navigating the medical and graduate school application processes.



Dr. PJ Utz presenting

“My favorite part of Bio-X was the talk from Dr. PJ Utz, [which] interested me a lot more into MD/PhD pathways. It will help me reflect on my personal goals more, and how they will mesh with my career goals.”

—2025 USRP Participant Kiian Huenemann



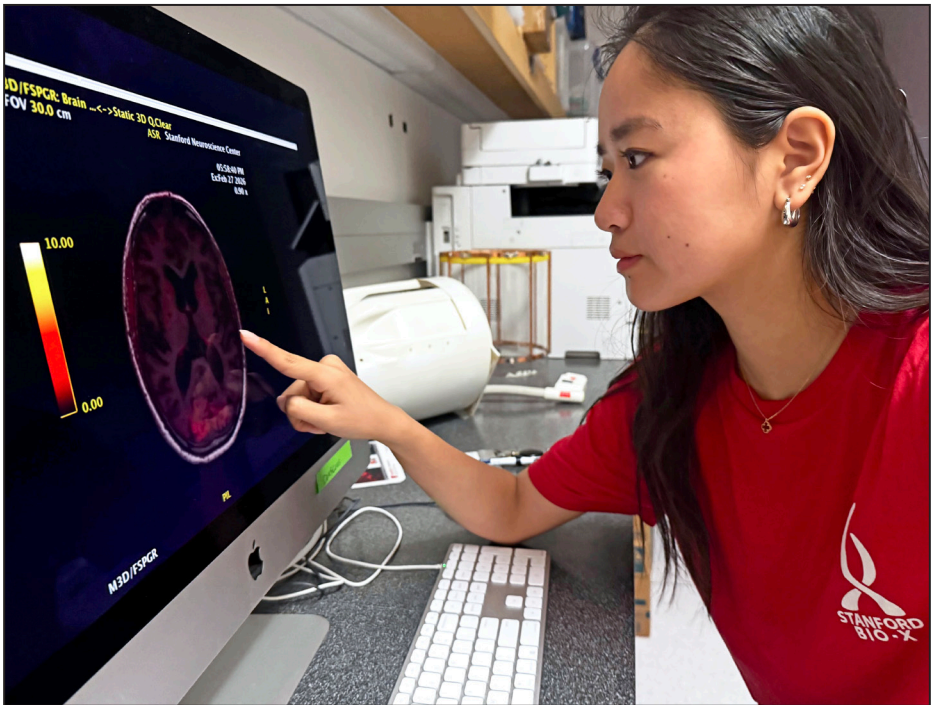
Luna Romero completed her Stanford Bio-X summer research training with Dr. Martha Cyert

Lab Safety:

Lab safety is a critical component of successful research. Every student in the Bio-X cohort completes appropriate safety training courses before the summer session to prepare them for their work in the labs. In addition, their orientation includes a special presentation by representatives from Stanford Environmental Health & Safety (EH&S) about laboratory and campus safety.



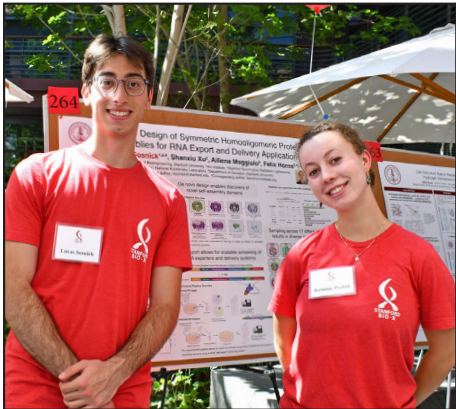
Nick Pak, Research Safety Specialist at Stanford Environmental Health and Safety (EH&S), presenting to the cohort



Aja Zou completed her Stanford Bio-X summer research training with Dr. Gary Steinberg

Scientific Poster Session:

On August 27th, the cohort present their posters at the Stanford Bio-X Interdisciplinary Initiatives Seed Grants Program Poster Session, which will include 309 scientific posters from Stanford faculty, postdocs, graduate students, research scientists, and other undergraduates!



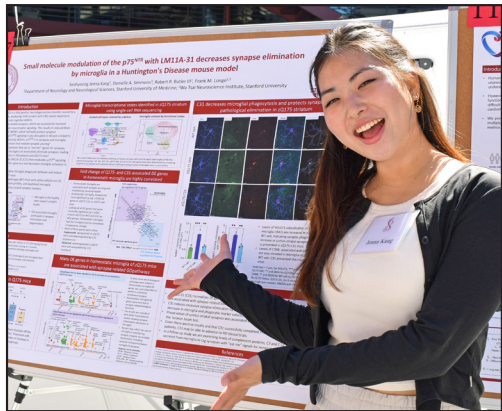
2025 USRP Participants Lucas Sosnick and Kristine Pashin at the poster session



2025 Stanford Bio-X Poster Session

“I loved how Bio-X truly highlighted the infinite possibilities in research and how working across fields is encouraged. Moving forward, Bio-X has inspired me to not be afraid to explore things that are unknown, and I hope to experience research in numerous fields.”

—2025 USRP Participant Jenna Kang



2025 USRP Participant Jenna Kang at the poster session



2025 Stanford Bio-X Poster Session

Stanford Sapp Family CS Bio-X Undergraduate Summer Research Program



Roberto Andrade completed his Stanford Bio-X summer research training with Dr. Timothy Durazzo

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