

# ACHIEVEMENT REWARDS FOR COLLEGE SCIENTISTS

INTRODUCING THE SCHOLARS 2024-2025





## ACHIEVEMENT REWARDS FOR COLLEGE SCIENTISTS SAN DIEGO CHAPTER

san-diego.arcsfoundation.org

## ARCS MISSION

ARCS<sup>®</sup> Foundation, Inc. advances science and technology in the United States by providing financial awards to academically outstanding U.S. citizens studying to complete degrees in science, engineering and medical research.

## WHO WE ARE

October 4, 1957 was a game-changer. On that date, Russia launched Sputnik, a 183-pound spaceship, roughly the size of a beach ball, into space. This surprise launch shocked the United States and forced it to rethink its place as the technological leader of the world. It also ushered in the Space Age and the Cold War. The Russian action touched all areas of America, including politics, patriotism, science, the military, and education. In response, the U.S. undertook an unprecedented push to educate Americans in science and math.

As part of that initiative, a group of women in Los Angeles saw the opportunity to make a difference by creating a partnership between science and society. Their goal was to re-establish and re-energize the technological superiority of the United States. They started the first ARCS Foundation chapter in September 1958. ARCS (Achievement Rewards for College Scientists) is a nationally recognized nonprofit organization founded and administered by women who support American leadership and aid advancement in science and technology, now comprised of 15 chapters across the nation.

In 1985, four San Diego women established ARCS Foundation San Diego: Karen Bowden, Karon Luce, Barbara McColl, and Pattie Wellborn. Forty years later, ARCS San Diego has provided over \$12.8 million in financial awards to the brightest STEM scholars at four local academic institutions. By investing in these scholars, we are securing a better future for America and the world.

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2

## SAN DIEGO CHAPTER

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## 2024-2025 SCHOLARS SAN DIEGO CHAPTER

The San Diego chapter of ARCS began in 1985 and has grown from the original four founders to 100 members today. As we enter our 40th anniversary year, we have made awards totaling over \$12.8 million. Our academic partners are:

#### San Diego State University | Scripps Research

#### University of California San Diego | University of San Diego

ARCS Scholars are selected by their institutions in recognition of their achievements and their exceptional promise to contribute significantly to their fields. Basic requirements have been established by ARCS® Foundation, Inc.: Scholars must be U.S. citizens, have at least a 3.5 GPA, and they must be enrolled full-time in academic degree programs in science, technology, engineering, math, and biomedical research. Awards are \$10,000, unrestricted, and renewable for three years. The San Diego chapter focuses on supporting students in doctoral programs, and the ARCS Scholars we have funded have a 98% graduation rate. For the 2024-2025 academic year, the San Diego ARCS chapter has awarded \$500,000 to 50 Scholars.



## SUMMARY

ARCS Foundation - San Diego Chapter 2024-2025 Scholars

#### SAN DIEGO STATE UNIVERSITY

Kian Bagheri - Civil Construction and Bioengineering Elizabeth Morgan Becker - Ecology Luisjesus Santiago Cruz - Biology Morgan Venness Farrell - Cell and Molecular Biology Ryan Hanscom - Biology Amanda Nancy Lee - Computational Science Jovan San Martin – Chemistry Ashley Valentina Schwartz – Computational Science Lilith Astete Vasquez – Environmental Engineering Christina Rodama Veziris - Clinical Psychology Isabel Alejandra White – Mathematics Education

#### SCRIPPS RESEARCH

Roger Justice Fleischmann III - Immunology Stephan Miguel Freeman - Chemistry Catherine Yicong Li - Chemical and Biological Sciences Garrett Lee Lindsey – Chemical Biology Colleen Ann Maillie – Integrative Structural and Computational Biology Michaela Medina – Cell Biology Kayla Elaine Nutsch – Biomedical Sciences Ariana (Ari) Sulpizio - Chemistry Drason Han Zhang - Chemistry

#### UNIVERSITY OF CALIFORNIA SAN DIEGO

Hannah Rose Battey - Public Health - Global Health Daniel Milgram Beaglehole - Computer Science and Engineering Austin Joseph Carter - Geosciences Morgan M. Caudle - Clinical Psychology Kayla M. Erler - Structural Engineering Wilfredo Gabriel Gonzalez Rivera - Biomedical Informatics Rayyan Mohammed Gorashi - Bioengineering Jonathan A. Gunn - Bioengineering Katherine Eugenia Izhikevich - Computer Science and Engineering Wade Truman Johnson - Nanoengineering Nishta Krishnan - Nanoengineering Benjamin Aaron Lam - Chemical Engineering Araz Majnoonian – Global Health Daniel Milshteyn - Chemistry and Biochemistry Spencer Louis Nelson - Biochemistry and Molecular **Biophysics** Renny Ka Hang Ng - Biological Sciences Renee Elizabeth Oles - Biomedical Sciences Avery Pong - Bioinformatics and Systems Biology Natalie Elaine Quach - Biostatistics Chiaki Isabela Santiago - Neurosciences Consuelo Sauceda - Biomedical Sciences Jared Simmons - Biomedical Sciences Chesson Scott Sipling - Physics Lauren Alexandria Valdez - Neuroscience Jessica Shen Yi Wan - Climate Sciences Olivia Jade Weng - Computer Science and Engineering

#### UNIVERSITY OF SAN DIEGO

Oliver Mallillin Erece - Nursing Sandy Jean Jellen - Nursing Kristina Maria Lopez - Nursing Tina Connie Smith – Nursing



( 6 )



The San Diego State University doctoral programs here are offered jointly with either the University of California Davis, the University of California San Diego, the University of California Irvine, or the University of California Riverside as noted in the Scholars' profiles.







# KIAN BAGHERI

#### San Diego State University / University of California San Diego

College of Engineering Concentration: Civil Construction and Bioengineering Specialization: Stormwater Management Donor: Donald C. and Elizabeth M. Dickinson Foundation



Kian utilizes computer modeling to study the impacts of stormwater on urban and natural systems. His research focuses on a range of stormwater management applications from quantifying pollution generation to mapping flooded areas. Within his stormwater models, he has estimated trash mobilization by stormwater, the benefits of rainwater harvesting through a life cycle assessment, the impacts of climate change on drainage systems, and transborder water management issues. These topics help support management strategies to mitigate the adverse effects of high quantities of stormwater runoff.

Personal Interests: I enjoy hiking, biking, fishing, rock climbing, scuba diving and other activities that allow me to be in nature.

## ELIZABETH MORGAN BECKER San Diego State University / University of California Davis

College of Sciences Concentration: Ecology Specialization: Plant Community Ecology Donors: Elwyn Heller Foundation of San Diego / ARCS Foundation - San Diego Chapter



Elizabeth's research focuses on the successful restoration and conservation of grassland ecosystems, which are declining rapidly from global climate change and invasive species. Grasslands have a vibrant array of plant and animal life which support human health and well-being through the ecosystem services they provide, such as carbon sequestration, flood mitigation, and hunting and foraging opportunities. Elizabeth examines the mechanisms which drive diverse, climate resilient, and invasion resistant grasslands. Her research will provide actionable guidance for grassland managers globally.

Personal Interests: In my free time I enjoy hiking, traveling, and reading.



## LUISJESUS SANTIAGO CRUZ San Diego State University / University of California San Diego

College of Sciences Concentration: Biology Specialization: Cancer Biology Donor: The Legler Benbough Foundation



Ovarian cancer progression is stimulated by signals in the tumor-microenvironment from surrounding cells and tissues. Luis is researching how an immune cell population known as macrophages in the tumor-microenvironment enhance ovarian cancer progression through the secretion of a protein known as TWEAK, which increases post-chemotherapy. He hopes to identify the macrophage population responsible for TWEAK secretion to find better cellbased immunotherapy by elucidating the role of specific immune cells in cancer progression and relapse.

Personal Interests: I spend most of my free time relaxing at home and going on mental health walks.

## MORGAN VENNESS FARRELL San Diego State University / University of California San Diego

College of Sciences Concentration: Cell and Molecular Biology Specialization: Environmental Microbiology Donor: The Reuben H. Fleet Foundation



Coral reefs are rapidly declining worldwide and require innovative solutions to stop this decline. Morgan is focusing her PhD work in studying how bacteria influence marine animal health and development with the objective of driving innovations that restore degraded coral reefs. She has uncovered a strategy that bacteria use to signal to coral and other invertebrates that they have found a suitable habitat to settle down. From this research she has developed a restoration device that helps increase marine invertebrate populations.

**Personal Interests:** Outside of my research, I enjoy being outside in nature, snorkeling, hiking, camping, and practicing photography.



## RYAN HANSCOM San Diego State University / University of California Riverside

College of Sciences Concentration: Biology Specialization: Behavioral Ecology Donor: Danielle James



Ryan's research centers on understanding how temperature influences shortgrass prairie ecosystems. He utilizes advanced accelerometry technology to study the foraging behaviors of rattlesnakes and kangaroo rats, both keystone species in this habitat. By attaching miniaturized accelerometer devices to these animals, Ryan has developed machine learning models capable of detecting their activity, cryptic behaviors, and even foraging activities in the wild. This pioneering research offers valuable insights into how climate change may affect ecosystem stability and predator-prey interactions in the natural world, bridging the gap between theory and practical field experimentation.

**Personal Interests:** As with my research, I prefer to spend most of my time in the field whether that is hiking, fishing, kayaking, wildlife photography, birding, herping (searching for amphibians or reptiles), and more!

## AMANDA NANCY LEE San Diego State University / University of California San Diego

College of Sciences Concentration: Computational Science Specialization: Artificial Intelligence and Radiology Donors: Kenneth and Marjorie Blanchard / ARCS Foundation - San Diego Chapter



Amanda's research focuses on the development of cutting-edge solutions for healthcare applications centered around the detection and treatment of chronic disease. In particular, she is interested in AI-based approaches that utilize clinical imaging and genetic data. Her graduate research has primarily involved the development of an end-to-end algorithm for CT-based diagnosis and staging of chronic obstructive pulmonary disease. In addition to this project, Amanda is developing "self-supervised" AI methods, which use unlabeled data, to expedite medical imaging tasks (e.g., pathology classification, biomarker discovery, and abnormality detection).

**Personal Interests:** I enjoy mentoring undergraduate students, participating in Masters rowing, running half marathons, and learning to make new espresso drinks.



## JOVAN SAN MARTIN San Diego State University / University of California San Diego

College of Sciences Concentration: Chemistry Specialization: Photocatalysis Donor: Hervey Family Fund



Jovan specializes in the design of new perovskite photocatalysts that use renewable energy in the form of visible light to drive chemical reactions. Perovskites are effective materials for solar cell technology and Jovan aims to repurpose such materials for enhanced photochemical reactions. His work has shown perovskites can produce a variety of organic compounds that can be the scaffold for future pharmaceutical drugs. Since perovskites are cheap, quick to produce, recyclable, and powered by renewable energy, Jovan's work can lower both the economic and environmental cost of producing pharmaceutical drugs.

Personal Interests: In my free time I like to exercise, write poetry, and make my friends laugh.

## ASHLEY VALENTINA SCHWARTZ San Diego State University / University of California Irvine

College of Sciences Concentration: Computational Science Specialization: Computational Toxicology Donor: Robin Luby



Environmental contaminants that pose a threat to the health and well-being of society are continually emerging, and high-throughput biological testing helps to characterize that risk. Ashley's research focuses on building mathematical and computational toxicology models to improve chemical safety assessment by leveraging available public data and creating an alternative to extensive animal testing. Ultimately, she hopes to shed light on the way environmental pollutant exposures can impact our health and development.

Personal Interests: In my free time, I enjoy walking and hiking with my dog, traveling to new places, and reading.



# LILITH ASTETE VASQUEZ

#### San Diego State University / University of California San Diego

College of Engineering

Concentration: Environmental Engineering

Specialization: Sustainable Onsite Sanitation Systems and Contaminants of Emerging Concern Donor: Hervey Family Fund



Lilith's research focuses on sanitation solutions for underprivileged global communities, which aids in preventing the release of harmful contaminants that pose risks to public and environmental health. She has studied ways to improve natural degradation within onsite sanitation systems, including a technology used to extend the operational lifespan of septic tanks and pit latrines. She's performed research in Brazil to quantify and treat antibiotic resistant bacteria within wastewater systems for economically disadvantaged communities. In her last year, Lilith will be studying to degradation of persistent pharmaceuticals in onsite sanitation systems.

Personal Interests: I enjoy learning cooking, dancing and new languages.

## CHRISTINA RODAMA VEZIRIS San Diego State University / University of California San Diego

College of Sciences Concentration: Clinical Psychology Specialization: Neuropsychology, Fetal Alcohol Spectrum Disorders Donor: Toby Eisenberg



Prenatal alcohol exposure and childhood adversity act as adverse factors that disrupt typical neurodevelopment. These prenatal and postnatal adverse experiences affect brain functioning and behavior, resulting in symptoms that are related to increased risk of trouble with the law. Christina's research aims to understand the underlying neurodevelopmental processes affected by the dual impact of prenatal alcohol exposure and childhood adversity and how this impact can increase the likelihood of trouble with the law. Christina also aims to develop better diagnostic measures that will lead to earlier identification of prenatal alcohol exposure.

**Personal Interests:** I enjoy reading, playing games, taking walks, and spending time with family and friends.



## ISABEL ALEJANDRA WHITE San Diego State University / University of California San Diego

College of Sciences

Concentration: Mathematics Education

Specialization: Algebraic Reasoning and Technology

Donor: The Reuben H. Fleet Foundation



Algebra serves as a gatekeeper to more advanced courses in secondary mathematics. At the same time, mathematics education has experienced rapid changes since the COVID-19 pandemic, highlighting a need for novel digital technology. Isabel is working on a research project that seeks to understand how students learn complex algebra topics using instructional mathematics videos featuring students in dialogue. Through her research, she aims to better equip educators support students' algebra learning in a digital world.

**Personal Interests:** I enjoy singing in choir, Latin dancing, and going to the movies.







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# ROGER JUSTICE FLEISCHMANN III

Scripps Research

Skaggs Graduate School of Chemical and Biological Sciences

Concentration: Immunology

Specialization: Cancer Immunotherapy

Donors: The Paul Bechtner Foundation / ARCS Foundation - San Diego Chapter



Justice investigates a novel cancer immunotherapy which his lab discovered several years ago. The therapy harnesses the power of the immune system to eliminate tumors, specifically solid tumors like breast cancer. His research revolves around understanding the therapy's mechanism of action, immunological function, and physiological impact on the patient. By studying the biology of this molecule, Justice will provide insights into the next generation of cancer medicines, reduce the potential for adverse effects, and improve the effectiveness of immunotherapy.

Personal Interests: I enjoy surfing, rock climbing, gardening, dance, DEI and STEM education, contemporary art, traveling, cooking, Dungeons and Dragons, interior design, and my dog.interior design, and my dog.

# STEPHAN MIGUEL FREEMAN

#### **Scripps Research**

Skaggs Graduate School of Chemical and Biological Sciences Concentration: Chemistry Specialization: Organic Chemistry

Donors: Drs. Mara and Larry Ybarrondo / ARCS Foundation - San Diego Chapter



Extracts of the bark of the Galbulimima tree are used in the traditional medicine of Papua New Guinea to relieve pain and induce hallucination, and these effects are attributable to forty small-molecule natural products found in the bark. Stephan is working to access these natural products by chemical synthesis – evidence suggests that Galbulimima alkaloids target central nervous system receptors, but identification of receptor targets has been limited by the low quantities of individual alkaloids in the bark (approx. 10 ppm). Reliable synthetic access to Galbulimima alkaloids will help to discover these molecules' mechanism of action, and might produce a collection of new CNS-active small molecules.

Personal Interests: I love the piano! When I'm not at the lab, I'm working on Ravel's *Gaspard de la nuit* – one of my favorite pieces ever written.



# CATHERINE YICONG LI

#### **Scripps Research**

Skaggs Graduate School of Chemical and Biological Sciences Concentration: Chemical and Biological Sciences Specialization: Virology Donor: Toby Eisenberg



The genetic information of human immunodeficiency virus 1 (HIV-1) is encoded in RNA that folds into complex and dynamic 3D structures. Catherine is studying a structured region of the HIV-1 genome essential for viral packaging, which is when new copies of the virus are assembled in the host cell before being released as infectious mature viruses. She is determining the viral packaging capabilities of thousands of RNA mutants to build a quantitative model of HIV-1 RNA function in cells, which will elucidate a novel target for antiviral drug development.

Personal Interests: In my free time, I enjoy reading fiction, taking long walks, watching theater, and traveling.

## GARRETT LEE LINDSEY

#### **Scripps Research**

Skaggs Graduate School of Chemical and Biological Sciences Concentration: Chemical Biology Specialization: Chemical Proteomics Donor: The Reuben H. Fleet Foundation



In the Cravatt lab, Garrett uses the application of Activity-based Protein Profiling (ABPP) to discover and functionally annotate proteins that contribute to human diseases, such as cancer. His research focuses on developing small molecules that target novel proteins to suppress pro-tumorigenic transcriptional networks. Currently, he is studying the mechanism of small molecules that modulate the RNA-binding protein, NONO. Studying these small molecules could provide a way forward for drugging the NONO protein for cancer therapy and more specifically treatment resistant forms of prostate cancer.

Personal Interests: I enjoy outdoor adventures with my family and practicing hot yoga.



# COLLEEN ANN MAILLIE

#### Scripps Research

Skaggs Graduate School of Chemical and Biological Sciences Concentration: Integrative Structural and Computational Biology Specialization: Protein Engineering Donor: Dorothy Georgens



Colleen combines protein engineering, computational design, and structural biology to understand how immune receptors transmit signals across cellular membranes. She is developing de novo transmembrane proteins to target Toll-like receptors. This class of immune receptors form a critical first line of defense against bacterial and viral infections and play a vital role in autoimmune diseases, cancers, and sepsis. Her research aims to provide a novel therapeutic targeting strategy and a way forward to better arm our immune systems against infections and disease.

Personal Interests: I enjoy beach volleyball, surfing, good coffee, CrossFit, mornings at the dog beach, and coaching high school field hockey.

## MICHAELA MEDINA

#### **Scripps Research**

Skaggs Graduate School of Chemical and Biological Sciences Concentration: Cell Biology Specialization: Quantitative Cellular Biology and Biophysics Donors: Paul and Cleo Schimmel / ARCS Foundation - San Diego



Michaela uses light microscopy, electron microscopy, and biochemical techniques to investigate how mitochondria sense and adapt to cellular stress. Her work focuses on how mitochondrial membranes remodel in a variety of different cellular contexts to gain a greater understanding for how these processes are regulated. Her goal is to understand how dysregulation of mitochondrial dynamics results in unhealthy mitochondrial populations that are a hallmark of neurodegenerative diseases, metabolic diseases, and cancer.

Personal Interests: I am an avid music lover, especially K-pop and the South Korean bands BTS and ATEEZ. I enjoy learning languages, reading, hiking, and traveling.



# KAYLA ELAINE NUTSCH

#### **Scripps Research**

Skaggs Graduate School of Chemical and Biological Sciences Concentration: Biomedical Sciences Specialization: Chemical Biology Donor: ARCS Foundation - San Diego Chapter



In her research, Kayla has performed a high-throughput drug screen to identify small molecules that inhibit the interaction between two proteins, YAP and TEAD, which regulate cell growth, organ size, and regeneration. This association of YAP and TEAD is often hyperactivated in human cancers driving cellular proliferation, metastasis, and chemotherapy resistance. Her work has uncovered small molecules that have been used to elucidate the unique regulation of TEAD and further developed them into pre-clinical candidates for novel cancer therapeutics.

Personal Interests: I enjoy painting, hiking with my dog, yoga, exploring local breweries with my husband, reading, cooking, traveling, and experimenting in mixology.

# ARIANA (ARI) SULPIZIO

#### **Scripps Research**

Skaggs Graduate School of Chemical and Biological Sciences Concentration: Chemistry Specialization: Chemical Biology Donor: ARCS Foundation - San Diego Chapter



Ariana studies small molecules that affect the cGAS-STING pathway, a crucial component of our immune system. When a cell experiences stress from cancer or infection, DNA can mistakenly accumulate in the wrong areas. The cGAS-STING pathway detects this misplaced DNA and signals the immune system to respond. In her research, Ariana has characterized a new inhibitor that could help treat autoimmune disorders caused by the overactivation of this pathway. She has also investigated different classes of pathway activators, revealing important insights that could lead to anti-cancer therapies targeting the cGAS-STING pathway.

Personal Interests: Outside of lab, I enjoy running, playing field hockey, singing in local choirs, and teaching piano lessons.



# DRASON HAN ZHANG

Scripps Research

Skaggs Graduate School of Chemical and Biological Sciences

Concentration: Chemistry

Specialization: Organic Chemistry

Donor: ARCS Foundation - San Diego Chapter



The opioid receptor system is important due to the role it plays in pain relief; however, its compounds, which bind to opioid receptors, can induce highly different effects on the human body, including addiction. One hypothesis for why this occurs involves the heterogeneity of brain tissue. Perhaps where these compounds localize in the brain determines their specific effect. Drason is synthesizing novel compounds and studying how to identify where in the brain these compounds go, with the hope of eventually improving our ability to design pain relievers without risk of addiction.

Personal Interests: When not in the lab, I enjoy chess, although I am not very good... yet.



# UC San Diego





## HANNAH ROSE BATTEY University of California San Diego / San Diego State University

Herbert Wertheim School of Public Health and Human Longevity Science

Concentration: Public Health – Global Health

Specialization: Epidemiology

Donor: Lambert Foundation for Education



Hannah is investigating the most common bacterial pathogens responsible for community-acquired pneumonia. Her research focuses on identifying which bacterial peptides are recognized by the immune system during infection. Currently, pneumonia treatments often begin without confirming the bacterial cause, leading to potential disease mismanagement, prolonged illness, and negative outcomes. Hannah aims to discover bacterial T cell epitopes that could be used in developing rapid diagnostic assays or vaccines, improving both treatment precision and patient outcomes.

Personal Interests: Hannah enjoys long solo hikes whilst listening to audiobooks, backpacking with her twin brother, traveling with friends and enjoying new restaurants in San Diego.

## DANIEL MILGRAM BEAGLEHOLE University of California San Diego

Jacobs School of Engineering Concentration: Computer Science and Engineering Specialization: Machine Learning Donor: Beyster Family Foundation



One of the biggest mysteries in the study of deep learning is why neural networks are able to perform well at test time (i.e., on data that was not used for learning). Daniel's work demonstrates that neural networks achieve this remarkable test performance by learning a particular statistic that is specific to the given dataset (a phenomenon known as feature learning). Daniel has shown how this mechanism can explain a variety of "intelligent" behaviors in deep learning, including the emergence of edge detectors in networks used for vision tasks. Further, Daniel demonstrated that the mechanism of feature learning identified in his work can be implemented in a simple, fast, and interpretable method that gives state-of-the-art performance on tabular data.

**Personal Interests:** Research is my passion, but I am also an avid Brazilian Jiu Jitsu practitioner. I also enjoy playing guitar, learning to surf, and reading philosophy.



# AUSTIN JOSEPH CARTER

University of California San Diego

Scripps Institution of Oceanography Concentration: Geosciences Specialization: Geochemistry Donor: The Reuben H. Fleet Foundation



Austin studies the chemistry, shape, and concentration of mineral dust (finegrained particles of rock) trapped in polar ice. He drills cores of ice on the East Antarctic Ice Sheet, carefully separates the dust, and measures its properties. These small, solid impurities can provide insight into how the conditions on the Earth's surface and the flow of air may have changed through time. By understanding how the environment has changed in the past, his research aims to better project how the environment will change in the future.

**Personal Interests:** I enjoy listening to music, exploring the beach, and making paper crafts.

## MORGAN M. CAUDLE University of California San Diego / San Diego State University

School of Medicine Concentration: Clinical Psychology Specialization: Experimental Psychopathology Donors: Carlos and Sharon Arbelaez



Anxiety, mood, and traumatic stress disorders are highly prevalent and associated with impaired physical health and cognitive functioning. Despite the existence of evidence-based treatments, many individuals do not fully recover; therefore, there is a need for the development of novel treatments. Under the mentorship of Dr. Jessica Bomyea, Morgan is assisting with testing the effects of a novel computerized cognitive training program aimed at improving symptoms by improving cognitive functioning. Additionally, she is investigating the effects of this cognitive training program on neural functioning and related symptom change.

Personal Interests: In my free time I enjoy traveling to new places and snowboarding.



## KAYLA M. ERLER University of California San Diego

Jacobs School of Engineering Concentration: Structural Engineering Specialization: Seismic Protective Systems Donor: The Reuben H. Fleet Foundation



Kayla specializes in research on the use of seismic isolation devices to protect buildings and bridges from damaging earthquakes. These devices have proven highly effective in reducing the forces transferred to structures and minimizing the need for repairs and downtime after seismic events. Her thesis focuses on the performance of these devices in bridges under extreme earthquake conditions, aiming to improve the understanding and reliability of design practices and ensure California's bridges—often critical lifelines—are adequately protected.

Personal Interests: Kayla spends as much of her free time as possible out with her beloved horse, whom she raised from birth.

## WILFREDO GABRIEL GONZALEZ RIVERA University of California San Diego

School of Medicine Concentration: Biomedical Informatics Specialization: Genetics and Genomics Donor: Ellen Browning Scripps Foundation



Wilfredo focuses on combining genetics, genomics, and social science to understand the underlying causes of significant health disparities among individuals from underrepresented racial and ethnic groups in the United States. As a first-generation Latinx in higher education, his work emphasizes the critical need to include these underrepresented groups in genomic research to enhance the accuracy and generalizability of precision medicine for all populations.

**Personal Interests:** I am interested in exploring the world around me and looking for nice coffee shops to enjoy reading or coding.



# RAYYAN MOHAMMED GORASHI

University of California San Diego

Jacobs School of Engineering Concentration: Bioengineering Specialization: Biomaterials and Sex-specific Disease Modeling Donor: ARCS Foundation - San Diego Chapter



Rayyan's research leverages biomaterial tools to better understand sex differences in heart valve disease. Current treatments are limited to pharmaceutical drugs or invasive, total valve replacement procedures. Drug treatments are often ineffective for females due to an incomplete understanding of female-specific disease mechanisms. Rayyan utilizes biomaterials to create physiologically relevant disease models to study sex-specific mechanisms. More broadly, Rayyan seeks to understand the sex differences in heart valve disease progression to create more equitable treatment options for both male and female patients.

Personal Interests: I enjoy nature/landscape and portrait photography, surfing, working out, video games, and spending time with family.

## JONATHAN A. GUNN University of California San Diego

Jacobs School of Engineering Concentration: Bioengineering Specialization: Immunotherapy and Nanomedicine Donor: ARCS Foundation - San Diego Chapter



Jonathan is developing a novel approach to cancer treatment using mRNA and self-amplifying RNA (saRNA) delivered by lipid nanoparticles. This innovative method aims to create an affordable, off-the-shelf therapy that can reprogram immune cells directly inside the body to target and eliminate cancer. By making this cutting-edge treatment more accessible, Jonathan hopes to improve outcomes for patients worldwide, reducing the financial and logistical barriers that currently limit access to life-saving cancer therapies.

Personal Interests: Chess, tennis, hiking, traveling.



# KATHERINE EUGENIA IZHIKEVICH

University of California San Diego

Jacobs School of Engineering Concentration: Computer Science and Engineering Specialization: Computer Security Donor: Ellen Browning Scripps Foundation



Katherine studies how to detect attackers in enterprise networks before they cause data breaches or ransomware attacks. She is currently building a system that detects, in real time, when an attacker is planning their next attack on a given enterprise. The scientific contribution of this system lies in differentiating between benign behaviors (e.g., employees simply checking their email), misconfigured behaviors (e.g., TVs attempting to connect to every device on the network), and malicious behaviors (e.g., attackers looking for vulnerabilities to exploit).

**Personal Interests:** I was a ballerina for 16 years but have recently become a runner. I love to read and creatively write.

## WADE TRUMAN JOHNSON University of California San Diego

Jacobs School of Engineering Concentration: Nanoengineering Specialization: Immune Engineering and Biomaterials Donors: Kurt Benirschke Family / ARCS Foundation - San Diego Chapter



Wade's research focuses on the development of nanoscale biomaterials to control flares in patients with chronic autoimmune diseases. The standard of care treatment for inflammatory flares is corticosteroids. Unfortunately, these treatments do not prevent flare recurrence, are associated with potent side effects, and reduce the body's natural ability to fight off infections and cancer. The biomaterials Wade develops are designed to prevent flare-ups by inducing a protective immune cell subset in a targeted area without systemically hampering the body's immune system to fight off disease.

**Personal Interests:** I spend my time outside as often as possible, whether that be backpacking, sailing, or golfing.



## NISHTA KRISHNAN University of California San Diego

Jacobs School of Engineering Concentration: Nanoengineering Specialization: Immunology and Drug Delivery Donor: The Reuben H. Fleet Foundation



Nishta's research focuses on cell membrane-coating nanotechnology, in which cell membrane is derived from live cells and coated onto the surface of synthetic nanoparticulate cores. In particular, Nishta is developing the next generation of these nanoparticles via genetic modification of the source cells. By introducing proteins onto the nanoparticle surface, she can integrate new capabilities and better address challenges in cancer therapy. She uses these genetic engineering approaches to develop nanoparticles with enhanced functionalities including improved targeting to disease sites, enhanced cellular entry, and superior biointerfacing capabilities.

Personal Interests: I enjoy rock climbing, board games, and eating otter pops!

# BENJAMIN AARON LAM

#### University of California San Diego

Jacobs School of Engineering Concentration: Chemical Engineering Specialization: Nanoengineering and Nanotechnology Donor: Donald C. and Elizabeth M. Dickinson Foundation



Benjamin's research focuses on the intersection of chemical engineering, nanotechnology, and materials science with the goal of advancing medical device technologies and improving human health. His current research focuses on understanding the nanoscale interactions between peptides and nanoparticles in their assembly and disassembly and developing computational tools to explain the experimental phenomena through molecular simulations. These discoveries offer knowledge that would enhance peptide-based therapeutics, drug discovery, diagnostics, environmental monitoring, and nanotechnology.

**Personal Interests:** In my free time, I enjoy volunteering, being outdoors, and spending time with family and friends.



# ARAZ MAJNOONIAN

#### University of California San Diego

Herbert Wertheim School of Public Health and Human Longevity Science Concentration: Global Health Specialization: Gender-Based Violence Prevention Donor: ARCS Foundation - San Diego Chapter



Araz is conducting pioneering research to evaluate domestic violence support services nationwide in Armenia. Her study, the first of its kind in the country, adopts a participatory approach involving survivors of violence, domestic violence support center staff, and partner organizations to assess the impact and accessibility of these services. By generating evidence-based insights and recommendations, her research aims to enhance support for survivors and inform policy and practice. Her work contributes to the global fight against gender-based violence, offering valuable lessons for low and middle-income countries.

**Personal Interests:** I advocate for indigenous rights and cherish outdoor adventures that include hiking, camping, and traveling.

## DANIEL MILSHTEYN

University of California San Diego

Physical Sciences Concentration: Chemistry and Biochemistry Specialization: Lipid Biochemistry and Biophysics Donor: ARCS Foundation - San Diego Chapter



Daniel studies the regulation of negatively curved lipids in cell membrane dynamics and environmental adaptation. His primary research focuses on the biophysical roles of cholesterol in mitochondrial fission driven by multiorganelle contacts. In addition, he collaborates with scientists from the Extreme Biophysics Research Coordination Network to understand the roles of lipids in adapting model organisms to survive in deep-sea or high-pressure environments. Daniel is training in interdisciplinary approaches including super resolution live-cell microscopy, membrane biophysics, and synthetic biology to understand the implications of lipid composition across scales from cell membranes to organismal physiology and disease.

Personal Interests: In my free time, I enjoy listening to music, getting lost in nature, and roller-blading.



# SPENCER LOUIS NELSON

University of California San Diego

**Physical Sciences** 

Concentration: Biochemistry and Molecular Biophysics Specialization: Protein Ubiquitination Donor: ARCS Foundation - San Diego Chapter



Spencer studies the biophysical impact and regulatory roles of protein ubiquitination through the use of novel ubiquitinated-protein purification techniques. His primary research focus explores how differing ubiquitin chains can alter the aggregation, degradation and toxicity of amyloidogenic proteins, particularly those related to neurological disorders such as Alzheimer's and Parkinson's disease. Through his research, he aims to elucidate the specific consequences of protein ubiquitination for aggregating proteins and hopes this will aid in the development of novel therapeutics utilizing targeted protein degradation strategies.

**Personal Interests:** When I'm not in the lab I enjoy watching anime or tending to my collection of carnivorous tropical pitcher plants.

# RENNY KA HANG NG

#### University of California San Diego / San Diego State University

Division of Biological Sciences Concentration: Biological Sciences Specialization: Olfaction Donor: Virginia Lynch Grady Endowment



Day/night cycles impact both physiology and behavior to help animals adapt to rhythmic environmental cues, but it is unclear whether primary chemosensory neurons (including neurons which mediate the sense of smell) respond to stimuli in a rhythmic way to then guide rhythmic behaviors. Renny studies the context-dependent neuromodulation of olfaction, and his current research project characterizes how day/night cycles modulate olfactory acuity and odor-guided behaviors. His research reveals how neuromodulatory impairment in the sensory periphery can gate day/night-regulated behaviors, apart from the influence of central circadian mechanisms.

Personal Interests: Hiking, camping, marksmanship.



## RENEE ELIZABETH OLES University of California San Diego

School of Medicine Concentration: Biomedical Sciences Specialization: Microbial Genetics and Genomics Donor: The Reuben H. Fleet Foundation



Renee is investigating how gut inflammation affects beneficial bacteria in our intestines and whether these changes worsen diseases like Inflammatory Bowel Disease. She focuses on a common gut bacterium called *Bacteroides fragilis*, which usually helps keep our gut healthy. Renee studies how this bacterium adapts to the stressful conditions of inflammation, such as exposure to harmful oxygen molecules. By understanding these bacterial changes, her research aims to uncover new ways to treat or prevent Inflammatory Bowel Disease, ultimately improving gut health and patient outcomes.

Personal Interests: Outside of lab, I enjoy rock-wall climbing and painting.

AVERY PONG University of California San Diego Jacobs School of Engineering Concentration: Bioinformatics and Systems Biology Specialization: Cancer Biology

Donor: Hervey Family Fund



Avery is studying how immune cells communicate with one another in the context of cancer treatment and inflammatory disease progression. He uses computational tools to mine next-generation sequencing data rendered from RNA molecules in tumor cells (for cancer studies) and inflamed fibroblasts (for allergic conditions). This yields information on which cells are producing proteins that could be used to interact with other neighboring cells. At the scale of hundreds of thousands of cells, this research delivers insights into wayward, diseased communication axes that could be targeted by therapeutics to improve patient outcomes.

Personal Interests: I like to climb, play piano, dance, play ultimate frisbee, and road bike.



# NATALIE ELAINE QUACH

### University of California San Diego

Herbert Wertheim School of Public Health and Human Longevity Science Concentration: Biostatistics Specialization: Causal Inference Donor: ARCS Foundation - San Diego Chapter



Natalie's current research focuses on developing methods for inference after conducting matching. A significant public health goal is to decrease tobacco use. Inference after matching can be used to examine the relationship of e-cigarette vaping with cigarette smoking abstinence. Natalie aims to describe how the effect of e-cigarette vaping on cigarette smoking abstinence can vary by characteristics such as age and gender. Through her research, Natalie hopes to contribute to the biostatistics field to answer questions in tobacco research and other biomedical areas.

**Personal Interest:** I enjoy spending time with family and friends, playing board games, and meditating.

## CHIAKI ISABELA SANTIAGO University of California San Diego

Division of Biological Sciences Concentration: Neurosciences Specialization: Cellular and Molecular Neurosciences Donor: Kathryn Crippen Hattox Endowment



Chiaki's thesis project aims to understand the molecular mechanisms that drive experience-dependent circuit plasticity in the mammalian brain. The animal brain extracts salient information from its environment, generating memories and behavioral adaptations that allow it to survive in a complex world. This is done through the activity of excitatory and inhibitory neurons that are organized into synaptically connected circuits. Chiaki studies how experience, through the execution of activity-dependent gene expression, regulates the connections between excitatory and inhibitory neurons, and how these processes relate to animal behavior and disease states.

Personal Interests: I love spending time in nature - playing volleyball, disc golf, surfing, or exploring our beautiful national parks.



## CONSUELO SAUCEDA University of California San Diego

School of Medicine Concentration: Biomedical Sciences Specialization: Microbiome, Host-Microbe Interaction Donor: Karen Bowden



Previously overlooked, the human gut has become a central focus in the study of many diseases as it holds a rich reservoir of microbes that play key roles in digestion and host immune defense. A tip in the balance of microbial abundance has been connected to many diseases, such as inflammatory bowel disease. As part of her ongoing mission, Consuelo Sauceda is focused on understanding how gut microbes contribute to disease severity in hopes of finding a targeted therapeutic. Using state-of-the-art technology, Consuelo aims to find proteins produced by gut microbes that may be leading to gut barrier dysfunction.

**Personal Interests:** I love spending time with friends and family. I also love to dance and teach choreography in my spare time.

## JARED SIMMONS University of California San Diego

School of Medicine Concentration: Biomedical Sciences Specialization: Dermatology Donors: Elizabeth and Joseph Taft



Jared's work in the Gallo Lab focuses on interactions between cell types in the skin and how they control inflammation. He has found that fibroblasts, the major structural cell of the dermis, are far more important to inflammatory response than was previously thought. A better understanding of the unique activity of these cells will provide new targets for developing therapeutics, and it may pave the way to improving outcomes in skin infections and inflammatory skin diseases which affect millions of people.

Personal Interests: My husband and I got a puppy this year, and he keeps us very busy!



# CHESSON SCOTT SIPLING

University of California San Diego

**Physical** Sciences

Concentration: Physics

Specialization: Physical Approaches to Computation Donor: Wally Schirra Memorial Endowment Fund



Conventional computers, while ubiquitous in modern society, fail to solve a wide variety of problems efficiently. Chesson's research aims to combat this: he is studying an alternative computing paradigm known as "MemComputing" which relies upon physical principles, rather than algorithms, to excel where traditional approaches have struggled. Such optimization is of paramount importance to avoid the computational bottlenecks being faced in the domains of private industry (passenger aircraft scheduling), public safety (autonomous self-driving vehicles), national security (RSA encryption), and more.

Personal Interests: I love long-distance running (from 5ks to ultramarathons) and backpacking! I also enjoy drumming and (mediocrely) singing karaoke.

## LAUREN ALEXANDRIA VALDEZ University of California San Diego

School of Medicine Concentration: Neuroscience Specialization: RNA Biology in Neurodegenerative Diseases Donor: Hervey Family Fund



Amyotrophic lateral sclerosis (ALS) is a very progressive and fatal age-related disease that manifests as muscle paralysis—due to death of motor neurons in its early stages. After learning about this disease, Lauren has joined the Chaim lab and focuses on RNA damage and RNA binding protein dysfunction in result of oxidative damage in patients with ALS. For her project, she is attempting to identify where in a neuron this disease begins as science and society are unsure of this answer.

Personal Interests: I love all types of arts and crafts activities as well as reading!



## JESSICA SHEN YI WAN University of California San Diego

Scripps Institution of Oceanography Concentration: Climate Sciences Specialization: Climate Geoengineering Donors: Laura Mateo / Lakeside Foundation



Jessica studies how climate geoengineering proposals might alleviate climate change impacts. Her research focuses on a type of geoengineering called marine cloud brightening, which cools the planet by adding sea salt particles to the lower atmosphere to form brighter marine clouds. She uses computer models of the Earth to simulate how different scenarios of marine cloud brightening could be leveraged for climate risk mitigation. As temperatures continue to rise, Jessica's research on climate geoengineering is becoming increasingly important as one proposal in the portfolio of innovative climate solutions.

**Personal Interests:** I am a professional ultimate frisbee player and college coach. I also enjoy hiking, disc golfing, baking, and painting.

## **OLIVIA JADE WENG**

University of California San Diego

Jacobs School of Engineering Concentration: Computer Science and Engineering Specialization: Hardware-software Codesign Donor: Donald C. and Elizabeth M. Dickenson Foundation



Many scientific applications require neural networks (NNs) to operate correctly in safety-critical or high radiation environments, including automated driving, space, and high energy physics. For example, physicists at the Large Hadron Collider want to deploy a model to filter their experimental data at a high data rate (~40TB/s) in a high radiation environment. Thus, the model's hardware must be both efficient and robust. However, efficiency and robustness are often in conflict with each other. Olivia's research explores this tradeoff to look for robustness in both NN hardware and software and have them work together.

Personal Interests: I regularly attend the theater.









# OLIVER MALLILLIN ERECE

Hahn School of Nursing and Health Science Concentration: Nursing Specialization: Adult-Gerontology Donor: Beyster Family Foundation



Oliver's research focuses on hospitalized patients who are nonverbal and cannot communicate their pain. The study aims to identify factors that influence the types of pain interventions provided to these patients, comparing those in palliative care with those who are not. By understanding these factors, Oliver hopes to enhance nursing care and reduce the risk of inappropriate or inadequate interventions in patients who are nonverbal.

**Personal Interests:** I am passionate about artistic expression through drawing and video editing. I am devoted to mentoring novice nurses for their growth and success.

## SANDY JEAN JELLEN

**University of San Diego** 

Hahn School of Nursing and Health Science Concentration: Nursing Specialization: Oncology Donor: Beyster Family Foundation



There is a high incidence of women who have experienced a form of physical sexual violence. Patients who have experienced sexual trauma are particularly vulnerable because they can become anxious and retraumatized during their medical experience. Sandy's focus is on improving the screening process for identifying patients with a sexual trauma history in order to provide trauma-informed care. Her research involves exploring the difference in sexual trauma screening between the current Abuse Assessment Screen (AAS) and the Two-Question Screening Tool in the gynecologic oncology setting.

Personal Interests: I enjoy traveling with my family, exploring different cultures, local cuisine, and visiting all the Disney parks around the world.



# KRISTINA MARIA LOPEZ

#### **University of San Diego**

Hahn School of Nursing and Health Science Concentration: Nursing Specialization: Perianesthesia Donor: Beyster Family Foundation



Surgery is increasingly adopting minimally invasive technologies like robotics. Patients undergoing robotic surgery may be discharged home directly from the recovery room. Kristina's research will explore potential relationships between patient comorbidities, anesthetic agents, and same-day discharge rates in robotic surgery patients to improve quality care, prevent postoperative complications, and reduce unexpected overnight admissions.

Personal Interests: In my downtime, I enjoy hiking, walks on the beach, Jeeping, and being out in nature.

# TINA CONNIE SMITH

#### **University of San Diego**

Hahn School of Nursing and Health Science Concentration: Nursing Specialization: Pediatrics

Donors: Laurie and Michael Roeder / ARCS Foundation - San Diego Chapter



As the literacy gap between healthcare workers and patients grows, nurses must help provide healthcare information realistically. For this reason, Tina's research is focused on the health literacy of parents of acutely sick children so that she can start to tackle the difficulties of the health literacy gap. Her entire bedside career has been dedicated to one of the most vulnerable populations, pediatric patients, and by increasing parents' and caregivers' health literacy she aims to improve the lives of her patients, both current and future.

**Personal Interests:** As a true Southern Californian, I enjoy beach days, reading, hiking, and trying new restaurants.





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