ARCS ADVANCING SCIENCE IN AMERICA®
SAN DIEGO CHAPTER

ACHIEVEMENT REWARDS FOR COLLEGE SCIENTISTS

INTRODUCING THE SCHOLARS
2021-2022

ACHIEVEMENT REWARDS FOR COLLEGE SCIENTISTS

SAN DIEGO CHAPTER

san-diego.arcsfoundation.org

ARCS® MISSION

ARCS® 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. Thirty-seven years later, ARCS San Diego has provided over $11 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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SAN DIEGO CHAPTER

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2021-2022 SCHOLARS
SAN DIEGO CHAPTER

The San Diego chapter of ARCS began in 1985 and has grown from the original four founders to more than 100 members today. As we enter our 37th anniversary year, we have made more than 1400 awards totaling well over $11 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 and have at least a 3.5 GPA; they must be enrolled full-time in academic degree programs in science, engineering, and medical research. Awards are unrestricted and merit-based. The San Diego chapter focuses on supporting students in doctoral programs, and the ARCS Scholars we have funded have a 98% graduation rate, compared with the national rate of 60% for graduate students in the sciences and engineering. Annual awards to Scholars range from $5,000 to $10,000. For the 2021-2022 academic year, the San Diego ARCS chapter has awarded $455,000 to 50 Scholars.

SUMMARY

ARCS Foundation - San Diego Chapter 2021-2022 Scholars

All ARCS Scholars supported by the San Diego Chapter are enrolled in doctoral programs

SAN DIEGO STATE UNIVERSITY

Amanda Therese Alker – Cell and Molecular Biology
Maricruz Carrillo - Mechanical Engineering
Ashley Dang-Nguyen - Chemistry
Jessica Eileen Griffin - Marine Ecology
Roslynn Beatrice King – Geophysics
Tiffany Luong – Cell and Molecular Biology
Kyle Evan Malter – Biological Sciences
Adrian Xavier Rivera - Structural Engineering
Laura Gilman Sisk-Hackworth - Microbiology
Kevin James Walsworth - Chemistry
Jennifer Anne Waters - Biology

SCRIPPS RESEARCH

Brett Michael Garabedian - Molecular Medicine
Nathalia Romanio Gazaniga – Biomedical Sciences
Tucker Ryan Huffman - Chemistry
Sergio Rodriguez Labra - Biomedical Science
Lucas James Oxtoby - Chemistry
Hailee Rose Perrett - Biophysics and Structural Biology
Caroline Rose Stanton - Biomedical Sciences
Nelson Ren Wu – Immunology
Leonard Heekyu Yoon - Chemical Biology

UNIVERSITY OF CALIFORNIA SAN DIEGO

Anela Kanani Akiona - Marine Biology
Kyle James Angle - Analytical and Atmospheric Chemistry
Gabriel Antonio Ascui-Gac - Biomedical Sciences
Miriam Kathleen Bell - Mechanical Engineering
Alec Joseph Calac - Medicine and Public Health
Minerva Contreras - Cellular and Molecular Biology
Ruben Daniel Elias - Biophysics
Sonya Renee Haupt - Biomedical Sciences
John Jaeun Holoubek - NanoEngineering
Nathaniel Max Klevit Hopkins - Computer Science/Engineering
Jervaughn DeAnthony Hunter - Bioengineering
Pratibha Jagannatha - Bioinformatics
Andrew Thomas Kleinschmidt - Chemical Engineering
David Ambrose McBride - Chemical Engineering
Colman Arthur Moore -NanoEngineering
Channing Joseph Prend - Physical Oceanography
Eleonora Rachtman - Bioinformatics and Systems Biology
Sankaran Ramanarayanan - Mechanical/Aerospace Engineering
Samantha Lylah Sison - Neuroscience
Angus Blacklaw Thies - Marine Biology/Physiology
Brian Kha Tran - Computational Mathematics
Alisha Anish Ukani - Computer Science
Alicia Ann Van Enoo - Neuroscience
Anthony Quoc Vu - Biomedical Sciences
Alexander Jeffrey Whitehead - Bioengineering
Jiarong Zhou - NanoEngineering

UNIVERSITY OF SAN DIEGO

Pedro Alonso Colio- Nursing
Ann Ozaze Lawani - Nursing
Patricia Jinhae Magdaluyo - Nursing
Nicole Renae Marcy - Nursing

San Diego State University

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

AMANDA THERESE ALKER

San Diego State University / University of California San Diego

College of Sciences

Concentration: Cell and Molecular Biology

Specialization: Environmental Microbiology

Donor: Reuben H. Fleet Foundation Fund

Many bottom-dwelling marine animals, like corals and tubeworms, release their babies into the water column, where they swim in search of an environmental cue that indicates a suitable place to settle onto the seafloor and develop. Certain bacteria coating submerged surfaces can serve as this environmental cue. Amanda's research investigates a single probiotic marine bacterium, and demonstrates that it can produce multiple different cues that influence the babies to settle down. Harnessing these bacteria as "environmental probiotics" may allow scientists to restore threatened ecosystems like coral reefs in the future.

Personal Interests: Live music- the funkier the better, surfing, backcountry camping, and SCUBA.

MARICRUZ CARRILLO

San Diego State University / University of California San Diego

College of Engineering

Concentration: Mechanical Engineering

Specialization: Additive Manufacturing of Bone Implants

Donor: Reuben H. Fleet Foundation

Maricruz's research focuses on the additive manufacturing and sintering of ceramic samples to be used as bone implants. Or, as she puts it, she is 3D printing bones. The aim is to manufacture patient specific bone scaffolds that mimic native bone properties by combining 3D printing and sintering technologies. A technology like this will be a crucial advancement in the orthopedic implant field because it will increase implant biocompatibility, decrease healing time, and avoid re-operations, ultimately leading to a better quality of life for orthopedic patients.

Personal Interests: Sustainability and entrepreneurship - I have a small business called Menos Waste. For fun, surfing and salsa dancing are my hobbies!

ASHLEY DANG-NGUYEN

San Diego State University / University of California San Diego

College of Sciences

Concentration: Chemistry

Specialization: Organic Chemistry

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

Electrophilic aromatic substitution is a common methodology used to functionalize pharmaceutical scaffolds and make additional analogues, aiming to synthesize more potent drugs targeting different diseases and cancers. However, the lack of site specificity makes it difficult to attach the functional group of interest at an exact position in high quantities. Ashley is currently designing and developing methodologies to address this issue in producing the target isomer. Her work aims to streamline pharmaceutical synthesis by allowing for direct access to produce analogues of lead compounds.

Personal Interests: Rock climbing, video games, and playing with my pug, Oliver.

JESSICA EILEEN GRIFFIN

San Diego State University / University of California Davis

College of Sciences

Concentration: Marine Ecology

Specialization: Coastal Marine Community Dynamics

Donor: The Heller Foundation of San Diego

Jessica is a marine ecologist whose research focuses on the conservation of coastal marine ecosystems, which are rapidly degrading due to climate change, invasive species and pollution. Jessica studies California seagrass beds, which perform vitally important ecosystem services, such as carbon sequestration and providing habitat for many fishes and invertebrates. Jessica's research addresses three threats to eelgrass survival: invasive species, eutrophication (addition of nutrients to the water), and climate change, and will provide insight on how to preserve these ecosystems under the stress of global change.

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

ROSLYNN BEATRICE KING

San Diego State University / University of California San Diego

Department of Geological Sciences

Concentration: Geophysics

Specialization: Controlled-Source Electromagnetism

Donor: Legler Benbough Foundation

Roslynn is interested in the design, fabrication, and use of controlled-source electromagnetic instruments to study hazards and potential resources that have direct implications for human life located on the continental shelf. More specifically, she is interested in identifying and analyzing marine hydrocarbon seeps, fluid pathways, freshwater resources, and archeological sites so as to reduce ambiguity in current climate models, manage groundwater resources in coastal communities, and aid in the current understanding of human migration pathways.

Personal Interests: Backpacking, painting, gardening, playing lacrosse, brewing beer, and diving into some solid podcasts.

TIFFANY LUONG

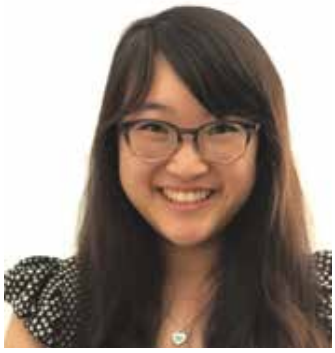
San Diego State University / University of California San Diego

Department of Biology

Concentration: Cell and Molecular Biology

Specialization: Bacteriophage Biology

Donor: Hervey Family Fund



Antibiotic-resistant bacterial infections are a growing concern worldwide. Due to their ability to infect and kill bacteria, there has been renewed interest in harnessing bacteriophages, phages for short, as an alternative treatment against antibiotic resistance. Currently, phage therapy can only be approved by the FDA as an emergency treatment. During Tiffany's PhD research, she developed a method to produce high-quantity clinically safe phage preparations for personalized emergency patient treatment. Her ongoing research will focus on the tripartite interactions between bacteria, phages, and the mammalian host.

Personal Interests: Some of my interests and hobbies include piano, tabletop role-playing games, mahjong, food & travel, video games, science fiction and fantasy literature.

KYLE EVAN MALTER

San Diego State University / University of California San Diego

College of Sciences

Concentration: Biological Sciences

Specialization: Host-Microbe Biology

Donor: Hervey Family Fund

Kyle's research aims to understand how bacteria directly affect animal development. Identifying the mechanisms that bacteria use to influence animal development could have a wide range of impacts on the scientific community, such as understanding more complex systems, including the human gut microbiome. To study this, Kyle uses a marine tubeworm which requires bacteria for growth and development. This required interaction has allowed him to find key bacterial proteins which control the tubeworm's development. Kyle's future work aims to understand how human gut bacteria contribute to health and development.

Personal Interests: In my free time I am an avid surfer, backpacker and guitar player. I am also an avid builder, shaping my own custom surfboards and handmade instruments.

ADRIAN XAVIER RIVERA

San Diego State University / University of California San Diego

College of Engineering

Concentration: Structural Engineering

Specialization: Non-Destructive Evaluation

Donor: ARCS Foundation - San Diego Chapter

Adrian's research is focused on analyzing manufacturing imperfections in aluminum honeycomb sandwich composites. The impact of this research will increase the understanding of how imperfections affect the material performance of aluminum honeycomb cores, allowing engineers to better identify potential failure of future aerospace structural designs. Furthermore, the tools used to construct finite element models of honeycomb core materials can be used for design optimization, improving the reliability and performance of fracture critical structures.

Personal Interests: I have played tennis at a collegiate level (Division III) and continue to play in local tournaments. I also have a great love of food, especially tacos.

LAURA GILMAN SISK-HACKWORTH

San Diego State University / University of California San Diego

College of Sciences

Concentration: Microbiology

Specialization: Microbiome-Host Interactions

Donor: Ellen Browning Scripps Foundation

You probably remember puberty as a time of immense and confusing changes, but you might not know that the microbes in your gut were changing with you. Laura's research focuses on how the physiological changes that we experience during puberty, like soaring hormone levels and metabolic shifts, affect which microbes live in our gut and what they do there. Knowing how puberty shapes the gut microbiome will help us better understand microbiome-related diseases that emerge during puberty, like polycystic ovary syndrome and type I diabetes.

Personal Interests: I spend my free time reading literature, gardening, and hiking the beautiful hills of San Diego.

KEVIN JAMES WALSWORTH

San Diego State University / University of California San Diego

College of Sciences

Concentration: Chemistry

Specialization: Organic Chemistry

Donor: Robin Luby/ARCS Foundation - San Diego Chapter

Kevin's research is focused on the design and synthesis of new drugs to help fight various diseases. He is currently working on two projects; one is the synthesis of a marine natural product that is an active against colon cancer, and the other is the design and synthesis of a new class of hepatitis C drugs. By synthesizing these compounds, he has been able to further optimize new analogues that will be more potent and selective to their targets.

Personal Interests: Watching baseball, playing video games, and binging Netflix.

JENNIFER ANNE WATERS

San Diego State University / University of California San Diego

College of Sciences

Concentration: Biology

Specialization: Cancer Biology

Donor: ARCS Foundation - San Diego Chapter

The way ovarian cancer spreads is heavily influenced by signals from the cells and tissues that surround the tumor, which is collectively referred to as the tumor microenvironment. Jenny is researching how immature fat cells in the tumor microenvironment, called preadipocytes, enhance the ability of ovarian cancer cells to spread and metastasize to the omentum, a fatty tissue that attracts ovarian cancer cells and has the highest tumor burden in patients. She hopes to identify potential drug targets that could reduce the rate of omental metastasis in ovarian cancer.

Personal Interests: Outside of the lab, I enjoy rock climbing, baking, trail running and cuddling with my dog.

Scripps Research

BRETT MICHAEL GARABEDIAN

Scripps Research

Skaggs Graduate School of Chemical and Biological Sciences

Concentration: Molecular Medicine

Specialization: Glycoimmunology

Donor: ARCS Foundation - San Diego Chapter

Brett uses chemistry and protein engineering to empower our immune system against diseases including chronic infection and cancer. His work focuses on the dense layer of sugars (glycans) that populate the cell-cell synapses formed between white blood cells and diseased cells. By tailoring these interactions using chemical biology tools, Brett is developing novel therapies of disease that will advance the field of "glycoimmunology" and broadly benefit patient outcomes in the clinic.

Personal Interests: SciComm, cooking, guitar, gardening, and prospecting for minerals.

NATHALIA ROMANIO GAZANIGA

Scripps Research

Skaggs Graduate School of Chemical and Biological Sciences

Concentration: Biomedical Sciences

Specialization: Immunology

Donor: ARCS Foundation – San Diego

Nathalia utilizes high throughput drug screening methods to identify small molecule immunomodulators in the context of tumors. By being a part of both a chemical biology and an immunology lab, she can screen for small molecules and subsequently work to understand their mechanism in vitro and in vivo. Her project focuses on applying these small molecules to alter the balance of immune cell populations in the tumor microenvironment.

TUCKER RYAN HUFFMAN

Scripps Research

Skaggs Graduate School of Chemical and Biological Sciences

Concentration: Chemistry

Specialization: Organic Synthesis

Donor: Reuben H. Fleet Foundation

Tucker's research is currently focused on the chemical synthesis of a biologically active fungal natural product that has exhibited anticancer activity. Access to this material will allow both investigations into its use as a therapeutic agent and studies into how this molecule kills cancer cells. Because of the complexity of the target molecule, Tucker is exploring new reactions that allow the natural product to be made quickly from much simpler, less expensive starting materials.

SERGIO RODRIGUEZ LABRA

Scripps Research

Skaggs Graduate School of Chemical and Biological Sciences

Concentration: Biomedical Science

Specialization: Translational Neuroscience

Donor: Toby Eisenberg

Alzheimer's disease is the most common form of dementia worldwide and is growing at an alarming rate without a cure. Sergio's research seeks to address a critical need in the field, lacking adequate pre-clinical models. By innovating stem cell-derived human brain organoid-based models to better reproduce the progression of Alzheimer's disease, Sergio's efforts focus on uncovering new disease mechanisms and more reliably testing promising new drugs in development as potential treatments for the disease.

Personal Interests: Volunteer with Cientifico Latino as co-director of a STEM graduate mentorship program for underrepresented minorities.

LUCAS JAMES OXTOBY

Scripps Research

Skaggs Graduate School of Chemical and Biological Sciences

Concentration: Chemistry

Specialization: Organometallics

Donor: Lambert Foundation for Education/ARCS Foundation - San Diego Chapter

Luke's research focuses on the development of a novel organometallic methodology using palladium catalysis, specifically through "transient directing group" strategies. Classical metal-coordinating directing groups have seen extensive use in the field of transition metal-catalyzed chemistry; however, their waste-generating installation and removal steps limit the efficiency and practicality of reactions that rely on their use. Using a transient directing group approach circumvents these issues enabling expedient access to structurally complex scaffolds that are otherwise difficult to prepare, including structures present in natural products, agrochemicals, and pharmaceutical agents.

Personal Interests: Visiting national and state parks with my fiancée.

HAILEE ROSE PERRETT

Scripps Research

Skaggs Graduate School of Chemical and Biological Sciences

Concentration: Biophysics and Structural Biology

Specialization: Structural Virology

Donor: Kurt Benirschke Family

For her research, Hailee uses cutting-edge electron microscopy, computational, and biochemical techniques to investigate viral glycoproteins that facilitate host cell attachment. Her work focuses on developing a more robust understanding of arenaviruses, which include the etiologic agents of various hemorrhagic fevers such as Lassa fever. The latter is endemic in West Africa and is recognized by the World Health Organization as a disease with pandemic potential. By defining these proteins' structures and functions, Hailee aims to contribute to the development of next-generation protein tools, therapeutic strategies, and vaccine candidates.

Personal Interests: Creating science-related digital illustrations and surreal oil paintings, hiking, cooking, writing, and walking my cat.

CAROLINE ROSE STANTON

Scripps Research

Skaggs Graduate School of Chemical and Biological Sciences

Concentration: Biomedical Sciences

Specialization: Chemical Biology

Donor: Karen and Robert Bowden

Caroline's graduate research focuses on understanding the regulation of the NLRP3 inflammasome, a protein complex closely tied to sterile inflammation in numerous diseases including gout, rheumatoid arthritis, multiple sclerosis, and stroke. To accomplish this goal, she has performed a high-throughput screen to identify new compounds which inhibit NLRP3 and is determining the mechanism of action of these compounds to establish new ways by which NLRP3 is regulated. This allows her to identify potential new drug targets to reduce NLRP3 activity and inflammation.

Personal Interests: Classical singing including art songs and opera, walking on the beach, reading, and baking.

NELSON REN WU

Scripps Research

Skaggs Graduate School of Chemical and Biological Sciences

Concentration: Immunology

Specialization: Vaccine Design

Donor: Laurie and Michael Roeder

Malaria is an ancient tropical disease caused by parasites carried by mosquitoes. While insecticide-treated nets and anti-malarial drugs have largely contributed to a decline in malaria cases, increasing drug resistance by malaria parasites necessitates the development of an effective vaccine. The most advanced vaccine for malaria is the RTS,S/AS01 vaccine approved for use in select African countries, but that is only partially effective. Nelson's research seeks to apply computational modeling to design and screen more effective vaccine candidates.

Personal Interests: In my spare time, I like performing Chinese-Yoyo, reading fantasy novels, and playing with my Siamese cat.

LEONARD HEEKYU YOON

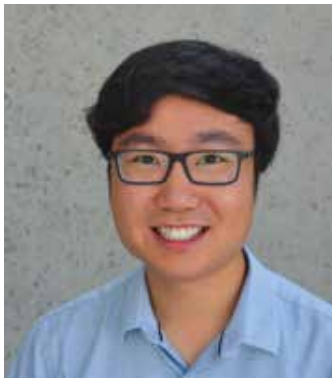
Scripps Research

Skaggs Graduate School of Chemical and Biological Sciences

Concentration: Chemical Biology

Specialization: Molecular Medicine

Donor: Karen and Robert Bowden



In the Kelly lab, Leonard is following up on a high-throughput screen that yielded small molecule autophagy activators. After discovering transcriptional and translational targets of these small molecules using RNA-Seq and MS/MS, he aims to synthesize more potent and selective analogs that can ameliorate neurodegenerative disease phenotypes in mammalian cell models. In the Dawson lab, Leonard is attempting to synthesize a D-space Fyn SH2 superbinder for phosphotyrosine-containing substrates. His goal is to inhibit overactivated signaling pathways found in various cancers using the superbinder, which will be less susceptible to proteolysis in cells.

Personal Interests: I am a clarinetist in the Coastal Communities Concert Band. I play tennis weekly at UCSD.

UC San Diego

ANELA KANANI AKIONA

University of California San Diego

Scripps Institution of Oceanography

Concentration: Marine Biology

Specialization: Coral Reef Ecology

Donor: ARCS Foundation - San Diego Chapter

Anela studies what determines species distribution on coral reefs, which are under threat from climate change. She uses data from scuba surveys to model how emerging interventions might make reef ecosystems in the Maldives, an island nation which relies heavily on coral-related tourism, more resilient as global temperatures rise. Her research seeks to bridge the gap between conservationists, managers, and scientists as the Maldivian government works to build their national coral conservation strategy.

Personal Interests: I enjoy scuba diving, hiking, going to the beach, cooking, buying plants, fostering dogs, and embroidering.

KYLE JAMES ANGLE

University of California San Diego

Division of Physical Sciences

Concentration: Analytical and Atmospheric Chemistry

Specialization: Aerosol Chemistry and Kinetics

Donor: Hervey Family Fund

Kyle studies the chemistry of sea spray aerosols. These aerosols are emitted into the air every time ocean waves break and bubbles burst, but their impact on climate change and human health is poorly understood. Kyle has developed new techniques for measuring their acidity, how quickly they can produce chemicals that lead to cloud formation, and how biological building blocks like amino acids change the climate properties of these aerosols. His research shows aerosols rapidly acidify and accelerate key chemical reactions that impact our lung health and atmospheric water uptake.

Personal Interests: I enjoy cooking, hiking, composing and playing piano pieces, and writing scenarios for tabletop games.

GABRIEL ANTONIO ASCUI-GAC

University of California San Diego

La Jolla Institute for Immunology

Concentration: Biomedical Sciences

Specialization: Immunology

Donor: Legler Benbough Foundation

Lung infections are major killers globally. Pneumonia alone is responsible for the deaths of 11% of children under 5 years old in the world. This make it important to understand how protective immune responses in the lung are generated. Gabriel's research focuses on Innate T cells and their importance for protection against bacterial infections. These innate T cells have rapid and donor-unrestricted responses making them important targets for vaccine development. He is using cutting-edge CRISPR screen technology to better understand the lung immune response and to describe novel mechanisms for protection and cellular interactions which aims to improve current therapeutic interventions.

Personal Interests: I like hiking around the San Diego area, and I also enjoy reading, playing bass guitar and painting.

MIRIAM KATHLEEN BELL

University of California San Diego

Jacobs School of Engineering

Concentration: Mechanical Engineering

Specialization: Computational Neuroscience, Computational Biophysics

Donor: Reuben H. Fleet Foundation

Miriam uses computational and mathematical tools to investigate the biophysics behind various biological phenomena in neurons and other cell lines. Most of her current projects focus on the shape-function relationship of dendritic spines, small protrusions on neurons that are centers of synaptic communication. Dendritic spines are known to have different shapes that are characteristic of aging, disease, and learning. Therefore, studying how these various shapes relate to dendritic spine and neuronal function provides valuable insight into underlying neural principles that can help combat various neurological diseases and conditions.

Personal Interests: Outside of the lab, I enjoy playing soccer, training for triathlons but never doing any, and baking.

ALEC JOSEPH CALAC

University of California San Diego

Herbert Wertheim School of Public Health and Human Longevity Science

Concentration: Medicine and Public Health

Specialization: Global Health

Donor: Lambert Foundation for Education

Alec, a proud descendant from the Pauma Band of Luiseño Indians, works collaboratively with the Global Health Policy and Data Institute on research projects that synthesize public health, global health, social media, and health technology. His research interests are in medical education and workforce development, Tribal public health, vaccine hesitancy and misinformation spread, and social media usage among Native youth. He also works at the state and federal level to identify barriers and facilitators to greater inclusion of Native Americans in medicine and the allied health professions.

Personal Interests: Homemade ice cream, indoor rock climbing, mentoring youth, exploring craft breweries, and checking out new coffee shops.

MINERVA CONTRERAS

University of California San Diego

School of Medicine

Concentration: Cellular and Molecular Biology

Specialization: Neurobiology

Donor: Laverne Briggs Family

The brain can modify its connections in response to experience, this is known as plasticity. During development, the brain's ability to respond to experience by making new connections, strengthening, or eliminating old ones, is high. As one gets older, this ability decreases. This explains why learning a new language is easier when one is young, for example. Minerva studies the mechanisms by which astrocytes, a type of non-neuronal cell, regulate plasticity in response to experience. She also hopes to elucidate therapeutic targets for neurodevelopmental diseases where plasticity alterations are hallmarks.

Personal Interests: Enjoying this beautiful San Diego weather with my wife and dogs, hiking, camping, going to the beach, and snorkeling.

RUBEN DANIEL ELIAS

University of California San Diego

Department of Chemistry and Biochemistry

Concentration: Biophysics

Specialization: Structural Biology

Donor: Paul and Cleo Schimmel/ARCS Foundation - San Diego Chapter

Ruben's work focuses on understanding how disordered proteins are utilized to orchestrate large scale biological events such as cell division and HIV-1 replication. Protein regions without well-defined, three-dimensional structures are often heavily involved in signal transduction pathways which regulate the timing of cellular processes. Viruses such as HIV-1 take advantage of this by using their own disordered domains to hijack cellular machinery. Ruben develops and applies methods to characterize these disordered proteins, providing valuable insight into their biological significance and towards future drug development.

Personal Interests: I am involved in science outreach and enjoy writing music.

SONYA RENEE HAUPT

University of California San Diego

Health Sciences

Concentration: Biomedical Sciences

Specialization: Immunology

Donor: Timkin-Sturgis Foundation/ARCS Foundation - San Diego Chapter

Sonya is researching novel technology to be used in HIV (human immunodeficiency virus) vaccines. She evaluates the immune response in model organisms to project what vaccination strategy will create broadly-neutralizing antibodies in humans. Her first project is developing a helper T cell epitope tag that can work across all human HLA types to boost germinal center education of antibody responses. Her second project is modeling how vaccines benefit from different components administered in each dose to progressively coach cells to evolve better neutralizing antibodies. Although HIV vaccines are not effective yet, she hopes that her contribution may help her see an approved HIV vaccine in our lifetime.

Personal Interests: I enjoy mentally challenging exercise and connecting with others. I have found such with ultimate frisbee and outdoor rock climbing.

JOHN JAEUN HOLOUBEK

University of California San Diego

Jacobs School of Engineering

Concentration: NanoEngineering

Specialization: Electrochemical Energy Storage

Donor: Ellen Browning Scripps Foundation

John's work aims to understand the energetics and dynamics of various ionic processes at the electrolyte/electrode interphase of electrochemical devices. He currently studies these charge-transfer processes in the context of lithium batteries, which typically fail to provide meaningful power output when operated under significant kinetic strain. He is currently engaged in a long-term effort to develop electrolyte design principles for lithium metal batteries at ultra-low temperatures. These findings aim to convert fundamental electrochemistry principles to application-based technological progress, which will have impact beyond batteries.

Personal Interests: In my free time, I enjoy playing basketball, and I am currently learning to surf (with limited success).

NATHANIEL MAX KLEVIT HOPKINS

University of California San Diego

Jacobs School of Engineering

Concentration: Computer Science/Engineering

Specialization: Theoretical Computer Science

Donor: Kathryn Crippen Hattox Endowment

From measurements of the largest galaxies to the smallest proteins, scientists now record more data in a day than they can possibly handle in a lifetime. This has led to a modern-day scientific revolution, where data-hungry machine learning techniques are used to attack age-old problems like protein folding. These applications, however, require data annotated by people, which is prohibitively expensive for applications like computer-assisted medical diagnosis. Max's research focuses on the theory behind how easily-accessible raw data combined with a few enriched annotations can significantly reduce otherwise infeasible labeling costs.

Personal Interests: In my free time I sing acapella and barbershop music, and enjoy pretty much every form of game.

JERVAUGHN DEANTHONY HUNTER

University of California San Diego

Jacobs School of Engineering

Concentration: Bioengineering

Specialization: Tissue Engineering and Regenerative Medicine

Donor: Wally Schirra Memorial Endowment Fund

Jervaughn's research focuses on utilizing injectable therapeutics to treat right ventricular heart failure. After injury, the right ventricle undergoes negative remodeling which can be characterized by cardiac cell death and the healthy tissue being replaced with scar tissue, resulting in heart failure. Currently, there are no treatments on the market that address this remodeling and the only cure would be total organ transplant. By evaluating these therapeutics in pre-clinical models, Jervaughn hopes to demonstrate their efficacy in mitigating this remodeling and ultimately bring these treatments from bench to bedside.

Personal Interests: I love traveling in my spare time. I also enjoy outdoor adventures, movies/video games, and discovering new premium beverages.

PRATIBHA JAGANNATHA

University of California San Diego

Jacobs School of Engineering

Concentration: Bioinformatics

Specialization: RNA Biology

Donor: Virginia Lynch Grady Endowment

The central dogma of biology states that RNA converts information stored as DNA sequences, a process called transcription, into proteins, a process called translation. RNA isoforms result from the same DNA sequences being transcribed into different RNA sequences. RNA isoforms are essential for proper functioning of neurons, highly regulated cells of the nervous system, and help support its unique morphology. Using computational and experimental approaches and third generation sequencing, Pratibha studies the relationship between RNA isoforms and translation in the context of normal cellular processes and disease development in neurons.

Personal Interests: I enjoy singing, dancing, painting, and watching documentaries. I also enjoy participating in outreach and mentoring programs.

ANDREW THOMAS KLEINSCHMIDT

University of California San Diego

Jacobs School of Engineering

Concentration: Chemical Engineering

Specialization: Materials Simulation and Design

Donor: Laura Mateo/Lakeside Foundation

Andrew's research focuses on modeling special types of plastics which can be used for solar cells and other electronic materials. These plastics could be used to create affordable solar cells soft enough to be worn on human skin or hard enough to be embedded into roadways. By modeling these materials, their electronic and mechanical behavior can be predicted before testing, allowing for more rapid technological advances.

Personal Interests: I volunteer with Reality Changers, an afterschool program to tutor at-risk high school students.

DAVID AMBROSE MCBRIDE

University of California San Diego

Jacobs School of Engineering

Concentration: Chemical Engineering

Specialization: Immune Engineering and Biomaterials

Donor: ARCS Foundation - San Diego Chapter

Dave's research focuses on the development of biomaterials to improve outcomes in patients with chronic autoimmune diseases. The current medications for autoimmune diseases are designed to systemically inhibit key inflammatory pathways. However, these approaches don't work in all patients, and may have adverse effects on the patient's ability to fight off infection or cancer due to a suppressed immune system. The biomaterials that Dave develops are designed to rebalance important cell subsets in the body's immune system to prevent autoimmune disease while retaining the ability to fight off infection.

Personal Interests: I spend the majority of my free time training intensively for beach volleyball, but also enjoy backpacking and painting.

COLMAN ARTHUR MOORE

University of California San Diego

Jacobs School of Engineering

Concentration: NanoEngineering

Specialization: Molecular Imaging

Donor: Donald C. and Elizabeth M. Dickinson Foundation

Colman studies the intersection of nanoengineering and biomedical imaging to develop new diagnostic strategies for probing disease. He is currently focused on optical and photoacoustic detection methods for proteases biomarkers. Gingipains are one target, a class of enzymes secreted by certain oral pathogens, with roles in periodontal disease and even Alzheimer's disease. This work is in parallel to ongoing clinical collaborations to validate ultrasound diagnosis of periodontal disease. In the past year, he has also been investigating the feasibility of protease-based COVID-19 diagnostics. Lastly, he recently applied a novel analytical technique for measuring the time-resolved size distributions of aggregating proteins, research with implications for various neurodegenerative disorders.

Personal Interests: Outside of the lab, I enjoy playing tennis, hiking, and collecting records.

CHANNING JOSEPH PREND

University of California San Diego

Scripps Institution of Oceanography

Concentration: Physical Oceanography

Specialization: Air-Sea Interaction

Donor: Toby Eisenberg

Channing studies the exchange of heat and carbon dioxide between the ocean and atmosphere, which regulates the global climate system. He uses measurements from autonomous robotic floats, as well as satellite data and numerical models, to research how ocean circulation contributes to patterns of biological productivity and carbon uptake in the Southern Ocean, which surrounds Antarctica. This region plays an outsized role in the global ocean circulation and carbon cycle, and thus, studying these processes is crucial to improving climate models and future climate projections.

Personal Interests: Science communication and outreach, history and philosophy of science, violin, rowing, swimming, and hiking.

ELEONORA RACHTMAN

University of California San Diego

Jacobs School of Engineering

Concentration: Bioinformatics and Systems Biology

Specialization: Genetics and Phylogenomics

Donor: ARCS Foundation - San Diego Chapter

Eleonora works on the development of computational methods for analysis of large-scale genomic datasets. She focuses on finding efficient ways to derive evolutionary relationships between species to answer questions in areas of biodiversity and ecology. Results of her research can be used for identification of novel or rare species to inform conservation efforts. Eleonora's work can be utilized in tracing bacterial or viral evolution to identify patterns of disease spread and likely sources of transmission. This information is key to finding ways to combat pathogen outbreaks and developing successful vaccines.

SANKARAN RAMANARAYANAN

University of California San Diego

Jacobs School of Engineering

Concentration: Mechanical and Aerospace Engineering

Specialization: Fluid Mechanics

Donor: Beyster Family Foundation

Sankaran is interested in problems involving steady streaming – a distinguishing characteristic of non-harmonically pulsating fluid flows. He is currently applying analytical and numerical methods to investigate the physics of bidirectional squeeze-film levitation: a phenomenon wherein a flexible plate vibrating near a parallel wall can generate repulsive and adhesive forces at different vibration frequencies. Advancing the understanding of steady streaming will allow scientists to better leverage its mechanics in applications ranging from soft-robot locomotion to targeted drug delivery.

Personal Interests: I spend time building and flying model airplanes, and I love listening to percussive music.

SAMANTHA LYLAH SISON

University of California San Diego

School of Medicine

Concentration: Neuroscience

Specialization: Neurobiology

Donor: Dorothy Georgens/ARCS Foundation - San Diego Chapter

Sammi's research project aims to understand the molecular mechanisms underlying Huntington's disease, a progressive neurodegenerative disorder that leads to motor and cognitive problems and eventually death. With a background in stem cell biology and neuroscience, Sammi uses induced pluripotent stem cells from Huntington's disease patients to study the genetic pathways that may be contributing to neurodegeneration in the brain. By using this system, she hopes to identify therapeutic targets for the potential treatment of Huntington's disease patients.

Personal Interests: I spend time building and flying model airplanes, and I love listening to percussive music.

ANGUS BLACKLAW THIES

University of California San Diego

Scripps Institution of Oceanography

Concentration: Marine Biology/Physiology

Specialization: Photosymbiosis

Donor: Carlos and Sharon Arbelaez

Angus studies the physiology of corals, the animals responsible for building coral reef ecosystems. These habitats support thousands of species, provide food for millions of humans, drive global tourism, and protect coastlines from storm damage and erosion. Alarmingly, coral populations are declining rapidly due to climate change not only threatening ecological biodiversity but endangering the food supply and livelihoods of local communities. Angus' research focuses on (1) understanding why coral populations are declining and (2) identifying coral species suitable for conservation and propagation efforts to rebuild degraded coral reef ecosystems.

Personal Interests: I love to rock climb, cook, spearfish, explore national parks, start (and maybe finish) DIY projects, and maintain close friendships.

BRIAN KHA TRAN

University of California San Diego

Department of Mathematics

Concentration: Computational Mathematics

Specialization: Geometric Integration

Donor: ARCS Foundation - San Diego Chapter

Brian investigates computational techniques for applications to problems in mathematical, theoretical, and computational physics. Specifically, he focuses on constructing structure-preserving and geometric discretizations of field theories in physics which provide a means of computationally modeling complex physical phenomena, such as electromagnetism and fluid flow. Such structure-preserving discretizations are characterized by the fact that they preserve, at the discrete and computational level, the geometric structures inherent to the physical phenomena of interest. This allows for robust and faithful modelling with applications throughout science and engineering.

Personal Interests: I enjoy playing the guitar and the piano, I love to surf, and I am an avid gamer.

ALISHA ANISH UKANI

University of California San Diego

Jacobs School of Engineering

Concentration: Computer Science

Specialization: Internet Measurement

Donor: ARCS Foundation - San Diego Chapter

Alisha's research focuses on using Internet traffic data to improve the performance and reliability of critical infrastructure like large-scale data centers, which power vital web services in healthcare and education. She has created a method to identify network outages at Google using network availability data. Alisha plans to build and leverage large-scale measurement systems to make web service infrastructure more reliable and thus better serve the public.

Personal Interests: I enjoy reading fiction, interior design, and spending time with my dog. I also like to cook and play acoustic guitar.

ALICIA ANN VAN ENOO

University of California San Diego

School of Medicine

Concentration: Neuroscience

Specialization: Developmental Neuroscience, Stem Cell Biology

Donor: ARCS Foundation - San Diego Chapter

Alicia's research is aimed at understanding the molecular mechanisms underlying abnormal neurodevelopment in autism spectrum disorders (ASD). She uses patient-derived and CRISPR engineered stem cells to create 3-D cortical organoids, nicknamed "mini brains". By studying how these mini brains develop in a dish, Alicia hopes to gain a better understanding of what goes wrong during fetal brain development in ASD patients. These studies will provide the much-needed groundwork necessary to identify novel therapeutic targets for the potential treatment of ASD.

Personal Interests: In my free time, I enjoy going to the beach, exploring new restaurants, and snowboarding.

ANTHONY QUOC VU

University of California San Diego

School of Medicine

Concentration: Biomedical Sciences

Specialization: Genetics and Genomics

Donor: Hervey Family Fund

Anthony's research focuses on understanding how stress granules may contribute to neurodegenerative diseases. Stress granules are transient clumps of protein and RNA that form inside the cell when exposed to environmental stresses. These assemblies protect molecules from damage and help the cell survive. Importantly, abnormal formation and clearance of stress granules may impact cell survival and are implicated in the pathogenesis of neurodegeneration. Through experimental methods, his goals are to identify components that contribute to stress granule biology and to determine how misregulation of key genes may contribute to disease.

Personal Interests: I enjoy playing tennis, drawing, cycling, rock climbing, working on cars, competing in automotive racing events, and snowboarding.

ALEXANDER JEFFREY WHITEHEAD

University of California San Diego

Jacobs School of Engineering

Concentration: Bioengineering

Specialization: Regenerative Medicine and Tissue Engineering

Donor: Reuben H. Fleet Foundation

Alex studies how the immune system regulates how the heart heals after a heart attack. He also studies how certain animals can regenerate their hearts, and whether we can use similar processes to heal human hearts. He uses large datasets to decipher how protein composition of the heart changes with age and in instances of disease. By combing data-driven approaches and molecular biology techniques, he hopes to identify drug targets to improve outcomes for heart attack patients.

Personal Interests: In my free time, I like to create music, cook, and snowboard in the winter.

JIARONG ZHOU

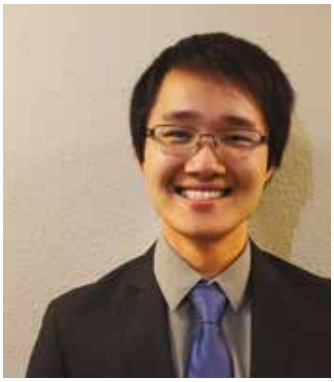
University of California San Diego

Jacobs School of Engineering

Concentration: NanoEngineering

Specialization: Vaccine Development

Donor: Donald C. and Elizabeth M. Dickinson Foundation



Jiarong's research focuses on leveraging tiny particles for the development of vaccines against both infectious diseases and cancer. Vaccines are the safest and most effective means of fighting against infections. By introducing the foreign substances into the immune system in a safe manner, our immune cells can be taught to fight against the pathogens and cancerous cells. Jiarong is currently utilizing cell membrane-coated nanoparticles to create personalized vaccine formulations for individual patients.

Personal Interests: Mentoring and teaching other people, programming, immersing in Japanese culture, cooking delicious food, and learning about innovative technologies.

University of San Diego

PEDRO ALONSO COLIO

University of San Diego

Hahn School of Nursing and Health Science

Concentration: Nursing

Specialization: Cardiology & Emergency Medicine

Donor: Beyster Family Foundation

Pedro's research project is geared towards identifying the incidence and prevalence of cardiac complications among COVID-19 patients in one of the most underserved counties in Southern California. Pedro hopes to identify any particular trends or determinants of health associated with this condition. If any trends are found, they could potentially be used for early screening and management among certain individuals.

Personal Interests: I love mountain biking, skateboarding, swimming, chess, traveling, grilling in the backyard, and playing baseball with my children.

ANN OZAZE LAWANI

University of San Diego

Hahn School of Nursing and Health Science

Concentration: Nursing

Specialization: Cardiopulmonary Nursing and Palliative Care

Donor: Beyster Family Foundation

My research stresses the critical need to include Palliative Care in the nursing curriculum to prepare nurses as better patient advocates at the bedside. Given the increase in our patient population with chronic illnesses, Palliative Care education is paramount for patients, families, physicians and the interdisciplinary team of healthcare workers. Patients with advanced cancer and comorbid chronic illnesses need information about the true nature of the disease and prognosis. This will ensure that the right decisions are being made, as it pertains to quality of life, cultural values and beliefs.

Personal Interests: I enjoy cooking, grilling and putting outfits together in my closet.

PATRICIA JINHAE MAGDALUYO

University of San Diego

Hahn School of Nursing and Health Science

Concentration: Nursing

Specialization: Oncology Patient Experience

Donor: Beyster Family Foundation

Patty's research interest is to understand the lived experience of oncology patients. She is interested in barriers to care and underserved populations. Results of this research will give nurses firsthand knowledge about oncology patients' daily living and functioning. Patty hopes that through this, we will all be better equipped to communicate with the patient about their quality of life. This will give us the foundation to develop interventions that will improve patient outcomes across the care continuum.

NICOLE RENAE MARCY

University of San Diego

Hahn School of Nursing and Health Science

Concentration: Nursing

Specialization: Machine Learning

Donor: Reuben H. Fleet Foundation

In 2019, 51.5 million U.S. adults were living with a mental illness. It is estimated 8 million deaths per year globally are attributed to a mental health condition. It is known that over half of mental health cases go untreated. Research shows that mental health issues are on the rise. There are estimates that mental health issues cost several billions of dollars annually globally. AI in mental health could expand access, reduce costs and save lives. Despite the achievements of AI, there is room for improvement. Nicole will investigate the effectiveness of AI in mobile applications used in mental health diagnosis and treatment.

Personal Interests: Off road rally navigation, overlanding, yoga, meditation, pilates, camping, hiking, reading, art, music, and travel.

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