
ARCS
ADVANCING SCIENCE IN AMERICA®
ACHIEVEMENT REWARDS FOR COLLEGE SCIENTISTS
Scholar Directory
2017 - 2018
SAN DIEGO CHAPTER

Words from University Presidents

"We are extremely grateful to the ARCS Foundation and its members for their partnership and sustained support of our students. Working together, we are developing the researchers and engineers who will lead our country's future scientific and economic development."

Sally Roush, President
San Diego State University

"ARCS does an extraordinary job of funding and promoting science education in our community. By supporting the most talented and innovative students, ARCS helps San Diego lead the charge in inspiring the next generation of scientists who will advance knowledge and improve human health. TSRI is grateful for the ARCS Foundation's long-standing support of the scientific community in San Diego."

Dr. Peter Schultz, President
The Scripps Research Institute

"ARCS Scholar awards provide UC San Diego graduate and doctoral students with vital support for their research in the sciences, engineering and medical fields. We are most grateful to the ARCS Foundation for its partnership in educating our future scientists, educators, innovators and leaders."

Pradeep K. Khosla, Chancellor
University of California, San Diego

"Generous philanthropic support from ARCS in the areas of science and technology fosters innovation and enhances the quality of life for so many individuals and communities. At USD, gifts from ARCS help to empower our most talented and deserving students to become Changemakers as they confront humanity's most urgent challenges. We remain very grateful for the enthusiastic expression of confidence that each ARCS gift represents."

James T. Harris III, D.Ed., President
University of San Diego

Words from our Presidents

In the past few weeks, I have had the opportunity to meet with our Scholars on several occasions. Every time I learn something new and exciting about their research and how it will change the world as we know it. It makes me both proud and humble to know that our local ARCS Foundation chapter plays a role in helping the Scholars fulfill their potential. This academic year the San Diego Chapter is giving welcomed financial and moral support to 58 brilliant Scholars at four institutions: San Diego State University, The Scripps Research Institute, UC San Diego, and the University of San Diego, for a total of $422,500. We feel confident that every penny we invest will pay great dividends for future generations.

This Scholar Directory is a testament to the variety of research that is taking place in the laboratories in our community. Reading it makes us realize that we are contributing to future leaders whose discoveries and innovations will have major impact both nationally and globally.

For me, it is extremely gratifying to be an active member of ARCS Foundation.

Unlike other organizations we may support, ARCS gives us the opportunity to directly interact with the recipients of our support - the Scholars.

What more can we ask!

Helga S. Moore, President, San Diego Chapter
ARCS Foundation, Inc.

The Scholars profiled in this booklet will go on to be the leaders of tomorrow in many fields. As Science and Technology evolve in this millennium, these young people will discover, invent and effect changes to our world that we can only dream about. It is a privilege to support these leaders in their continuing research into areas unknown today that will be part of everyday lives for generations to come. I urge you to read about their research and acquaint yourself with what is ahead. We who are supporters of this organization are enabling the progress of the best and the brightest of this new generation; it is a thrill to consider ourselves a part of their accomplishments.

Mary Lou Quick, Co-President, San Diego Chapter
ARCS Foundation, Inc.

ARCS San Diego Chapter Board of Directors 2017-2018

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ARCS® Scholars 2017-2018

San Diego State University

NAME	DEGREE	AREA OF CONCENTRATION	SPECIALIZATION
John M. Allen	Ph.D.	Cell and Molecular Biology	Stem Cell Biology and Regeneration
Naneh Apkarian-SDSU/UCSD	Ph. D.	Mathematics Education	Undergraduate Mathematics Education
Erik Blackwood-SDSU/UCSD	Ph. D.	Cell and Molecular Biology	Molecular Cardiology
Liwen Deng	Ph. D.	Cellular and Molecular Biology	Microbiology
Sean Maddox	Ph. D.	Chemistry	Organic Catalysis
Paul Maier	Ph. D.	Evolutionary Biology	Genomics of Adaption and Specialization
Brian Maniaci	Ph. D.	Chemistry	Protein Design
Megan Monsanto-SDSU/UCSD	Ph. D.	Cell and Molecular Biology	Cardiac Stem Cell Biology
Megan Morris	Ph. D.	Ecology	Microbial Ecology
Erik Paulson	Ph. D.	Chemistry	Biofuntional Catalysis
Colette Smirniotis	Ph. D.	Statistics	Data Assimilation
Winston Stauffer	Ph. D.	Cell and Molecular Biology	Cardiology
Pedro Torres-SDSU/UCSD	Ph. D.	Cell and Molecular Biology	Microbiome, Bioinformatics
Adriana Trujillo	Ph. D.	Cell and Molecular Biology	Heart Disease
Janet Walker	Ph. D.	Ecology	Marine and Wetland Ecology
Melissa Ward	Ph. D.	Marine Ecology	Ocean Biogeochemistry and Chemical Oceanography
Joi Weeks	Ph. D.	Cell and Molecular Biology	Cancer Immunology
Nicholas Williams	Ph. D.	Chemistry	Materials Chemistry

The Scripps Research Institute

Rigo Cintron-Colon	Ph. D.	Chemical Physiology and Molecular and Cellular Neurosciencee	Physiology of Thermoregulation
Chris Cottrell	Ph. D.	Biomedical Sciences	Structural Immunology
Danielle Grotjahn	Ph. D.	Biomedical Sciences	Cell and Molecular Biology
Margaret (Daisy) Johnson	Ph. D.	Biology	Immunology
Michael Ledbetter	Ph.D.	Biomedical Science	Microbiology, Molecular Biology, Protein Engineering

University of San Diego

Lisa Alvarez	Ph. D.	Nursing Sciences	Cardiology
Deanna Johnston	Ph. D.	Nursing Sciences	Adult Health, Gerontology and Palliative Care
Nichole Martinez	Ph. D.	Nursing Sciences	Emergency Medicine
Allison Perkins	Ph. D.	Nursing Sciences	Adult Medical-Surgical Nursing

UC San Diego

NAME	DEGREE	AREA OF CONCENTRATION	SPECIALIZATION
Molly Allen	Ph. D.	Bioengineering	Genetic Engineering, Synthetic Biology, Cancer Immunotherapy
Alric Althoff	Ph. D.	Computer Science	Hardware Security
Mazar Betash	Ph. D.	Nanoengineering	Computational Materials Science, Solid State Physics
Cody Carpenter	Ph. D.	Nanoengineering	Materials Science
Rachel Diner	Ph. D.	Marine Biology	Marine Microbiology
Jennifer Dumdie	M.D./Ph.D.	Biomedical Science	Reproductive Medicine
Peter Edge	Ph. D.	Bioinformatics	Haplotype and Analysis Methods
Igor Federov	Ph. D.	Electrical Engineering	Machine Learning and Signal Processing
Michael Fox	Ph. D.	Ecology	Ecophysiology
William Greenwald	Ph. D.	Bioinformatcs	Genetics and Genomics
Danielle Hagstrom	Ph. D.	Cellular and Developmental Biology	Developmental Neurotoxicity
Matthew John Kolar	M.D./Ph. D.	Biomedical Sciences	Chemical Biology
Ashley Kroll	Ph. D.	Biomedical Nanotechnology	Cancer Immunotherapy
Aditya Kumar	Ph. D.	Bioengineering	Stem Cells, Heart Disease
David Leon	Ph. D.	Physics	Cosmology
Emily Nardoni	Ph. D.	Physics	High Energy Theory
Perry Winstead Naughton	Ph. D.	Electrical Engineering	Digital Signal Processing, Marine Acoustics
Aimee Raleigh	Ph. D.	Bioengineering	Synovial Joint Transport and Physiology
Robyn Ridley	Ph. D.	Materials Science and Engineering	Nanomaterials Synthesis
Marino Romero	Ph. D.	Mathematics	Algebraic Combinatorics
Samuel Root	Ph. D.	Chemical Engineering	Organic Material Science
Kevin Ross	Ph. D.	Biomedical Science	Genetics
Aleksandra Shirman	Ph. D.	Biophysics	Computational Neuroscience
Dylan Skola	Ph. D.	Bioinformatics	Transcriptional Regulation
Terry Solomon	Ph. D.	Biomedical Science	Genetics and Genomics
Tam T. Tran	Ph. D.	Neuroscience	Cognitive Neuroscience, Cognitive Aging
Daniel Trugman	Ph. D.	Geophysics	Observational Seismology
Jessica Ungerlieder	Ph. D.	Bioengineering	Tissue Engineering and Biomaterials
Adam Weiss	Ph. D.	Mechanical Engineering	Fluid Mechanics and Combustion
Emily Wheeler	Ph. D.	Biomedical Science	Genomics, Bioinformatics, Cancer Biology
Jia Jia Zhang	Ph. D.	Chemical Biology	Molecular Biology, Bacterial Genetics

JOHN ALLEN

San Diego State University
College of Sciences

Degrees:

B.S. in Molecular Biology, Harvey Mudd College, Claremont, CA

Scholar Sponsor:

Reuben H. Fleet Foundation Fund

About the Scholar:

John's research project is focused on understanding cell fate decisions, especially for stem cells. The questions asked are how stem cells are regulated, how is their proliferation controlled, how do they know which cells to become, and how are they involved in regeneration. This involves studying a class of enzymes that modify other proteins by attaching a signaling molecule onto them. This signaling can cause a wide variety of outcomes depending on the context, including regulating genes or causing protein degradation. The goal is to uncover the specific genes and proteins that are regulated by different members of this enzyme class. He has broad interests in epigenetics as they apply to stem cell regulation and regeneration; specifically, studying the deposition of ubiquitin onto histones as a regulator gene activity. Other projects include examining ubiquitin ligase function in regeneration and stem cell regulation in an in vivo model and aiming to uncover downstream targets of the ubiquitin ligases. John enjoys aquarium-keeping, local music shows and home brewing.

Benefits to Society:

Stem cells are critical in the renewal of tissues throughout a lifetime and are implicated in aging disorders. Many of the factors that allow them to proliferate and self-renew are the same factors that become deregulated in cancers. John's lab wants to better understand how these cells are regulated and how these cells can be used to regenerate and renew damaged or lost tissues in adult organisms. The research will lead to a deeper understanding of the epigenetic regulation of stem cells, ubiquitin signaling and provide insights into pathways deregulated in disorders of aging and cancers.

Publications and Posters:

Allen, J. M.; Ross, K. G.; Zayas, R. M. eLS2016, 1–9.

Ho, M. C. W.; Johnsen, H.; Goetz, S. E.; Schiller, B. J.; Bae, E.; Tran, D. A.; Shur, A. S.; Allen, J. M.; Rau, C.; Bender, W.; Fisher, W. W.; Celniker, S. E.; Drewell, R. A. PLoS Genetics2009, 5(11).

Ho, M. C.; Goetz, S. E.; Schiller, B. J.; Allen, J. M.; Drewell, R. A. Fly2008, 2(3), 152–155.

MOLLY ALLEN

University of California, San Diego
Jacobs School of Engineering

Degrees:

M.S. in Bioengineering, University of California, San Diego

B.S. in Bioengineering, University of California, Berkeley

Scholar Sponsor:

Legler Benbough Foundation

About the Scholar:

One promising area in cancer immunotherapy is called chimeric antigen receptor (CAR) T cell therapy. In this approach, a cancer patient's T cells are engineered to express receptors which allow them to recognize a chosen cancer cell surface marker and mount an attack to combat the disease. However, it is rare to find a single unique cancer marker, so these T cells can also end up attacking vital normal tissues. Molly's research project is to engineer T cells to be smarter at targeting localized cancer cells while minimizing off-target collateral damage to normal tissue. Molly loves to cook.

Benefits to Society:

Molly expects that her research will provide a useful tool for improving the safety of cancer immunotherapy by training T cells to better target tumors. Instead of relying on a single marker to target cancer cells, she is engineering a system in which T cells require three distinct inputs before T cell activation occurs. This will greatly increase T cell specificity for cancer cells, which will in turn help avoid off-target damage to normal tissue during (CAR) T cell therapy.

Awards and Honors:

NHLBI Training Grant Award July 2014 - Present

SLAS New Product Award Designation, LabAutomation2011 Conference 2011

Berkeley Bioengineering Co-op Program Internship Awardee June-December 2009

International Genetically Engineered Machine Competition, Finalist 2008

ALRIC ALTHOFF

University of California, San Diego
Jacobs School of Engineering

Degrees:

M.S. in Computer Science, University of California, San Diego

B.S. in Mathematics, University of California, San Diego

B.S. in Cognitive Science, University of California, San Diego

Scholar Sponsor:

Reuben H. Fleet Foundation Fund

About the Scholar:

With cyberattacks focusing on hardware becoming more prevalent, industrial manufactures of computing resources have begun to focus on more countermeasures. Unfortunately, two major questions still exist: how should we apply a reliable "security grade" to existing devices and how do we measure whether or not a device is retaining its security properties? Alric's research focuses on answering specific aspects of these questions. Referring to the first question, he has been investigating resistance of computer processors to side-channel attacks: attacks that obtain secret information with direct access to the data of interest. For the second question, he is determining whether an attack is possible and how easy it might be to perform an attack without knowledge of and execution of the attack itself. Alric is an avid reader. He also plays several musical instruments: the oboe and many woodwinds, including the saxophone and clarinet. Currently, his woodwind interests are the Great Highland Bagpipes, the pennywhistle and the ocarina.

Benefits to Society:

Alric's work will decrease the effort and uncertainty inherent in designing secure computer processors. This will allow the faster deployment of safer hardware and provide clear and reliable differentiation between trustworthy and untrustworthy components. In addition, this work will provide tools for industry to evaluate systems prior to a large-scale commitment to a potentially flawed design. It will also continuously test hardware for attacks or defects, thus providing additional safety to the average user.

Awards and Honors:

National Science Foundation Graduate Research Fellowship, San Diego Fellowship

Publications and Posters:

Althoff, A.; Kastner, R. An Architecture for Learning Stream Distributions with Application to RNG Testing. In Proceedings of the Design Automation Conference 2017

Hu, W.; Althoff, A.; Ardeshiricham, A.; Kastner, R. Towards Property Driven Hardware Security. In Proceedings of the Microprocessor Test and Verifcation Conference 2016

Meng, P.; Althoff, A.; Gautier, Q.; Kastner, R. Adaptive Threshold Non-Pareto Elimination: Re-thinking Machine Learning for System Level Design Space Exploration on FPGAs. Design Automation and Test in Europe 2016

Mao, B.; Hu, W.; Althoff, A.; Matai J.; Oberg J.; Mu, D.; Sherwood T.; Kastner, R. Quantifying Timing-Based Information Flow in Cryptographic Hardware. In Proceedings of the International Conference on Computer-Aided Design 2015

LISA ALVAREZ

University of San Diego
Hahn School of Nursing and Health Science

Degrees:

MSN/FNP, University of San Diego

ADN in Nursing, College of the Albemarle, Elizabeth City, NC

B.A. in Psychology, University of North Carolina, Chapel Hill, NC

Scholar Sponsor:

Beyster Family Foundation Fund IV

About the Scholar:

Lisa wishes to improve collaboration between outpatient and inpatient care providers for heart failure populations. Currently there is a disconnect leading to incomplete discharge instructions and follow-up for these patients. Lisa plans to lead new practice changes to bridge the gap of resources from inpatient to outpatient and increase access care. She wants to develop a heart failure pathway, with evidenced-based practices, and implement standard guidelines for nurse education and discharge instructions. Education and continuity of care will empower patients to take control of this progressive disease and, therefore, decrease 30-day readmission rates. Her research focus continues to be on AFIB monitoring with the implantable LINQ device. Lisa's outside interests include hiking, yoga, running, and her two Italian greyhounds.

Benefits to Society:

Having a cohesive flow to care will provide the community the best options and services for heart failure management. Heart failure is a progressive disease that affects 230 million people, 2% of the population. Furthering science in heart failure will greatly improve morbidity and mortality across all patient populations. Lisa's professional responsibility will be to use the resources that she will learn to change healthcare and disseminate research processes to combine them with current practice.

Awards and Honors:

Cardiac Surgery Clinical Excellence Team Quality Award: Sharp Healthcare 2014

Sharp Guardian Angel Recipient 2015

Sharp CORE Award

Sharp Pillar Award

Jonas Scholar

NANETH APKARIAN

San Diego State University/University of California, San Diego
Joint Doctoral Program and Center for Research in Mathematics and Science Education

Degrees:

M.A. in Mathematics, University of California, San Diego

B.A. in Mathematics, Pomona College, Pomona, CA

Scholar Sponsors:

Virginia Lynch Grady Endowment

About the Scholar:

Naneth's research is in undergraduate mathematics education, in particular the process of change that will shift the mode of instruction at undergraduate institutions toward evidence-based instructional practices. She is currently focused on understanding how departmental culture in teaching norms and social structures can be leveraged to promote sustainable shifts in instruction that support student success in mathematics courses. Her future work will investigate ways to support change agents who work with faculty and administration in Science, Technology, Engineering and Mathematics (STEM) departments across the country to improve students' experiences and increase student success. The goal is to develop guidelines and best practices to support and sustain change initiatives in STEM departments. Naneth has played water polo for nearly 20 years in high school and in college, and she continues to play on a coed masters team in San Diego.

Benefits to Society:

Today's world depends on science and technology, and America is not producing enough STEM majors. Poor experiences in introductory STEM courses contribute to this issue, and efforts to improve these courses using evidence-based practices are not yet sustained or widespread. This work will contribute to the understanding of change in departments of higher education in ways which promise to support the future efforts of change agents to improve undergraduate programs, and increase STEM interest and pursuits among students.

Publications and Posters:

Apkarian, N.; Bowers, J.; O'Sullivan, M. E.; Rasmussen, C. A case study of change in the teaching and learning of precalculus to calculus 2: What we're doing with what we have. PRIMUS: Problems, resources, and issues in mathematics undergraduate studies. (in press).

Apkarian, N.; Kirin, D.; Gehrtz, J.; Vroom, K. Math department concerns: Working to bridge the gap between goals and first steps. MAA FOCUS, February/March 2017, 35-37.

Rasmussen, C.; Apkarian, N.; Hagman, J. E.; Johnson, E.; Larsen, S.; Bressoud, D. Progress through calculus team. Characteristics of precalculus through calculus 2 programs: Insights from a national census survey. Journal of Research in Mathematics Education. (in review)

Apkarian, N.; Rasmussen, R. Mathematics instruction leadership in undergraduate mathematics departments (in preparation).

MAZ BEHTASH

University of California, San Diego
Jacobs School of Engineering

Degrees:

M.S. in Nanoengineering, University of California, San Diego

B.S. in Bioengineering, University of California, Berkeley

Scholar Sponsors:

Lambert Foundation for Education at Union Bank

About the Scholar:

Maz uses computational models to study semiconductors and next-generation solar materials. These materials are made up of many crystals or 'grains,' held together by structures called grain boundaries. As it turns out, the properties of the overall material depend heavily on the properties of these grain boundaries. For example, a polycrystalline metal with weak grain boundaries isn't going to hold up a building very well. Maz's research centers on the electronic and thermodynamic properties of these grain boundaries. In particular, he is trying to understand precisely how the atomic makeup at the grain boundary differs from that inside the grains. Maz enjoys Krav Maga, Muay Thai, weightlifting, and archery.

Benefits to Society:

The expected benefits to society are twofold. First, by deepening general understanding about grain boundaries, his work opens the door for grain boundary engineering. In other words, if it can be determined what causes certain grain boundaries to form, one can better tailor our synthetic processes to minimize or maximize the formation of these boundaries as desired. Second, organohalide perovskite photovoltaics are on the cusp of transforming the solar energy landscape worldwide, yet grain boundaries in these materials remain poorly understood. Maz's work will help to remedy this.

Awards and Honors:

UCSD Nanoengineering Departmental Fellowship, 2013-2014

Graduate Student Association Travel Grant, 2016

Publications and Posters:

Behtash, M.; Joo, P. H.; Nazir, S.; Yang, K. Electronic structures and formation energies of pentavalent-Ion-doped SnO2: First-principles hybrid functional calculations J. Appl. Phys. 2015, 117, 175101

Behtash, M.; Nazir, S.; Wang, Y.; Yang, K. Polarization effects on the interfacial conductivity in LaAlO3/SrTiO3 Heterostructures: A first-principles study Phys. Chem. Chem. Phys. 2016, 18 6831-6838

ERIK BLACKWOOD

Joint Doctoral Program with San Diego State University and University of California, San Diego
Cell and Molecular Biology

Degrees:

B.S. in PreProfessional Studies and Philosophy, University of Notre Dame, South Bend, IN

Scholar Sponsor:

ARCS Foundation/Karen and Bob Bowden

About the Scholar:

In the last year, Erik has identified a small molecule that can enhance adaptive signaling and responses in the heart. It confers protection against cardiac damage during an Acute Myocardial Infarction (AMI) (i.e. heart attack). He has tested the efficacy of this compound in a mouse model of an AMI that mimics one which a human patient experiences in the clinic. This small molecule preserves cardiac function and ameliorates damage after the injury. He is now moving into a larger animal model to test the efficacy of this small molecule as a hopeful druggable target. He is also beginning to test this small molecule in other disease pathologies in mice, specifically protein aggregation based diseases (i.e. Alzheimer's) and forms of pathological cardiac hypertrophy that are a result of chronic hypertension and atherosclerosis. As a secondary approach to treating diseases by enhancing the same adaptive pathway, he has initiated a study to treat pathological cardiac hypertrophy and heart failure using a gene therapy that was derived in his lab. Erik was a scholar-athlete playing football for the University of Notre Dame and continues to watch Notre Dame football. He now participates in competitive bodybuilding and powerlifting.

Benefits to Society:

Ischemic heart disease is the leading cause of human deaths worldwide and is mainly due to acute myocardial infarction (AMI), where coronary artery occlusion causes rapid, irreparable damage to the heart. This increases susceptibility to progressive cardiac degeneration and heart failure. A small molecule that has been identified in this research can enhance the adaptive signaling and responses in the heart. It confers protection against cardiac damage during an AMI. This small molecule may also have beneficial effects in disease models targeting other organ systems.

Awards and Honors:

American Heart Association Predoctoral Fellowship

National Institutes of Health F31 Predoctoral Fellowship

Rees-Stealy Fellowship

Inamori Fellowship

Best Poster Presentation - International Society for Heart Research 2017

Publications and Posters:

Jin, J-K.; Blackwood, E.A.; Azizi, K.; Thuerauf, D.J.; Fahem, A.G.; Hofmann, C.; Doroudgar, S.; Glembotski, C.C. ATF6 Decreases myocardial ischemia/reperfusion damage and links ER stress and oxidative stress signaling pathways in the heart. Circ Res. 2017, 120, 862-875.

Gray, C.B.; Suetomi, T.; Xiang, S.; Blackwood, E.A.; Glembotski, C.C.; Miyamoto, S.; Westenbrink, B.D.; Mishra, S.; Brown, J.H. CaMKII‰ subtypes differentially regulate infarct formation following ex vivo myocardial ischemia/reperfusion through NF-ÎB and TNF-·. J Mol Cell Cardiol. 2017, 103:48-55.

CODY CARPENTER

University of California, San Diego
Jacobs School of Engineering,
Department of Nanoengineering

Degrees:

B.S. in Nanoengineering, University of California, San Diego

M.S. in Nanoengineering, University of California, San Diego

Scholar Sponsor:

Samuel I. and John Henry Fox Foundation

About the Scholar:

Cody studies the intersection of nanoengineering and behavioral psychology using a materials science approach to understand the human sense of touch. His research will allow the development of new materials for novel human-machine interfaces. Human skin is the body's largest sensing organ, and the science surrounding how it is responsible for sensing the physical properties of the material world is relatively young compared to vision and auditory research. The primary objective of Cody's research is to engineer and develop new skin-like materials for wearable devices such as virtual reality gloves. The idea is to create the equivalent "red, green, and blue" pixels found in televisions, but instead for the sense of touch. These touch pixels can be combined to fabricate a device capable of recreating the complex geometry of the human skin. Cody enjoys the surf in the beautiful waters of San Diego.

Benefits to Society:

Combining nanofabrication techniques with behavioral psychology will lead to a better understanding of how we perceive the world around us through the sense of touch. Creating this foundation of knowledge, using a material science approach, new materials will be developed for wearable tactile displays. Applications of wearable tactile displays include: non-invasive neural prosthetics for amputees, wearable rehabilitation devices for patients suffering stroke induced hemiparesis (weakness of one entire side of the body) and wearable devices to better understand neuropathy.

Awards and Honors:

NSF I-Corps Phase I & II von Liebig Center Program (2014)
Chancellor's Interdisciplinary Collaboratories Grant (2017)

Publications and Posters:

Carpenter, C.; Dhong, C.; Root, N.; Rodriquez, D.; Abdo, E.; Skelil, K.; Alkhadra, M.; Ramírez, J.; Ramachandran, V.S.; Lipomi, D.J. How humans sense surface chemistry by touch, (submitted).

Root, S.; Carpenter, C.; Kayser, L.; Rodriquez, D.; Tan, M.; Davies, D.; Meng, S.; Lipomi, D.J. Ionotactile: Ionic hydrogels for tactile stimulation, (submitted).

RIGO CINTRON-COLON

The Scripps Research Institute
Kellogg School of Science and Technology

Degrees:

B.S. in General Natural Science, Universidad del Sagrado Corazon, Puerto Rico

Scholar Sponsor:

Reuben H. Fleet Foundation Fund

About the Scholar:

Rigo's research project aims to investigate the molecular and cellular mechanisms that mediate thermoregulation, specifically in brain regions that have been reported to function as the body's thermostat. Moreover, he aims to elucidate the cellular and biochemical mechanism involved in the integration of temperature and nutrient homeostasis, as they are the main regulators of health, aging and metabolism. In the past year, Rigo's findings describe the absence of a receptor that is important for driving immune response and helps to delay the loss of the dopaminergic neurons brain cell. These brain cells are responsible for coordinating motor activity. The loss of these cells is associated with the onset and progression of Parkinson's Disease (PD). Therefore, this suggests that controlling specific cells in the immune response during chronic stress may contribute to delaying the damage of the dopaminergic neurons cells and potentially delay the onset of PD. Another aspect of his research involves findings that show three of the main factors/interventions of calorie restriction, reduction of the insulin-like growth factor 1 signaling, and lowered core body temperature are components of the same pathway. This information may lead to a way to pharmacologically manipulate components of the insulin-like growth factor 1 pathway to modulate energy expenditure in certain conditions such as obesity and cancer cachexia. In his spare time, Rigo enjoys playing beach volleyball, hiking and running.

Benefits to Society:

Understanding the molecular mechanisms modulating the integration of nutrient and temperature homeostasis is physiologically relevant to energy homeostasis, which is responsible for sustaining life of homeothermic organisms. Reducing calorie intake prolongs lifespan and subsequently, core body temperature decreases upon calorie intake reduction. Thus, the molecules regulating core body temperature to calorie intake reduction are potential targets for age-related diseases. Furthermore, the findings of Rigo's research can have an impact in pointing out novel routes to treat metabolic disorders like obesity, and other syndromes such as cachexia.

Awards and Honors:

Honorable Mention in the 2015 FORD (National Academies) predoctoral fellowship program solicitation.

Academic Excellence Award to the student with the highest GPA of 2014 graduating class from Universidad del Sagrado Corazon.

Publications and Posters:

Cintron-Colon, R.G.; Vega, I.E. Molecular mechanism of Paclitaxel-induced degradation of SCG10: A potential neuropathy biomarker. Presented at Experimental Biology, San Diego, CA, April 26-30, 2014.

Cintron-Colon, R.G.; Vega, I.E. Molecular mechanism of Paclitaxel-induced degradation of SCG10: A potential neuropathy biomarker. Presented at Society for Neuroscience, San Diego, CA, November 9-13, 2013.

Mori, S.; Sugama, S.; Nguyen, W.; Michel, T; Sanna, G.;Sanchez-Alavez, M.; Citron-Colon, R.; Moroncini, G; Kakinuma, Y.; Maher, P.; Conti, B. Lack of interleukin-13 receptor alpha 1 delays the loss of dopaminergic neurons during chronic stress. J Neuroinflammation. 2017, 14, 88.

Citron-Colon, R.; Sanchez-Alaveraz, M.; Nguyen, W.; Mori, S.; Gonzalez-Rivera, R.; Lien, T.; Bartfai, T.; Aid, S.; Francois, J.; Holzenderger, M.; Conti, B. The insulin-like growth factor 1 receptor regulates hypothermia during calorie restriction. Proc Natl Acad Sci USA. 2017, 114, 9731-9736.

CHRIS COTTRELL

The Scripps Research Institute
Kellogg School of Science and Technology

Degrees:

M.S. Biotechnology, Johns Hopkins University, Baltimore, MD

B.S. Chemistry, United States Naval Academy, Annapolis, MD

Scholar Sponsor:

Reuben H. Fleet Foundation Fund

About the Scholar:

Despite over 30 years of effort, an effective HIV vaccine has yet to be developed. In animal models, experimental vaccines are capable of eliciting neutralizing antibodies against the vaccine strain of HIV, but do not produce antibodies capable of neutralizing the diverse strains of HIV circulating in the epidemic. Chris's research seeks to combine high-resolution structural biology information with immunological and bioinformatics data to engineer a series of HIV immunogens designed to broaden the vaccine-induced neutralizing antibody response. In the past year, Chris has solved five high-resolution structures of the HIV envelope proteins bound to vaccine elicited antibodies. He has used these structures to create a series of HIV envelope immounogens engineered to guide the immune system developing neutralizing antibodies. These immunogens will be combined with novel immunization protocols in an effort to elicit antibodies capable of neutralizing multiple strains of HIV. Chris enjoys cooking, kayaking, and hiking.

Benefits to Society:

Despite significant advances in HIV therapy and prevention, in 2015 an estimated 2.1 million individuals were newly infected with HIV worldwide. An effective HIV vaccine is necessary in order to halt the spread of the epidemic. Chris's research is focused on developing new HIV vaccine candidates and evaluating the efficaciousness of these vaccine candidates using animal models. Knowledge gained from these experiments will not only contribute to the development of an HIV vaccine, but will provide insight into the immune system responses to vaccines.

Awards and Honors:

NIH Ruth L. Kirschstein National Research Service Award Individual Predoctoral Fellowship (F31) 2017

Publications and Posters:

Torrents de la Pena, A.; Julien, J.; de Taeye, S.; Garces, F.; Gurrman, M.; Ozorowski, G.; Pritchard, L.; Behrens, A.; Go, E.; Burger, J.; Schermer, E.; Sliepen, K.; Ketas, T.; Pugach, P.; Yasmeen, A.;Cottrell, C.; et. al. Improving the immuno-genicity of native-like HIV-1 envelope trimers by hyper stabilization. Cell Rep 2017, 20 (8), 1805-1817.

Ringe, R.; Ozorowski, G.; Yasmeen, A.; Cupo, A.; Cruz portillo, V.; Pugach, P.; Golabek, M.; Rantalainen, K.; Holden, L; Cottrel, C.; et. al. Improving the expression and purfurtication of soluble, recombinant native-like HIV-1 envelope glyco-protein trimersby targeted sequence changes. J Virol 2017, 91 (12).

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Pauthner, M.; Havenar-Daughton, C.; Sok, D.; Nkolola, J. P.; Bastidas, R.; Boopathy, A. V.; Carnathan, D. G.; Chandras-hekar, A.; Cirelli, K. M.; Cottrell, C. A.; et al. Elicitation of robust tier 2 neutralizing antibody responses in nonhuman primates by HIV envelope trimer immunization using optimized approaches. Immunity 2017, 46 (6), 1073-1088 e6.

Pallesen, J.; Wang, N.; Corbett, K. S.; Wrapp, D.; Kirchdoerfer, R. N.; Turner, H. L.; Cottrell, C. A.; Becker, M. M.; Wang, L.; Shi, W.; Kong, W. P.; Andres, E. L.; Kettenbach, A. N.; Denison, M. R.; Chappell, J. D.; Graham, B. S.; Ward, A. B.; McLellan, J. S., Immunogenicity and structures of a rationally designed prefusion MERS-CoV spike antigen. Proceedings of the National Academy of Sciences of the United States of America 2017, 114 (35), E7348-E7357.

Ozorowski, G.; Pallesen, J.; de Val, N.; Lyumkis, D.; Cottrell, C. A.; Torres, J. L.; Copps, J.; Stan eld, R. L.; Cupo, A.; Pugach, P.; Moore, J. P.; Wilson, I. A.; Ward, A. B. Open and closed structures reveal allostery and pliability in the HIV-1 envelope spike. Nature 2017, 547 (7663), 360-363.

Lee, J. H.; Andrabi, R.; Su, C. Y.; Yasmeen, A.; Julien, J. P.; Kong, L.; Wu, N. C.; McBride, R.; Sok, D.; Pauthner, M.; Cottrell, C. A.; Nieusma, T.; Blattner, C.; Paulson, J. C.; Klasse, P. J.; Wilson, A.; Burton, D. R.; Ward, A. B., A Broadly neutralizing antibody targets the dynamic HIV envelope trimer apex via a long rigidified, and anionic beta-hairpin structure. Immunity 2017, 46 (4), 690-702.

Cottrell, C. A.; Ward, A. B. The 2017 Keystone Symposium on HIV Vaccines. Human Vaccines & Immunotherapeutics 2017.

LIWEN DENG

San Diego State University
Cellular and Molecular Biology

Degrees:

B.S. in Physiology and Neuroscience, University of California, San Diego

Scholar Sponsor:

ARCS Foundation/Hervey Family Non-Endowment Fund

About the Scholar:

Liwen is interested in how the typically commensal bacterium Group B Streptococcus (GBS) is able to cause severe disease in vulnerable populations such as newborns. GBS normally colonizes in the vaginal tract of healthy women asymptomatically and is also the leading cause of neonatal sepsis and meningitis in the US. Since beginning her work in Dr. Doran's lab, Liwen has identified several bacterial factors that may contribute to the transition between asymptomatic colonization to causing invasive disease. This past year Liwen has been writing a manuscript about a cell surface adhesion expressed by the GBS that she has determined is important for disease progression in meningitis. She is also collaborating with a group at Broad Institute and MIT to do RNA-sequencing to discover GBS genes that may be important for host colonization as well as pathogenesis. Personal health and fitness are very important to her, and she practices yoga regularly.

Benefits to Society:

In order to cause disease in newborns, GBS must persist in the mother's vaginal tract by evading maternal immune detection, but after infecting the neonate, GBS must cause an overreaction of the newborn's immune system to cause meningitis. The current treatment strategy consists of universal screening for GBS vaginal carriage during pregnancy and intrapartum antibiotic prophylaxis for all women who are carriers. However, this protocol has not prevented GBS neonatal sepsis and meningitis and there is also concern of emerging patterns of antibiotic resistance in GBS and other organisms present during treatment. Liwen hopes that a better understanding of how GBS interacts with the host immune system to cause disease may lead to the development of more targeted therapeutics to treat GBS infections.

Awards and Honors:

ASM Streptococcal Genetics Student Travel Award

ASM Graduate Student Travel Grant

Southern California ASM Outstanding Graduate Research Award

Publications and Posters:

Ma, F.; Deng L.; Secrest, P.; Shi, L.; Zhao, J.; Gagneux, P. A mouse model for dietary xenosialitis: antibodies to xenoglycan can reduce fertility. J. Biol. Chem. 2016, 291, 18222-18231

Fong, J..J.; Sreedhara, K.; Deng, L.; Varki, N. M.; Angata, T.; Liu, Q.; Nizet, V.; Varki, A. Immunomodulatory activity of Hsp70 mediated via paired receptors Siglec-5 and Siglec-14. EMBO J. 2015, 34, 2775-2788

Gordts, P. L.; Foley, E. M.; Lawrence, R.; Sinha, R.; Lameda-Diaz, C.; Deng, L.; Nock, R.; Glass, C. K.; Er-bilgin, A.; Lusis, A. J.; Witztum, J. L.; Esko, J. D. Reducing macrophage proteoglycan sulfation increases atherosclerosis and obesity through enhanced type I interferon signaling. Cell Metab. 2014, 20, 813-826

Deng, L.; Feng, Y.; Ma, X.; Yao, B.; Siong, Y.; Wu, Y.; Wang, L.; Ma, Q.; Ma, F. Role of selectins and their ligands in the human implantation state. Glycobiology, 2017.

RACHEL DINER

University of California, San Diego
Scripps Institution of Oceanography (SIO)

Degrees:

M.S. in Biology, San Francisco State University, San Francisco, CA

J.D. in Law, University of San Diego

B.S. in Biology, University of Georgia, Athens, GA

Scholar Sponsor:

Reuben H. Fleet Foundation Fund

About the Scholar:

Rachel studies microbial communities in the coastal waters of San Diego. Her main objective is to determine whether there are bacterial species in these waters that can cause harm to humans and in what environmental conditions they thrive. Her research involves using genomic approaches, including next-generation sequencing, to identify these potential pathogens. She then determines what other species naturally occur with them. By examining the pathogens' lifestyle, the potential for human exposure can be better understood. Ultimately, Rachel hopes this research can help inform local water quality policy agencies and protect human health. Rachel enjoys surfing, gardening, and reading.

Benefits to Society:

Bacterial pathogens that live naturally in marine waters cause thousands of illnesses each year in the United States and hundreds of thousands across the world. However, information about the pathogens' presence and whether or not particular species can actually harm humans is lacking in many areas where there may be high potential for exposure. Her research will help provide this information for the San Diego area, a densely populated region with high beach tourism.

Awards and Honors:

UCSD Microbial Sciences Graduate Research Fellowship

SIO Department Graduate Student Excellence Travel Award

Edna Bailey Sussman Foundation Internship

Graduate Student Association Travel Grant

SIO Program for Interdisciplinary Environmental Research Fellowship

Publications and Posters:

Diner, R. E.; Noddings, C. M.; Lian, N. C.; Kang, A. K.; McQuaid, J. B.; Jablanovic, J.; Espinoza, J. L.; Nguyen, N. A.; Anzelmatti, M. A.; Jansson, J.; Bielinski, V. A.; Karas, B. J.; Dupont, C. L.; Allen, A. E.; Weyman, P. D. Proc. Natl. Acad. Sci. 2017, 201700764.

Diner, R. E.; Bielinski, V. A.; Dupont, C.; Allen, A. E.; Weyman, P. D. Front. Bioeng. Biotechnol. 2016, 4 (August), 65.

Diner, R. E.; Schwenck, S. M.; McCrow, J. P.; Zheng, H.; Allen, A. E. Front. Microbiol. 2016, 7 (June), 880.

Karas, B. J.; Diner, R. E.; Lefebvre, S. C.; McQuaid, J.; Phillips, A. P. R.; Noddings, C. M.; Brunson, J. K.; Valas, R. E.; Deerinck, T. J.; Jablanovic, J.; Gillard, J. T. F.; Beeri, K.; Ellisman, M. H.; Glass, J. I.; Hutchison III, C. a.; Smith, H. O.; Venter, J. C.; Allen, A. E.; Dupont, C. L.; Weyman, P. D. Nat. Commun. 2015, 6, 6925.

JENNIFER DUMDIE

University of California, San Diego
Biomedical Sciences Program

Degrees:

B.S. in Mathematics and Biology, University of South Dakota, Vermillion, SD

Scholar Sponsor:

ARCS Foundation

About the Scholar:

Pathways governing early embryo development remain poorly understood, leading to a gap in our knowledge that presents a significant barrier to advances in treating infertility and creating novel stem cell therapies. Most studies on early embryo development investigate the role of transcription, a process leading to the creation of mRNA from the genetic code (DNA). These studies fail to account for the equally important role of mRNA decay, which is the basis of Jennifer's project. The results from this study have the potential to improve our understanding of the molecular basis of embryo quality and treatment options for infertile women.

Benefits to Society:

In the US, about 12% of women have difficulty becoming pregnant or carrying a pregnancy to term. Current infertility treatments are costly and assisted reproductive technology success rates are less than ideal. Many infertility patients are unable to become pregnant due to unknown causes, a phrase said too often by clinicians. A significant barrier to uncovering unknown causes of infertility and advancing fertility medicine is our limited understanding of early embryo development and the role of post-transcriptional regulation in embryogenesis.

Awards and Honors:

NRSA Individual Predoctoral MD/PhD F30 Fellowship, NICHD 2016 – 2019

San Diego Matching Fellowship Graduate Scholarship, UCSD 2015

Publications and Posters:

Dumdie, J. N.*; Ramaiah, M.*; ..., Wilkinson, M.F; Cook-Andersen, H. Global transcriptional silencing and developmental competence in the oocyte mediated by the mRNA degradation activator ZFP36L2. In review at Developmental Cell. * co-first authors

Lou, C.H.; Dumdie, J.; ..., Wilkinson, M. F. NMD Dictates embryonic stem cell fate. Stem cell reports. 2016; 6(6): 844-57.

Shum, E. Y.*; Jones, S.H.*; Shao, A.; Dumdie, J.; ..., Cook-Andersen, H.; Wilkinson, M. F. The antagonistic gene paralogs Upf3a and Upf3b govern nonsense-mediated RNA decay. Cell. 2016; 165(2): 382-95. * co-first authors.

Mora-Castilla, S.; To, C.; Vaezeslami, S.; Morey, R.; Srimeenakshi, S.; Dumdie, J.N.; Cook-Andersen, H.; Jenkins, J.; Laurent, L. Miniaturization technologies for efficient single-cell library preparations and Next-Generation Sequencing. J Lab Autom. 2016.

PETER EDGE

University of California, San Diego
Jacobs School of Engineering

Degrees:

B.S. in Computer Science, University of Minnesota, Twin Cities, College of Science and Engineering, Minneapolis, MN

B.S. in Genetics, Cell Biology & Development, University of Minnesota, Twin Cities, College of Biological Sciences, Minneapolis, MN

Scholar Sponsor:

The Donald C. and Elizabeth M. Dickinson Foundation

About the Scholar:

DNA sequencing has steadily dropped in price such that it is now possible to sequence a human genome for less than $1000. In order to use these data for medical decisions and to detect disease, it is necessary to detect individual specific variants in the raw data. Peter's research involves developing computational methods to detect genetic variation. He has described a new method for assembling haplotypes (sequences of separate maternal/paternal chromosomes) from DNA sequence reads. One problem he has researched is how to use the sequencing data to determine which variants occur on the separate haplotypes. He is especially interested in techniques that generalize well to diverse types of sequencing data. Peter likes to cook, skateboard, and play video games.

Benefits to Society:

Detection of DNA variants and haplotype information from raw sequencing data is important to basic science as well as the field of medicine. Peter's work furthers basic science by allowing biologists to better understand the genetic basis of traits and associate genetic variants to specific phenotypes and diseases. Further, there is increasing effort to use DNA sequencing to achieve "personalized medicine" in the clinic: personalized medical treatments and diagnoses based on the patient's genetic traits.

Awards and Honors:

Honorable Mention, National Science Foundation Graduate Research Fellowship Program (GRFP), 2016

Monica Tsang and James Weatherbee Merit Scholarship, 2013-2014

Publications and Posters:

Chu, W. K.; Edge, P.; Lee, H. S.; Bansal, V.; Bafna, V.; Huang, X.; Zhang, K. Ultra-accurate genome sequencing and haplotyping of single human cells. 2017. Under review.

Edge, P.; Bafna, V.; Bansal, V. HapCUT2: robust and accurate haplo-type assembly for diverse sequencing technologies. Genome Research 2016, 27 (5), 801–812.

Patel, A.; Edge, P.; Selvaraj, S.; Bansal, V.; Bafna, V. InPhaDel: integrative shotgun and proximity-Ligation sequencing to phase deletions with single nucleotide polymorphisms. Nucleic Acids Research 2016, 44 (12).

Sundaram, V.; Cheng, Y.; Ma, Z.; Li, D.; Xing, X.; Edge, P.; Snyder, M. P.; Wang, T. Widespread contribution of transposable elements to the innovation of gene regulatory networks. Genome Research 2014, 24 (12), 1963–1976.

IGOR FEDEROV

University of California, San Diego
Jacobs School of Engineering

Degrees:

M.S. In Electrical Engineering, University of Illinois at Urbana-Champaign, IL

B.S. In Electrical Engineering, University of Illinois at Urbana-Champaign, IL

Scholar Sponsor:

Reuben H. Fleet Foundation Fund

About the Scholar:

Igor's research is centered on applying mathematics and statistics to data in search of patterns. He focuses on developing novel algorithms for processing various types of signals, including audio, video, text, and multi-modal data types. The result of his research is usually an approach for automating a task generally done by humans, such as speech denoising, face recognition, and document classification. Igor loves sports and spending time at the beach, and is interested in travel.

Benefits to Society:

Igor's research seeks to develop a better understanding of how humans extract, process, and fuse information from diverse signals. This understanding allows him to replicate and/or enhance functions performed by the human perceptual system on a computer. By transferring certain computing tasks to computers, his research can be used to aid individuals with disabilities and impairments, to provide assistance to people working in harsh environments, and to enable people to do things they have never been able to do before.

Awards and Honors:

ECE Departmental Fellowship, UCSD

Jules D. Falzer Scholarship, UIUC

Publications and Posters:

Fedorov, I.; Giri, R.; Rao, B.D.; Nguyen, T. Robust bayesian method for simultaneous block sparse signal recovery with applications to face recognition. IEEE Conference On Image Processing, 2016.

Fedorov, I.; Nalci, A.; Giri, R; Rao, B.D.; Nguyen, T.Q.; Garudadri, H. A unified bayesian framework for sparse non-negative matrix factorization. arXiv preprint arXiv:1604.02181. 2016 Apr 7.

Nalci, A.; Fedorov, I.; Rao, B.D. Rectified gaussian scale mixtures and the sparse non-negative least squares problem. arXiv preprint arXiv:1601.06207. 2016 Jan 22.

MICHAEL FOX

University of California, San Diego
Scripps Institute of Oceanography (SIO)

Degrees:

M.S. in Marine Science, Moss Landing Marine Laboratories, California State University, Monterey Bay

B.S. in Marine Science, University of San Diego

Scholar Sponsor:

Becki and Ed Etess

About the Scholar:

Rising ocean temperatures and the increasing frequency of coral bleaching events threatens the persistence of coral reef ecosystems. Mike's research focuses on understanding the relationship between coral health and environmental conditions. He combines work on uninhabited islands in the middle of the Pacific Ocean with experimental work that examines the effects of pollution on coral health. His research seeks to understand how coral responds to food availability at multiple spatial scales and how food availability may promote resilience to future bleaching events. His research links oceanographic patterns at the regional and island scale with the physiological responses of individual corals. By looking at patterns of coral health and their response to thermal stress across a gradient of ocean conditions and local impacts (i.e. pollution), Mike hopes to refine our understanding of the environmental conditions that may facilitate the persistence of reef-building corals in a warming ocean. Michael is an avid succulent grower, gardener and surfer.

Benefits to Society:

The findings from this research are expected to help to determine the placement and design of conservation efforts in coral reef ecosystems. The identification of the environmental conditions that promote the resilience of corals to future bleaching events can provide decision makers with the information needed to protect the reefs that are most important to them and the needs of their communities.

Awards and Honors:

Nancy Foster Scholarship

NOAA Office of National Marine Sanctuaries Graduate Student Excellence Award, Scripps Institution of Oceanography

Lewis and Clark Exploration Grant

American Philosophical Society

John H. Martin Scholarship, Moss Landing Marine Laboratories Outstanding Undergraduate Research Award, University of San Diego

Publications and Posters:

Fox, M.D.; Williams, G.J.; Johnson, M.D.; Kelly, E.L.A.; Radice, V.Z.; Zgliczynski, B.; Rohwer, F.; Sandin, S.A.; Smith, J.E. Trophic strategies of reef-building corals track primary production at local and global scales. In review.

Fox, M.D. Biomass loss reduces growth and resource translocation in giant kelp, Macrocystis pyrifera. Mar. Ecol. Prog. Ser. 2016, 562, 65-77.

Enochs, I.C.; Manzello, D.P.; Donham, E.; Kolodziej, G.; Okano, R.; Johnston, L.; Young, C.; Iguel, J.; Edwards, C.; Fox, M.D.; et. al. Shift from coral to macroalgal dominance on a volcanically acidified reef. Nat. Clim. Change. 2015, 5, 1083-1088.

WILLIAM GREENWALD

University of California, San Diego
Jacobs School of Engineering

Degrees:

B.S. in Computational and Systems Biology, University of California, Los Angeles

Scholar Sponsor:

Dowling and Yahnke

About the Scholar:

Bill's research focuses on integrating math, computer science and biology in order to understand biological systems, such as gene regulation, with the ultimate goal of using this information to improve our understanding of human disease and enable better personalized medicine. He studies how changes in regulatory DNA affect genes that are far away from the change. While these "regulatory variants" have been implicated in changes in human traits and disease, it has been difficult to interrogate their effects as a large amount of information is needed. Bill's research utilizes multiple genomic data types which interrogate different regulatory processes in induced pluripotent stem cells (iPSCs) and iPSC-derived cardiomyocytes. By having multiple types of data across many samples, he hopes to identify genetic variants that alter specific steps in gene regulation and integrate this information to propose mechanisms for functional regulatory variants. Bill spends his free time playing board games and video games, cooking and playing music (the drums and guitar).

Benefits to Society:

Personalized medicine promises to transform how to diagnose and treat disease by taking a person's genetic makeup into account. While millions of genetic variants associated with human traits and diseases through genome-wide association studies (GWAS) have been found, these variants often have regulatory roles. The variants make it difficult to identify the genes they target. Thus, as a key step in implementing personalized medicine, it is important to identify regulatory variants in the human genome and characterize their underlying molecular mechanisms. Bill has worked on a tool suite that expedites and facilitates research into the 3D architecture of the human genome by enabling quick processing and intersection of relevant file types.

Awards and Honors:

UCSD Institute for Engineering in Medicine Fellow

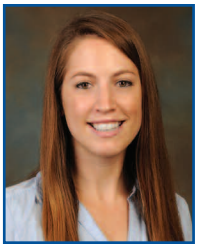
Google Young Scientist Award: Canary Center for Early Cancer Detection

Graduated Highest Departmental Honors: UCLA Computational and Systems Biology AP Scholar with Distinction

Publications and Posters:

Greenwald W.W.; Klitgord N.; Seguritan V.; Yooseph S.; Venter JC.; Garner C.; Nelson KE.; Li. W. Utilization of defined microbial communities enables effective evaluation of meta-genomic assemblies. BMC Bioinformatics. 2017, 18, 296.

Greenwald W.W.; Li H.; Smith E.N.; Benaglio P.; Nariai N.; Frazer K.A. Pgltools: a genomic arithmetic tool suite for manipulation of Hi-C peak and other chromatin interaction data. BMC Bioinformatics. 2017, 18, 2017



DANIELLE GROTJAHN

The Scripps Research Institute
Kellogg School of Science and Technology

Degrees:

B.S in Biology with Honors in Research, B.S in Spanish, University of Wisconsin-Madison, WI

Scholar Sponsor:

Roche/ARCS Foundation

About the Scholar:

Danielle uses one of the world's most powerful electron microscopes to visualize tiny motor proteins that carry out the important function of moving nutrients and signaling molecules to specific destinations within the cell. This transport process is particularly important in neurons, where the efficient transport of these components along elongated processes is essential for neuronal health and function. In the past year Danielle solved the first three-dimensional structure of the molecular motor protein complex dynein-dynactin. Unexpectedly, this structure revealed that each complex contains two dynein motors bound to a single dynactin. For decades it was thought that only a single dynein bound to dynactin, therefore this discovery represents a paradigm shift in the motor protein field. Visualizing the structure of this molecular machine has been a longstanding goal in the dynein scientific community, and this structure helps them further understand how this protein complex functions in cells. Danielle enjoys hiking and camping, as well as yoga.

Benefits to Society:

Increasing evidence suggests that impairments to the intracellular transport machinery contribute to the pathologies associated with many neurodegenerative diseases, including Amyotrophic Lateral Sclerosis (ALS) and Alzheimer's disease. Although able to relieve symptoms of disease, no current therapies can prevent the progressive death of neurons in patients suffering from neuro-degenerative disease. Therefore, these studies of motor protein regulation will build a vital foundation for the development of powerful therapeutics that could eventually liberate society from these devastating diseases.

Awards and Honors:

National Science Foundation (NSF) Graduate Research Fellowship

The Kellogg School for Science and Technology Dean's Fellowship

The Cargill Benevenga Research Fund Scholarship

The College of Agricultural and Life Sciences Undergraduate Scholarship

Publications and Posters:

Grotjahn, D.; Lander, G.C.; Encalada S.E. Ultrastructural characterization of motor protein conformations and regulation. Graduate Student Retreat, The Scripps Research Institute, Lake Arrowhead, CA.; October 2015.

Ge, X.; Grotjahn, D.; Welch, E.; Holguin, C.; Lyman-Gingerich, J.; Dimitrova, E.; Abrams, E.; Marlow, F.; Yabe, T.; Mullins, M.; Pelegri, F. Hecate/Grip2a acts to reorganize the cytoskeleton in the symmetry-breaking event of embryonic axis induction. PLoS Genetics. 2014; 10(6): e1004422 doi:10.1371/journal.pgen.1004422.

Grotjahn, D.; Lander, G.C.; Encalada S.E. Ultrastructural characterization of motor protein conformation and regulation in neurons. Graduate Student Retreat, The Scripps Research Institute, Lake Arrowhead, CA.; October 2014.

Grotjahn, D. A.; Chowdhury, S.; Xu, Y.; McKenney, R. J.; Schroer, T.; Lander, G. Cryo-electron tomography reveals that dynactin recruits a team of dyneins for processive motility. bioRXiv. 2017. (also in submission at Nature Journal) .

DANIELLE HAGSTROM

University of California, San Diego
Division of Biological Sciences

Degrees:

B.S. in Molecular Biology, University of California, San Diego

Scholar Sponsors:

Ellen Browning Scripps Foundation

About the Scholar:

Danielle analyzes how low doses of common pesticides damage the developing brain. The most commonly used pesticides impair an important regulator of neurons controlling movement. However, it is suggested that these abundant pesticides in low doses which do not harm adults may specifically damage the developing infant brain. Danielle uses flatworms, which have remarkable regenerative capabilities, such that after amputation they can regrow a working brain within 1-2 weeks. Using this incredible model system, Danielle is delineating how these chemicals target the developing brain, and their effect on behavior. Danielle and her advisor have started a new program at UCSD for personalized mentoring of women in STEM. Outside of science, she enjoys puzzles and video games.

Benefits to Society:

It has been suggested that the growing prevalence of childhood neurological diseases may be due to the abundance of environmental toxicants, particularly pesticides, that we are exposed to daily. Danielle's work examining how low doses of these chemicals affect the developing brain will help guide the development of more appropriate exposure guidelines and preventative therapies. Particularly, flatworms provide a quicker, cheaper and less ethically challenging alternative to classical mammalian models allowing for rapid preliminary testing to better guide future studies in mammals.

Awards and Honors:

2016 Goeddel Chancellor's Award

NIH Cellular and Molecular Genetics Training Grant Recipient

Publications and Posters:

Hagstrom, D.; Cochet-Escartin, O.; Collins, E.-M.S. Planarian brain regeneration as a model system for developmental neurotoxicology. Regeneration. 2016, 3(2), 65-77.

Hagstrom, D.; Cochet-Escartin, O.; Zhang, S.; Khuu, C.; Collins, E.-M.S. Freshwater planarians as an alternative animal model for neurotoxicology. Toxicol Sci. 2015, 147(1), 270-85.

DAISY JOHNSON

The Scripps Research Institute
Kellogg School of Science and Technology

Degrees:

M.S. in Biomedical Sciences, Texas A&M University, College Station, TX

B.S. in Biological Sciences, Cornell University, Ithaca, NY

Scholar Sponsors:

Webster and Helen Kinnaird/Paul Bechtner Foundation

About the Scholar:

The Havran lab has identified protein interactions that are important for normal wound healing to occur and which are dampened in the tissue surrounding chronic wounds. The goal of Daisy's project is to manipulate these protein interactions for therapeutic benefit. Her team is collaborating with the Finn Lab at GeorgiaTech to contain these proteins in hydrogels with finely tuned release rates (from minutes to months) that will allow treatment over a specific period of time. Using this method of product release, she will evaluate the ability of these proteins to improve wound repair in vitro and in vivo. In the past year Daisy's project has focused on identifying keratinocyte-expressed ligands important for activating gamma delta T-cells following wounding. An RNA-sequence study has been completed and Daisy is moving forward with functional studies on a list of candidate genes to determine if they play a role in gamma delta T-cell activation. Daisy's interests outside of the lab include cross-country skiing, hiking, and riding horses.

Benefits to Society:

Chronic wounds, such as pressure sores in elderly patients and foot ulcers in diabetic patients, are an increasing problem. Currently, treatment options are limited and often involve debridement (removing non-healing tissue from around the edges of the wound). Any therapeutic benefit shown through this project would be potentially useful in treating non-healing wounds. Additionally, the development, with the Finn lab, of a delivery system for treating skin lesions over variable time frames has clinical and scientific applications.

Awards and Honors:

Lechner Scholar, Texas A&M University

Texas A&M College of Veterinary Medicine Graduate Student Research Trainee Award

Publications and Posters:

Steelman, S.M.; Johnson, D.; Wagner, B.; Stokes, A.; Chowdhary, B.P. Cellular and humoral immunity in chronic equine laminitis. Vet. Immunol. Immunopathol. 2013, 153, 217-226.

Rasmann, S.; Johnson, M.D.; Agrawal, A.A. Induced responses to herbivory and jasmonate in three milkweed species. J. Chem. Ecol. 2009, 35, 1326-1334.

DEANNA JOHNSTON

University of San Diego
Hahn School of Nursing and Health Sciences

Degrees:

M.S. in Nursing, San Diego State University, San Diego

B.S. in Nursing, San Jose State University, San Jose

Scholar Sponsor:

The Donald C. and Elizabeth M. Dickinson Foundation

About the Scholar:

Deanna plans to conduct research related to utilizing Palliative Care for chronically ill patients from the Hispanic or Latino patient population. The Hispanic and Latino populations have a cultural view that an illness is not to be talked about, preventing these populations from receiving the best care. Palliative Care has often been mistaken for Hospice or end-of-life care. Now, the emphasis for Palliative Care has reverted back to its roots as a resource for any patient with an incurable, chronic illness. Palliative Care consists of a team of nurses, physicians, social workers, chaplains and other members to ensure that all patients, no matter their disease stage, have the resources available to maintain a good quality of life. Deanna enjoys reading, teaching, traveling, being anywhere near the ocean, sewing and spending as much time as she can with her family.

Benefits to Society:

Deanna's proposed research would greatly improve the health outcomes of the Hispanic and Latino populations as well as decrease the length of stay and readmissions for patients with chronic illnesses. She believes that this research will be translatable to other patient populations and keep more patients out of the hospital. This decrease in hospitalizations will help the Emergency Department care for patients who truly need the emergency care as well as keep patients at home with their families.

Awards and Honors:

Sharp Healthcare - Center of Nursing Excellence Award for designating two Progressive Care Units as specialty units. Data showed that by designating one Progressive Care unit as a Stroke Specialty Unit and the other as a Pre/Post Open Heart Surgery Progressive Care, the care of patients greatly improved and patients stayed in the hospital less time.

Sharp Healthcare - Center of Nursing Excellence Award for obtaining Gold Status for Core Measures in Stroke Care.

MATTHEW KOLAR

University of California, San Diego
Biomedical Sciences, Chemical Biology

Degrees:

B.S. Chemistry, University of North Carolina at Chapel Hill, Chapel Hill, NC

Scholar Sponsor:

Drs. Mara and Larry Ybarrando

About the Scholar:

Matthew's research focuses mainly on the regulation of a novel class of anti-diabetic and anti-inflammatory lipids called Fatty Acid esters of Hydroxy Fatty Acids (FAHFAs). These lipids have been shown to have anti-diabetic and anti-inflammatory effects because they correlate with insulin sensitivity; patients with low levels are more likely to be insulin-resistant. In the laboratory, he is trying to find ways to increase these beneficial lipids in humans. Using mass spectrometry and chemical biology techniques, he has co-discovered three enzymes that regulate these lipids. They are currently studying how modulating these enzymes affects the levels of these beneficial lipids. He is also interested in discovering novel FAHFAs from dietary sources. Many seed oils are known to be rich in beneficial omega fatty acids, and recently he has found out that these seed oils also have a high abundance of novel classes of FAHFAs. Matthew enjoys reading, running, surfing and spending time with his cats.

Benefits to Society:

Currently there is a growing epidemic of obesity, insulin resistance and type 2 diabetes (T2D). Due to major gaps in knowledge of the molecular mechanisms underlying insulin resistance and T2D, there are only a few sustainable prevention strategies and limited effective treatments for these disorders. With the discovery of this novel anti-diabetic lipid, there is hope of finding ways to increase these lipids in humans, as this may provide another therapeutic avenue in combating T2D.

Awards and Honors:

San Diego Fellowship Matching Commitment

Mary K. Chapman Foundation Fellowship

National Institute of Health F30 Award

Publications and Posters:

Nelson, A. T.*; Kolar, M. J.*; Chu, Q.; Syed, I.; Kahn, B. B.; Saghatelian, A.; Siegel, D. Stereochemistry of endogenous palmitic acid ester of 9-hydroxystearic acid and relevance of absolute configuration to regulation. J Am Chem Soc. 2017, 139 (13), 4943-4947. *-co-first authors.

Svensson, R. U.; Parker, S. J.; Eichner, L. J.; Kolar, M. J.; Wallace, M.; Brun, S. N.; Lombardo, P. S.; Van Nostrand, J. L.; Hutchins, A.; Vera, L.; Gerken, L.; Greenwood, J.; Bhat, S.; Harriman, G.; Westlin, W. F.; Harwood, H. J., Jr.; Saghatelian, A.; Kapeller, R.; Metallo, C. M.; Shaw, R. J. Inhibition of acetyl-CoA carboxylase suppresses fatty acid synthesis and tumor growth of non- small-cell lung cancer in preclinical mod-els. Nat Med 2016, 22 (10), 1108-1119.

Kolar, M. J.; Kamat, S. S.; Parsons, W. H.; Homan, E. A.; Maher, T.; Peroni, O. D.; Syed, I.; Fjeld, K.; Molven, A.; Kahn, B. B.; Cravatt, B. F.; Saghatelian, A. Branched fatty acid esters of hydroxy fatty acids are preferred substrates of the MODY8 protein carboxyl ester lipase. Bio-chemistry 2016, 55 (33), 4636-41.

Parsons, W. H.*; Kolar, M. J.*; Kamat, S. S.; Cognetta, A. B., 3rd; Hulce, J. J.; Saez, E.; Kahn, B. B.; Saghatelian, A.; Cravatt, B. F. AIG1 and ADTRP are atypical integral membrane hydrolases that degrade bioactive FAHFAs. Nat Chem Biol 2016, 12 (5), 367-72. *co-first authors.

ASHLEY KROLL

University of California, San Diego
Jacobs School of Engineering

Degrees:

M.S. in Nanoengineering, University of California, San Diego

B.S. in Nanoengineering, University of California, San Diego

Scholar Sponsor:

ARCS Foundation

About the Scholar:

Vaccines train the body to recognize specific proteins, while also stimulating the immune system to destroy cells that display these proteins on their surface. Ashley's project uses nanoparticles that are coated with the membrane of cancer cells as a vaccine. Immune cells are then trained against a variety of cancer-specific surface proteins, leading to the easier identification of cancer cells. These nanoparticles are also loaded with an immune-stimulating substance to highly activate the immune system, creating a more robust anticancer immune response. When she is not in the lab, Ashley enjoys cooking, watching Netflix, and exercising her dog.

Benefits to Society:

Current cancer treatment largely relies on surgery and chemotherapy, both of which can be invasive and cause extreme side effects. Cancer vaccines have the potential to be a more natural strategy, yet there are few clinically relevant formulations due to weak responses. The cancer cell membrane-coated nanoparticle is expected to generate a strong antitumor response due to the variety of authentically retained cancer cell surface proteins, and if successful could be envisioned as a clinical trial candidate.

Awards and Honors:

National Science Foundation (NSF) Graduate Research Fellowship 2016-present

National Institute of Health (NIH) T32 Training Grant 2015-2016

UCSD Nanoengineering Departmental Fellowship 2014-2015

Phi Beta Kappa 2014

Publications and Posters:

Wang, F.; Fang, R.H.; Luk, B.T.; Hu, C-M. J.; Thamphiwatana, S.; Dehaini, D.; Angsantikul, P.; Kroll, A.V.; Pang, Z.; Gao, W.; Lu, W.; Zhang, L. Nanoparticle-based anti-virulence vaccine for the management of methicillin-resistant Staphylococcus aureus skin infection. Advanced Functional Materials. 2016, 26, 1628-1635.

Fang, R.H.; Kroll, A.V.; Zhang, L. Nanoparticle-based manipulation of antigen-presenting cells for cancer immunotherapy. Small. 2015. 11, 5483-5496.

Hu, C-M.; Fang, R.H.; Wang, K-C.; Luk, B.T.; Thamphiwatana, S.; Dehaini, D.; Nguyen, P.; Angsantikul, P.; Wen, C.H.; Kroll, A.V.; Carpenter, C.; Ramesh, M.; Qu, V.; Patel, S.H.; Zhu, J.; Shi, W.; Hofman, F.M.; Chen, T.C.; Gao, W.; Zhang, K.; Chien, S.; Zhang, L. Nanoparticle biointerfacing by human platelet membrane cloaking. Nature. 2015, 526, 118-121.

ADITYA KUMAR

University of California, San Diego
Jacobs School of Engineering

Degrees:

B.S. in Bioengineering, Rice University, Houston, TX

Scholar Sponsors:

Roche/ARCS Foundation Scholar Award

About the Scholar:

Aditya is working on the development of a novel "disease-in-a-dish" niche which mirrors the dynamic extracellular changes that occur during myocardial infarction (MI). This niche will be used to identify novel pathways that could result in potential therapeutic solutions for the treatment and prevention of MI. In addition, Aditya is culturing patient-specific induced pluripotent stem cell-derived cardiomyocytes on this niche to better assess potential genetic susceptibility toward MI. Outside of lab, Aditya enjoys exercising and playing basketball.

Benefits to Society:

Myocardial infarction represents the leading cause of death in the United States. Therapeutic treatments are limited due to the inability to replicate the environmental changes associated with MI progression, namely the dynamic increase in stiffness of the infarcted tissue compared to the surrounding healthy tissue. The development of this novel biological substrate, coupled with stem cell-derived cardiomyocytes, allows for better understanding of altered cellular behavior in response to MI progression in addition to providing a platform for drug testing.

Awards and Honors:

National Science Foundation Graduate Research Fellowship

Distinction in Research and Creative Works, Rice University

Publications and Posters:

Wiltz, D. W.; Han, R. I.; Wilson, R. L.; Kumar, A.; Morrisett, J. D.; Grande-Allen, K. J. Differential aortic and mitral valve interstitial cell mineralization and the induction of mineralization by lysophosphatidylcholine in vitro. Cardiovasc. Eng. Technol. 2014, 5(4), 371-383.

Kumar, A.; Wiltz, D. W.; Grande-Allen, K. J. Gentamicin reduces calcific nodule formation by aortic valve interstitial cells in vitro. Cardiovasc. Eng. Technol. 2013, 4(1), 16-25.

Kumar, A.; Wiltz, D. W.; Grande-Allen, K. J. In vitro Modeling of the Effect of Gentamicin on Aortic Valve Interstitial Cell Calcification. Tissue Engineering & Regenerative Medicine International Society Conference, Houston, TX. December 12, 2011.

MICHAEL LEDBETTER

The Scripps Research Institute
Kellogg School of Science and Technology

Degrees:

B.S. in Biochemistry, University of Texas, Austin, TX

Scholar Sponsor:

ARCS Foundation

About the Scholar:

Recently, the Romesberg group reported replication of an unnatural base pair in a living bacterial cell (E. coli). However, the pair was lost from cells in all but the most controlled settings. Michael aims to improve maintenance of the unnatural base pair through manipulation of E. coli's native DNA repair pathways that normally maintain genomic integrity in the face of DNA-damaging agents. Additionally, cells currently lack the molecular machinery required for retrieving the chemical information provided by the unnatural base pair. In the past year his work has culminated in the successful construction of E. coli strains with improved unnatural basepairs replication and the discovery of novel functions of repair machinery. Michael is now moving forward to construct translation machinery necessary to capitalize on the novel information provided by the introduction of unnatural base pairs to living cells. He aims to use directed evolution to develop the machinery that will translate the pair into functional biomolecules.

Benefits to Society:

Currently used biologics (insulin, antibodies, etc.) have already revolutionized medicine, but are limited to natural chemical building blocks. The creation of an organism that stably maintains and retrieves the chemical information provided by the unnatural base pair would generate a platform technology for the production of next-generation biologics. Michael's group hopes to assign the novel coding space in our six-letter genetic alphabet to unnatural chemical building blocks, and, in turn, produce biologics with unnatural chemistries that improve their medicinal properties.

Awards and Honors:

National Science Foundation Graduate Research Fellowship (TSRI); June 2015

Dean's Honored Graduate (UT Austin)

Dr. Norman Hackerman Prize for Research in Chemistry (UT Austin): 2013

Fortigo, Inc. Award for Excellence in Computational Biology, Biochemistry or Chemistry Research (UT Austin): 2013

University Honors List (UT Austin): 2011-2013

Publications and Posters:

Ledbetter, M.P.; Hwang, T.W.; Stovall, G.M.; Ellington, A.D. Continuous in vitro evolution of a ribozyme ligase: a model experiment for the evolution of a biomolecule. Biochemistry and Molecular Biology Education. 2013, 41, 433-442.

Ledbetter, M.P.; Hwang, T.W.; Stovall, G.M.; Ellington, A.D. 6th International Meeting on Synthetic Biology, London, UK, July 9-11, 2013; BioBricks Foundation: San Francisco, CA.

Ledbetter, M.P.; Hwang, T.W.; Stovall, G.M.; Ellington, A.D. Proceedings of the Thirteenth International Conference on the Simulation and Synthesis of Living Systems, 13th International Conference on the Simulation and Synthesis of Living Systems, East Lansing, MI, July 19-22, 2012; The MIT Press: Cambridge, MA, 2012.

Feldman, A.; Ledbetter, M.; Zhang, Y.; Romesberg, F. E. Reply To Hettinger: hydrophobic unnatural base pairs and the expansion of the genetic alphabet. PNAS. 2017, 114:32, E6478-E6479.

DAVID LEON

University of California, San Diego
Center for Astrophysics and Space Sciences

Degrees:

M.S. in Physics, University of California, San Diego

B.S. in Physics, California Institute of Technology, Pasadena

Scholar Sponsor:

Virginia Lynch Grady Endowment

About the Scholar:

David's research group is part of the POLARBEAR collaboration. It studies the Cosmic Microwave Background, which is light from the early universe that was first emitted when the universe cooled enough to form Hydrogen atoms. This light travels through the universe, mostly unperturbed, until detected in the present day by a telescope in the Atacama Desert in Chile. David is currently analyzing polarization data from the first two years of observations to determine the amount of gravitational lensing that this light has experienced as it passed through space to reach us. David enjoys writing fiction/poetry, archery, badminton, and travel.

Benefits to Society:

Researching the Cosmic Microwave Background is a promising area for insights into fundamental physics. Analysis of gravitational lensing using next-gen instruments could determine the neutrino mass hierarchy, a longstanding problem in fundamental particle physics. Detection of B-mode polarization would be a smoking gun for inflation, the leading theory of physics right after the big bang; not even the LHC (Large Hadron Collider) can probe energies at this scale. Finally, detection of polarization rotation could provide clues on exotic Lorentz violating physics.

Awards and Honors:

Caltech President's Scholarship

UCSD Physics Excellence Award

Attended OSG User School at UW-Madison

SEAN MADDOX

San Diego State University
College of Sciences

Degrees:

B.S. in Chemistry, University of California, Davis

Scholar Sponsor:

ARCS Foundation/Dottie Georgens

About the Scholar:

Sean's research aims to discover new transformations in organic chemistry that can be used to aid in the discovery of potent drugs for the treatment of disease. He is currently studying different methods of inserting chlorine atoms into drug scaffolds. The addition of chlorine into these small molecules can have a large effect on the molecule's structure as well as its electronic properties. This transformation also is used to structurally rigidify promiscuous small molecule drugs to increase their potency and possibly decrease unwanted side effects. During the past year, Sean has developed new methodologies toward the synthesis of well-defined, drug-like atropisomers. When not in the lab, Sean enjoys golf.

Benefits to Society:

Sean's research is fundamentally entrenched in the field of drug design. The discoveries from his lab show promise toward the design of more selective kinase inhibitors, which are not very selective toward their respective targets, many often inhibiting 30 or more kinases. Being one of the first to utilize Lewis base catalyzed chlorination, Sean aims to thoroughly study the mechanistic principles of this catalysis to allow this chemistry to be easily implemented into any research laboratory.

Publications and Posters:

Maddox, S. M.; Nalbandian, C. J.; Smith, D. E.; Gustafson, J. L. A practical Lewis base catalyzed electrophilic chlorination of arenes and heterocycles. Org. Lett. 2015, 17, 1042.

Luca, O. R.; Gustafson, J. L.; Maddox, S. M.; Fenwick, A. Q.; Smith, D. C. Catalysis by electrons and holes: formal potential scales and preparative organic electrochemistry. Org. Chem. Front. 2015, 2, 823.

Maddox, S.; Dinh, A.; Armenia, F;Um, J.; Gustafson, J. The catalyst-controlled regiodivergent chlorination of phenols. Org. Let., 2016, 5476-5479.

PAUL MAIER

San Diego State University
Joint Doctoral Program in Evolutionary Biology, College of Sciences

Degrees:

B.S. in Ecology, Evolution, and Aquatic Biology, University of California, Santa Barbara

Scholar Sponsor:

Thomas C. Ackerman Foundation

About the Scholar:

The overarching goal of Paul's dissertation research is to understand the interfacing roles of migration, adaptation, and plasticity in shaping the persistence of natural populations. Specifically, he is interested in developing novel network analytical tools to model the evolution of amphibians across isolated alpine meadows. His research objectives include two themes: First, he will apply these tools in a conservation genomic framework to inform the recovery of federally threatened Yosemite toads; secondly, he will elucidate the consequences of hybridization between distantly related Yosemite toad lineages. In the past three semesters, Paul has added to the understanding of the toad's evolutionary history and predicting the fate of this species. The Yosemite toad persists in extremely low abundances because of its breeding habitat and external threats (climate change and fungal disease). Therefore, the entire species is at risk of extinction from depauperate genetic diversity. He is now using next-generation sequencing technology to discover that lineages of toads have been isolated for hundreds of thousands of years. Breeding between these lineages has the potential to catalyze adaption in the wild. With further support, this discovery would signal an important shift in how we think about mitigating species declines from climate change. Paul enjoys endurance sports, mountaineering, aviation, drumming, herpetology, macro-photography, and martial arts.

Benefits to Society:

Landscape genetics is the study of environmentally mediated evolution, including connectivity, population persistence, local adaptation, and genetic rescue. Paul's research will bear on the evolutionary history and future of the Yosemite Toad (Anaxyrus canorus), and his results will have significant utility for prioritizing the future management and conservation of this iconic California native. Additionally, our understanding of how ecological specialists evolve will help prioritize translocations, assisted migration, and captive breeding programs for many species worldwide.

Awards and Honors:

Jordan D. Covin Memorial Scholarship
Harold & June Grant Memorial Scholarship
USGS Conservation Genetics Assistantship
Eugene Cota-Robles Fellowship
Honor Society of Phi Kappa Phi

Publications and Posters:

Maier, P.; Ostoja S.; Vandergast A.; Aguilar A.; Bohonak A. A novel genetic network model predicts range shifts in response to climate change for Yosemite toads (Anaxyrus [Bufo] canorus). Mol Ecol. 2015, in prep.

Ostoja S.; Matchett, J.; McKenny, H.; Brooks, M.; Berlow, E.; Knapp, R.; Maier, P.; Danielle, N. Yosemite toad (Anaxyrus [Bufo] canorus) breeding occupancy of meadows in Yosemite and Kings Canyon National Parks, California. Herp. Con. Bio. 2015, in prep.

Klinger, R.; Cleaver, M.; Anderson, S.; Maier, P.; Clark, J. Implications of scale-independent habitat specialization on persistence of a rare small mammal. Global Ecol Con. 2015, 3, 100-114.

Rosso, A.; Maier, P.; Ostoja, S.; Aguilar, A. Conservation genetics of Yosemite toads in Sequoia Kings National Park, UC Merced, Merced, CA

Maier, P.; Bohonak, A. Historical isolation and future adaptation of an endemic toad. Southwest Herpfest 2017, Riverside, CA, February 25, 2017.

BRIAN MANIACI

San Diego State University,
College of Sciences Chemistry

Degrees:

B.S. in Biochemistry, California Polytechnic State University, San Luis Obispo

Scholar Sponsor:

Reuben H. Fleet Foundation Fund

About the Scholar:

Currently, Brian's research entails the de novo (from scratch) design of protein/protein interfaces by re-engineering (mutating) previously monomeric proteins to bind one another and form protein complexes with high affinity and specificity. The approach addresses two major concerns of protein/protein design: weak binding and non-specific interactions. To achieve these goals, Brian and his coworkers have engineered novel metal binding sites at the newly created protein interface. This approach addresses two major concerns of protein/protein design: weak binding and non-specific interactions. It is hoped that this will impart design elements from naturally occurring protein/protein to a further drive molecular recognition and self-assembly in a defined and controlled manner. This increased knowledge of design and prediction interactions will potentially improve the discovery and design of new therapeutics. Brian enjoys hosting dinner parties for friends and family with games afterward.

Benefits to Society:

In the near future Brian plans to use these protein design methodologies to target proteins associated with human disease in a manner that is analogous to the immune system's antibody/antigen response mechanism. For example, he intends to target diseases that are caused by aberrant protein aggregation such as Parkinson's and Alzheimer's. The ability to design proteins that bind other proteins with high affinity will lead to effective protein-based drugs for these two devastating diseases.

Awards and Honors:

Arne N. Wick Predoctoral Research Fellowship

Publications and Posters:

Yomogida, K.; Chou, Y.; Pang, J.; Baravati, B.; Maniaci, B.; Wu, S.; Zhu Y.; Chu, CQ. Streptavidin supresses T-cell activation and inhibits IL-2 production and CD25 expression. Cytokine. 2012, 58, 431-436.

Yomogida, K.; Wu, S.; Baravati, B.; Avendano, C.; Caldwell, T.; Maniaci, B; Chu, CQ. Cell penetrating re-combinant Foxp3 protein enhances Treg function and ameliorates arthritis. Biochemical and biophysical research communications. 2013, 434(2), 263-267.

NICOLE MARTINEZ

University of San Diego
Hahn School of Nursing and Health Science

Degrees:

M.S. in Nursing/FNP, Western University of Health Sciences, Pomona, CA

B.S. in Biology, University of California, Los Angeles

Scholar Sponsor:

Beyster Family Fund IV

About the Scholar:

Nicole is currently representing all emergency nurse practitioners as the Western Regional Director for the American Academy of Emergency Nurse Practitioners. Her planned research is to address the growing epidemic of individuals who utilize the emergency department as a primary care institution for various needs, including chronic disease and pain management. Society has had a convoluted understanding of emergency care that has been heavily influenced by cultural views, generational perspectives, financial constraints and limitations to access. Education provides patients with the power to change and improve overall health and well-being. After assessing patient's health literacy and limitations to emergency services, her plan is to lead new practice changes through detailed discharge instructions and follow-up. Nicole has three small children and participates in yoga, pilates, hiking, and healthy eating. She also loves to read.

Benefits to Society:

Nicole's proposed research will greatly improve the overall structure and follow-up to healthcare. She also hopes to help to resolve the bottleneck that has been created in emergency departments across the nation. She believes that establishing an effective protocol for discharge planning that empowers the patients with education can be translated across generations and cultures. The decrease in unnecessary emergency room visits is reflective of improved patient health literacy.

Awards and Honors:

National Dean's List (2005-2008)

Class of 2008 Award

Hispanic Scholarship Federation Scholar (2000-2004)

Publications and Posters:

Gadler, T.; Gardiner, A.; Martinez, N. Caring for the post operative patient with complications presenting to the emergency department. Advanced Emergency Nursing Journal. 2014, 36, 134-144.

Gadler, T.; Keedy, M.; Rivas-Martinez, N. The case of hematuria. Advanced Emergency Nursing Journal. 2010, 32, 30-41.

MEGAN MONSANTO

Joint Doctoral Program at San Diego State University and University of California, San Diego
Cell and Molecular Biology Program

Degrees:

B.S. in Genetics, Clemson University, Clemson, SC

Scholar Sponsor:

Hervey Family Non-Endowment Fund

About the Scholar:

Megan joined Dr. Mark Sussman's research laboratory where work focuses on cardiac stem cells in hope of treating patients with heart disease. Her graduate project involves isolating novel stem cells from the human heart with the idea of combining these distinct stem cells in a defined manner to construct a three-dimensional structure that has been termed a "CardioCluster." The belief is that by rationally creating a structure that incorporates the potential provided by each of these stem cells, CardioClusters will improve regeneration of damaged heart tissue above and beyond anything currently seen in the cardiac field. Megan loves to be in the outdoors: hiking, fishing, snorkeling, and spending time with her dog. She also enjoys woodcarving as well as drawing and painting.

Benefits to Society:

Current limitations with cardiac stem cell therapy include poor engraftment and low survival rates, leading to loss of cell-to-cell communication. Megan's graduate project addresses these challenges by creating what are termed CardioClusters. By combining three diverse stem cell populations to create a CardioCluster, the overall structure is larger and allows for direct cell contact. The hope is that CardioClusters will enhance cellular communication and regenerative capacity compared to current single, stem cell-based therapies.

Awards and Honors:

NIH-R01 Co-investigator "Enhanced Myocardial Repair with CardioClusters and CardioChimeras"

AHA Cardiovascular Disease Student Scholarship

Gordon Conference Best Graduate Student Poster Award

CSUPERB Travel Award

ISHR-NAS Travel Award Recipient, Buenos Aires, Argentina

Elliott Family Fund Scholarship, San Diego State University

Biology Department Outstanding Graduate Teaching Assistant

Publications and Posters:

Monsanto, M.; Sussman, M. Myocardial infarct scar: hunting down the responsible cells, but then what? J Am Coll Cardiol. 2015, 65(19):2067-2069.

Samse, K.; Emathinger, J.; Hariharan, N.; Quijada, P.; Völkers, M.; Ormachea, L.; De La Torre, A.; Alvarez, R.; Din, S.; Mohsin, S.; Monsanto, M.; Fischer, K.M.; Dembitsky, W.P.; Sussman, M.A. Functional effect of Pim1 depends upon intracellular localization in human cardiac progenitor cells. J Biol Chem. 2015, 290(22):13935-47.

Hariharan, N.; Quijada, P.; Mohsin, S.; Joyo, A.Y.; Samse, K.M.; Monsanto, M.; De LaTorre, A.; Avitabile, D.; Ormachea, L.; McGregor, M.J.; Tsai, E.; Sussman, M.A. Nucleostemin rejuvenates cardiac progenitor cells and antagonizes myocardial aging. J Am Coll Cardiol. 2015, 65(2):133-47.

Mohsin, S.; Khan, M.; Nguyen, J.; Alkatib, M.; Siddiqi, S.; Hariharan, N.; Wallach, K.; Monsanto, M.; Gude, N.A.; Dembitsky, W.P.; Sussman, M.A. Rejuvenation of human cardiac progenitor cells with Pim-1 kinase. Circ Res. 2013, 113(10):1169-79.

Monsanto, M.; White, K.; Kim, T.; Wang, B.; Fisher, K.; Ilves, K. Kahalafalla, F.; Casillas, A.; Broughton, K.; Mohsin, S.; Dembitsky, W.; Sussman, M. Circ Res. 2017, 121 (2), 113-124.

MEGAN MORRIS

San Diego State University
Ecology, Microbial Ecology

Degrees:

B.S. in Biology, San Diego State University

Scholar Sponsor:

The Heller Foundation of San Diego

About the Scholar:

Megan's research primarily focuses on microbial ecology and how microbes (bacteria) influence the health of the environment and other macro-organisms. The majority of her research thus far has investigated the microbes associated with southern California kelp forests and how microbes have the potential to influence survival of kelp. Over the past year she has started a microbial ecology study in a new system, looking at how microbes may influence plant-pollinator relationships. Her research uses DNA sequencing and metagenomic analysis of microbial communities across the different ecosystems, including kelp forests, coral reefs, rhodolith beds, and oral nectar. Megan enjoys spending time outdoors hiking and doing creative projects such as cooking, baking, and sewing.

Benefits to Society:

Microbes are the most abundant living organisms in the environment, but they are often overlooked or undescribed in ecological surveys. Megan's research is contributing towards the understanding of these microscopic organisms across multiple environments, and the influence that they may have. Sequencing the genetic material of environmental microbial communities will describe their capabilities in great detail. This information will then be uploaded to publically available databases for other researchers to utilize or reference.

Awards and Honors:

CSUPERB Graduate Student Travel Grant

SDSU Student Research Symposium President's Award

Inamori Fellowship

Harold and June Grant Memorial Fund

COAST Graduate Student Research Award

Publications and Posters:

Morris, M. M.; Haggerty, J. M.; Papudeshi, B. N.; Vega, A. A.; Edwards, M. S.; Dinsdale, E. A. Nearshore pelagic microbial community abundance affects recruitment success of giant kelp, Macrocystis pyrifera. Frontiers in Microbiology. 2016, 7.

Walsh, K.; Haggerty, J. M.; Doane, M.; Hansen, J.; Morris, M.; Moreira, A. M.; de Oliveira, L.; Leomil, L.; Garcia, G.; Thompson, F. L.; Dinsdale, E. A. Aura-biomes are present in the water layer above coral reef benthic macro-organisms. PeerJ. 2017.

EMILY NARDONI

University of California, San Diego
Department of Physics

Degrees:

B.S. in Physics, Massachusetts Institute of Technology, Cambridge, MA

Scholar Sponsor:

Carlos and Sharon Arbelaez

About the Scholar:

Emily is interested in studying the mathematical structure of the most fundamental theories of nature--theories of particle physics. To this end, she studies the framework of quantum field theory, which is one of the most accurate in modern physics and best describes particle physics. There are still many conceptual gaps in our understanding of quantum field theory which she hopes her research can help close. By trying to understand the language in which physical theories are written, she hopes to gain a better understanding of particle physics itself. Emily enjoys cooking, making espresso, running, and watching movies.

Benefits to Society:

The framework of quantum field theory encompasses the mathematical structure of particle physics, condensed matter systems, and the physics of the early universe, accurately describing experiments in all contexts. Because it is such a broad and fundamental framework in modern physics, it is important that we better understand what it can and cannot teach us, and search for new ways to ask questions in physics whose answers are not limited by the current framework. Already, progress toward new and more efficient ways of thinking about quantum field theory has led to new insights across several disciplines in physics.

Awards and Honors:

UC San Diego Dept. of Chemistry and Biochemistry Distinguished Graduate Student Award, Spring 2016

Disney Scholars award, provided by Walt Disney Co. Foundation

Publications and Posters:

Nardoni, E. M.; Intriligator, K. I. Deformations of W_{A,D,E} SCFTs

PERRY NAUGHTON

University of California, San Diego
Jacobs School of Engineering

Degrees:

M.S. Intelligent Systems, Robotics and Controls, University of California, San Diego

B.S. Electrical and Computer Engineering, University of California, San Diego

Scholar Sponsor:

ARCS Foundation

About the Scholar:

The Global Positioning System revolutionized the way we navigate and collect spatial data in the terrestrial world. Unfortunately, the harsh attenuation of manmade signals underwater has thwarted an equivalent localization system for underwater applications. Perry is working on a localization system for a swarm of mobile sensors that only relies on ambient signals already embedded into the ocean - the ambient sound field. The localization approach is based on results in experimental physics that demonstrate that an estimate of the distance between two underwater microphones can be obtained by comparing the ambient sound field received by the two underwater microphones. Perry enjoys outdoor activities: surfing, camping, rock climbing, diving, and backpacking.

Benefits to Society:

Perry's research will decrease the cost for localizing dense swarms of underwater sensors and free the need of external infrastructure. Like the Global Positioning System in terrestrial environments, this localization method will lower barriers to localizing underwater, enabling a new modality of ocean sensors focused on dense sampling in both space in time.This will facilitate our understanding of many processes in physical oceanography and marine ecology. Perry's engineering breadth allows him to identify limitations in current monitoring systems and his work is strategically chosen to overcome these limitations.

Awards and Honors:

NSF Graduate Research Fellowship

NSF Integrative Training and Research Award

NSF Graduate Research Opportunities World Wide Chateaubriand STEM Scholarship (French Embassy) Friends of the International Center Scholarship

Publications and Posters:

Naughton, P. ; Roux, P.;Yeakle, R.; Schurgers, C.; Kastner, R.; Roberts, P. L. D.; Jaffe, J. S. Ambient noise processing on a mobile deformable array. Journal of the Acoustical Society of America, 2016, 140 (60, 4260-4270,

Naughton, P.; Edwards, C.; Petrovic, V.; Kastner, R.; Kuester, F.; Sandin, S. Scaling the annotation of subtidal marine habitats. Proceedings of the 10th international conference on underwater networks & systems, Washington D.C. October 22-24, 2015

Mirza, D.; Naughton P.; Schurgers, C; Kastner, R. Real-time collaborative tracking for underwater networked systems. Ad Hoc Networks. 2015, 34, 196-210

Bojakowski, P.; Bojakowski K.C.; Naughton, P. A comparison between structure from motion and direct survey methodologies on the warwick. Journal of Maritime Archaeology. 2015, 10 (2), 159-180

ERIK PAULSON

San Diego State University
Department of Chemistry and Biochemistry

Degrees:

Single Subject Teaching Credential, University of California, Riverside

B.S. in Chemistry, University of California, Riverside

Scholar Sponsor:

Kathryn Crippen Hattox Fund

About the Scholar:

The Grotjahn group makes catalysts that make reactions faster using an approach that mimics Nature's catalysts: enzymes. Enzymes often use the activity of a metal like iron or copper to assist in the building of molecules, but the metal can be tailored using organic molecules as shrubbery (a protein, for example). In this whole system, there is a synergistic interplay between the two that can allow these enzymes to efficiently and selectively create the molecules of life. Erik's group designs catalysts in which they attach organic molecules to the metal that not only directly tailor the metal's activity, but also play an active role in the reaction itself! They call these bifunctional catalysts. In Erik's particular case, the transformation achieved with his catalysts is the migration of a double bond down a chain, a reaction which can require a base to shuttle and shift a hydrogen atom around. By attaching a dangling organic base directly to the metal as opposed to its floating around free in solution, he can achieve rate increases on the magnitude of 300 to 10000! In his spare time, Erik loves traveling, hiking, and watching football.

Benefits to Society:

Erik's group has tailored their catalysts to be incredibly selective to produce (E)-alkenes. A direct potential area of application to cross over into the commercial sector is with flavors and fragrances. They can use their catalysts to take essential oils like clove oil (eugenol) and shift the double bond to give essentially exclusively (E)-isoeugenol, which has a scent like nutmeg, without forming the harsh-smelling (Z)-isoeugenol. There are thousands of syntheses of natural products or derivatives in which a double bond is functionalized as part of the process, and their catalysts provide a mild synthetic transformation of this double bond, which can lead to more efficient routes of synthesizing pharmaceutical or other commercial products.

Awards and Honors:

Organic Reactions Catalysis Society (ORCS) Travel Award (March 2014)

Two-time Teacher of the Month, John Burroughs High School, Burbank, California (January and November 2007)

Publications and Posters:

Larsen, C. R.; Paulson, E. R.; Erdogan, G.; Grotjahn, D. B. A facile, convenient, and green route to (E)-propenylbenzene flavors and fragrances by alkene isomerization. Synlett 2015, Ahead of Print. (Authors contributed equally)

Grotjahn, D.B.; Larsen, C.R.; Erdogan, G.; Paulson, E.R. Terminal alkene monoisomerization catalysts and methods. U.S. Pat. Appl. Publ., US 20150231621 A1 20150820, January 9, 2015.

Paulson, E.R.; Larsen, C.R.; Erdogan, G.; Grotjahn, D.B. Abstracts of Papers, 248th ACS National Meeting and Exposition, San Francisco, California, August 10th-14th, 2014; American Chemical Society: Washington, DC, 2014; ORGN-683.

Paulson, E.R.; Grotjahn, D.B. Book of Abstracts, 25th Biennial Organic Reactions Catalysis Society Conference, Tuscon, Arizona, March 2nd-6th, 2014.

ALLISON PERKINS

University of San Diego
Hahn School of Nursing and Health Sciences

Degrees:

M.S. in Nursing, University of San Diego

B.S. in Nursing, Niagara University, Louiston, NY

Scholar Sponsors:

Beyster Family Fund IV

About the Scholar:

Allison is a Medical-Surgical/Telemetry Clinical Nurse Specialist with the San Diego VA (Veterans Agency) Healthcare System. Her main focus as a Clinical Nurse Specialist is to improve patient outcomes for veterans. This is accomplished by implementing the latest research to improve care and ensuring that staff are competent to care for this complex and unique population. The primary focus of her research will be on veterans diagnosed with a mental health illness and how this impacts the care they receive while hospitalized. Often times, in the hospital setting, the veteran is treated for their primary illness but not for their mental health illness. Since their mental health issues are often overlooked by the healthcare professional, it can often times lead to poor patient outcomes after discharge. Allison has four children. She enjoys reading, cooking and running.

Benefits to Society:

The veteran population is very complex and unique in terms of health problems they experience due to their time in the military. Many of the veterans suffer from a mental health illness which impacts their lives in a variety of ways. Allison's research is focused on assisting the healthcare profession to improve the care of hospitalized veterans with mental health issues.

Awards and Honors:

San Diego VA Healthcare System 2016 Karis Award for Outstanding Leadership in Healthcare

Outstanding Achievement for Oncology Nursing Education or Patient/Family Education Award in the Oncology Nursing Society 2014

VA Mentor Award 2012

Outstanding Faculty Member from Mortar Board Association at SDSU 2011

Publications and Posters:

Muehlbauer, P. and Perkins, A. Using simulation to assess chemotherapy competency. Clinical journal of oncology nursing, vol. 17 (4), pp 392-396.

Perkins, A. GI assessment for the bedside nurse. Elsevier online continuing education modules, July 2007.

AIMEE RALEIGH

University of California, San Diego
Jacobs School of Engineering

Degrees:

M.S. in Bioengineering, University of California, San Diego

B.S.E. in Biomedical Engineering, Duke University, Durham, NC

Scholar Sponsor:

ARCS Foundation

About the Scholar:

Aimee's research combines in vitro cell and tissue culture, animal models of post-traumatic osteoarthritis and mathematical modeling to evaluate key early biochemical and bio-mechanical phenomena that contribute to joint disease progression. In synovial joints (such as the knee), a viscous synovial fluid allows for low-friction and low-wear lubrication of articulating cartilage surfaces. Within this synovial fluid are two major lubricating molecules, hyaluronan and proteoglycan 4. Her research combines in vitro cell and tissue culture, animal models of joint disease and mathematical modeling to predict turnover of these two molecules following acute injury and during osteoarthritis progression. Because synovial fluid lubricant function is deficient during osteoarthritis progression, a theoretical and experimental model framework that can be tailored to patient-specific characteristics could be used to help develop novel therapies. Aimee enjoys listening to podcasts, reading and traveling. She also likes to hike, scuba dive and explore historical sites.

Benefits to Society:

Osteoarthritis (OA) is the most common form of arthritis and as a term encompasses a group of chronic, incapacitating joint diseases that affect nearly 20% of the population of the United States. Aimee's project seeks to evaluate early biochemical and bio-mechanical changes that occur prior to the onset of OA in the knee joint. These early biophysical changes to the joint will add to the development of targeted therapies to prevent the progression of OA.

Awards and Honors:

T32 Trainee in Musculoskeletal Engineering 2014-2016

UC San Diego Frontiers of Innovation Scholarship 2015-2016

San Diego Fellowship 2016-2017

Jacobs School of Engineering Gordon Scholar 2015-2016

TERMIS-AM 2016 Conference Leadership/Scientist Award.

Publications and Posters:

Raleigh, A.R.; McCarthy W.J.; Chen, A.C.; Meinert, C.; Klein, T.J.; Sah, R.L. Synovial Joints: Mechanobiology and tissue engineering of articular cartilage and synovial fluid. In comprehensive biomaterials II, Ducheyne, P.; Healy, K.E.; Hutmacher, D.E.; Grainger, D.E.; Kirkpa-trick, C.J. Eds.; Elsevier: 2017; p 107.

Raleigh, A.R.; Sun, Y.; Temple-Wong, M.M.; Kato, K.; Murata, K.; Fi-restein, G.S.; Masuda, K.; Sah, R.L. Fluctuation of synovial fluid hyaluronan concentration in post-traumatic osteoarthritis: Dependence on the dynamic balance between biosynthesis, loss and dilution. Arthritis Rheumatol. 2017, submitted.

Temple-Wong, M.M.; Raleigh, A.R.; Frisbie, D.D.; Sah, R.L.; McIl-wraith, C.W. Articular cartilage lubrication with polyglycan: Effects in vitro and with in vivo supplementation following osteochondral fracture in the horse. Osteoarthritis Cartilage. 2017, in revision.

Vernekar, V.N.; Wallace, C.S.; Wu, M.; Chao, J.T.; O'Connor, S.K.; Raleigh, A.R.; Liu, X.; Haugh, J.M.; Reichert, W.M. Biligand surfaces with oriented and patterned protein for real-time tracking of cell migration. Colloids Surf B. 2014, 123, 225-35.

ROBYN RIDLEY

University of California, San Diego
Jacobs School of Engineering

Degrees:

M.S. in Materials Science and Engineering, University of California, San Diego

B.S. in Materials Science and Engineering, Columbia University, New York, NY

Scholar Sponsor:

The Donald C. and Elizabeth M. Dickinson Foundation

About the Scholar:

Robyn investigates non-aqueous, reverse micelle systems and the effects of short-chain alcohols on surfactant self-assembly using dynamic light scattering (DLS). Reverse micelles can be described as nanometer-wide droplets of water surrounded by molecules called surfactants. These surfactants are amphiphiles, one side is attracted to water and one side is attracted to oil, and allows water droplets to be dispersed in oil. Materials scientists have an interest in using these nanometer-sized droplets as reaction vessels for synthesizing nanoparticles. Many of the chemicals used for nanoparticle synthesis are reactive with water, so there is interest in replacing water with other solvents. She is studying a system that uses ethanol, surfactant, and oil to determine if alcohols are an adequate replacement. Robyn plays ultimate frisbee, swims and has started learning to paint and cook vegan food.

Benefits to Society:

Reverse micelles are useful as nano-sized reaction vessels for nanoparticle synthesis, biological membrane models, protein extraction systems and many other applications. The products of reverse micelle applications impact the energy, medical, and food industries. These three areas are incredibly important to keep improving for the benefit of society. Having a fundamental understanding of the reverse micelle systems themselves is critical to being able to effectively use them for a variety of applications.

Awards and Honors:

San Diego Fellowship

Alfred P. Sloan Minority PhD Program Scholar

American Chemical Society Scholar

Publications and Posters:

Ridley, R.E.; Graeve, O.A. Investigating the effects of ethanol on surfactant assembly in ethanol/AOT/n-heptane systems. In preparation.

Ha, J.; Novitskaya E.; Hirata, G.A.; Zhou, C.; Ridley, R; Graeve, O.A.; McKittrick, J. A method to improve quantum efficiency of nano-sized phosphors using a flux for solid state lighting applications. J. Am. Ceram. Soc. 2017, Submitted.

Puritty, C.; Strickland, L.R.; Alia, E.; Blonder, B.; Klein, E.; Kohl, M.T.; McGee, E.; Quintana, M.; Ridley, R.E.; Tellman, B.; Gerber, L.R. For diversity initiatives, current best efforts may not be enough. Science 2017, Accepted.

MARINO ROMERO

University of California, San Diego
Department of Mathematics

Degrees:

B.S. in Mathematics, California Polytechnical University, San Luis Obispo

Scholar Sponsor:

ARCS Foundation

About the Scholar:

Marino's research is in algebraic combinatorics and involves symmetric functions and representations of the symmetric group. The symmetric group is the set of permutations viewed as operators. For the symmetric group, we can use symmetric functions to represent these irreducible symmetries. His research looks at a certain class of operators on the space of symmetric functions, in some sense, a space on which certain operators act. For example, given a cube, there are the operations which rotate the cube. This forms a representation, where the operations are rotating the cube and the space is given by all possible positions of the cube. It can be shown that these actions have a unique collection of irreducible symmetries. Marino enjoys mathematics, silly magic tricks and music.

Benefits to Society:

One would argue that in itself, working in mathematics is furthering our understanding of science. However, more specifically, Marino's research can be viewed as a computational tool. Many abstract mathematical notions are difficult to, for example, put in a computer. He hopes that his research can help the understanding of abstract values by using concrete ideas.

Awards and Honors:

Competitive Edge Fellowship Program, UCSD 2014

Valomar A. and Viola I. Folsom Scholarship, Cal Poly SLO Math Department 2012

Ralph M. Warten Memorial Scholarship, Cal Poly SLO Math Department 2011

Publications and Posters:

Romero, M. The Delta Conjecture at q=1. Trans. Amer. Math. Soc., 2017.

Mendes, A.; Romero, M. A note on the kth tensor product of the defining representation. Journal of Combinatorics 7, 4, 2016

SAM ROOT

University of California, San Diego
Jacobs School of Engineering

Degrees:

B.S. in Chemical Engineering, University of Rochester, NY

Scholar Sponsor:

Beyster Family Foundation Fund IV

About the Scholar:

Sam's work involves development of computational and experimental methods to study the nanoscale structural and mechanical properties of semiconducting polymer for applications in electronic devices for energy and healthcare. In his off hours Sam enjoys participation in surfing, yoga, and meditation.

Benefits to Society:

Sam feels his studies will lead to increased fundamental understanding of how molecular structure and processing conditions effect the nanoscale arrangement and device-scale properties of organic semiconductors to enable the rational design of optoelectronic materials with the capacity for mechanical durability, biodegradability, and self-repair.

Awards and Honors:

Powell Fellowship

Publications and Posters:

Root, S. E.; Savagatrup, S.; Pais, C. J.; Arya, G.; Lipomi, D. J. (2016). Predicting the mechanical properties of organic semiconductors using coarse-grained molecular dynamics simulations. Macromolecules, 49(7), 2886-2894.

Zaretski, A. V.; Root, S. E.; Savchenko, A.; Molokanova, E.; Printz, A. D.; Jibril, L.; ... Lipomi, D. J. (2016). Metallic nanoislands on graphene as highly sensitive transducers of mechanical, biological, and optical signals. Nano letters, 16(2), 1375-1380.

Savagatrup, S.; Printz, A. D.; O'Connor, T. F.; Zaretski, A. V.; Rodriquez, D.; Sawyer, E. J.; ... Lipomi, D. J. (2015). Mechanical degradation and stability of organic solar cells: molecular and microstructural determinants. Energy & Environmental Science, 8(1), 55-80.

KEVIN ROSS

University of California, San Diego
Biomedical Sciences Graduate Program

Degrees:

B.S. in Molecular and Cellular Biology/Psychology, University of Illinois, Urbana-Champaign, IL

M.S. in Physics, University of California, San Diego

B.S. in Chemistry, University of Arizona, Tucson, AZ

Scholar Sponsor:

Hervey Family Non-Endowment Fund

About the Scholar:

Kevin's research is focused on a unique regulatory role for nuclear export factor1 (Nxf1), whose main function is to recognize mature mRNA transcripts and facilitate their transport from the nucleus to the cytoplasm of a cell. An additional function of Nxf1 is the suppression of genetic mutations caused by retroviruses in mice, in a manner that suggests it occurs prior to the recognition of a mature mRNA. He is studying the specific mechanism of this suppression, and the role of variation in Nxf1 that determines its interaction with other factors involved in mRNA processing and maturation. In his free time, he serves as a representative on the UCSD Graduate Student Association, and participates in his own program's graduate council, which works to enrich the lives of students outside of the lab. He also is an avid racquetball player.

Benefits to Society:

Understanding the functional consequences of common genetic variation in the context of disease risk and severity is a subject of great importance to society. Nxf1 sits at the center of a gene regulatory network, and common, non-pathogenic variation in Nxf1 has a significant impact on the outcome of potential disease-causing mutations in other genes in mice. A detailed understanding of the role of Nxf1 in mRNA maturation and processing will provide new insights into complex genetic systems that underlie disease.

Awards and Honors:

NIH Training Program in Basic and Clinical Genetics

Best Poster Award, Mouse Molecular Genetics Conference, Genetics Society of America

Edmund J. James Scholar, University of Illinois

Publications and Posters:

Zhang, S.; Ross, K. D.; Seidner, G. A.; Gorman, M. R.; Poon, T. H.; Wang, X.; Keithley, E. M.; Lee, P. N.; Martindale, M. Q.; Joiner, W. J.; Hamilton, B. A. Nmf9 encodes a highly conserved protein important to neurological function in mice and flies. PLoS genetics 2015, 11 (7), e1005344.

Concepcion, D.; Ross, K. D.; Hutt, K. R.; Yeo, G. W.; Hamilton, B. A. Nxf1 natural variant E610G is a semi-dominant suppressor of IAP-induced RNA processing defects. PLoS genetics 2015, 11 (4).

Uricchio, L. H.; Chong, J. X.; Ross, K. D.; Ober, C.; Nicolae, D. L. Accurate imputation of rare and common variants in a founder population from a small number of sequenced individuals. Genetic Epidemiology 2012, 36 (4), 312-319.

ALEKSANDRA SHIRMAN

University of California, San Diego
Department of Physics

Degrees:

M.S. in Physics, University of California, San Diego

B.A. in Physics, University of California, Berkeley

Scholar Sponsor:

ARCS Foundation

About the Scholar:

Sasha is studying the electrostatic properties of neurons in networks. To properly understand the overall behavior of a brain, or a region of the brain, one must be able to collect data from many of the neurons present. Given the number of neurons in the brain, this is an unrealistic goal. Sasha aims to create a mathematical map between the behavior of a set of neurons and the voltage of the extracellular media in which they sit. She would then use extracellular data to infer the behavior of "unseen" neurons. During this past year, Sasha has been working on the methods that she has been using. These methods are used to estimate the parameter that govern equations describing interesting and complicated systems that cannot be directly measured. These methods are called data assimilation and machine learning. She also continues to work on search algorithms to estimate parameter and state variable values in dynamical systems. Sasha enjoys tango, judo, and drawing.

Benefits to Society:

Currently, research relating to neurons is limited by the difficulty of recording data directly from a neuron. The procedure of recording data may also be harmful for the neurons as well as gleaning only a small amount of information about the general behavior of the brain. Extracellular measurements are simpler to make. A method that can connect extracellular measurements to behavior in many individual neurons could improve the rate at which research on neurological diseases progresses, as it will help us to understand when and how a single neuron "breaks."

Awards and Honors:

San Diego Fellowship, 2015, 2016

Publications and Posters:

Daniel B.; Shirman, S.; Armstrong, E.; Kadakia, N.; Abarbanel, H. HVC Interneuron Properties from Statistical Data Assimilation. 2016, arXiv:1608.04433. arXive.org e-Print archive.

Abarbanel, H.; Shirman, S.; Breen, D.; Kadakia, N.; Rey, D; Armstron, E.; Margoliash, D. A unifying view of synchronization for data assimilation in complex nonlinear networks. 2017.

DYLAN SKOLA

University of California, San Diego
Department of Medicine

Degrees:
B.S. in Biology, Humboldt State University, Arcata, CA

Scholar Sponsor:

Timken-Sturgis

About the Scholar:

Transcription factors are molecular "switches" that turn genes on or off by binding to DNA. Different combinations of transcription factors act together in different cells to create "programs" that tell a cell what to do and when to do it. Dylan creates computational models that guess the rules of these programs by simulating their interactions and seeing how well the simulations fit with experimental data. He has described the transcriptional regulatory landscape of human microglia. He has extended and improved a technique for using hidden Markov Models (HMMs) to efficiently enumerate combinations of transcriptional regulators. Another aspect of his research has explored the large-scale regional organization of mammalian chromatin and has begun uncovering bimodal compartmentalization of transcription factor binding that correlates with developmental function. He has also initiated a series of experiments to quantitatively model nucleosome positioning using artificial chromatin. Dylan enjoys wilderness backpacking, body surfing, snowboarding, photography and cooking.

Benefits to Society:

Most genetic variants that dictate disease risk are found in noncoding genomic regions and presumably act by disrupting transcriptional regulation, but the path from DNA sequence to regulation remains unclear. Decoding the rules by which different transcriptional regulators interact to specify cell identity and respond to signals remains a key challenge of modern biology. In addition to improving our understanding of basic biology, Dylan's research may shed light on causative mechanisms of diseases and suggest targets for therapeutic intervention.

Awards and Honors:

Presidential Scholar Award 2000, Humboldt State University

Molecular Approaches to Endocrinology Training Grant recipient 2016-2017, UCSD School of Medicine

Publications and Posters:

Carvunis, A.-R.; Wang, T.; Skola, D.; Yu, A.; Chen, J.; Kreisberg, J. F.; Idea, T. Evidence for a common evolutionary rate in metazoan transcriptional networks. Elife 2015, 4.

Gosselin, D.; Skola, D.; Coufal, N. G.; Holtman, I. R.; Schlachetzki, J. C. M.; Sajti, E.; Jaeger, B. N.; O'Connor, C.; Fitzpatrick, C.; Pasillas, M. P.; et al. An environment-dependent transcriptional network species human microglia identity. Science 2017, 356 (6344).

Holtman, I. R.; Skola, D.; Glass, C. K. Transcriptional control of microglia phenotypes in health and disease. J. Clin. Invest. 2017.

COLETTE SMIRNIOTIS

San Diego State University
Computational Science Research Center, College of Sciences

Degrees:
M.S. in Statistics (Biostatistics), San Diego State University

B.A. in Math and Economics, Washington University, St. Louis, MO

Scholar Sponsor:

Ellen Browning Scripps Foundation

About the Scholar:

Scientists use mathematical models to describe the weather, the oceans, and the climate. For example, consider the multiple hurricane paths weather forecasts show on the news when a hurricane is forming and approaching land. Colette's main research is in the field of data assimilation, which is the process of combining real observations with the output from the models, to update and improve forecasts. Her aim is to improve existing algorithms, resulting in more accurate predictions. This past year she has also been working on a project to create improved predictions of snowfall in the Rocky Mountains, using statistical methods to combine multiple data sets. Accurately modeling and predicting snow cover presents a scientific challenge, in part because it is difficult to measure this quantity directly. Given the choice of different indirect measurements and also different algorithms to retrieve snow cover from these data, there is no single, standard gridded snow data set that can be used for climate model evaluation. The goal of this project is to use a statistical model to create a blended product of snow water equivalent (SWE) from multiple data sets and, in the process, also quantify the uncertainty of this across different locations. When not at her computer, Colette enjoys swimming, running, hiking, and camping.

Benefits to Society:

Weather and climate models are used to forecast everything from hurricane trajectories to snowfall to sea level rise—all of which can have significant impacts on society. Improvements to existing data assimilation algorithms will improve predictions. Better predictions for hurricane trajectories, for example, would allow for better preparedness by communities in its path. More accurate snowfall estimates improve water resource management, as snowfall is a major water source for much of the Western United States.

Awards and Honors:

Academic Excellence in Biostatistics, San Diego State University, 2013

Publications and Posters:

Smirniotis, C.; Bailey, B. Comparison of Ensemble Filters for Data Assimilation. Presented at the STATMOS/NCAR Invited Poster Presentations at the Joint Statistical Meetings, Seattle, WA, August 8-13, 2015.

Smirniotis, C.; Bailey, B. Visualization of Data Assimilation Methods. Presented at the STATMOS/NCAR Invited Poster Presentations at the Joint Statistical Meetings, Seattle, WA, August 2-7, 2014.

TERRY SOLOMON

University of California, San Diego
School of Medicine

Degrees:

B.S. in Biomedical Science and Biotechnology, Rochester Institute of Technology, Rochester, NY

Scholar Sponsor:

Hervey Family Non-Endowment Fund

About the Scholar:

Terry's research utilizes genetics to understand how changes in protein levels can affect disease. Individuals that carry genetic variants that increase the levels of proteins involved in venous thromboembolism (VTE), a common cardiovascular disease, may be at increased risk of disease. Specifically, her goal is to identify the chain of events whereby specific genetic variants increase certain proteins, which then affect other proteins, and ultimately to increase disease risk. To do this, she will examine how levels of blood proteins are associated with genetic variation in 2,652 individuals genotyped for VTE-risk variants as well as variants throughout their genomes. Terry enjoys reading, playing computer games and folk dancing.

Benefits to Society:

Terry, with collaborators, is incorporating findings into risk models of disease in order to improve prediction, prevention, and treatment of VTE. For example, the genetic variants could be used in risk models to identify high-risk individuals. Additionally, proteins that causally influence VTE risk can be good biomarkers and may help identify individuals who would benefit from prophylactic treatment. Finally, by understanding the molecular mechanisms of disease, this work could provide insight into improved drug targets for treatment.

Awards and Honors:

President, UCSD Biomedical Science Graduate Council (2016-2017)

NIH Genetics Training Grant Recipient (2015-2017)

Graduated from Rochester Institute of Technology with Highest Honors (2013)

RIT Dean's List (2009-2013)

Recipient, RIT Presidential Scholarship (2009-2013)

Publications and Posters:

Solomon, T.; Smith, E. N.; Matsui, H.; Braekkan, S. K.; INVENT Consortium; Wilsgaard, T.; Njølstad, I.; Mathiesen, E. B.; Hansen, J. B.; Frazer, K. A. Associations between common and rare exonic genetic variants and serum levels of 20 cardiovascular-related proteins: The Tromsø Study. Circ. Cardiovasc. Genet. 2016, 9 (4), 375-383.

Gran, O. V.; Smith, E. N.; Braekkan, S. K.; Jensvoll, H.; Solomon, T.; Hindberg, K.; Wilsgaard, T.; Rosendaal, F. R.; Frazer, K. A.; Hansen, J. B. Joint effects of cancer and variants in the Factor 5 gene on the risk of venous thromboembolism. Haematologica. 2016, [Epub ahead of print] DOI: 10.3324/haematol.2016.147405

Hasenkamp, N.; Solomon, T.; Tautz, D. Selective sweeps versus introgression-population genetic dynamics of the murine leukemia virus receptor Xpr1 in wild populations of the house mouse (Mus musculus). BMC evolutionary biology 2015, 15 (1), 1.

WINSTON STAUFFER

San Diego State University, UC San Diego
San Diego State University Heart Institute, Biology Department

Degrees:

B.S. in Biology, University of California, Santa Cruz

Scholar Sponsor:

Marti and Larry Showley

About the Scholar:

Winston is interested in how the heart responds to stresses that mimic what happens during a heart attack or congestive heart failure on a cellular level. This includes how ischemic stress or lack of blood flow interferes with how heart muscle cells create and fold new proteins. If these processes are disrupted, the buildup of misfolded proteins can become toxic and can lead to cell and tissue death. A set of genes designed to aid protein folding can be activated to prevent this from happening. His research focuses on identifying and manipulating these genes to look for possible therapeutic targets beneficial to those with heart disease. In his spare time, Winston likes to read history, play trivia games and ultimate Frisbee, and enjoy his dogs.

Benefits to Society:

If a way can be found to enhance this gene program, called the Unfolded Protein Response, this could lead to a variety of new treatments that prevent tissue death during and after a heart attack. This may preserve heart function and prevent cardiac remodeling that leads to heart failure. In the case of cardiac stem cells we may even be able to re-grow and repair damaged hearts without the need for surgery or transplants.

Awards and Honors:

Rees-Stealy Research Foundation Fellow (2014 and 2015).

Publications and Posters:

Stauffer, W.T.; Bailey, B.; Arrieta, A.; Doroudgar, S.; Glembotski, C.C. MANF is an ER Stress-inducible Protein with Novel Roles as a Regulator of Cardiac Myocyte Growth. AHA Scientific Sessions, Chicago, IL, November 15-19, 2014; American Heart Association. Oral Presentation.

Stauffer, W.T.; Doroudgar, S.; Stephens, H.N.; Glembotski, C.C. The Adaptive ER Stress Response has a Critical Role in Promoting Proliferation and Viability in Cardiac Progenitor Cells. SDSU Graduate Student Seminar, San Diego, CA, April, 2015. San Diego State University. Poster and oral presentations.

Stauffer, W.T.; Doroudgar, S.; Stephens, H.N.; Bailey, B.; Glembotski, C.C. ATF6 and the Adaptive ER Stress Response Promotes Proliferation and Viability of Mouse Cardiac Progenitor Cells. AHA Scientific Sessions, Orlando, FL, November 7-11, 2015; American Heart Association. Poster Presentation.

PEDRO TORRES

Joint Doctoral Program at San Diego State University and University of California, San Diego
Cell and Molecular Biology

Degrees:

M.S. in Microbiology, San Diego State University

B.S. in Biology, University of California, Santa Barbara, Santa Barbara

Scholar Sponsor:

Lambert Foundation for Education at Union Bank

About the Scholar:

Pedro's lab studies polycystic ovary syndrome (PCOS), an endocrine disorder that affects 10% of women worldwide. In addition to infertility and pregnancy complications, many women with PCOS have metabolic disorders that result in an increased risk of obesity, metabolic syndrome, type 2 diabetes and cardiovascular disease. A complex community of microorganisms (the gut microbiome) resides within the large intestine and is important for human health. His research also focuses on investigating whether the gut microbiome is required to induce PCOS metabolic symptoms and if modification via pre- and probiotics can alleviate those symptoms. Although the etiology of PCOS remains elusive, androgen excess is considered to be a corner-stone in the metabolic pathology of PCOS.

Benefits to Society:

Current treatment options for the metabolic symptoms of PCOS are limited. Although dysbiosis of gut microbiota has been proposed to contribute to the development of PCOS, it is unknown whether there is an association between the gut microbiome and PCOS and if the gut microbiome plays a causal role in the PCOS metabolic phenotype. Results from this study will provide insight into these questions and may lead to the development of novel treatment options for women with PCOS, including pre- and probiotic therapies.

Awards and Honors:

James and Mary Crouch Memorial Scholarship SDSU

Inamori Fellowship SDSU

American Society of Microbiology, Microbe Minority Travel Award

Microbial Sciences Graduate Research Fellowship UCSD

The Azziz-Baumgartner Family Young Investigators Travel Awards, AE-PCOS Society

Publications and Posters:

Torres P.J.; Edwards R.A.; McNair K. PARTIE: a partition engine to separate metagenomic and amplicon projects in the Sequence Read Archive. Bioinformatics, 2017

Gureld N.; Grewal S.; Cua L.S.; Torres P.J.; Kelley S.T. Endosymbiont interference and microbial diversity of the Pacific coast tick, Demacentor occidentalis in San Diego County, California. PeerJ 5:e3202, 2017.

Torres P.J.; Fletcher E.; Gibbons S.M.; Bouvet M.; Doran K.S.; Kelley S.T. (2015) Characterization of the salivary microbiome in patients with pancreatic cancer. PeerJ 3:e1373, 2015.

TAM TRAN

University of California, San Diego
Neurosciences Graduate Program

Degrees:

B.S. in Neuroscience, University of California, Los Angeles

Scholar Sponsor:

ARCS Foundation

About the Scholar:

Even in the absence of disease, our performance on tasks requiring high degrees of focus or precise recall of past events will likely decline with age. While there is extensive research on the behavioral consequences of healthy aging, the underlying physiological changes are less understood. Tammy's research explores how aging affects brain activity and how these changes are related to attention and working memory performance. This research provides insight not only into how the brain prepares for and retains incoming information, but also into how the mechanisms responsible for these processes are vulnerable to healthy aging. In her off hours, Tammy likes cooking, reading, and hiking.

Benefits to Society:

The United States population is rapidly growing older, with the number of people over age 65 expected to more than double by 2060. Thus, understanding the physiological consequences of healthy aging is of critical medical and public health importance. In examining how the brain is affected by aging and how these effects relate to cognition, Tammy hopes that her research will one day lead to new developments that will help maintain quality of life in older adults.

Awards and Honors:

Kavli Institute for Brain and Mind Innovative Research Grant

Society for Neuroscience Trainee Professional Development Award

UCLA Undergraduate Research Scholar

UCLA Amgen Scholar

Publications and Posters:

Tran, T.T.; Hoffner, N. C.; LaHue, S. C.; Tseng, L.; Voytek, B. Alpha phase dynamics predict age-related visual working memory decline. Neuroimage (in press).

DANIEL TRUGMAN

University of California, San Diego
Scripps Institution of Oceanography:
Institute of Geophysics and Planetary Physics

Degrees:

M.S. in Geophysics, University of California, San Diego

B.S. in Geophysics, Stanford University, Stanford, CA

Scholar Sponsor:

Lakeside Foundation/ARCS Foundation

About the Scholar:

Daniel's research in the field of observational seismology is focused on developing and applying novel, data-driven methods to study earthquakes. By characterizing how earthquake occurrence patterns and source properties vary in space and evolve in time, his aim is to provide quantitative constraints that can be used to inform and improve the next generation of seismic hazard assessments. A better understanding of this variability, including the deviant, outlier earthquakes with unusual source properties, will also help us learn more about the complex physical processes underlying earthquake nucleation and triggering (how earthquakes get started), and earthquake-earthquake interaction (how sequences of nearby earthquakes may be related). Daniel is an avid outdoorsman and enjoys applying statistical and data analytic methods to sports, politics and economics.

Benefits to Society:

Seismologists are confronted with a number of unresolved questions about earthquake occurrence that must be addressed in order to provide rigorous, quantitative forecasts of seismic hazard. These forecasts are essential to society's capacity to prepare for and respond to the occurrence of large and damaging earthquakes, but are currently subject to considerable scientific uncertainty. Daniel's research works to improve such forecasts by leveraging the rich suite of available observational data to provide statistically robust constraints on earthquake occurrence.

Awards and Honors:

Paul G. Silver Young Scholar Research Enhancement Award, 2016

National Science Foundation Graduate Research Fellowship, 2014

Kennedy Prize for Outstanding Stanford Honors Theses, 2013

Hoefer Prize for Excellence in Undergraduate Writing, 2013

Firestone Medal for Excellence in Undergraduate Research, 2013

Publications and Posters:

Trugman, D. T.; Shearer, P. M.; Borsa, A. A.; Fialko, Y. A comparison of long-term changes in seismicity at The Geysers, Salton Sea, and Coso Geothermal Fields. J. Geophys. Res. 2016, 121(1), 225–247, doi: 10.1002/2015JB012510.

Trugman, D. T.; Wu, C.; Guyer, R. A.; Johnson, P. A. Synchronous low frequency earthquakes and implications for deep San Andreas fault slip. Earth Planet. Sci. Lett. 2015, 424, 132–139, doi:10.1016/j.epsl.2015.05.029.

Trugman, D. T.; Borsa, A. A.; Sandwell, D. T. Did stresses from the cerro prieto geothermal field influence the El Mayor-Cucapah Rupture Sequence? Geophys. Res. Lett. 2014, 41(24), 8767–8774, doi: 10.1002/2014GL061959.

Trugman, D. T.; Dunham, E. M. A 2D pseudodynamic rupture model generator for earthquakes on geometrically complex faults. Bull. Seismol. Soc. Am. 2014, 104(1), 95–112, doi: 10.1785/0120130138.

ADRIANA TRUJILLO

San Diego State University
College of Sciences
Cell and Molecular Biology

Degrees:

M.S. in Cellular and Molecular Biology, San Diego State University

B.S. in Cellular and Developmental Biology, California State University, Fullerton

Scholar Sponsor:

ARCS Foundation

About the Scholar:

Adriana's research utilizes fruit flies to model dilated cardiomyopathy (DCM), a common form of human heart disease that results in heart enlargement and failure. This disease can be caused by mutations in myosin, the protein responsible for producing muscle contraction through its interaction with the actin protein. Her lab has determined that two human disease mutations suppress the interaction of myosin with actin. She made flies which harbor the same myosin mutations found in human patients to better understand disease pathogenesis. She is currently implementing multidisciplinary approaches (molecular, cellular and whole tissue) to better understand how changes within the structure of the myosin molecule leads to biochemical defects and how these abnormalities relate to the structural and physiological decline of muscles. Adriana enjoys cooking, playing the piano, and volunteering at a local dog rescue.

Benefits to Society:

Though dilated cardiomyopathy is the most common form of heart disease, the mechanisms whereby mutant myosin causes dilated cardiomyopathy are poorly understood. This project will allow her lab to understand the molecular, cellular, and physiological changes involved in disease progression. It will also help to determine the broad application of using fruit flies as a model for dilated cardiomyopathy. Finally, their model will generate a platform for therapeutic intervention with the aim of restoring muscle function through drug treatment.

Awards and Honors:

NIH F31 Diversity Pre-doctoral Fellowship (2015-2019)

Rees-Stealy/SDSU Heart Institute research fellowship (2014-present)

NIH Research Supplement to Promote Diversity in Health Related Research (2011-2013)

Biophysical Society Minority Affairs Committee travel award

Publications and Posters:

Achal, M.*; Trujillo, A. S.*; Melkani, G. C.; Farman, G. P.; Ocorr, K.; Viswanathan, M. C.; Kaushik, G.; Newhard, C. S.; Glasheen, B. M.; Melkani, A.; Suggs, J. A.; Moore, J. R.; Swank, D. M.; Bodmer, R.; Cammarato, A.; Bernstein, S. I. A restrictive cardiomyopathy mutation in an invariant proline at the myosin head/rod junction enhances head flexibility and function, yielding muscle defects in drosophila. J. Mol. Biol. 2016, 428(11), 2446-2461. *co- first authors.

Melkani, G. C.; Trujillo, A. S.; Ramos, R.; Bodmer, R.; Bernstein, S. I.; Ocorr, K. Huntington's disease induced cardiac amyloidosis is reversed by modulating protein folding and oxidative stress pathways in the drosophila heart. PLOS Genet. 2013, e1004024.

JESSICA UNGERLEIDER

University of California, San Diego
Jacobs School of Engineering

Degrees:

M.S. in Bioengineering, University of California, San Diego

B.S. in Biomedical Engineering, University of Virginia, Charlottsville, VA

Scholar Sponsor:

ARCS Foundation

About the Scholar:

Jessica is working on the development of injectable biomaterials to treat muscle damage. Specifically, she synthesizes and characterizes decellularized biomaterial scaffolds, which are made by removing cells from tissues, leaving behind the protein extracellular matrix scaffold. She has shown that this matrix derived from skeletal muscle improves muscle and blood vessel regeneration in a peripheral artery disease model. In addition, she is showing the improvement of muscle regeneration and arteriogenesis through transcriptomic and histological analysis. She is now investigating mechanisms behind this tissue regeneration. She is also studying the importance of tissue specific extracellular matrices in acute and chronic muscle regeneration by comparing materials derived from skeletal muscle, cardiac muscle and lung. Jessica enjoys running, biking and swimming and has participated in two triathlons. She likes to read and explore San Diego.

Benefits to Society:

Muscle damage is one of the leading causes of pain and injury in adults. Peripheral artery disease is a cardiovascular cause of muscle damage where blood flow is reduced to the legs (called ischemia), which can lead to amputation. The biomaterial scaffolds that Jessica is developing present a therapeutic alternative for treating muscle damage from acute or ischemic causes. The scaffolds can be injected and thus more minimally invasive and cheaper than a surgical alternative. Understanding how biomaterial scaffolds improve muscle regeneration will be vital for creating the most effective muscle regeneration therapy for patients.

Awards and Honors:

Siebel Scholar

National Institutes of Health F31 Predoctoral Fellowship

Gordon Engineering Leadership Fellow

American Heart Association Predoctoral Fellowship

Outstanding Student of the Year, University of Virginia School of Engineering and Applied Science

Publications and Posters:

Ungerleider, J.L.; Kammeyer, J.K.; Braden, R.L.; Christman, K.L.; Gianneschi, N.C. Enzyme-targeted nanoparticles for delivery to ischemic skeletal muscle. Polym. Chem. 2017, 8, 5212- 5219.

Ungerleider, J.L.*; Johnson, T.D.*; Hernandez, M.J.; Elhag, D.I.; Braden, R.L.; Dzieciatkowska, M.; Osborn, K.G.; Hansen, K.C.; Mahmud, E.; Christman, K.L. Extracellular matrix hydrogel promotes tissue remodeling, arteriogenesis, and perfusion in a rat hindlimb ischemia model. J. Am. Coll. Cardiol. Basic Transl. Sci. 2016, 1, 32-44.

Ungerleider, J.L.; Johnson, T.D.; Rao, N.; Christman, K.L. Synthesis and evaluation of injectable hydrogels for peripheral artery disease. Methods, 2015, 84, 53-59.

Ungerleider, J.L.; Christman, K.L. Injectable biomaterials for the treatment of myocardial infarction and peripheral artery disease: translational challenges and progress. Stem Cells Transl. Med. 2014, 3, 1090-1099.

JANET WALKER

San Diego State University
College of Sciences

Degrees:

B.S. in Environmental Sciences, University of Virginia, Charlottesville, VA

Scholar Sponsors:

Virginia Lynch Grady Foundation

About the Scholar:

The central goal of Janet's research is to better understand patterns of local and regional salt marsh community structure. Animals can influence community structure and ecosystem functions via both feeding (consumption) and non-feeding (trampling, burrowing, etc.) pathways. Her research focuses on the role of Pacific coast crabs in structuring California salt marsh plant communities by examining the herbivorous and burrowing nature of these crabs. Crabs can burrow into soils surrounding marsh vegetation and thereby alleviate submergence and hypoxic stress for plants. However crabs may also influence plants by grazing. These impacts of crabs may shape the distribution and abundance of plant species and may be especially pronounced at lower latitudes where temperature-related stress is already high. Janet is a certified yoga instructor and enjoys teaching and practicing yoga. She also coaches swimming for all ages. She likes to stay active doing running, skiing, sailing and hiking.

Benefits to Society:

Understanding the role of consumers in mediating plant stress and the outcomes of plant interactions will become important in the face of a changing climate. Intense drought in southern California coupled with high salinity may magnify the effects of herbivory, thereby reducing plant biomass and/or mediating plant distributions. Identifying factors that mitigate this environmental stress (e.g. the activities of burrowing crabs) will contribute to conservation strategies and enhance our appreciation for the resilience of these ecosystems in the face of climate change.

Awards and Honors:

Garden Club of America Award in Coastal Studies (2017)

Society of Wetland Scientists Student Research Grant (2017)

Joint-Doctoral Program in Ecology Funding (2016-2017)

Outstanding Oral Presentation, CERF Conference (2015)

Mahlon G. Kelly Prize for Outstanding Research in Ecology (2015)

Publications and Posters:

Walker, J.K.; Long, J.D. Site-specifc effects of burrowing crabs on plant community composition in California salt marshes. (In preparation)

Walker, J.K.; Long, J.D. Site-specific effects of burrowing crabs on plant community composition in California salt marshes. Oral Presentation, Coastal and Estuarine Research Federation, Providence, RI. November 2017.

Walker, J.K., and Long, J.D. Burrowing crabs alter salt marsh plant community composition. Poster Presentation, Western Society of Naturalists, Monterey Bay, CA. November 2016.

Walker, J.K.; Blum, A.J.; Bijak, A.L.; Van Dijk, K. Genetic diversity and spatial structure of phenotypically similar spartina alterniflora stands. In Review.

MELISSA WARD

San Diego State University
Department of Biology

Degrees:

B.S. in Biological Sciences, Univeristy of California, Irvine

M.S. in Ecology, University of California, Davis

Scholar Sponsors:

French and Masserini Foundation

About the Scholar:

Melissa's research explores how underwater meadows of seagrass may serve to buffer the impacts of ocean acidification. As carbon dioxide (CO2) in the atmosphere increases from burning fossil fuels, the ocean absorbs about a third of this CO2. This absorption makes the seawater more acidic which can harm calcifying organisms, such as oysters or corals. The west coast of the United States is just beginning to feel economic and ecological impacts of this ocean acidification and is seeking solutions to remove CO2 from seawater and make it less acidic. Seagrass meadows absorb high levels of CO2 from the atmosphere and seawater. It has been shown that California seagrasses may store about 73 billion grams of carbon in the top 30 centimeters of the ocean, act as sinks for atmospheric CO2 and may be significantly improving the water chemistry to organisms sensitive to ocean acidification via CO2 uptake. Melissa enjoys rock climbing, is an avid hiker, backpacker and has just started kite surfing.

Benefits to Society:

Seagrass meadows improve water quality, stabilize sediments and are home to many economically and ecologically valuable species; yet most of California's seagrass meadows have been lost. By exploring the ability of seagrass to sequester carbon and alter water chemistry, they can quantitatively evaluate the carbon services gained through seagrass conservation and restoration. This work will help inform state and federal management agencies about restoring these habitats while maximizing the carbon services they provide, which will become increasingly more important in the face of climate change.

Awards and Honors:

COAST Graduate Research Fellowship Winner, CSU Council on Ocean Affairs, Science, and Technology (November 2016)

Science Fellow, National Network for Ocean and Climate Change Interpretation (November 2016- August 2017)

Carbon Neutrality Competition: People's Choice Award (May 2016)

NSF Graduate Fellowship Honorable Mention (March 2014 and March 2015)

Publications and Posters:

Ward, M.A.; Oechel, W. E.; Largier, J. Long-term Air-Sea CO2 fluxes over coastal waters in the southern California bight. (In preparation).

O'Donnell, B.C.; Hill, T.M.; Kroeker, K.; Ward, M.A. Carbon sequestration in pacific seagrass meadows. (Submitted for review). PLoS ONE, 2017.

Ward, M.A.; Oechel, W.E.; Hill, T.M. Estuarine aquatic vegetation as strong seasonal sinks for atmospheric carbon dioxide. (In preparation).

Ward, M.A.; Seagrass Blue Carbon: Long-term burial and short-term chemical modification. Policy briefing document delivered to California legislature, cabinet secretaries and office of the Governor.

JOI WEEKS

San Diego State University
Cell and Molecular Biology

Degrees:

M.S. in Cell/Molecular Biology, San Diego State University

B.S. in Chemistry, University of North Carolina, Chapel Hill, NC

Scholar Sponsor:

Legler Benbough Foundation

About the Scholar:

Joi's research is focused on understanding interactions between cancer cells and the immune system and how this knowledge can be applied to develop cancer treatments. Specifically, she is using hollow nanoparticles (nanoshell, NS) with ultrasound to mechanically fracture tumor cells and later treat with NS coated in toll-like receptor 7 (TLR7) ligands to increase the anti-tumor immune response by immune cells. Her experiments will focus on determining the appropriate treatment combination, the mechanism of TLR7 ligand internalization and developing assays to evaluate human immune cell responses to treatments. Joi enjoys creating jewelry, designing attire, reading, and racing with her kids at the beach.

Benefits to Society:

Immunotherapy holds great promise in the treatment of cancer, however novel approaches are required to expose tumor antigens and train the immune system to destroy internal cancer cells. Joi's experiments will increase our understanding about combining nanoparticle technology with immuno-therapies, how TLR7 ligands are internalized by immune cells and ways to strengthen the anti-tumor response. Once the TLR7 NS combination treatments are found to be effective and safe for fighting human tumors, she hopes that this therapy will move on to clinical trials.

Awards and Honors:

Ford Foundation Scholarship,

National Academy of Sciences

San Diego Fellowship, UCSD

Harold and June Grant Memorial Scholarship, SDSU

Graduate School Scholarship, Black Opal/Biocosmetic Research Labs

Publications and Posters:

Wang, J.; Barback, C.; Ta, C.; Weeks, J.; Gude, N.; Mattrey, R.; Blair, S.; Trogler, W.; Lee ,H.; Kummel, A. Extended lifetime in vivo pulse stimulated ultrasound imaging. IEEE Transactions. 2017, PP.

Koechlein, C.; Harris, J.; Lee, T.; Weeks, J.; Fox, R.; Zimdahl, B.; Ito, T.; Blevins, A.; Jung, S; Chute, J.; Chourasia, A.; Covert, M.; Reya, T. High-resolution imaging and computational analysis of haematopoietic cell dynamics in vivo. Nat Commun. 2016, 7, 1-14.

Henderson, J.; Nisperos, S.; Weeks, J.; Ghulam, M.; Marín, I.; Zayas, R. Identification of HECT E3 ubiquitin ligase family genes involved in stem cell regulation and regeneration in planarians. Dev. Biol. 2015, 404, 21-34.

Kwon, H.; Bajaj, J.; Ito, T.; Blevins, A.; Konuma, T.; Weeks, J.; Lytle, N.; Koechlein, C.; Rizzieri, D.; Chuah, C.; Oehler, V.; Sasik, R.; Hardiman, G.; Reya, T. Tetraspanin 3 is required for the development and propagation of acute myelogenous leukemia. Cell stem cell. 2015, 17, 152-164.

ADAM WEISS

University of California, San Diego
Jacobs School of Engineering

Degrees:

B.S. in Mechanical Engineering, University of California, San Diego

Scholar Sponsors:

Wally Schirra Memorial Fund

About the Scholar:

In the past year, Adam's research has provided valuable insight regarding the classical counter flow configuration in which two gaseous jets impinge from opposite facing feed streams, a configuration that has far-reaching applications across several fields. His first effort clarified the dependence of the strain rate on the global properties of the counter flow, including the nozzle spacing between the two jets as well as their ratio of momentum flux. His second contribution includes a novel formulation that can be used for the study of chemically-reacting mixing layers situated in stagnation-type counter flows which was later used in his analysis of the acoustic pressure response of strained diffusion flames to harmonic pressure oscillations. Adam enjoys playing soccer, hiking and reading.

Benefits to Society:

Adam's work leads to a fundamental understanding of high-pressure phenomena known as acoustic instabilities characterized by the amplification of pressure oscillations in liquid-propellant rockets. His work will lead to improving predictive capabilities of these unwanted phenomena, thereby benefiting society and industry through better design of these engines.

Awards and Honors:

Outstanding Teaching Assistant Award, Mechanical & Aerospace Engineering Department, UC San Diego, 2015-2016

Publications and Posters:

Weiss, A. D.; Coenen, W.; Sánchez, A. L. Aerodynamics of planar counter flowing jets. J. Fluid Mech. 2017, 821, 1-30.

Weiss, A.D.; Vera, M.; Liñán, A.; Sánchez, A. L.; Williams, F.A. A novel formulation for unsteady counter flow flames using a thermal conductivity-weighted coordinate. Combust. Theor. Model. 2017 (accepted).

Weiss, A.D.; Coenen, W.; Sánchez, A. L.; Williams, F.A. Analysis of acoustic pressure response of nonpremixed counter flow flames in the diffusion flame regime. Combust. Flame, 2017 (submitted).

EMILY WHEELER

University of California, San Diego
Biomedical Science

Degrees:

B.S. in Environmental Science, Indiana University, Bloomington, IN

Scholar Sponsor:

ARCS Foundation

About the Scholar:

Emily's research is focused on understanding how cells in the body become cancerous and then create a life-threatening condition. Cancer is caused by mutations in proteins that cause cells to behave in an abnormal fashion. It is understood that mutations exist, but it is not understood how they change the function of the cell on a molecular level. Her research has successfully mapped the binding sites on RNA of a protein that is commonly mutated in a blood cancer. The binding to the RNA is largely similar between the mutated and normal forms of the protein. She is continuing this work by adding more components to the system which will help to understand which cellular function is affected by this mutant protein. She combines computational and experimental methods to understand how cells work on a molecular level.

Benefits to Society:

Cancer is the second leading cause of death in our country behind heart disease. However, curative treatments for most types of cancer are currently not available. Emily's research is focused on understanding which cellular functions are affected by the mutant protein. These questions need to be addressed in order to design treatments that will reverse the cancerous molecular functions and contribute to a cure for the disease.

Awards and Honors:

National Science Foundation Graduate Research Fellowship

Genetics Training Program Fellowship, UCSD

Publications and Posters:

Wheeler, E. C.; Van Nostrand, E. L.; Yeo, G. W. Advances and challenges in the detection of transcriptome-wide protein-RNA interactions. Wiley Interdiscip Rev RNA. [Online] 2017, 10.1002/wrna.1436.

Wheeler, E. C.; Washburn, M. C.; Major, F.; Rusch, D. B.; Hundley, H. A. Noncoding regions of C. elegans mRNA undergo selective adenosine to inosine deamination and contain a small number of editing sites per transcript. RNA Biol. 2015, 12(2):162-74.

Deft, S.; Yee, B.; Manning, A.; Rajendren, S.; Vadlamani, P.; Wheeler, E.C.; Domissy, A.; Washburn, M.; Yeo, G. W.; Hundley, H. A. The C. elegans neural editome reveals an ADAR target mRNA required for proper chemotaxis. eLIFE, submitted 2017.

NICHOLAS WILLIAMS

San Diego State University
College of Sciences, Chemistry

Degrees:

B.A. in Chemistry, Washington and Jefferson College, Washington, PA

B.A. in Economics Washington and Jefferson College, Washington, PA

Scholar Sponsor:

Diane and Tyler Miller

About the Scholar:

Nicholas' research entails the synthesis, purification and characterization of a proton reducing catalyst and promptly attaching the catalyst to a light absorbing semiconductor wafer. After using GATR-FTIR and contact angle measurements to provide substantial evidence of the molecular catalyst attachment, he went on to test the photo-catalytic capabilities of this hybrid system. Using a light source calibrated to one sun power, he found that by attaching the catalyst, the catalytic efficiency improved from that of the bulk semiconductor. This produces more hydrogen gas at a lower potential. Additionally, the modification also improved the electronic properties of the semiconducting materials, shifting its band potential and protecting it from forming an oxide surface. Going forward, he will be attaching other derivatives of the proton-reducing catalyst to water soluble light absorbing nano-particles. This will allow him to examine the benefits of using a homogeneous catalyst versus the previously described heterogeneous catalyst. Nicholas enjoys going to the gym and playing pick-up soccer.

Benefits to Society:

Mimicking the active center of a naturally occurring enzyme, Nicholas has prepared a molecular catalyst which will convert protons into hydrogen gas. Currently, the best catalyst for this reaction is platinum, a rather expensive metal, whereas, the catalyst Nicholas is using is iron based. His research is focused on combating the energy crisis. Using solar energy to produce hydrogen gas is essential, because it can be stored and burned at any point of day to meet energy demands with its only byproducts being water and energy, rather than emitting greenhouse gasses, like fossil fuels. Additionally, it provides another way to fine tune the electronic properties of a semiconductor surface, which is applicable to almost any electronic device.

Awards and Honors:

2017 Annual Masters Research Award

JIA JIA ZHANG

University of California, San Diego
Scripps Institution of Oceanography

Degrees:

B.S. in Biomedical Engineering, Harvard College, Cambridge, MA

Scholar Sponsor:

Virginia Lynch Grady Endowment

About the Scholar:

Jia Jia's research is focused on the development of genetic and molecular tools for the manipulation of biosynthetic pathways from marine bacteria. These pathways are responsible for producing structurally complex chemicals that have historically served as excellent drug leads. Understanding how to clone and express biosynthetic pathways in heterologous hosts could lead to the discovery of new bioactive compounds. Jia Jia is an avid fan of professional tennis in her relaxing moments.

Benefits to Society:

Natural products, or naturally occurring small molecules isolated from animals, plants, and microbes, have historically served as excellent medicines. Jia Jia's research seeks to further our understanding of the biosynthesis and bioactivity of natural products from bacteria such that they can continue to be utilized as drugs.

Awards and Honors:

National Science Foundation Graduate Research Fellow, August 2013- August 2016

Honors in Biomedical Engineering, Harvard College, 2013

1st Place NSF REU Student, Vanderbilt Institute of Nanoscale Science and Engineering, 2011

National Merit Scholar, 2009-2013

3rd Place National Junior Science and Humanities Symposium, 2008

Publications and Posters:

Zhang, J.; Moore, B.S. Digging for biosynthetic dark matter. eLife 4:e06453 (2015).

Tang, X.; Li, J.; Millan-Aguinaga, N.; Zhang, J. E.; O'Neill, C.; Ugalde, J. A.; Jensen, P. R.; Mantovani, S. M.; Moore, B.S.; Identification of thiotetronic acid antibiotic biosynthetic pathways by target-directed genome mining. ACS Chem. Biol. 10(12): 2841-2849 (2015).

Gunther, G.; LeBlanc, D.; Prasai, J. Zhang, D.E. Cliffel, K.I. Bolotin, G.K. Jennings. Photosystem I on grapheme as a highly transparent, photoactive electrode. Langmuir 29: 4177-4180 (2013).

Ways to Help ARCS Foundation Scholars

100% of each contribution is directed to the Scholar Award Fund.

ARCS Foundation provides a unique vehicle for supporting Scholars in science, medicine, and engineering without incurring administrative overhead. Member dues and event underwriting cover all operating expenses, and members donate their time to provide most administrative services.

There are two ways to support ARCS Scholars studying to complete their degrees in science, medicine, and engineering. The first is to make an annual gift to the Scholar Award Fund. The entire amount is awarded within a year of receipt. The second way to support Scholars is through a gift to the Endowment Fund. The principal continues to accrue interest in perpetuity; Scholar Awards are made from the interest.

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ARCS Legacy Society: ARCS Legacy Society comprises donors who have provided for ARCS Foundation in their estate plans, thereby insuring the future of ARCS Scholars. For further information about how to become a member of the Legacy Society, contact Becki Etess at (858) 456-2593.

Memorial & Honorary Gifts: Gifts may be made in memory of a loved one or in recognition of an individual on the occasion of a birthday, anniversary, or special event. All memorials and honoraria help build the Endowment.

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The amounts above include donations to the ARCS Foundation Scholar Award Fund, Endowment, and Memorial Funds as of June 30, 2017.

See an error or omission? Please contact Rachel Friedman rfriedman1@mac.com

ARCS® Foundation, Inc.

Achievement Rewards for College Scientists

About Us

ARCS Foundation is a nonprofit organization founded and administered entirely by women who see a national problem and are taking the initiative to try to solve it. The organization's aim is to address this country's most critical competitiveness issue: the serious shortage of American scientists and engineers. We address this issue by providing financial awards and encouragement to men and women working to complete their degrees in science, engineering, and medical research.

Since its founding in 1958, ARCS Foundation has grown to 16 chapters nationally and invested more than $100 million in the potential of 9,500 of the most outstanding American graduate and undergraduate Scholars in science, engineering and medical research at 51 of the country's top research universities. Since 1985, the San Diego chapter alone has been responsible for contributions of more than $9.6 million in support of Scholars attending our four academic partner institutions:

San Diego State University • The Scripps Research Institute
University of California, San Diego • University of San Diego

We are very proud of what ARCS Foundation has accomplished. We know that we have a mission that is important to our country's economic recovery, our global technological leadership, and ultimately the well-being and quality of life for all people.

ARCS Mission

ARCS Foundation 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.

About Our Scholars

ARCS Scholars represent an elite group of students selected by their faculty for their recognized achievements and for their exceptional promise to contribute substantially to their fields. These Scholars represent America's future. San Diego ARCS Scholars can boast of a 98% graduation rate, compared with the national rate for graduate students in the sciences and engineering of 60%. Funds invested in our Scholars pay dividends for generations to come.

Scholar Selection

Scholars must be U.S. citizens and meet ARCS-established academic criteria of a 3.5 GPA pursuing undergraduate and graduate degrees in a wide range of subjects. Beyond the general area of science, engineering and medical research, these Scholars are specializing in astronomy, biochemistry, botany, cell and molecular biology, chemistry, computer science, ecology, engineering, genetics, marine biology, mathematics, oceanography, physics and more.

During 2017-2018, ARCS is pleased to support 58 Scholars for a total of more than $422,500.

ARCS San Diego Business Network

The ARCS San Diego Chapter has evolved their ***Community Advisory Council (CAC)*** into the ***ARCS San Diego Business Network.*** The ARCS San Diego Business Network includes professionals from San Diego's Science, Technology, Engineering, and Math (STEM) companies and trade organizations and ARCS Scholars. Through the Chapter's private ARCS Foundation San Diego Chapter LinkedIn Group, ARCS Scholars have direct access to representatives from these entities who are focused on the advancement of science and technology in the San Diego community. Graduating ARCS Scholars who embark on careers in industry in turn become contacts in the Network. The Network is committed to assisting the ARCS San Diego Chapter accomplish its goals, and for the ARCS Scholars, the Network serves as a bridge to San Diego's STEM industries and entrepreneurial community. Industry members interested in joining the ARCS San Diego Business Network can email June Chocheles, ARCS Chapter member and LinkedIn Group Administrator, at chochelesconsulting@cox.net.

A Note to ARCS Donors

Student comments below illustrate the benefits your generosity has brought to the lives of ARCS Scholars:

1) Recognition amongst peers as a leader and as a change agent for our profession
2) A reminder that our work is highly relevant to the general public
3) The prestige of receiving this award will be beneficial for future careers
4) Provides a vote of confidence that is motivating and gratifying
5) Opportunity to represent a prestigious organization and be in the company of like-minded successful individuals
6) Opportunities for professional development by supporting conferences-related travel
7) Consistent source of funding for research and public engagement goals
8) Opportunity to meet peers across other fields and scientists of high caliber
9) Ability to ask bigger and broader questions in fields of research
10) Easing the financial burdens of living expenses

We of ARCS Foundation thank you for your partnership in support of this year's 58 dedicated and hard-working Scholars.

2017-2018 ARCS® Membership

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