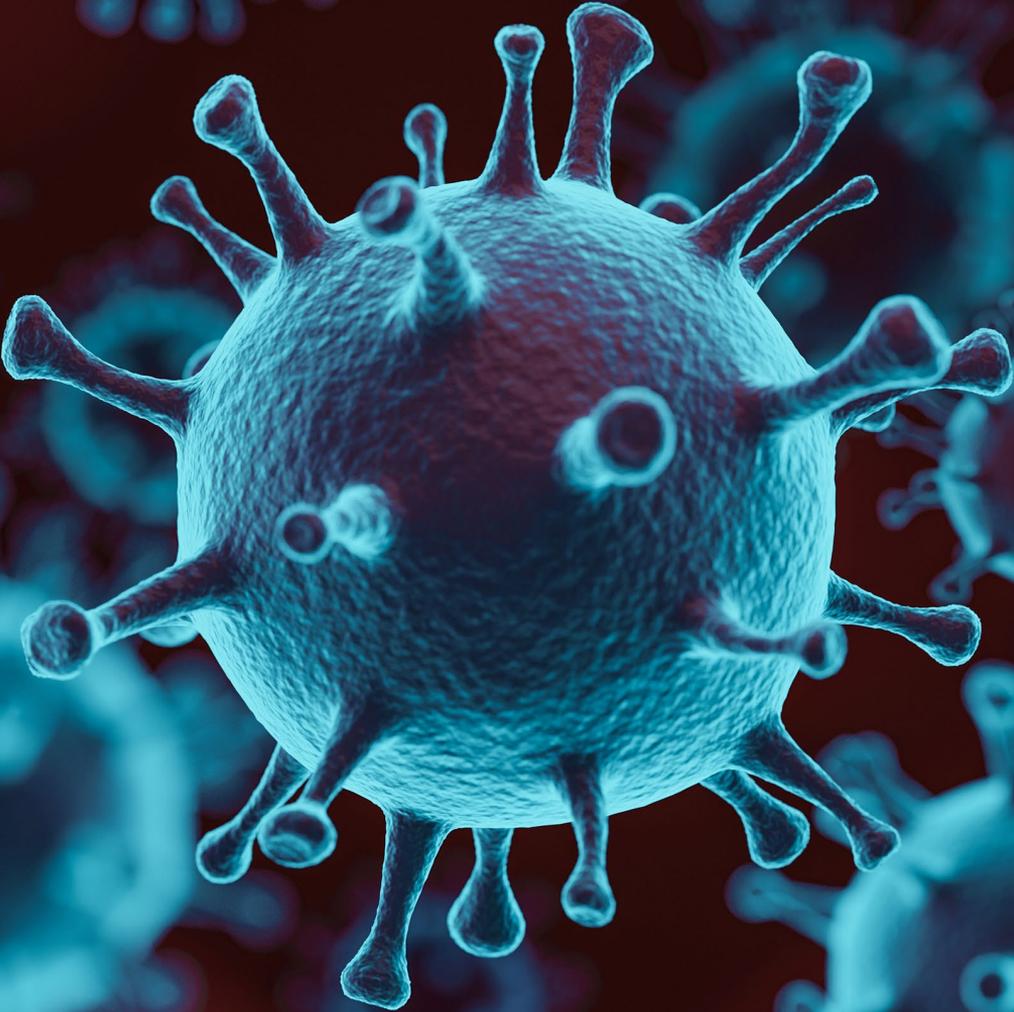


SAN DIEGO STATE UNIVERSITY
2019 - 2020
RESEARCH
HIGHLIGHTS



SAN DIEGO STATE
UNIVERSITY



SAN DIEGO STATE UNIVERSITY

Nine months into the 2019-20 fiscal year, the world changed. SDSU's response to the COVID-19 pandemic and subsequent shut-down focused on the safety and health of our community and followed CDC and County of San Diego health guidelines.

Despite the challenges facing our researchers, many of whom moved to virtual instruction and assumed family care responsibilities, they transitioned quickly and successfully. Those whose activities were deemed essential continued their work on campus, and another 200 researchers returned to their labs by June. Others adapted to continue their work remotely. Funding agencies pivoted and issued COVID-19 grant opportunities. Our faculty responded. To date they have received nearly \$9 million to support investigations into the testing, tracing, spread, communications and effects (physical and mental) of the coronavirus. Pages 10-11 highlight some of their COVID-19 related work.

Two milestones, achieved despite the pandemic, will strengthen and expand our research mission. First, SDSU is moving its Strategic Plan forward. It includes a goal to increase the research profile of the university and supports movement to an R1 institution. Second, SDSU broke ground on its Mission Valley campus, which will include an innovation district and is expected to expand the university's regional economic impact by \$3 billion annually.

I am proud of the 307 SDSU faculty and staff who received 758 awards and \$144.4 million last year, despite unexpected difficulties. Some of their projects are highlighted on the pages that follow. A [complete listing*](#) of all 2019-20 awardees and the more than 300 sponsors who supported them, can be found [here](#).

Hala Madanat
Interim Vice President for Research and Innovation
San Diego State University

Cover: Coronavirus. See pages 10-11

* https://www.foundation.sdsu.edu/recent_awards.html
https://www.foundation.sdsu.edu/pdf/about_2019_20_awards_listing.pdf

Analyzing and Predicting Viruses Mathematically

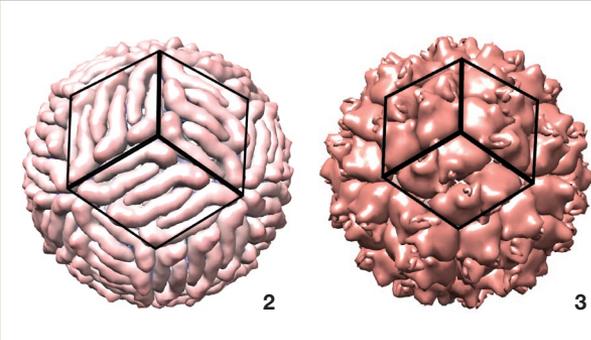
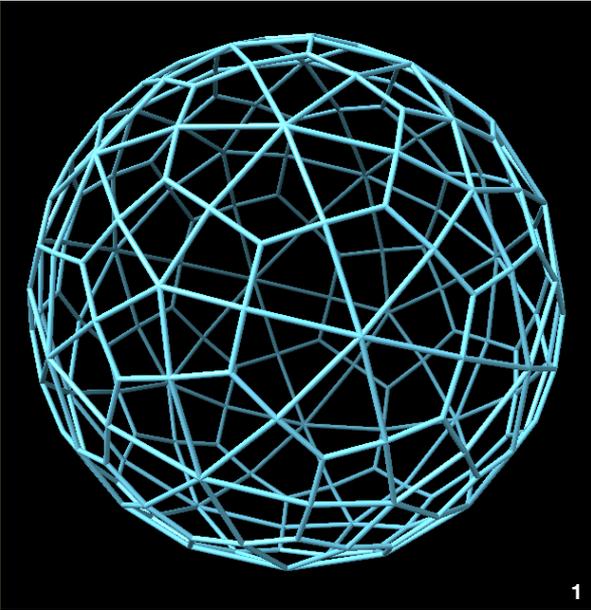
ANTONI LUQUE

*Mathematics and Statistics
and Viral Information Institute*

Viruses store their infective genetic material in a protein shell called a capsid. The capsid protects the virus's genetic material and delivers it into a host to initiate a new infection. Most capsids display icosahedral symmetry, but little is known about how viral proteins have evolved to form such precise geometries.

Dr. Antoni Luque models the geometrical and physical properties of viral capsids. He developed a mathematical framework to examine viral capsids that were until now unresolved. Dr. Luque and his team are applying this framework to predict viral capsids from genomic information. Ultimately, this technology will offer antiviral strategies for even unknown viruses that are lurking in the environment.

The National Science Foundation supports Dr. Luque's research (#1951678).



- 1 Chimera image of a 3D model of the new architectures discovered by Dr. Luque and colleagues.
 - 2 Two viruses recently classified & mathematically using Luque's framework: Zika virus (2) and picobirnavirus (3) Zika virus. Image by Reidun Twarock and Antoni Luque
 - 3 Dr. Antoni Luque. Photo by Cynthia Silveira
- <http://luquelab.com>

Impact of Past, Secondhand Smoke and Dietary Patterns on Breast Cancer Prognoses

TIANYING WU

Public Health

Tobacco smoke residue contains toxic chemicals and carcinogens, polluting homes and public places long after smoking has ceased. According to the Centers for Disease Control (CDC), there is no risk-free level of exposure to this secondhand smoke (SHS).

Women with breast cancer are more susceptible to environmental damages; those with low incomes are at high risk of living in homes polluted with SHS. Many breast cancer survivors (30-40%) are former smokers and have an already increased risk of recurrence and mortality.

Epidemiologist Tianying Wu studies the impacts of SHS, past smoking, dietary patterns, and endogenous biological damages on invasive breast cancer recurrence and mortality. Her research suggests that breast cancer survivors who are former smokers and have higher consumption of acid-producing diets have three times the mortality risk than survivors who are never smokers with comparable intakes of acid-producing diets.*

Dr. Wu's work will provide strategies to improve cancer prognosis and evidence to support smoking prevention measures.

California's Tobacco-related Disease Research Program supports Dr. Wu's work (T301P0998).

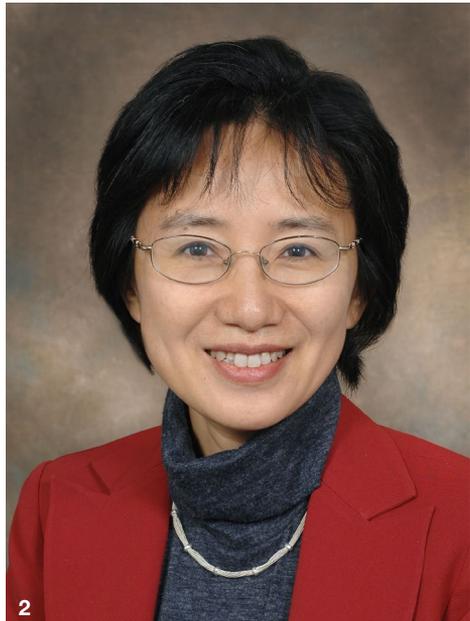
* The results of Dr. Wu's study were published in the *Journal of Clinical Medicine* in June 2020.



1

Acidic diets plus high past smoking intensity lead to worse prognoses in breast cancer survivors.

“Breast cancer survivors, especially those who are past smokers, need precision care.”
-Tianying Wu



2

1 Image by Alkalife.com

2 Dr. Tianying Wu.

<https://publichealth.sdsu.edu/people/tianying-wu>



bishlab
BODY IMAGE, SEXUALITY, & HEALTH



Preventing Eating Disorders among Vulnerable Populations

AARON BLASHILL

Psychology

There is a long-standing belief among the general public and clinicians that eating disorders are almost exclusively a female problem. However, males also experience eating disorders and may constitute up to 40% of individuals with eating issues. Among males, sexual minorities (i.e., gay, bisexual and non-heterosexual identified individuals) are one of the most vulnerable groups for developing eating disorders, due in large part to the stressors they experiences as minority individuals in a heterosexist society.

Noting a lack of research on eating disorder prevention in this population, psychologist Aaron Blashill is testing a promising intervention that is brief in duration, peer-led and group-based, which could potentially be implemented in community health centers across the country.

Dr. Blashill directs SDSU's Body Image, Sexuality and Health Lab. His work is supported by the National Institute on Minority Health and Health Disparities (5R01MD012698-04).

1 Photo by Nicholas Swatz

2 Dr. Aaron Blashill. Photo by Godelievre Louis

<https://bishlab.sdsu.edu>

Discovering Brain and Muscle Treatment Targets for Post-Traumatic Headache

KATRINA MALUF

Exercise and Nutritional Sciences

Nearly 1.7 million individuals sustain a traumatic brain injury (TBI) requiring medical attention every year in the U.S. Nearly half of those who sustain a TBI report residual disability from post-concussive symptoms that can persist for years after injury. Post-traumatic headache (PTH) is the most common and debilitating of these symptoms.

Dr. Katrina Maluf and colleagues at UCSD and the Veteran's Administration San Diego Healthcare System are using advanced quantitative sensory testing and magnetic resonance imaging techniques to identify brain and muscle biomarkers of PTH and chronic neck pain in veterans with mild TBI. This work will improve the diagnosis and treatment of PTH to reduce the burden of chronic pain in military service members, veterans, athletes, and others impacted by TBI.

This research is supported by the National Institute of Neurological Disorders and Stroke (1R21NS109852-01A1).



- 1 Dr. Maluf (left) and research assistant Mike Walsh (right) discuss functional magnetic resonance imaging (fMRI) of the brain and neck.
- 2 Research assistants Tiana McMann (left) and Nicole Whiteley (right) assess pressure pain thresholds in the temporalis muscle.
- 3 Dr. Maluf shows students in the Doctoral of Physical Therapy Program how to measure multidirectional neck strength in the Applied Sensorimotor Laboratory at SDSU.

Photos by UCSD and SDSU labs

<https://ens.sdsu.edu/dpt/research/faculty-research-interests/applied-sensorimotor-research-laboratory>



EQUIP



EMPOWERED TEACHERS, EQUITABLE CLASSROOMS



“Implicit bias is a pervasive problem that limits the participation of women, students of color, people with disabilities, and other minoritized groups in STEM. Helping faculty address their biases will create more equitable learning environments.”

-Daniel Reinholz

Building More Equitable Classrooms

DANIEL REINHOLZ

Mathematics and Statistics

Student participation provides the foundation for student learning. When students actively participate in classroom discussions, they refine their ideas and develop a sense of belonging in their disciplinary communities.

Dr. Daniel Reinholz is a co-developer of EQUIP, a free web-based classroom observational tool for tracking student participation. EQUIP data help teachers identify the subtle and sometimes invisible racialized and gendered patterns that play out in their classrooms, privileging some students over others. Dr. Reinholz uses EQUIP in his research to help STEM faculty teach more equitably when eliciting participation and responding to student ideas.

This work will help transform the education system to better serve the needs of all students.

Dr. Reinholz’s research is funded by a prestigious National Science Foundation CAREER award (#1943146).

1 Dr. Daniel Reinholz, Amelia Stone-Johnstone, and Antonio Martinez working with analytics generated by the EQUIP observation tool. Photo by Christine Luu

<https://www.danielreinholz.com>
<https://www.equip.ninja>

Leveraging Stem Cell Biology to Cure Cancer

STEPHANIE GRAINGER

Biology

Biologist Stephanie Grainger studies how stem cells are made, maintained and become cancerous. Dr. Grainger explores how hematopoietic stem cells (HSCs) are developed and expanded, and has identified a specific Wnt protein that increases the number of HSCs during development in zebrafish and human pluripotent stem cells (hPSCs).

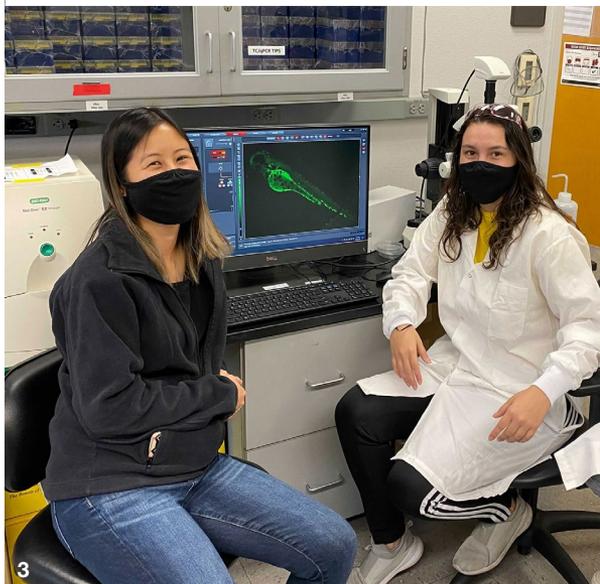
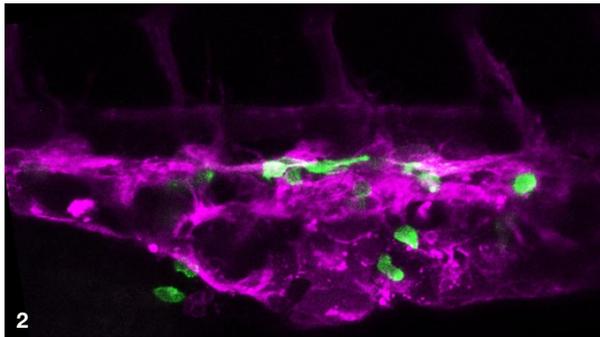
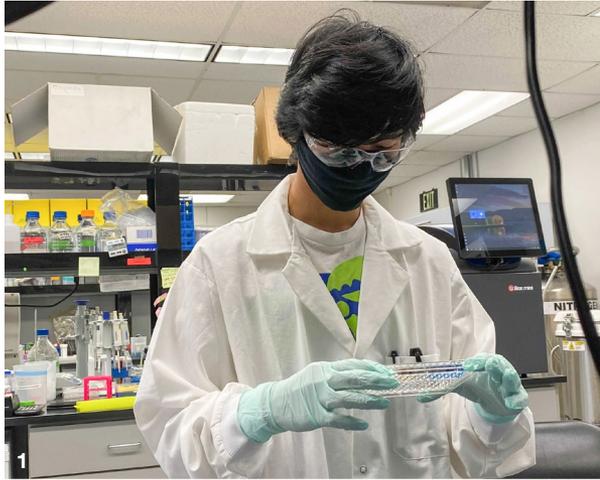
HSCs are the cells that make up the entire blood supply, and much of the immune system. They are also the curative cell in a bone marrow transplant—patients with blood cancers like leukemia have their diseased HSCs replaced with donor HSCs. Yet, matched donors are hard to come by. Making HSCs in a dish from hPSCs could circumvent the need for bone marrow donations.

Dr. Grainger uses zebrafish to study the cell signals that make HSCs because they are transparent as HSCs develop. This enables her team to watch HSCs as they are born, in real time, and to assess how modulating different genes impacts HSC development.

The National Heart, Lung and Blood Institute supports this research (R00HL133458-04).

- 1 Undergraduate student Dwayne Sese examines his protein lysates.
- 2 Hematopoietic stem cells (green) in one of their endothelial cell niches (magenta), captured by confocal microscopy in a live 3 day old zebrafish.
- 3 Nikki Nguyen and Jasmine Chavez with a glowing zebrafish embryo.

<https://thegraingerlab.com>



Identifying Breakdowns in Vocabulary Learning in Children with Language Disorders

ALYSON ABEL MILLS

Speech, Language and Hearing Sciences

Developmental Language Disorder (DLD) affects two children in every classroom. Children with DLD have trouble using learning and using new words, affecting their reading and broad academic outcomes.

Dr. Alyson Abel Mills directs SDSU's Language Learning Lab and studies word learning and language processing in children with DLD using a combination of behavioral and brain measures. Behavioral measures of word learning tell us how successful children are learning new vocabulary. Brain measures, such as electroencephalogram (EEG), examine word learning in real-time and offer a way of examining the neural mechanisms and associated processes involved in word learning.

This research will help uncover what influences the vocabulary deficits in children with DLD and will inform clinical practices with these children.

Dr. Abel Mills' work is supported by the National Institute on Deafness and Other Communication Disorders (1R21DC018865-01).



1 Research assistants Savannah Kennedy and Natalie Andersen work with Dr. Abel Mills in the computer lab.

2 A child research participant receiving EEG testing, with research assistant Kirsten Miller.

Photos by Language Learning Lab

<https://slhs.sdsu.edu/lllab>

Brain-Implantable Processors

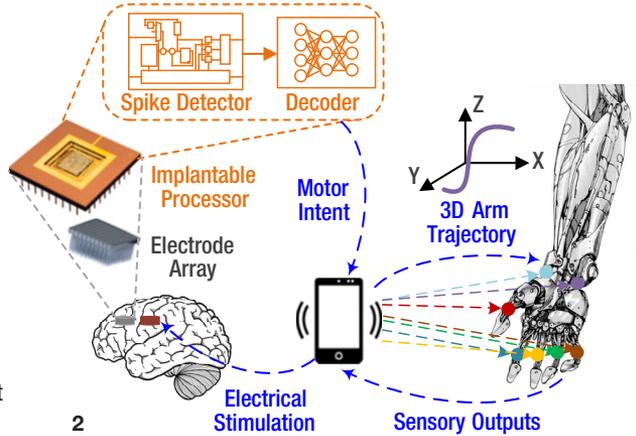
AMIR ALIMOHAMMAD

Electrical and Computer Engineering

One of the primary aims of brain-computer interfaces (BCIs) is to restore behavioral functions for patients who are unable to move or communicate through normal neural pathways caused by stroke or chronic disease. BCIs acquire signals from the brain, analyze them and translate them into commands that are transmitted to an external device to carry out a desired action.



Dr. Amir Alimohammad is developing a brain-implantable mixed-signal processor to accurately and reliably decode the brain's neural spikes for controlling prosthetic devices with a wide range of movements. The brain's neural activities are first recorded by an electrode array. The implantable processor will then decode the inherent information in the detected neural spikes and transmits the motor intent wirelessly to a mobile phone, which sends arm trajectories to the prosthetic. The sensory information collected by the prosthetic will be sent to the brain to provide patients with a feeling of natural control. This research will result in a transformative BCI system that will contribute to the rehabilitation and improving the quality of life of patients suffering from neurodegenerative diseases or paralysis.



Dr. Alimohammad's work is funded by the National Science Foundation (#2007131).

- 1 Rehabilitation of patients using the brain-implantable processor.
- 2 Utilization of the brain-implantable processor in the BCI systems. Illustration by Amir Alimohammad
- 3 Dr. Amir Alimohammad. Photo by Terra Birkigt

<https://amir.sdsu.edu>



A Unique University-Prison Partnership

ANNIE BUCKLEY

Art and Design

People incarcerated in prison have been shown to benefit from taking part in art seminars and projects. Participation in arts programming in prisons leads to increased empathy, confidence and self-esteem.

The Prison Arts Collective (PAC) applies a university model and principles of restorative justice to rehabilitation through visual arts and creative writing. PAC's diverse teaching team includes faculty, undergraduate and graduate students, and professional guest artists, writers, musicians and scholars.

Annie Buckley directs SDSU's School of Art and Design. Her focus on art and social justice led to her founding of PAC in 2013. PAC facilitates weekly art programming in eleven California state prisons and has chapters at four CSU campuses, providing an important opportunity for those incarcerated to engage with others and develop critical and creative thinking.

PAC is a project of Arts in Corrections, an initiative of the California Arts Council and the California Department of Corrections and Rehabilitation (IA AIC-18-136).



“We envision a safer, healthier society where everyone has access to the arts to promote wellbeing and empowerment.”

-Annie Buckley



1 Student interns gather with participating artists to discuss their work and share ideas at California State Prison, Los Angeles County.

2 Annie Buckley, right, works with participants at the California Institution for Women during a collaborative mandala project.

3 Annie Buckley guides a participant during one of Prison Art Collective's critique classes at the California Institution for Men.

Photos by Paul Merts

<https://www.prisonartscollective.com>



TACKLING CORONAVIRUS

Faculty from all seven of SDSU's colleges are studying COVID-19, analyzing how COVID-19 operates and spreads, how the pandemic affects our mental health and how communities are coping. A few examples follow.

Eyal Oren, associate professor and interim director of the School of Public Health, is working with clinical partners in San Diego to collect information on COVID-19 cases in order to understand who is more likely to test positive for COVID-19 depending on characteristics like age, gender, ethnicity or occupation. His project is funded by the County of San Diego Health and Human Services Agency.

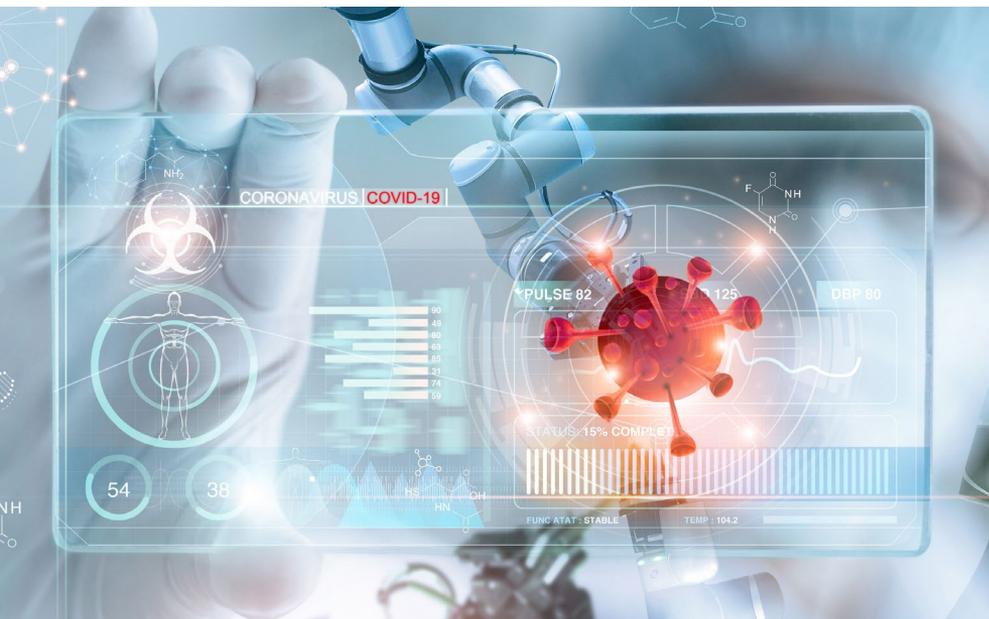
Surabhi Bhutani, assistant professor in the School of Exercise and Nutritional Sciences, is examining the relationship between loss of smell and taste and COVID-19. In one analysis, Bhutani and colleagues found that smell loss during illness is the best predictor of COVID-19 status.

Public Health professor **Hala Madanat**, and Institute of Public Health director **Corinne McDaniels-Davidson** are partnering with the County of San Diego Health and Human Services Agency to recruit and train a workforce of Community Health Workers to provide culturally appropriate and linguistically concordant COVID-19 contact tracing services in underserved communities.

School of Nursing assistant professors **Amanda Choflet** and **Judy Dye** are collaborating with Sharp HealthCare to better understand the effect of COVID-19 on the stress, coping and anxiety levels of nurses.

Psychology professors **Gregory Talavera** and **Linda Gallo** are studying the impact of the COVID-19 pandemic on the health and well-being of Latinx residents of San Diego's South Bay. They are surveying 2,200 participants on the psychosocial and socio-economic impact of the pandemic, as well as COVID-19 health status, testing, hospital admissions and recovery.

Virology professor **Forest Rohwer** and associate professor of mathematics and statistics **Naveen Vaidya** are collecting and analyzing environmental samples for COVID-19. Their team is developing mathematical and computational models to predict COVID-19 risk and trends in different parts of San Diego, informing public agencies about how the virus spreads and determining if there are environmental reservoirs where the virus thrives. Their work is funded by a Rapid Response Grant from the National Science Foundation.



Civil, construction & environmental engineering associate professor **Natalie Mladenov** and assistant professor **Matthew Verybyla**, are working with public health assistant professor **Kari Sant** to measure SARS-CoV-2 in wastewater and evaluate its persistence in water. They are using spiking and degradation experiments, combined with sample collection from waterways with known wastewater contamination, to understand the persistence of SARS-CoV-2 in wastewater and surface water. The project is funded by the California State University COAST program and San Diego River Conservancy.

Public health professors **Hala Madanat**, **Susan Kiene**, and **Eyal Oren** are leading an NIH-funded project to increase uptake of testing in underserved communities, hoping to curb these disparities. The effort, dubbed “Communities Fighting COVID!,” aims to test 42,000 people in 14 months.

Professor of geography **Ming-Hsiang Tsou** directs SDSU’s Center for Human Dynamics in the Mobile Age, where they have developed a comprehensive resource database to help monitor and visualize outbreak patterns in San Diego County using big data, GIS and social media. The Research HUB data includes vulnerability maps, timelines that track major policies and events for 16 major cities, and SMART dashboards that use social media and keywords to monitor real-time information.

Biology professor **David Lipson** is collaborating with San Diego biotechnology company Menon Biosensors and University of California, San Diego researchers to develop a new COVID-19 test using a combination of molecular biology and nuclear magnetic resonance technology.

Professor **Shawn Flanigan** and associate professor **Megan Welsh** in the School of Public Affairs, are surveying unsheltered homeless to understand how they cope and survive during shelter-in-place orders, which have disrupted access to needed services and resources. Their project is funded by the California Tobacco-Related Disease Research Program.

Xialu Liu, associate professor of management information systems, is using statistical methods to analyze how government actions impact the spread of COVID-19.

<https://research.sdsu.edu/covid-19-projects>

Information courtesy of Kellie Woodhouse/SDSU Research

Making Batteries Last Longer and Deliver More Energy

KEVIN WOOD

Mechanical Engineering

Energy storage is one of the most critical challenges facing 21st century society.

Dr. Kevin Wood specializes in electrochemical energy storage devices including next generation Li metal batteries. Lithium metal is critical to battery technology as it could enable electric vehicles to travel from San Diego to Seattle on a single charge. Unfortunately, dangerous growths called dendrites occur when charging these battery systems. Dendrites reduce battery capacity and can cause catastrophic fires, preventing the use of high energy density lithium metal in commercial applications.

Dr. Wood is collaborating with an electric vehicle battery provider to understand the origins of dendrite growth and how to prevent these damaging deposits from forming. They are engineering solutions that will enable lithium metal electrodes for electric vehicles to improve driving range and safety.

Support for this research comes from Benelos Clean Power Holding Ltd.



“Batteries are the most prevalent energy storage solution and hold the key to a clean electric grid and electrification of high energy density portable applications (such as cars and buses).”

-Kevin Wood

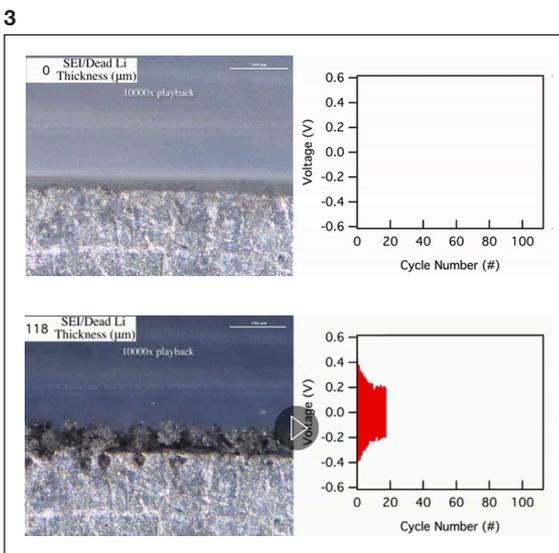
1 Ph.D. student Alex Aleshin working in the glovebox which keeps reactive battery materials usable and safe to work with.

2 Interface Design Lab principal investigator Dr. Kevin Wood

3 Degradation of battery electrodes during cycling. The black material build up is called Dead-Li, and causes cell failure.

Photos by Interface Design Lab

<https://interfacedesignlab.sdsu.edu>



Exploring Brazilian Culture

ERIKA ROBB LARKINS

Anthropology and Sociology

Dr. Erika Robb Larkins directs SDSU's Behner Stiefel Center for Brazilian Studies, which focuses on the interdisciplinary examination of globally relevant issues in Brazil.

The center collaborates with Brazilian scholars and community members to bring programming and educational activities to SDSU. One of Dr. Larkins' recent programs featured the Afro-Brazilian cultural traditions of Northeastern Brazil. With funding from the Consulate General of Brazil in Los Angeles, the center hosted a travelling art exhibit to discuss Brazilian history and culture. The center's new virtual initiative, the Digital Brazil Project, expands access to Brazilian studies for the SDSU community and beyond.

Dr. Larkins' three-week seminar, The Making of Modern Brazil, was attended by faculty from around the United States. This National Endowment for the Humanities-supported seminar examined the social, racial and cultural diversity of Brazil through films, music, ethnographic texts, fiction, and historical images and documents (FS-267176-19).



“Our goal is to foster research that is interdisciplinary in nature, a focus that reflects our perspective that today’s challenges can only be solved by working across academic borders.”

-Erika Robb Larkins



- 1 Street art depicting prominent human rights activist, Marielle Franco. Photo by Erika Robb Larkins
- 2 A traveling art exhibit brought Afro-Brazilian culture to campus. Photo by Joel Ortiz
- 3 Dr. Erika Robb Larkins. Photo by Jacque Braun
- 4 Images from Rio de Janeiro, where Larkins' research is focused. Photo by Kathryn Sanchez

<https://brazil.sdsu.edu>
<https://www.digitalbrazilproject.com>

Using Seaweed Farms to Clean Organic Pollutants from San Diego Bay

MATTHEW EDWARDS

Biology

The frequent introduction of organic pollutants into the marine environment causes concern for the health of nearshore ecosystems and the people that use them.

Ecologist Matthew Edwards is working with Leslie Booher and Torre Polizzi from Sunken Seaweed, LLC to grow seaweeds that will remove pollutants from San Diego Bay waters through bioremediation.

They are currently testing mass-specific and time-dependent rates of Nitrogen and Phosphorus uptake by the green alga *Ulva lactuca* (aka sea lettuce). If this seaweed is shown to effectively remove these organic pollutants from the water, they will expand their activities to grow *Ulva* on a farm near the Grape Street Pier in San Diego Bay, helping to clean the bay's waters and improve the health of the ecosystem.

The U.S. Department of Energy supports this research (DE-AR0001171).



- 1 Leslie Booher underwater at the Sunken Seaweed Farm, the only operational macroalgal farm in California waters. Photo by Torre Polizzi
- 2 Seaweeds growing under different nutrient and salinities in the Edwards lab. Photo by Matthew Edwards
- 3 Dr. Edwards in the field (Aleutian Islands). Photo by Brenda Konar

<https://sdsukelp.weebly.com>



Why are Hispanic and Latinx Americans Less Likely to Die from Cardiovascular Disease?

AMANDA C. MCCLAIN Exercise and Nutritional Sciences

Cardiovascular disease (CVD) is the leading cause of mortality in the U.S. However, it is the number two cause of mortality for Hispanic/Latinx adults, behind cancer. This deviation exists despite a large proportion of Hispanic/Latinx adults exhibiting physiological risk factors like hyperglycemia, obesity and hypertension, and social risk factors like poverty, low levels of education and food insecurity.

Dr. Amanda McClain explores why Hispanics/Latinx are less likely to die from CVD than non-Hispanic white and Black adults. By identifying existing social, material, human and cultural resources that promote food security and healthier diets and subsequent lower CVD risk, her research will help us understand which resources can be integrated into interventions that promote CVD health among Hispanic/Latinx communities.

Dr. McClain's research is supported by a prestigious K01 career award from the National Heart, Lung and Blood Institute (1K01HL150406-01).

1 Dr. McClain and students Jacqueline Ibarra (L), Erika Romero (R), and Jonnatan Fajardo (R) meet to review and discuss qualitative data. Photo by Scott Hargrove

2 Dr. Amanda C. McClain. Photo by Scott Hargrove

3 Undergraduate Foods and Nutrition student, Jacqueline Ibarra, presents at the 2019 SDSU Student Research Symposium. Photo by Amanda McClain

<https://ens.sdsu.edu/people/amanda-mcclain>

Creating Chemistry Pathways

REGIS KOMPERDA
B. MIKAEL BERGDAHL
BYRON PURSE

Chemistry and Biochemistry

Underrepresented students at community colleges face challenges of financial resources, persistence rates and transfer rates to four-year universities. This hampers their ability to progress towards building a career in a STEM field or to enter a graduate degree program.

Drs. Regis Komperda, Mikael Bergdahl and Byron Purse and their colleagues at Southwestern Community College (SWC) have developed a mentoring and research experience bridging the SDSU and SWC chemistry and biochemistry programs. Students interested in chemistry are offered scholarships, paired with faculty mentors, and provided critical lab experience and research opportunities.

This project will help remove roadblocks to student transfer and post-transfer success by supporting students while they complete chemistry and STEM programs at SWC and earn chemistry and biochemistry degrees at SDSU. It will ultimately allow them to graduate with less debt and continue on to careers and graduate studies in STEM.

This work is supported by the National Science Foundation (DUE-1929758).

- 1 Chemistry professors Regis Komperda, Byron Purse and Mikael Bergdahl are collaborating with Southwestern Community College to foster students interested in chemistry. Photo by Scott Hargrave
- 2 Recent SWC transfer and Mentored Pathways student Sophia Alvarado Hernandez works in the Purse lab with her graduate student mentor, George Samaan. Photo by Dr. Pratibha Kumari

https://newscenter.sdsu.edu/sdsu_newscenter/news_story.aspx?sid=77800



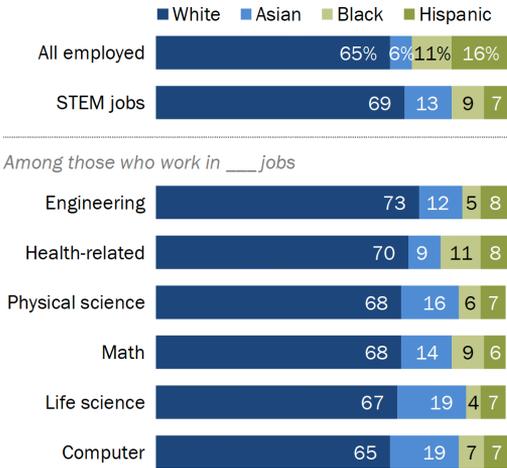
“Positive mentored undergraduate research experiences are key to helping students feel like part of the scientific community and to their persistence in earning degrees. We are thrilled to bring these students into the research lab and to help them achieve their goals.”

-Regis Komperda



Blacks and Hispanics underrepresented across most STEM job clusters

% of employed in each occupational group who are ...



1

Ensuring Success for Women of Color

MELO-JEAN YAP
FELISHA HERRERA VILLARREAL

Administration, Rehabilitation and Postsecondary Education

According to the Pew Research Center, whites, Blacks and Hispanics are equally likely to say they liked both math and science classes in grades K-12. However, Blacks and Hispanics are underrepresented in STEM occupations relative to their share in the U.S. workforce.

Social interactions have been shown to influence persistence in STEM fields, but not much has been studied about how these interactions influence women of color and their scientific thinking. Drs. Melo-Jean Yap and Felisha Herrera Villarreal are examining national trends in community college STEM pathways for women of color and the dynamics in their networks to understand their academic journeys. Their work will identify factors that contribute to student retention and success for women of color and other underrepresented populations in STEM.

The National Science Foundation supports this research via NSF (DUE-1937777).



2

- 1 Pew Research Center, January 2018. "Women and Men in STEM Often at Odds Over Workplace Equity."
- 2 Dr. Yap (center, right) and Dr. Herrera Villarreal (center, left) with project participants.

<https://res-iste.sdsu.edu/index.php/women-of-color-in-stem>

Moving from Decolonizing to Indigenous Centered Practices

CAROL ROBINSON-ZANARTU
KATY LEIGH-OSROOSH
KATINA LAMBROS-ORTEGA

Counseling and School Psychology

Decolonization requires examining and challenging the colonialist practices that have influenced our society and still persist today. Indigenous centered practices recognize the importance of creating approaches based on the beliefs, histories and practices of Native American and Indigenous (NAI) peoples when working with NAI communities.

Drs. Carol Robinson-Zanartu and Katy Leigh-Osroosh co-direct the SHPA project, an interdisciplinary training program which prepares school counselors and psychologists to work with NAI youth with high mental health needs. Shpa is a Kumeyaay word for eagle in one of the dialects, and represents the centering of the Kumeyaay community in this work. SDSU scholars, educators and community leaders are creating Kumeyaay centered resilience groups

This project will help us understand how Indigenous centered practices contribute to the development of protective factors in NAI youth experiencing colonialist education systems.

The U.S. Department of Education supports this work (H325K190006).

- 1 SHPA scholars present their work at the NIEA convention.
- 2 SHPA scholars exploring Kumeyaay historical sites with Kumeyaay leader.

Photos by SHPA scholars
<https://education.sdsu.edu/shpa>





“Older adults face many challenges when making financial decisions, especially with declining cognitive abilities. It calls for greater efforts to support them through the cognitive aging process.”
-Ning Tang



How will Cognitive Aging Affect your Financial Behavior?

NING TANG

Finance

The growing older population needs to make important financial decisions about the wealth they have accumulated over a lifetime. Meanwhile, cognitive abilities, a critical component for optimal decision-making, decline sharply in old age.

Will weakening cognitive abilities influence financial behavior among older adults? What is the underlying mechanism of the effect?

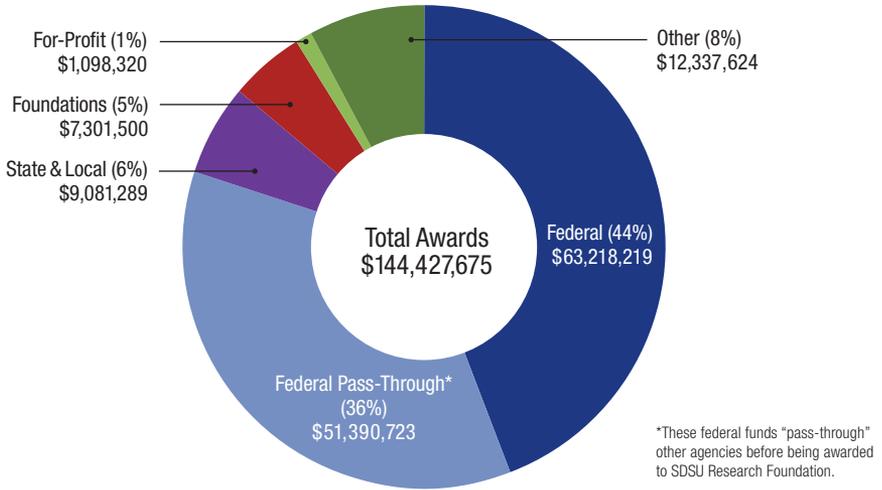
Dr. Ning Tang studies the effects of cognitive abilities on a set of financial behaviors with different dependence on information processing abilities. She also explores the potential ways cognition works on financial behavior. For example, do cognitive abilities affect financial decision-making through information processing ability or noncognitive skills such as self-efficacy? Understanding this issue has important implications for policymakers to assist the older population through the widespread cognitive aging process.

Dr. Tang's work is supported by the TIAA Institute.

- 1 People are taking greater responsibility for their personal financial management, while facing a more complex financial market and products.
- 2 Dr. Ning Tang. Photo by Fowler College of Business, San Diego State University.

<https://business.sdsu.edu/about/directory/ntang>

Awards by Sponsor Type Fiscal Year 2019-2020



SDSU Doctoral Programs

SDSU is proud to offer these joint and independent doctoral programs:

MAJOR/CONCENTRATION	PARTNER UNIVERSITY
Audiology (Au.D.)	UC San Diego
Biology	UC San Diego
Chemistry	UC San Diego
Clinical Psychology	UC San Diego
Computational Science	UC Irvine
Ecology	UC Davis
Education	Claremont Graduate University
Education Leadership: Pre K-12 School Leadership	Independent
Education Leadership: Community College/Post-Secondary Leadership	Independent
Engineering Sciences: Bioengineering	UC San Diego
Engineering Sciences: Electrical & Computer Engineering	UC San Diego
Engineering Sciences: Mechanical & Aerospace Engineering	UC San Diego
Engineering Sciences: Structural Engineering	UC San Diego
Evolutionary Biology	UC Riverside
Geography	UC Santa Barbara
Geophysics	Scripps Institution of Oceanography/UCSD
Interdisciplinary Research on Substance Use	UC San Diego
Language & Communicative Disorders	UC San Diego
Math & Science Education	UC San Diego
Physical Therapy (DPT)	Independent
Public Health: Epidemiology	UC San Diego
Public Health: Global Health	UC San Diego
Public Health: Health Behavioral Sciences	UC San Diego

Other Distinctions:

- SDSU faculty and staff received \$144.4 million to support their research programs.
- The National Institutes of Health awarded \$31.9 million to SDSU researchers, a 10 percent increase over the previous year.
- The National Science Foundation awarded a record \$15.7 million to SDSU — an increase of 69.4%.
- Approximately 430 undergraduate, graduate and doctoral students presented their research in last year's Student Research Symposium.
- SDSU rose in the U.S News & World Report rankings to No. 65 among public universities and No. 143 among national universities overall.
- San Diego State University ranked No. 5 nationally and No. 1 in California for the number of students studying abroad in the latest Institute for International Education's Open Doors report.
- SDSU was again recognized as one of the top universities in the country and one of the nation's "best value" colleges among 200 undergraduate institutions by The Princeton Review.
- The National Latino Education Research and Policy Program (NLERAPP)—a consortium of universities and community-based organizations—selected SDSU as one of four National Grow Your Own Model of education sites.
- SDSU hosted the first annual RE-BORDER conference exploring transborder binational issues and innovative solutions.
- History professor Elizabeth Pollard received a California State University Faculty Innovation and Leadership Award. A digital innovator, Dr. Pollard played a critical role in transitioning the College of Arts and Letters to virtual space during the pandemic.
- The Albert W. Johnson University Research Lectureship is awarded annually to an SDSU faculty member based on evidence of distinction and recognized achievement in research and scholarship. Last year's distinguished awardee was Dr. Hala Madanat, whose lecture "From Discovery to Delivery: An Obesity Prevention Example" was postponed due to COVID-19.
- Microbiologist Nicholas Shikuma received a National Science Foundation Career Award to further advance his research on a beneficial bacterium that causes metamorphosis.
- The National Communication Association selected Brian Spitzberg for a 2020 Distinguished Scholar Award for his significant contributions to the communication discipline.
- Professor emerita of English and Comparative Literature Marilyn Chin received the Poetry Foundation's 2020 Ruth Lilly Poetry Prize, which honors a living American poet for their outstanding lifetime achievement.
- Ahmet T. Kuru, professor of political science, was selected as co-winner of the American Political Science Association's Robert L. Jervis and Paul W. Schroeder Prize for the Best Book in International History and Politics for his book, "Islam, Authoritarianism, and Underdevelopment."
- Professor of Portuguese Ricardo Vasconcelos was awarded a Fulbright U.S. Scholars fellowship to conduct research for his next book in Portugal. His book studies the role of the arts in shaping aspects of national identity.
- Dr. Wayne Beach, professor of communication, Timothy Powell, professor of theater, television & film and Dr. Anne Wallace, UCSD professor of clinical surgery, presented a screening of their documentary film *A Journey Through Breast Cancer*, later shown on public television.
- Distinguished professor of biology Walter Oechel received funding from the U.S. Department of State to support STEM research and graduate education in the country of Georgia.
- With support from the National Science Foundation, mathematics professor Dr. Naveen Vaidya is identifying antiretroviral therapy protocols that can prevent and cure HIV infections.
- Astronomers Jerome Orosz and William Welsh and colleagues at the Goddard Space Flight Center have discovered two new double-star planetary systems.



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