

SAN DIEGO STATE UNIVERSITY
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H I G H L I G H T S



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Leadership Starts Here



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San Diego State University is celebrating 120 years of educating students and conducting research. Now designated a top public research university, SDSU's research portfolio and infrastructure are growing. Our new Engineering and Interdisciplinary Sciences Complex opens in 2018. It more than doubles instructional space and will house state-of-the-art classrooms and laboratories. Dr. Martin Sereno, who helped write the first software to map brain activity, will direct SDSU's new Brain Imaging Center. The Center houses the university's first magnetic resonance imaging (MRI) machine.

Despite the unpredictable federal budget climate, SDSU faculty have continued their research productivity and success. They are instructing students, conducting research in their labs, making discoveries, publishing papers and books, and applying for grants.

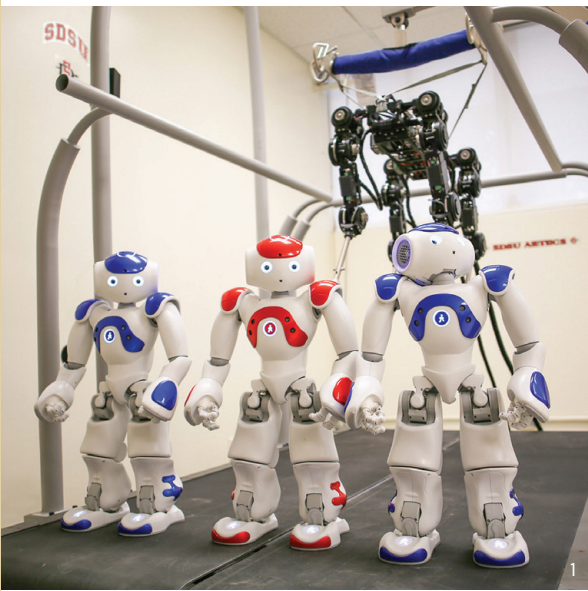
Last year, they received 783 awards and \$134 million to support their research. We highlight some of their work in this brochure - from astronomers, historians and psychologists to chemists, engineers and social workers. Four of those profiled are recipients of the prestigious "K award" offered by the National Institutes of Health. This career-development mechanism prepares promising scientists to conduct innovative, independent research. NIH also honored Dr. Sanford Bernstein last year with a renowned MERIT award for his research on muscle proteins.

These are just a handful of the 344 faculty members who received external funding for their important work. A complete listing of 2016-17 grants can be found here:
https://www.foundation.sdsu.edu/pdf/about_2016_17_awards_listing.pdf.

Stephen C. Welter
Vice President for Research and Dean of Graduate Affairs
San Diego State University

Cover: The Starburst Galaxy M82. See page 15.

Credit: NASA, ESA, and The Hubble Heritage Team (STScI/AURA);
Acknowledgment: J. Gallagher (University of Wisconsin),



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“Our control system could be transformative for those who have lost limbs and utilize prosthetics.”
 – K. Akbari Hamed

Improving Locomotion in Legged Robots

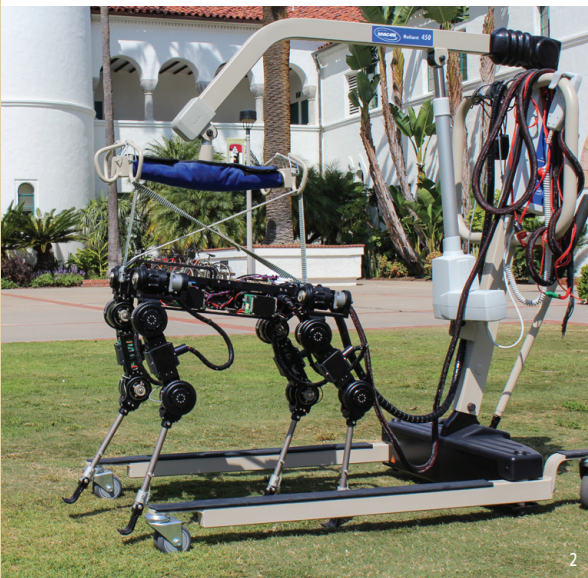
KAVEH AKBARI HAMED Mechanical Engineering

Decentralized controllers require only local information to accomplish their function. In the case of legged locomotion, decentralization is desirable for several reasons. For prosthetics, where the purpose is to replace a lost natural limb, it is impractical to wire the user with a profusion of sensors; the prosthetic device must primarily rely on its own built-in measurements. Another advantage of decentralization is the management of complexity.

Using a 3D quadruped robot and a powered prosthetic leg, Dr. Kaveh Akbari Hamed is developing a decentralized control system to make robots walk more naturally. He uses novel algorithms to systematically design nonlinear, decentralized controllers that stabilize walking gaits.

Dr. Hamed’s feedback control solutions can be used to improve the control of existing robots, mechanical systems interrupted by collision and the mechanical design of future controlled prosthetic legs.

This research is supported by the National Science Foundation.



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- 1 NAO H25 humanoid robots and SQ1 robot in Dr. Akbari Hamed’s research lab
- 2 SQ1 robot on the SDSU campus. Photos courtesy of SDSU Robotics and Controls Laboratory

Improving Latino Community Health

LINDA GALLO *Psychology*

A leader in the field of cardio-metabolic health, Dr. Linda Gallo focuses on sociocultural aspects of risk and resilience in chronic diseases such as diabetes and cardiovascular disease.

Her work aims to understand and reduce disparities in the prevalence and outcomes of these conditions for Hispanics/Latinos. She is currently testing an innovative intervention that incorporates wireless monitoring, transmission of behavioral data, and automated messaging to improve patient-provider communication and diabetes outcomes.

Dr. Gallo's research, which will guide future prevention and intervention efforts for Hispanic communities, is supported by funding from the National Institutes of Health.

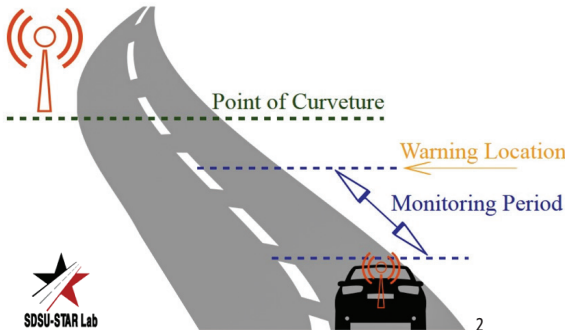


- 1 Dr. Linda Gallo. Photo by: SDSU
- 2 Medical assistant Magdalena Hernandez takes a blood pressure measurement
- 3 Dr. Gallo partners with community organizations, including this clinic in Escondido.(L-R): Magdalena Hernandez (Medical Assistant), Javier Segura (Research Assistant), Daniela Vital (Project Coordinator), and Elizabeth Alvarez (Research Assistant)
- 4 Research assistant Elizabeth Alvarez uses a stadiometer to measure height. Photos 2, 3, 4 by: Duvia Lara Ledesma



1

“Curve Speed Warning (CSW) systems assess threat levels for a driver approaching a curve too quickly, and provide warnings to increase safety on curvy roads.”
 – S. Ghanipoor-Machiani



2



Simulating Driver Behavior on the Road

SAHAR GHANIPOOR MACHIANI

Civil, Construction and Environmental Engineering

Transportation engineer Sahar Ghanipoor Machiani is the SDSU director of Safe-D National University Transportation Center (UTC).

Dr. Ghanipoor Machiani and her colleagues are exploring how to maximize safety as transportation technology advances. Using SDSU's driving simulator, they are modeling driver behavior to understand how drivers respond to driver-assistance systems such as curve speed warning technology.

With the advent of self-driving vehicles and cars that can communicate wirelessly, it's critical to understand how these advances impact driver and road-user safety.

The Safe-D UTC is part of a consortium with Virginia Tech Transportation Institute (VTTI) and Texas A&M Transportation Institute (TTI) and is supported by the U.S. Department of Transportation.



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1 SDSU-STAR Lab driving simulator. Photo by: Debbie Brighton

2 CSW system function on a horizontal curve. Image courtesy of Sahar Ghanipoor-Machiani

3 Dr. Ghanipoor Machiani. Photo by: Debbie Brighton

Assembling Spider Silk

GREGORY HOLLAND Chemistry and Biochemistry

Spider silk has extraordinary mechanical properties including strength, elasticity and durability. However, attempts at replicating it in the laboratory have been unsuccessful.

Analytical chemist Gregory Holland is using nuclear magnetic resonance approaches, X-ray diffraction and cryo-electron microscopy to understand the molecular structure of the proteins that comprise the silk and the silk-producing process. By studying spider silk-producing glands, he hopes to determine the biochemical triggers responsible for converting the gel-like liquid to the silk's protein fiber.

Dr. Holland has already been successful in growing spider silk fibers directly from the gland fluid by altering the biochemical conditions such as pH.

This research is funded by the Air Force Office of Scientific Research and could impact areas where there is a need for high strength/light weight materials like surgical sutures, artificial tendons and high performance textiles.

1 Dr. Greg Holland, left, with lab members.
Photo by: Jennifer Holland

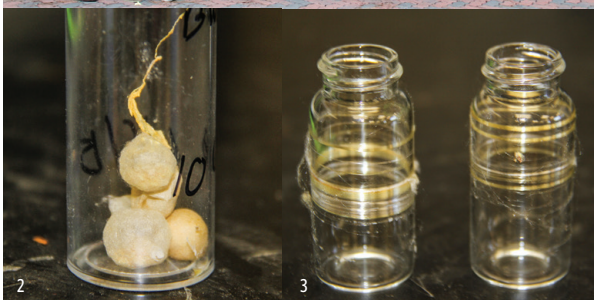
2 The egg cases of the western black widow are composed of multiple types of spider silk that protect the eggs from environmental stresses.
Photo by: Debbie Brighton

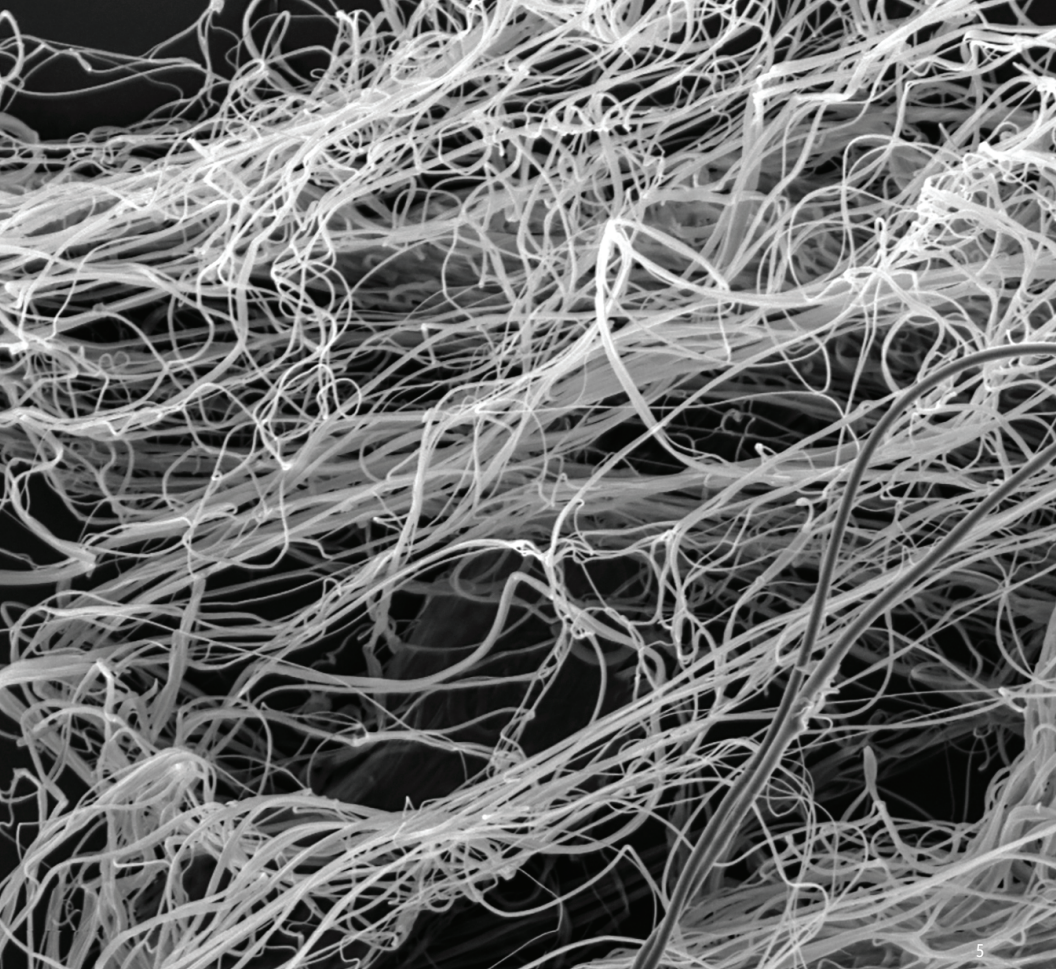
3 Vials showing the silk of *Nephila clavipes*, an orbweaver that spins a bright yellow silk leading to their common name: the Golden Orbweaver. Photo by: Debbie Brighton

4 The garden orbweaver, *Argiope argentata*, builds large radial webs with a characteristic zig-zag pattern that may help stabilize the web.
Photo by: David Onofrei

5 Spider prey wrap silk is among the strongest and finest biological polymer fibers, with an average cross-sectional diameter of less than 1 micrometer (for comparison, a human hair is usually 100 micrometers in diameter). Photo by: David Onofrei

6 Tarantulas do not build suspended webs, but rather lay them down as wire-traps for ground-dwelling prey. Photo by: Debbie Brighton





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Reducing Risk for Women in the Sex Trade

LIANNE URADA Social Work

Clinical social worker Lianne Urada studies how community engagement can help address the issues facing women in the sex trade.

Dr. Urada's current research examines the role of community mobilization (communities identifying and responding to their own needs) in reducing HIV and sexually transmitted infections and violence among substance-using females in the Tijuana, Mexico sex trade.

This work is funded by a prestigious "K Award" through the National Institute on Drug Abuse. It will not only help this community and population of women, but the results will inform communities worldwide that are also grappling with sexual violence and human trafficking.



*"An estimated 7,000 females are working in the Tijuana sex industry; less than half are registered as required by the municipal state department."
— Frontera Info, 2016*



- 1 Dr. Lianne Urada. Photo by: Dr. Jong Won Min
- 2 Tijuana research team. Photo by: Lianne Urada
- 3 A Tijuana street near the Zona Norte, where the legalized red light district is located. Photo by: Lianne Urada





Meeting the Needs of Migrant Students

CARLOS HERRERA *Imperial Valley Campus*

More than 100,000 migrant students attend California schools. These students are the children of migrant workers who travel across the country seeking employment - often temporary or seasonal work. They relocate frequently and as a result, their children face obstacles to educational achievement.

Dr. Carlos Herrera, in partnership with Dr. Sandra Kofford, Director of Migrant Programs at the Imperial County Office of Education, is working to provide educational continuity and social tools to enable the success of migrant students in the Imperial Valley.

The University Based Summer Institute program supports teachers of migrant students in grades K-12 and uses a non-traditional, interactive curriculum to help students overcome their fears, frustrations and anxieties about math, language and state assessments.

The Imperial County Office of Education supports this program.



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Imperial Valley



1 Dr. Carlos Herrera. Photo by: Herminia Leon-Herrera

2 Teacher candidates participating in a mathematics workshop exercise. Photo by: Mireli Rahiotis, Imperial County Office of Education

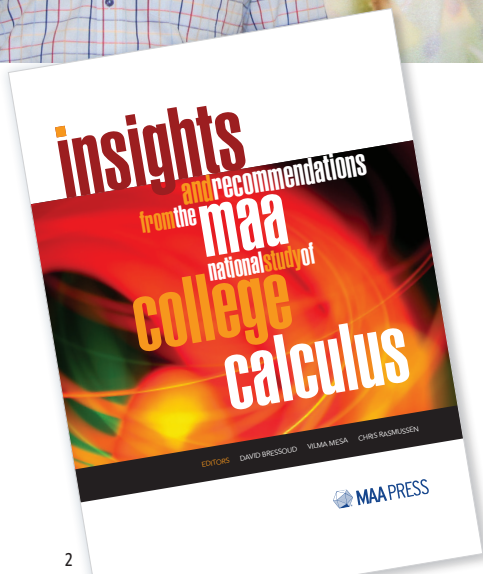
Improving Undergraduate Mathematics Instruction

CHRIS RASMUSSEN
*Mathematics and Statistics/
Center for Research in
Mathematics and Science
Education*

An international leader in mathematics education research, Chris Rasmussen focuses on the classroom learning environment and instructional practices that promote student learning with understanding. His research addresses a very practical and important area: improving the student experience in first year calculus.

In partnership with the Mathematical Association of America and the Association of Public and Land-grant Universities, Dr. Rasmussen is investigating features of successful programs that contribute to student success in undergraduate mathematics courses and how to influence similar success at other institutions.

Dr. Rasmussen's work is supported by the National Science Foundation.



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1 Dr. Chris Rasmussen.
Photo by: Debbie Brighton

2 Dr. Rasmussen is co-editor of this influential book

3 Professor Rasmussen listens to students' explanations of position versus time graphs. Photo by: Ethan Garcia





Assessing Toxicity of Waterpipe Tobacco Smoking

NADA KASSEM
*Graduate School
of Public Health*

Waterpipe or “hookah” smoking in the U.S. is on the rise and is associated with increased risk for lung and oral cancers and coronary heart disease.

Dr. Nada Kassem has found that hookah tobacco smokers are exposed to harmful levels of toxicants and carcinogens. These include acrolein, a cardiotoxicant and toxic respiratory irritant; benzene, a hematotoxicant and a leukemogen; NNK, a potent tobacco-specific lung carcinogen and the addictive drug nicotine.

Dr. Kassem is currently investigating the differential effects of waterpipe tobacco smoking practices on toxicity levels of smoke inhaled by the user. Her findings will inform the development of waterpipe tobacco product regulations to reduce the adverse health effects associated with this emerging tobacco use method.

The Food and Drug Administration and the National Institute on Drug Abuse support this research.

- 1 Study and laboratory coordinator Noura Kassem, MPH, prepares urine samples provided by hookah smokers to ship for analysis. Photo by: Nada Kassem
- 2 Hookah pipes and study testing materials. Photo by: Noura Kassem
- 3 A single puff of hookah smoke. Photo courtesy of St. George & Sutherland Shire Leader

Pioneering Vietnamese Language Research

GIANG PHAM *Speech, Language, and Hearing Sciences*

A trilingual speech-language pathologist, Dr. Giang Pham investigates language development and disorders among bilingual children, especially those who speak a minority first language.

She is collaborating with colleagues in Vietnam to examine language impairment among Vietnamese students in grades K-2 and to identify language and cognitive predictors of later reading outcomes. This is the first study of its kind investigating primary language impairment (PLI) in Vietnamese children.

By determining how PLI manifests in monolingual Vietnamese speakers, Dr. Pham will be able to identify and treat PLI in bilingual children in the U.S. whose first language is Vietnamese.

Dr. Pham's research is funded by a prestigious "K Award" from the National Institute on Deafness and Other Communication Disorders.

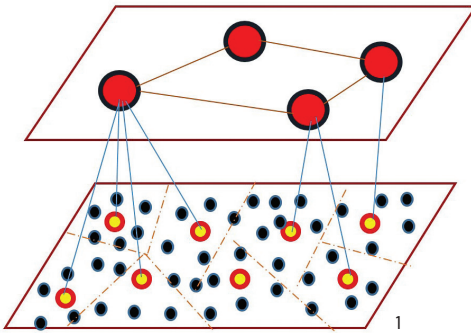
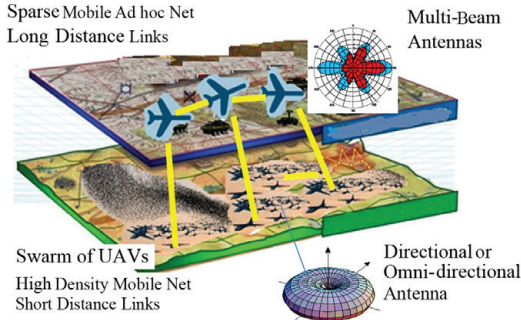


1 Giang Pham leads a training workshop on analyzing children's stories at Hanoi National University of Education (HNUE), Vietnam. Photo by: Thuy Dao

2 Sung Pham, age 5, completes Vietnamese assessments with graduate research assistant, Ngoc Do. Photo by: Giang Pham

3 View of Hanoi, Vietnam, where data collection takes place for this NIH study. Photo by: Giang Pham





Enhancing Performance in Directional Wireless Networks

SUNIL KUMAR Electrical and Computer Engineering

Directional communication has attracted increased interest recently, both for civilian (such as 5G networks and disaster recovery) and military (intelligence gathering, surveillance, and reconnaissance) use. While it enables significantly improved spectrum reuse and interference management, the use of directional communication complicates the operation of wireless networks, especially for mobile systems such as unmanned aerial vehicles.

Dr. Sunil Kumar designs novel, cross-layer schemes for wireless networks, to enable intelligent, congestion/interference-aware, and more energy efficient network operations. His research on Quality of Service (QoS) allows networks to prioritize certain users/devices or traffic and supports multimedia applications.

Dr. Kumar is a Senior Member of the Institute of Electrical and Electronics Engineers and Thomas G. Pine Faculty Fellow. This research is supported by the Department of Defense and industry.

1 Airborne network, illustrating the teaming of manned (aircrafts) and unmanned (UAVs) assets. Photo by: Kumar Lab

2 Unmanned Aerial Vehicle. Courtesy of Angelique Robinson, Drone Pilot, Inc.

Mimicking Natural Photosynthesis

JING GU

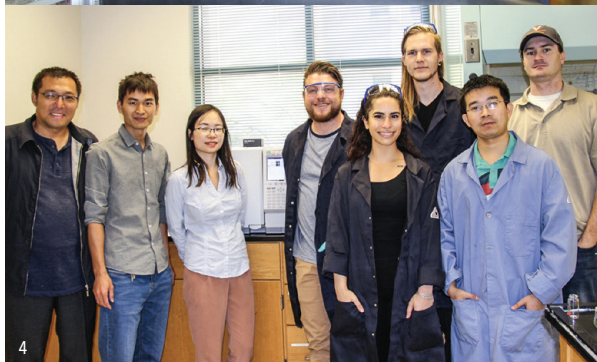
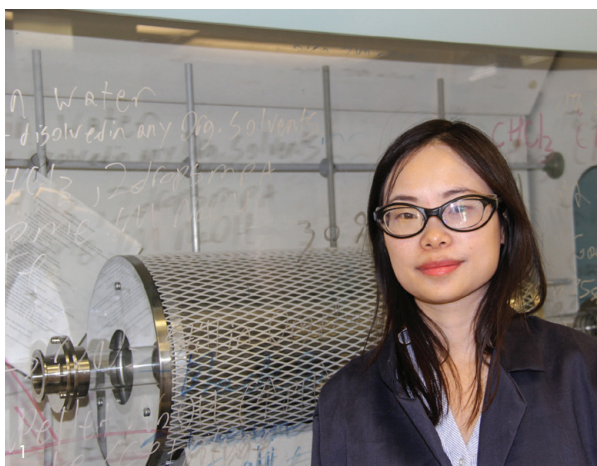
Chemistry and Biochemistry

Burning fossil fuels to create power emits toxins that are damaging to the environment and cause global warming. While sunlight offers an inexhaustible source of renewable energy, direct harvesting of solar energy is challenging due to the variation and intermittance of natural sunlight. One promising solution is the collection and storage of solar energy into chemical bonds by forming fuels such as hydrogen. This approach is similar to photosynthesis that occurs in nature and has been dubbed “artificial photosynthesis.”

Dr. Jing Gu is producing hydrogen fuels through a self-sustaining microbial photoelectrolysis process which addresses both energy and water issues. This process can recover energy and electrons from organics in wastewater and generate hydrogen *without any supply of external electricity.*

This research will help develop the next generation of scalable, durable, and affordable energy (and water treatment) devices. The National Science Foundation supports Dr. Gu's work which will reduce our energy dependence on fossil fuels.

- 1 Dr. Gu in front of a fume hood, which reduces inhalation hazards and serves as a lab discussion board
- 2 Undergraduate student Sabrina Younan weighs chemicals in preparation for electrodeposition of a catalyst
- 3 Graduate student Tony Trammel operates the glove box where air-sensitive chemicals are stored in order to protect the chemicals from degrading
- 4 The Gu lab poses in front of a gas chromatography machine used for measuring conversion products. Photos by: Debbie Brighton





“Only 28% of caregivers feel they contribute to the development of their child’s mental health treatment plan.”
– Family & Youth Roundtable 2013
Engaging Family & Youth Report



Promoting Parent Participation

RACHEL HAINE-SCHLAGEL *Child and Family Development*

Clinical psychologist Rachel Haine-Schlagel specializes in understanding and promoting caregiver participation in child and family services. Over 50% of families drop out of treatment early and many caregivers do not participate actively in services. Caregiver participation is critical to effective services for many child and family challenges.

Dr. Haine-Schlagel and her Parents And Caregivers in Services Lab have developed tools to promote caregiver participation in a variety of services including home-based parenting programs for families in the child welfare system, community-based programs for young children at risk for autism, and families receiving publicly-funded child mental health treatment.

A recipient of the prestigious NIH K award, Dr. Haine-Schlagel's current work is supported by the National Institute of Mental Health, Annie E. Casey Foundation, and Autism Speaks. This research will improve caregiver participation in and the quality and effectiveness of services for children and families.

¹ Dr. Rachel Haine-Schlagel.
Photo by: Debbie Brighton

² The PACT toolkit includes training and tools for providers and caregivers

Strengthening STEM Pathways

FELISHA HERRERA VILLARREAL

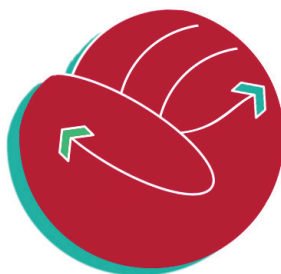
Administration, Rehabilitation and Postsecondary Education

The transition to a four-year college can be challenging for science, technology, engineering and mathematics (STEM) students in community colleges.

Dr. Felisha Herrera Villarreal is director of the Research & Equity Scholarship Institute on Student Trajectories in Education (RESISTE), an education policy research center at SDSU. SDSU is one of eleven Hispanic Serving Institutions in the San Diego area with which the institute collaborates.

Dr. Villarreal's program focuses on identifying the barriers and supports for students transitioning across multiple institutions, and examines the role of minority serving institutions, which are important for historically underrepresented students, specifically African Americans, American Indians, and Latinos.

Her work is supported by the National Science Foundation and will impact and inform STEM education policy and practice.

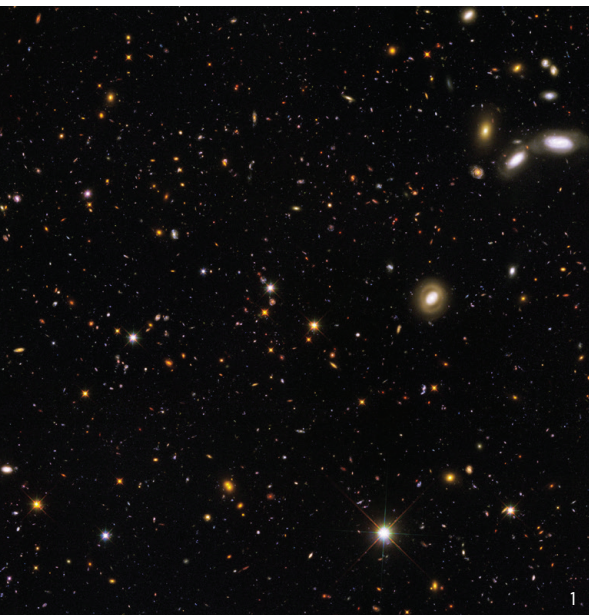


RESISTE

1 Dr. Felisha Herrera Villarreal

2 RESISTE research team 2016-17
(from left to right) Anthony Villarreal,
Felisha Herrera Villarreal, Melissa Navarro,
Gabriela Kovats Sanchez, Michelle Ruiz.
Photos by: Michelle Ruiz





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Galactic Gas Flows

KATE RUBIN

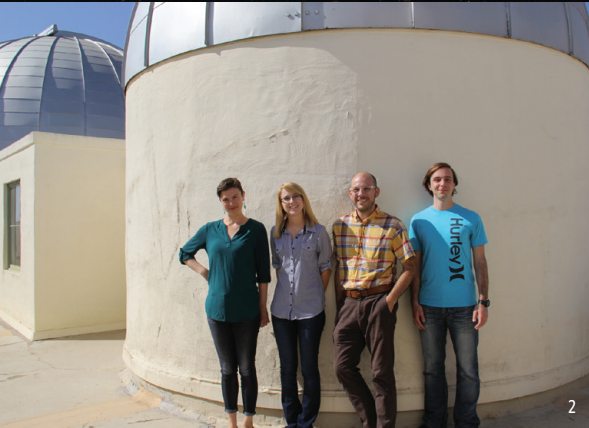
Astronomy

Astrophysicist Kate Rubin studies the movement of gas into and out of galaxies and the effects of this cycle on galaxy formation and evolution.

Stars form out of cool gas; the inflow of this gas onto galaxies provides an important source of fuel for further star formation. Once stars form, however, their radiation or explosive deaths can push away the surrounding gas into the outer galaxy and beyond.

Dr. Rubin's work uses spectroscopy to examine infalling and outflowing gas and the effects of these flows on star formation.

The National Science Foundation and the Space Telescope Science Institute support her research which will help answer an important question in modern astrophysics: what is regulating the growth of galaxies like our own Milky Way?



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1 Hubble Space Telescope image of thousands of galaxies. Dr. Rubin is studying the action of gas flows in these galaxies as they evolved over the past eight billion years. Credit: NASA, ESA, R. Windhorst, S. Cohen, M. Mechtley, and M. Rutkowski (Arizona State University, Tempe), R. O'Connell (University of Virginia), P. McCarthy (Carnegie Observatories), N. Hathi (University of California, Riverside), R. Ryan (University of California, Davis), H. Yan (Ohio State University), and A. Koekemoer (Space Telescope Science Institute)

2 Dr. Rubin and students Stephanie Stawinski, Ryan Rickards Vaught, Michael Bareian. Photo by: Debbie Brighton

3 The Starburst Galaxy M82, a nearby example of galactic-scale outflows of gas driven by star formation activity. Dr. Kate Rubin and her team are measuring the impact of these flows on galaxies in the more distant universe. Credit: NASA, ESA, and The Hubble Heritage Team (STScI/AURA);

Acknowledgment: J. Gallagher (University of Wisconsin), M. Mountain (STScI), and P. Puxley (National Science Foundation)



3

Disrupting the Cycle of Poverty

SHAWN FLANIGAN Public Affairs

Dr. Shawn Flanigan studies service-seeking behavior among low-income individuals, minorities, and other marginalized groups.

In an effort to identify how innovative housing programs can serve as levers to disrupt multigenerational cycles of poverty, Dr. Flanigan is evaluating strategies to address housing insecurity at the San Diego Housing Commission and Community Housing Works.

This research was developed in collaboration with federal policy designers, and will enable better policy making to assist low-income families and minority communities. The research is funded by the JP Morgan Chase Foundation and Open Society Foundation, through a partnership with the University of Southern California.



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- 1 An encampment of homeless residents in downtown San Diego. Photo by: Associated Press, September 19, 2017
- 2 Housing construction site in downtown San Diego. Photo by: KPBS July 21, 2016
- 3 Dr. Shawn Flanigan. Photo by: Jon Petreikis
- 4 Student research assistants observe activity at a service provider for homeless individuals in San Diego's East Village. Photo by: Shawn Flanigan



Promoting Health in Sexual Minority Youth

JEREL CALZO Graduate School of Public Health

Developmental psychologist Jerel Calzo studies gender and sexual orientation health disparities in adolescence and young adulthood. Sexual minorities (those who don't identify as heterosexual) have higher rates of disordered eating. Behaviors like purging, restrictive dieting, and binge eating can be life-threatening and challenging to treat.

In addition, Dr. Calzo uses community-based participatory approaches to develop school and community programs to support the health and positive development of gender in sexual minority adolescents. His research with school-based genders and sexualities alliances (also known as gay-straight alliances) examines how youth organize to provide support, learn about LGBT issues, and engage in advocacy.

This research is funded by a prestigious "K Award" from the National Institute on Drug Abuse, and Boston Children's Hospital. Results of Dr. Calzo's studies will improve eating disorder treatment and prevention for sexual minorities.



“Through strategic interdisciplinary collaborations and school and community-based partnerships, we can develop responsive programs to address gender and sexual orientation health disparities.” – J. Calzo



1 Dr. Jerel Calzo. Photo by: Michael Sullivan

2 Rainbow Flag courtesy of Gay San Diego



“More than a million used tires are exported from California to Baja California each year, where they accumulate rapidly and challenge local authorities to provide proper disposition.”
 – P. Ganster



Waste Tires: A Health and Environmental Hazard

PAUL GANSTER
Institute for Regional Studies of the Californias

Paul Ganster is an authority on the U.S. - Mexico border region and director of SDSU's Institute for Regional Studies of the Californias (IRSC). IRSC focuses on the California/ Baja California peninsula border, addressing topics of important regional concern including the environment, trans-border governance, and sustainable development/tourism.

Dr. Ganster is examining the flow of used and waste tires in the region. Waste tire piles are a fire hazard and provide habitat for disease vectors, particularly the *Aedes aegypti* mosquito that transmits West Nile, Zika, and Dengue viruses. Waste tires are often carried by winter storms across the border into sensitive protected areas in San Diego.

This research, funded by the California Department of Resources, Recycling and Recovery, is helping California and Baja California environmental agencies address this critical, shared environmental problem.

1 Waste tires at the municipal transfer station in San Luis Río Colorado awaiting shredding for cement kiln fuel. Photo by: Paul Ganster

2 Paul Ganster at ceremony for awarding of Honorary Doctorate at the Autonomous University of Baja California in Tijuana with former Master's students from the joint SDSU-UABC program, left to right, Calderaria Pelayo, UABC School of Law; Bertha Hernández, SDSU's Department of Chicana/o Studies; Anabele Cornejo, Cleveland National Forest. Photo by: UABC

3 Machinery at the Mexicali tire facility where waste tires are shredded and then transported to Hermosillo, Sonora, to be used as fuel in cement kilns. Photo by: Efraín Nieblas

Sharkskin: Infection Reducer?

ELIZABETH DINSDALE

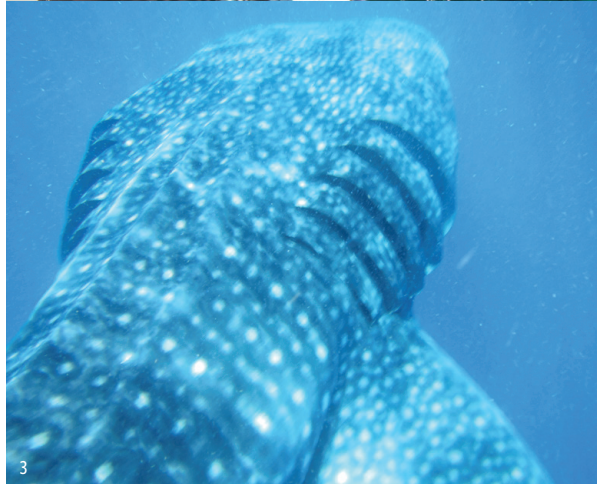
Biology

Marine ecologist Elizabeth Dinsdale studies marine microbiomes and how they interact with the larger organisms they inhabit. In addition to coral reefs and kelp ecosystems, her lab is studying the health and microbial interaction on sharks.

The shark has a unique skin surface, which is comprised of teeth, making them efficient swimmers. Dr. Dinsdale is testing whether the shark skin, in addition to enabling the fast and hydrodynamic movement, reduces the settlement of the microbes, and the infection of sharks by bacteria, fungi, and viruses.

Understanding how microbes recruit to surfaces offers the potential to develop products that take advantage of the shark skin patterns to reduce the microbial load on surfaces in the built environment. This work is supported by the National Science Foundation and a private donor.

- 1 Recent Ph.D. graduate, Matthew Haggerty, collects water from above different types of corals on the Abrolhos Bank in Brazil to test microbial taxa differences. Photo by: Miranda Brett
- 2 Bermuda water is so clear that Ph.D. students Lais Lima (left) and Amanda Alker (right) could describe the health of the corals without leaving the boat
- 3 Whale sharks feed on plankton by taking great mouthfuls of water and filtering out the small organisms; the water exits through the gills, seen flared out in the photo
- 4 Ph.D. student Michael Doane describes how to sample the microbes from the kelp forest at Point Loma to undergraduate students, Taylor Dillon (center) and Meredith Peterson (right)
- 5 Whale shark opening its mouth for feeding; it has no teeth, making it a good shark to collect microbes from
- 6 Ph.D. student, Lais Lima, looking for a specific species of coral. Once found Lais will sample the microbes in the mucus and collect the coral to investigate the ability of the coral to withstand temperature stress
- 7 In addition to eating plankton, this whale shark is visiting the waters of Cancun for caviar; the small particles in the water are tuna eggs. Photos 2-7 courtesy of Dinsdale lab

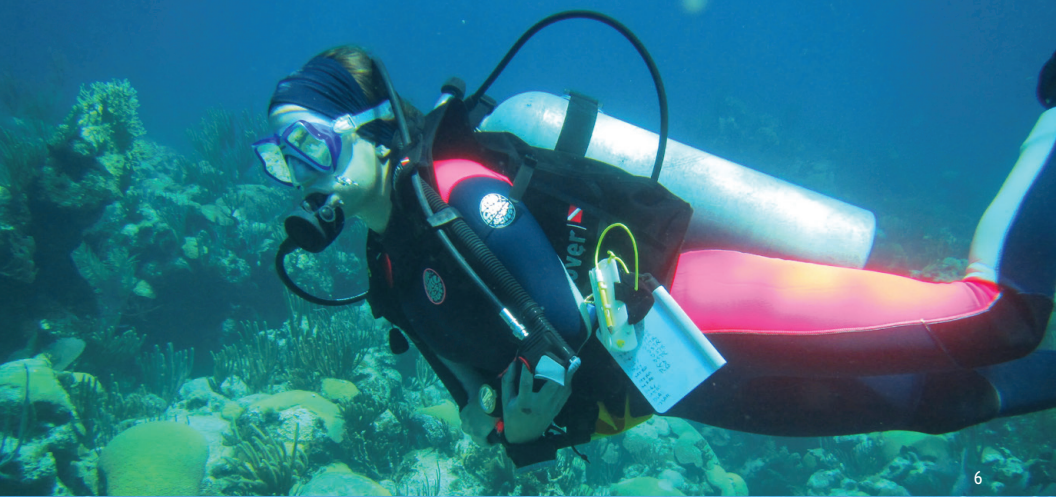




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Deception Detection

AARON ELKINS

Management Information Systems

Artificial intelligence (AI) expert Aaron Elkins studies how computers can detect when people lie and their accompanying emotional and cognitive states based on their voice, eyes or behavior.

Dr. Elkins has developed the Automated Virtual Agent for Truth Assessments in Real Time (AVATAR), a kiosk-based automated screening system with integrated behavior sensors that conducts interviews using an AI-embodied conversational agent.

AVATAR is a valuable tool that has been tested in airports and border crossings. AVATAR can increase the efficiency of border screening while supporting border officers in identifying terrorists or smugglers. It can also be used for other human applications like medical triage, sales, and job interviews.

The AVATAR project has been supported by the U.S. Department of Homeland Security and Frontex, the European Union Border Security Agency.



1 AI Lab research assistant Vini Kalra speaks to San Diego ABC 10 news about the lab's automated deception detection research. Photo by: SDSU

2 The AVATAR conducts its first interview with a humanoid robot (Dr. Elkins, rear). Photo by: SDSU

3 The current generation AVATR kiosk with integrated behavioral sensors and automatic height adjustment. Credit: National Center for Border Security and Immigration (BORDERS)



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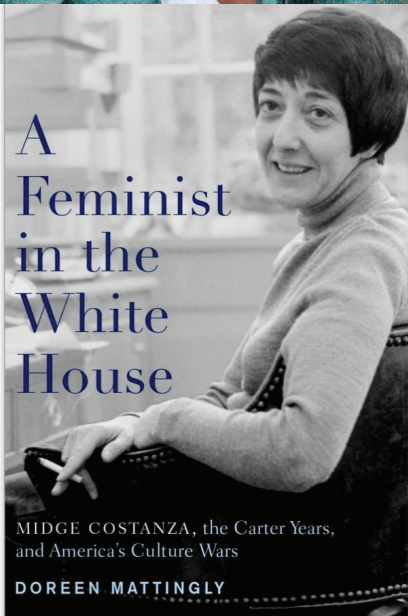
Gender Politics

DOREEN MATTINGLY *Women's Studies*

An authority on women and politics, Dr. Doreen Mattingly is studying the role of Southern California organizations and lawmakers in feminist legislation in the 1960's and 1970's.

She is also the author of *A Feminist in the White House*, which chronicles the rise and fall of Midge Costanza, Jimmy Carter's outspoken aide who advocated for women's rights, LGBT rights and the poor. In addition, Dr. Mattingly works with the SDSU Bread and Roses Center for Feminist Research and Activism, which supports student research with local women's organizations.

Dr. Mattingly's current project is funded by the John Randolph and Dora Haynes Foundation.



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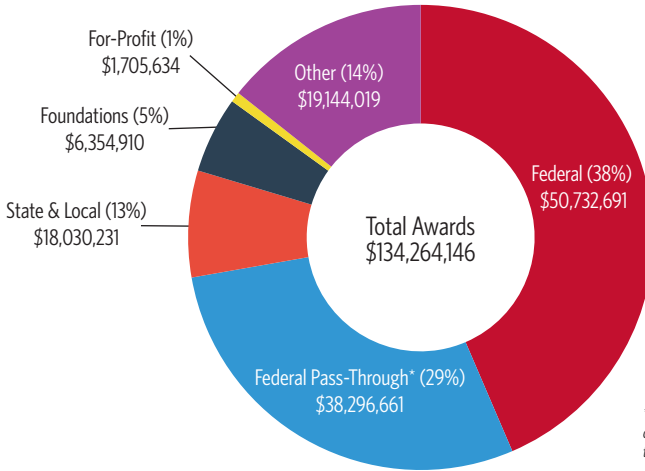
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1 Dr. Doreen Mattingly. Photo by: Cami Abel

2 *A Feminist in the White House* by Doreen Mattingly

3 2016 Bread and Roses "Feminist Research Justice Symposium." From left: Nassim Moallem, SDSU student; Vernita Gutierrez, Planned Parenthood of the Pacific Southwest; Georgette Gomez, San Diego City Council; Dr. Kimala Price, SDSU Women's Studies; Dr. Doreen Mattingly, SDSU Women's Studies; Kimberly Castillo, Nile Sisters; Rebecca Paida, Nile Sisters; and Marie Nemeth, SDSU student. Photo by: Huma Ghosh

Awards by Sponsor Type Fiscal Year 2016-2017



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	Claremont Graduate University
Computational Science: Statistics	Claremont Graduate University
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 \$134.3 million to support their research programs.
- The National Institutes of Health awarded \$19.7 million to SDSU researchers.
- The National Science Foundation awarded \$9.4 million to SDSU researchers.
- SDSU is classified as an R2 Doctoral University with Higher Research Activity by The Carnegie Foundation.
- Approximately 500 undergraduate, graduate and doctoral students across 50 disciplines participated in SDSU's Student Research Symposium – an annual forum in which they showcase their faculty-mentored research.
- Money magazine ranked SDSU one of the nation's top universities for educational quality, affordability and graduate earnings.
- SDSU was included on Princeton Review's List of "The Best 382 Colleges."
- SDSU is ranked #68 among public universities and #140 among national universities in the U.S. News and World Report America's Best Colleges list.
- Graduate programs ranked in the top 50 nationally include: aerospace engineering (#37); audiology (#30); clinical psychology (#25); health care management (#47); nursing midwifery (#28); public health (#39); rehabilitation counseling (#10); speech language pathology (#24); and the online graduate education program (#22).
- U.S. News and World Report ranked SDSU among the top 10 full-time MBA programs with the highest proportion of women.
- The Campus Pride Index ranked SDSU highly for the eighth consecutive year; in 2017, SDSU was on its top 25 list of LGBTQ-friendly colleges and universities.
- Astronomers William Welsh and Jerome Orosz worked with colleagues from NASA to identify a new planet, Kepler-1647b, the largest planet yet discovered around a double-star system.
- Historian Kathryn Edgerton-Tarpley won a Fulbright award for research in China on cultural responses to calamity.
- Neuropsychologist Sarah Mattson created a new tool to help clinicians diagnose Fetal Alcohol Disorder more easily.
- The American Academy for Microbiology elected Rob Edwards a fellow.
- A \$25 million gift from Ron and Alexis Fowler will endow scholarships, professorships and programs in the Fowler College of Business.
- Art professor Kim Stringfellow received an Andy Warhol Curatorial Fellowship to support her work on The Mojave Project.
- Biologist Nick Shikuma received a prestigious Sloan Research Fellowship for rising young scholars.
- The California Department of Education funded the work of Professors Osvaldo Soto, Randolph Philipp and William Zahner on the "California Mathematics Readiness Challenge Initiative."
- Biologist Donatella Zona published a study about the effects of drainage in permafrost in the journal *Nature Geoscience*, and provided a commentary in *Nature* about the importance of long-term data to assess the dangerous release of atmospheric carbon dioxide (a leading contributor to global warming) as permafrost melts.
- Dr. Karen Emmorey's sign language project won a People's Choice award in the National Science Foundation's annual Visualization Challenge, or Vizzies.
- Plant biologist Michael Simpson and colleagues identified a new and rare succulent species found only in Baja California – and named it after guitar great Jimi Hendrix.
- The Campaign for SDSU concluded, exceeding its goal and raising \$815 million to support students, faculty, and research and creative endeavors.



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