

SAN DIEGO STATE UNIVERSITY  
2013 - 2014  
RESEARCH  
HIGHLIGHTS



SAN DIEGO STATE  
UNIVERSITY

*Leadership Starts Here*



SAN DIEGO STATE  
UNIVERSITY

---

*Leadership Starts Here*

**S**an Diego State University values all scholarship - whether it's the discovery of a new virus, a "jewelry portrait," an orchestral composition, a book about the first female presidential assistant, digitizing Shakespeare's historical map of London, exploring the Ukrainian struggle, using Twitter to track the spread of influenza, excavating primitive burial grounds in Oaxaca, Mexico, understanding the evolution of antibiotic resistance or improving the efficacy of diabetes treatments in Latino and Latina populations.

While not all scholarship is grant-supported, it's important to recognize the SDSU faculty and programs that are successful in highly competitive funding efforts with external sponsors. This brochure represents just a few of the more than 700 awards made to SDSU researchers last year. A complete list of 2013-14 grants can be found here: <http://tinyurl.com/awardslisting>.

Congratulations to all the SDSU scholars who are innovating, engaging our students and enhancing their lives, the community, and the world.

Stephen C. Welter

*Vice President for Research and Dean of Graduate Affairs*

*San Diego State University*

**Front Cover:** *Paradise Tanager (Tangara chilensis). See page 2. Photo by Matt Alexander*

**Back Cover:** *This "snapshot" of the human IKK2 enzyme might have caught it in the act of switching to its active state. If that is true, then molecules that block this interaction might serve as drugs against chronic inflammatory diseases and cancer in which IKK2 is overactive. See page 8.*

## Understanding the Autistic Brain

### RALPH-AXEL MÜLLER *Psychology*

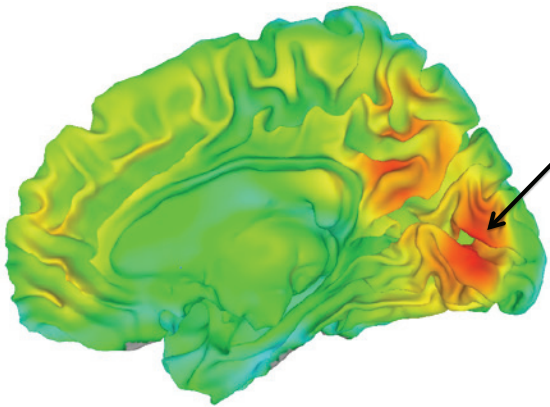
Autism Spectrum Disorder (ASD) affects 1 in 68 children and is the fastest-growing developmental disability in the U.S. Cognitive neuroscientist Ralph-Axel Müller's Brain Development Imaging Lab studies brain function and anatomy in children with ASD, funded by NIH and Autism Speaks.

Using various types of magnetic resonance imaging (MRI), his group has been among the very first to examine brain connectivity in ASD. While the brain in ASD is often considered 'underconnected' (different parts 'talking too little with each other'), Dr. Müller's lab has shown that – on the contrary – overconnectivity contributes to the behavioral problems autistic children have.

Brain markers for ASD are still unknown. Findings from these MRI studies are crucial because targeted treatments first require a clear understanding of how exactly brain development is disturbed in ASD.

**Top:** Functional MRI map showing density of local neuronal connections. In children with autism, high local connectivity in visual areas at the back of the brain (arrow) is correlated with severity of the disorder. (From Keown et al., *Cell Reports*, 2013).

**Middle and Bottom:** Doctoral student Aarti Nair with healthy child volunteer preparing for an MRI scan and during the MRI scanning. Photos by Brain Development Imaging Lab



## Biodiversity: Secrets of the Songbird

### KEVIN BURNS

#### Biology

Tanagers are the largest family of songbirds and represent the largest evolutionary radiation of songbirds found in the New World tropics. Known for their colorful plumage, tanagers represent roughly 375 species that show incredible variation in many traits. In addition to variation in colors, species in this group also vary in their beak shapes, feeding behaviors, vocalizations, and habitats.

Using genetic data, Dr. Kevin Burns has constructed an evolutionary tree that is revealing the pattern of species diversification in this family and the characteristics that drive speciation. This information helps us understand how biodiversity is generated, knowledge that is fundamental to preserving biodiversity in our changing world.

His work is supported by the National Science Foundation.

**Top:** Dr. Kevin Burns. Photo by Kevin O'Neill

**Middle:** Red-capped Cardinal (*Paroaria gularis*). Photo by Kevin Burns

**Middle:** Saffron Finch (*Sicalis flaveola*). Photo by Kevin Burns

**Bottom:** Graduate student Nick Mason analyzing tanager songs. Photo by Pascal Title

**Top Right:** Bananaquit (*Coereba flaveola*). Photo by Matt Alexander

**Bottom Right:** Blue Dacnis (*Dacnis cayana*). Photo by Kevin Burns





## Resilient Reefs

### MATTHEW LAUER

#### Anthropology

Environmental anthropologist Matt Lauer co-directs SDSU's new Sustainability major which teaches students how to address social and environmental issues locally and globally.

Dr. Lauer's National Science Foundation-funded research takes him and his students to the Pacific island of Mo'orea. Using an integrated social and natural science approach, Lauer's team is studying how Mo'orea's fishermen manage the island's coral reefs. Even though the reefs have been impacted by several major disturbances (e.g., cyclones, urchin outbreaks) they consistently rejuvenate their complex structure and rich fish communities.

This demonstrated and unique resilience may be due to the management practices of local fishermen. If their management techniques are shown to be effective they could be applied to other coral reef systems around the world to help them thrive.

**Top:** Tahitian research team member, Terava, conducting a roadside survey. Photo by Mark Strother

**Middle:** A local fisherman rigs sardines for deep sea tuna fishing in between Mo'orea and Tahiti. Photo by Mark Strother

**Middle:** Graduate student Ashley Bunnell and Tahitian colleague Olivette Lenihan conducting mapping exercises during an informant interview with local fisherman Moana. Photo by Andrew Rassweiler

**Bottom:** Fishing in Opunohu Bay, local fisherwoman Mami Jeanne holding a Bluefin Jack (Paaihere) she caught using artificial bait. Photo by Ashley Bunnell





## Understanding and Protecting Ecosystems

### ARIELLE LEVINE *Geography*

Environmental scientist and geographer Arielle Levine is helping resource managers in American Samoa better understand local interactions with coral reef ecosystems and the outcomes of conservation efforts to protect the coastal and marine environment.

Using participatory mapping (PGIS) techniques to study human uses of the American Samoan coast, her work provides valuable data for local coastal and marine resource management agencies. With input from local resource managers and village residents, Dr. Levine created maps of Fagaloa harbor and neighboring villages, one of the most heavily used coastal regions on the islands, and maps of watersheds and nearshore marine environments for three other villages. Her documentation of the relationship between watershed pollution, flooding, and the marine environment offers a useful resource for villages developing watershed management plans, and important information for local natural resource management agencies.

Dr. Levine has also been conducting surveys on island resident behaviors and attitudes relating to coral reef resources to inform the National Coral Reef Monitoring Program.

Dr. Levine's research is supported by the National Oceanic and Atmospheric Administration and the National Fish and Wildlife Foundation.

*Top and Bottom:* Members of the American Samoan survey team survey island residents about attitudes and behaviors relating to coral reefs. Photos by Stacey Kilarski

*Middle:* Dr. Levine presents watershed mapping results of the participatory GIS workshop to residents of Fatumafuti village, American Samoa. Photo by Alice Lawrence



## Documenting an Endangered Language

### MARGARET FIELD *American Indian Studies*

Many American Indian languages are seriously endangered and have only a few child speakers left. One cause may be a result of economics: indigenous communities find they must learn to speak the dominant language in order to find employment. Through transcription of narratives, linguist Margaret Field is documenting the Kumeyaay language while it is still actively spoken in Baja California, and creating a multidialectal Kumeyaay dictionary.

With support from the University of London's Hans Ruasing Endangered Languages Project, Dr. Field is collecting narratives which include traditional stories, oral histories and explanations of traditional culture, on topics from childbirth to life histories to creation stories. Her research will produce an important body of texts for the Kumeyaay people in the U.S. and Baja, linguists, anthropologists, and oral literature specialists.

**Top:** *Paipai elders from Santa Catarina.*

**Bottom:** *Teodora Cuero, an elder and fluent speaker from the Kumeyaay community of La Huerta.*

**Bottom Right:** *Aurora Meza Calles and Norma Meza Calles demonstrating the traditional method of making shawii, acorn mush. Here they are leaching the tannen out of the acorn meal.*

*Photos by Mike Wilken-Robertson*







## Engineering Enzymes to Block Harmful Cells

**TOM HUXFORD**

*Chemistry & Biochemistry*

Dr. Tom Huxford and students in his Structural Biochemistry Laboratory are studying how human cells activate the expression of survival genes in response to potentially toxic stimuli. Using x-ray crystallography, the researchers solved the three-dimensional structure of the human I $\kappa$ B Kinase 2 enzyme (IKK2) in its active state. The structure suggested a unique mechanism through which the enzyme can switch itself from its inactive form into a state of activity. Experiments performed on engineered versions of the enzyme support this model for IKK2 activation and suggest new strategies for blocking cell survival in situations where it is not beneficial, such as in cancer cells.

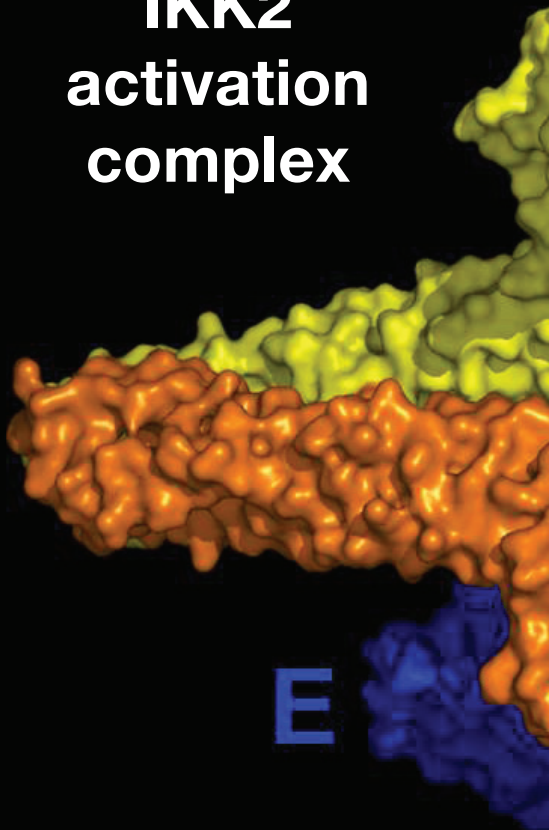
A grant from the U.S. Department of Defense enabled the recent acquisition of a NanoTemper Microscale Thermophoresis instrument, one of the first of its kind in the state of California. It will allow researchers to measure interactions of biological molecules involved in cell signaling, activation of survival genes, and muscle assembly and repair.

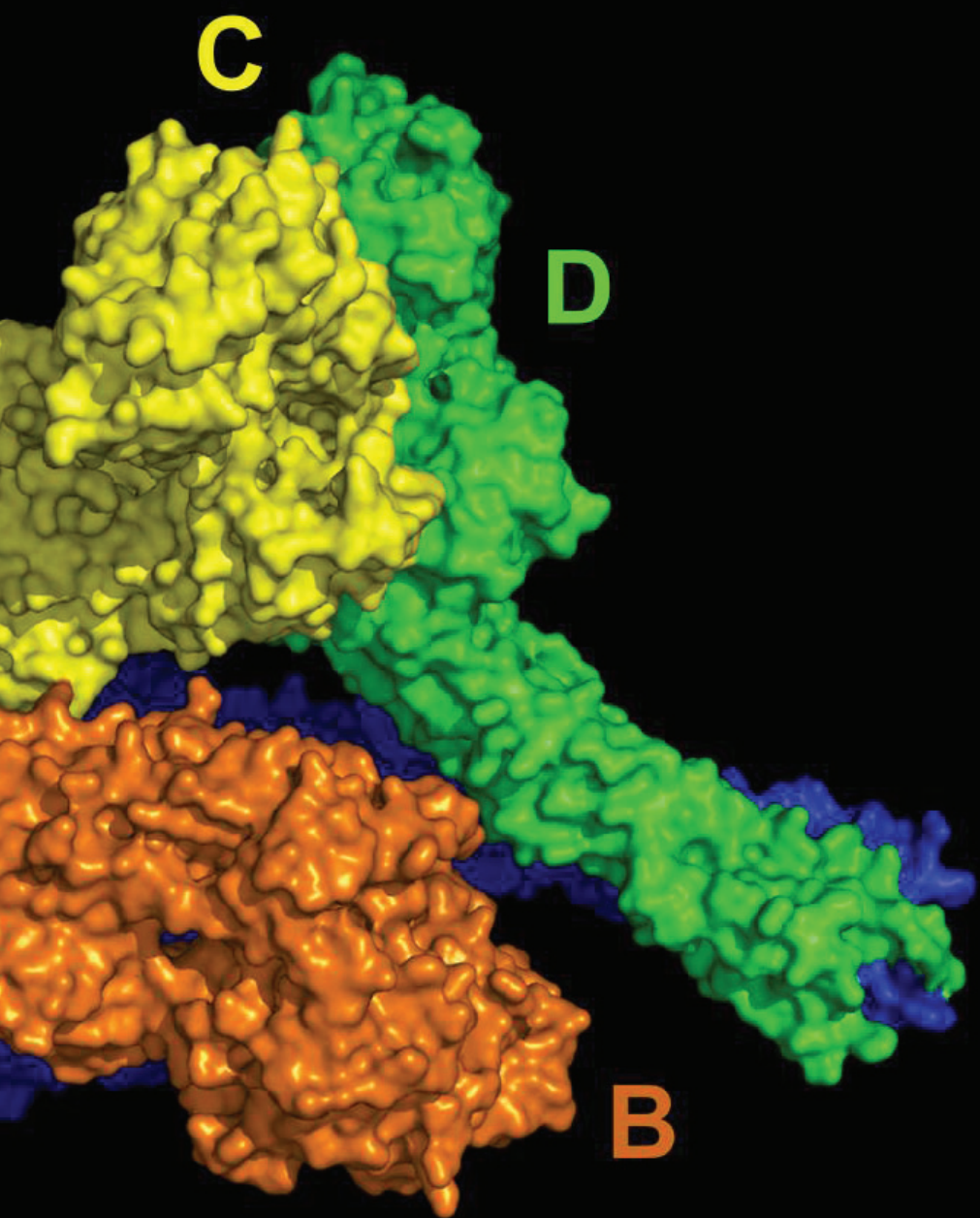
The National Science Foundation and American Cancer Society also support Dr. Huxford's research.

**Right:** *The x-ray crystal structure of human IKK2 captures two copies of the enzyme (B:C and D:E) in a complex that promotes its activation.*

**Below:** *Doctoral candidate Cathrine Aivati demonstrates the new NanoTemper Monolith NT.115 MicroScale Thermophoresis instrument. Photo by Tom Huxford*

# Human IKK2 activation complex





## The Power of Plastic

### JULIO VALDES

*Civil, Construction, and Environmental Engineering*

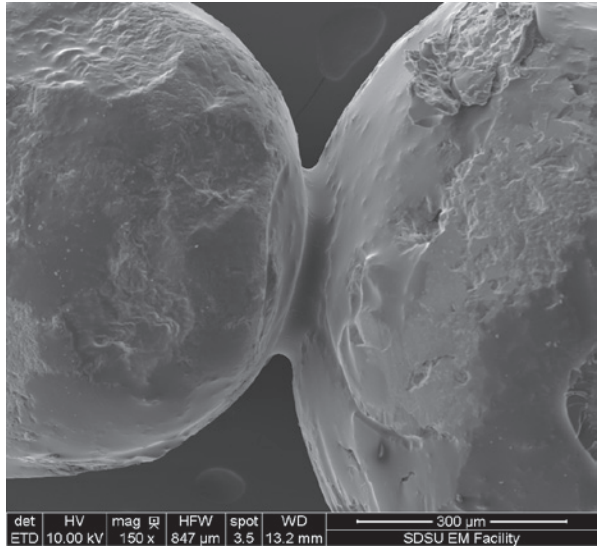
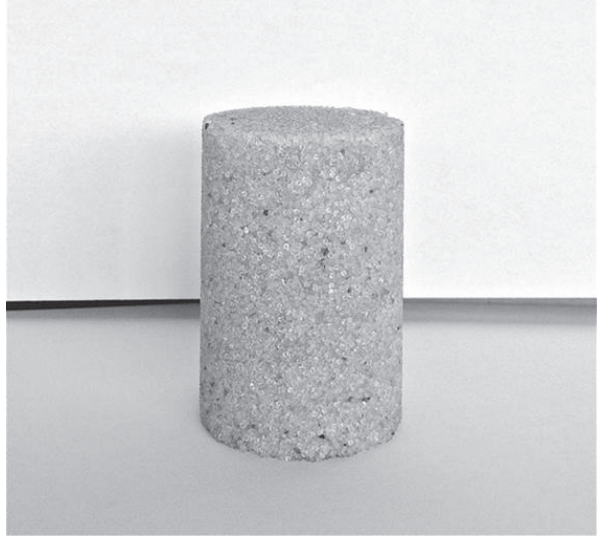
The National Science Foundation supports Dr. Julio Valdes's research efforts to develop a novel technique for strengthening sandy soils by 'heat-gluing' the grains together with recycled plastic. The soil is mixed moist with tiny amounts of recycled plastic powder. Applied heat melts the plastic particles and upon cooling, they solidify, bonding the soil grains together. The result is a bonded soil with high stiffness and strength. An important feature of the technique is that the bonds achieved are ductile (instead of brittle) and healable (broken bonds can be healed with heat).

The technology may have profound implications in the future of ground improvement for sustainable infrastructure systems; for example, flexible pavement bases, and for reducing the soil's susceptibility to liquefaction during earthquakes.

**Top:** Cylindrical specimen of plastic-bonded sand. Photo by Geo-Innovations Research Lab, SDSU

**Middle:** Two sand particles sharing a hardened plastic bond. Photo by S. Barlow

**Bottom:** Dr. Julio Valdes (rear, center) with research students (standing L to R) Nicole Garcia, Marianna Figueiredo, Nicole Salem, Pouya Golshan, Kioomars Ravaghi and seated Jacquelyn Vila, Angelica Rojas-Colin. Photo by Geo-Innovations Research Lab, SDSU



## Measuring Movements, Improving Communication

### IGNATIUS NIP *Speech, Language and Hearing Sciences*

SDSU's Speech Physiology Lab uses an eight-camera optical motion capture system and an electromagnetic articulograph to record movements of the lip, jaw and tongue. This is the same technology used by the film industry to convert actors' expressions to computer-generated film characters - and the technology used by lab director and speech language professor Ignatius Nip to examine the movement and coordination disturbances in children with cerebral palsy, many of whom have speech and language disorders.

Dr. Nip's research helps identify how children with cerebral palsy move their mouths when speaking. Eventually, this knowledge may be used to create speech therapy techniques that help them become more effective communicators. The National Institute on Deafness and Other Communication Disorders supports his work.

**Top:** Dr. Nip places reflective markers on Lindsay Kempf, an undergraduate research assistant. These reflective markers help the system record mouth and facial movements during speaking.

**Middle:** Fifteen reflective markers are placed to help create a 3D model of the face.

**Bottom:** The optical motion capture system uses eight cameras to record speech movements. These cameras are placed around the room so that participants can move their heads and look around without affecting the recording.

**Below:** This system has been used to record participants as young as three months of age. Babies and toddlers are seated in a car seat to be recorded.



## From Fish to Bobcats: Supporting Sustainable Ecosystems

### REBECCA LEWISON

#### *Biology*

Dr. Rebecca Lewison uses innovative analyses and approaches to understand the impact of human resource and land use on terrestrial and marine wildlife. Fisheries are one type of resource use that is fundamental to human survival, and a primary focus of her research. An increase in fishing over the last fifty decades has resulted in an increase in the incidental or unintended capture of non-target species, known as bycatch. Fisheries bycatch has been identified as the single largest threat to some existing populations and causes observable declines in seabirds, sea turtles, marine mammals, sharks and larger predatory fish. Working with partners from resource management agencies and the fishing industry, Dr. Lewison is providing the science needed to improve our understanding of where and why bycatch occurs, supporting effective and sustainable fisheries management.

Other projects that Dr. Lewison leads have a similar focus - conducting science that has direct relevance and application to resource and land management. Whether studying desert tortoises, bobcats, seabirds, sharks or sea turtles, what unites the research from the Lewison Lab is a common focus on the complexity of the relationship between human and ecological processes and a commitment to conduct science in service to the San Diego, national and international community.

Dr. Lewison's work is supported by NASA, the California Department of Transportation, the National Oceanic and Atmospheric Administration, California Department of Fish and Wildlife, and the National Science Foundation.





NMFS Permit #1591

**Top Left:** Tagging and releasing a common thresher shark; in the process, the team collects biological data and a skin sample for use in the genetics lab. Photo by Austin Jeffcoat

**Bottom Left:** Loggerhead sea turtles are one of the long-lived animals that can get accidentally captured in fishing gear. Photo by B. Wallace

**Top:** Doctoral candidate Sheila V. Madrak adheres a Time-Depth Recorder to an adult green turtle (*Chelonia mydas*) in San Diego Bay. (NOAA NMFS Permit #1591) Photo by Angelo D'Amico (SPAWAR)

**Middle:** Remote cameras detected this gray fox near a culvert under Highway 67 at Mount Woodson during an SDSU-led wildlife crossing study funded by CalTrans. Photo by Megan Jennings

**Bottom:** A GPS-collared bobcat in Los Peñasquitos Canyon Preserve. This animal was one of 17 animals captured within San Diego's Multiple Species Conservation Plan preserve network during a study by SDSU researchers to understand wildlife movement between protected areas. Photo by Shouqin Huo



## Helping Urban Schools Achieve Excellence

**JOSEPH F. JOHNSON, JR.**  
*Dean, College of Education*

Dr. Joseph Johnson leads the National Center for Urban School Transformation (NCUST) which has identified and awarded 94 "remarkable" elementary, middle, and high schools in 22 states. The schools defy stereotypes because they demonstrate high proficiency and graduation rates for every demographic group and maintain many other measures of student success.

The Center examines these schools to determine why they attain excellent results. Key findings focus upon positive relationships among educators, students, and parents; rigorous curricula; instructional approaches that build upon student strengths; and leadership that helps all parties work to improve teaching and learning. The Center is testing these findings in partnerships designed to improve urban schools in several cities including San Diego, Riverside, Houston, and Phoenix.

**Top:** Dean Johnson. Photo by San Diego State University

**Middle:** Dean Johnson with Assistant Principal Maria Espinosa and Principal Elena Martinez-Buley of Sylvan Rodriguez Jr. Elementary School in Houston, one of the 2014 NCUST Excellence in Urban Education Award recipients, and Houston School Services Officer Lupita Hinojosa. Photo by Ray Perez

**Middle:** Awards are presented to winning schools at an annual recognition event. Photo by Ray Perez

**Bottom:** Principal Delia Pacheco and student at Gold level award-winning elementary school, EJE Academies in El Cajon, California. Photo by Ray Perez

*Equity without excellence is just mediocrity. Excellence without equity is an oxymoron.*

*— Joseph Johnson*







## Estimating Labor Trafficking Abuse

**SHELDON ZHANG**  
Sociology

The federal government, labor rights groups and many international organizations claim that human trafficking for labor abuse is a widespread problem. However, researchers have not been able to produce reliable estimates to verify such claims because estimation among victim populations is very difficult. Conventional research methods are inadequate.

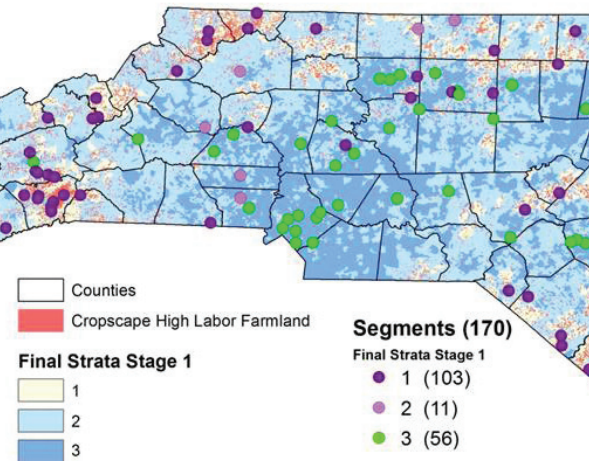
Sociologist Sheldon Zhang is among a few in the world who are creating a way to provide the estimation. Zhang and his team applied an innovative method to estimate labor trafficking and abusive employment practices in San Diego County; his current project, funded by the U.S. Department of Justice, is estimating the prevalence of labor trafficking victimization among migrant farmworkers in North Carolina.

North Carolina has a vibrant agriculture that is heavily dependent on migrant farmworkers. Using a GIS-based enumeration strategy, Zhang and his research partners are implementing a multistage probability sampling to produce statistically sound estimates on the scope of the problem in North Carolina. This work will provide important empirical data to guide policy debate and the mobilization of resources to fight against labor trafficking and other forms of gross labor exploitations.

*Top:* By marking their properties such as trees or barns with a purple sign, North Carolina property owners are warning strangers to stay away. Photo by Sheldon Zhang

*Middle:* A probability-based sample produced widely scattered locations where the field team must visit to find and interview migrant farmworkers. Photo by RTI International

*Bottom:* On-site visits must identify farmworker residences. This house gives some clues of a possible farmworker residence. Photo by RTI International



## Regulating Tobacco Marketing

### MEGHAN MORAN *Communication*

Dr. Meghan Moran is examining the tobacco marketing landscape and the marketing features that produce inequitable outcomes in tobacco use. It is well-documented that tobacco companies target ethnic minorities which is problematic because disparities in exposure to tobacco marketing could account for inequitable outcomes in tobacco use.

By identifying key features in tobacco marketing such as colors, descriptors, branding, and claims and specifying the cognitive/physiologic response to these ads by African American, Asian American, Latino and non-Hispanic white consumers, Dr. Moran can determine how tobacco use is initiated and changes as a result of exposure to advertising and illuminate the specific marketing features that disproportionately affect different ethnic groups of youth and young adults.

The National Institute on Drug Abuse supports this work.

**Top and Bottom:** Sample marketing materials.

**Middle:** Dr. Meghan Moran.



© Copyright 2013

# pleasure!

Visit us at [Newport-pleasure.com](http://Newport-pleasure.com)  
Restricted to Adult Smokers 21 or Older.

Newport, Pleasure!, Newport Pleasure!, The World of Newport Pleasure, Marlboro Gold, Marlboro Blue, Newport Lights, Newport Lights and other trade dress elements TM Lorillard Licensing Company LLC. Phil. U.S. Pat. & Tm. Off.

These cigarettes do not present a reduced risk of harm compared to other cigarettes.

**SURGEON GENERAL'S WARNING: Smoking Causes Lung Cancer, Heart Disease, Emphysema, And May Complicate Pregnancy.**

Scan the QR code to learn more about Newport Pleasure!



Rewrite The Rules.

# FIN

Electronic Cigarettes



## Safer Fun in the Sun

### PETER ANDERSEN *Communication*

Skin cancer is the most common and most preventable form of cancer.

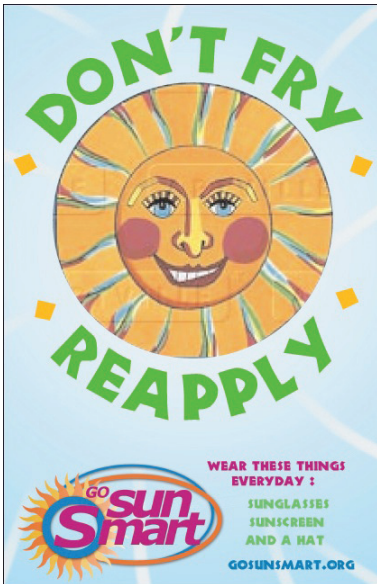
The sun's ultraviolet rays can damage skin in as little as 15 minutes. Avoiding exposure to ultraviolet light could prevent more than three million cases of skin cancer annually. Daily use of sunscreen would cut the incidence of melanoma, the deadliest form of skin cancer, in half.

Health communication expert Peter Andersen has developed a sun safety program for employees and guests at 40 winter and summer resorts nationwide. The program emphasizes the early and reapplication of sunscreen; use of wide-brimmed hats, protective clothing and shade; and understanding the effects of time of day and season on sun safety.

The goal of the NIH-funded *Go Sun Smart* program is to encourage guests at outdoor resorts, whether they are skiing or swimming, to make good choices about sun protection, minimizing their risk of skin cancer.

*Top:* Dr. Peter Andersen collecting data at a ski resort. Photo by Gabriel Chagnon

*Bottom:* Go Sun Smart program poster



*Each year, more than 2 million Americans are diagnosed with skin cancer.*

*– American Cancer Society*

## Faster Analysis, Superior Design

### ROBERT K. DOWELL *Civil, Construction, and Environmental Engineering*

SDSU's Structural Engineering Lab houses a unique "shaking table" designed and built by Dr. Robert K. Dowell and used for testing the structural integrity of buildings, building components, anchors, seismic dampers, and red clay roof tiles. The shaking table has applied accelerations that are larger than have ever been measured in a real earthquake.

An expert in seismic analysis and structural engineering, Dr. Dowell's research is applied to the analysis, design and construction of bridges, buildings and ships. His new nonlinear seismic analysis method is thousands of times faster than existing methods, changing the way bridge structures will be designed.

Dr. Dowell's work is supported by various companies including McQuarrie Temolen Group and Hilti Corporation.

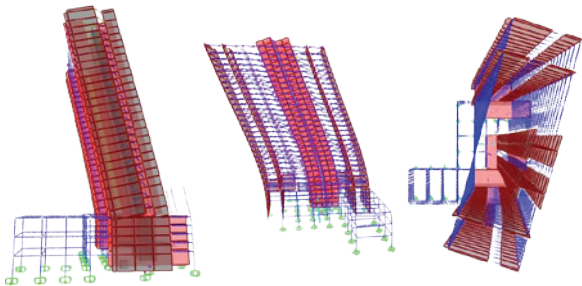
**Top:** The Dowell research team from left to right: Chethan Kubsad (student), David Riley (student), Robert Kochan (student), Josh Reece (student and NASSCO engineer), Akash Patel (engineer), Carol Stein (student), Dr. Dowell (Principal Investigator and Lab Director), Greg Morris (Technician and Lab Manager), Crystal Garcia (student), Noel Briseno (student), Bestun Pashid (student) and Spencer Phillippo (student), all standing in front of a completed test setup.

**Middle:** Tallest building on Guam; Dr. Dowell served as an expert consultant for a detailed nonlinear seismic analysis due to recent increased seismic hazard maps developed by the USGS for Guam.

**Middle:** Analysis model for Guam building (displacements exaggerated for viewing purposes).

**Bottom:** Building component fully collapsed on the shaking table, indicating failure of the anchors and end of the dynamic structural test.

Photos by Dowell Lab





## Improving the Odds for Breast Cancer Survivors

### **KRISTEN WELLS** *Psychology*

Clinical health psychologist Kristen Wells leads the Cancer Disparities and Cancer Communications Lab at SDSU.

One of her studies is already showing promise for enhancing access to health information and health care in underrepresented populations.

Following treatment for breast cancer, patients should receive regular follow-up exams, mammograms and/or medication. However, many women cannot get this care which could prolong their lives.

In collaboration with colleagues at Sharp HealthCare, Moffitt Cancer Center, and the University of South Florida, Dr. Wells has developed a patient navigator program to assist breast cancer survivors in getting the care they need and maintaining a high quality of life. The program includes developing routines and reminders for taking medicine, providing linguistically appropriate and low-literacy information regarding the benefits/side effects of medications, and providing ongoing support.

Her work is funded by the National Cancer Institute.

*Top: Dr. Kristen Wells (right) consults with Patient Navigator Dr. Claudia Carrizosa. Photo by Debbie Brighton*



*If our patient navigator program can help assist patients in taking their medication and returning to their doctors for regular exams, we may be able to help prolong the lives of breast cancer survivors, who remain at a high risk for death from cancer.*

*– Kristen Wells*

## Smoothing Transitions

### CAREN SAX

*Administration, Rehabilitation and Postsecondary Education/ Interwork Institute*

Dr. Caren Sax's disability research and training efforts related to transition are tied together through two themes: person-driven services and interdisciplinary collaboration. She serves as SDSU's principal investigator on the groundbreaking research and demonstration project, California Promise Initiative (CaPROMISE). This statewide collaborative led by California Department of Rehabilitation, Interwork Institute, 100+ school districts, and 18 family resource centers provides services to Supplemental Security Income (SSI) recipients, ages 14-16, and their families, and is designed to increase economic self-sufficiency as students transition to adulthood.

This U.S. Department of Education-funded program empowers these individuals to establish and realize high expectations for their futures. A closely related project is a Kessler Foundation Signature Employment Grant that helps college students with disabilities gain meaningful employment upon graduation.

Dr. Sax's transition work has also involved collaborations with the European Platform for Rehabilitation and colleagues in China and Hong Kong.

**Top:** Dr. Sax, seated left, with Dutch colleagues who work with transition-age students on a visit to Interwork.

**Middle:** a "person-driven plan" for transition planning, based on training Dr. Sax conducted in the Netherlands.

**Bottom:** transition planning meeting for high school student with family, friends, and teachers.

*Photos by Interwork Institute*





## Mixing Math and Art

### RICARDO NEMIROVSKY *Mathematics and Statistics*

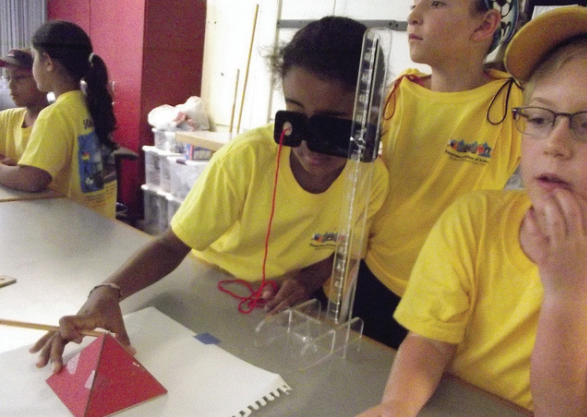
Dr. Ricardo Nemirovsky is a member and former director of SDSU's interdisciplinary Center for Research in Mathematics and Science Education (CRMSE), a Center that joins faculty and students from the Colleges of Education and Sciences to advance math and science education locally, nationally, and internationally. He incorporates art projects to merge personal expressiveness into the mathematics that he teaches.

Dr. Nemirovsky is currently directing the NSF-funded InforMath Project. InforMath brings together SDSU researchers and staff from San Diego's Mingie International Museum, Museum of Photographic Arts, Reuben H. Fleet Science Center and Natural History Museum to investigate ways of creating mathematical experiences for museum visitors.

**Top:** Peering through the view finder of Alberti's window, a girl creates a projected image of the view down the Prado. The transparency she is sketching on was then used to create a sun print of the scene. Photo by Paolo Zuniga

**Middle:** Ruben H. Fleet Science Center. Photo by Ruben H. Fleet Science Center

**Bottom:** A girl situates a pyramid in preparation for creating its projected image. Photo by Elementary Institute of Science



## Advancing the Nursing Workforce

### PHILIP A. GREINER Nursing

Nurses play a critical role in improving patient outcomes. A recent National Institute of Health study links levels of nurse staffing and education to reduced patient mortality.

Dr. Philip A. Greiner, Director of SDSU's School of Nursing, directs the Imperial Valley Consortium for Nursing Workforce Development project which facilitates the transition of associate degree-educated Hispanic nurses to the baccalaureate level.

"Our goal is to raise the bar for nursing education and practice in Imperial County," says Dr. Greiner. Increasing the supply of BSN-prepared RNs in this California community will lead to improved quality of care and patient outcomes.

Partners in this Health Resources and Services Administration-funded program include local educational, healthcare and community agencies.

**Top:** RN-BS students with Imperial County Supervisor Mike Kelley; as part of the Community Health Nursing course, students explored county government and the establishment of a Local Health Authority.

**Middle:** Luisa Grijalva & Carmen Fitzsimmons on a ride along with EMS at Calexico Fire Station as part of their clinical rotations.

**Bottom:** Nursing students Leslie Johnson, Erin Hannon and Jennifer Toves participating in a tour of the Imperial Irrigation District Steamplant through their Community Health Nursing class.

Photos by Helina Hoyt







## LGBT Populations Face Health Disparities

### HEATHER CORLISS Graduate School of Public Health

The majority of lesbian, gay, bisexual, and transgender (LGBT) people lead healthy, happy, and productive lives. Even so, as a population, research shows that compared to heterosexual, non-transgendered people, LGBT people experience health disparities in a variety of domains including risk for suicide, mental health and substance disorders, and chronic conditions such as cardiovascular disease and type 2 diabetes.

Heather Corliss is a social and behavioral epidemiologist who is currently leading three NIH-funded studies focused on LGBT health. Her team uses diverse research designs (i.e., cross-sectional and longitudinal) and methods (i.e., quantitative, qualitative, and mixed methods) with the aim of improving understanding of the causes of these disparities and promoting healthier outcomes.

**Top:** Dr. Heather Corliss. Photo by Jill Denny Photography

**Bottom:** The Corliss research team: Dr. Aleksandar Keckojevic, Dr. Hee-Jin Jun, Dr. Heather Corliss, Tenaya Siva, and Cheryl Ann Valdez (not pictured: Hilda Huamba and Dr. Nicole VanKim). Photo by Karmin Rodriguez



*Health disparity...the difference in the incidence, prevalence, morbidity, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups.*

*– National Institutes of Health (NIH)*

## Designing the Next Generation Lighter, and Durable Aerospace Structures

### SATCHI VENKATARAMAN *Aerospace Engineering*

Composite materials due to their lightweight and high strength are increasingly used in aerospace structures. The ability to predict “failure” in composite structures and their behavior as they age is critical for the aerospace industry to safely operate planes.

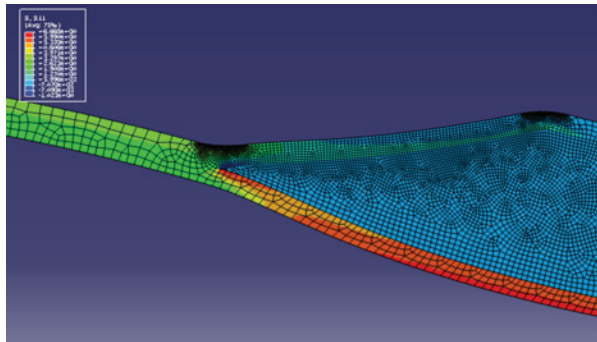
Dr. Satchi Venkataraman is an expert in analysis and design of aerospace structures, structural optimization and risk assessment. His research is helping to understand failure modes in composite structures, durability of bonded and bolted joints, and developing methods to design lighter and safer structures.

Dr. Venkataraman’s work is supported by NASA, Office of Naval Research (jointly with UCSD), Air Force Office of Scientific Research (jointly with NextGen Aeronautics) and Northrop Grumman.

**Top:** Compression testing of composite aircraft panels to measure residual strength after impact damage. Photo by Satchi Venkataraman

**Middle:** Finite Element Analysis (FEA) simulation of stresses in a sandwich composite tapered closeout joint region due to tension loads. Photo by Andrew Christensen, Katherine Kucharski, Satchi Venkataraman

**Bottom:** Photograph of a sandwich composite beam showing failure at the tapered closeout joint region after the tensile testing. Photo by Scott James, Brett Sens, Satchi Venkataraman





## Educating the Entrepreneur

### SUSAN BAXTER

*California State University  
Program for Education and  
Research in Biotechnology  
(CSUPERB)*

### ALEX DENOBLE

*Management/Lavin  
Entrepreneurship Center*

The National Science Foundation's Innovation Corps (I-Corps™) programs support a network of entrepreneurial and innovation centers to educate, mentor and advise researchers nationwide.

Dr. Susan Baxter and Dr. Alex DeNoble direct the California State University's I-Corps™ Site, focused on biological sciences commercialization. The SDSU-based Site organizes experiential entrepreneurship curriculum, networking opportunities and mentoring for faculty and student researchers at all 23 CSU campuses. The CSU I-Corps™ programs get teams out of their labs, innovation centers, and off-campus. By consulting with mentors, advisors and potential customers from biotechnology organizations across California, teams learn how to find a product-market fit for bioscience ideas.

Expert evaluation panels ensure student teams can match their product concept to a biotechnology market that might value it.

**Top:** *The final evaluation panel at the 2014 Student Challenge in Santa Clara, California, included (left to right) Adam Mendelsohn (CEO, Nano Precision Medical), Elise Brownell (Founder, ZephyrBiotech) and David Paulling (Intellectual Property Counsel, Sutro Biopharma).*

**Bottom:** *The 2014 VIGOR team from CSU Sacramento presented an assistive technology product concept designed to help the vision-impaired navigate campuses and neighborhoods. Left to right: Joseph Gulliano, David Anderson, Fernando Garcia and William Low.*

*Photos by Kyle Chesser, Hands On Photography*



## Faith in Action

### ELVA ARREDONDO

*Graduate School of Public Health*

The low prevalence of moderate-to-vigorous physical activity among adult Latinas likely contributes to the high rates of cancer and other chronic diseases in this population. Clinical psychologist and public health researcher Elva Arredondo is examining preventive practices and behavioral interventions to combat this trend.

The National Cancer Institute is supporting her multi-level intervention promoting physical activity among churchgoing Latinas. Churches play a central role in the Latino community and provide an ideal setting for this study, which utilizes specially trained *promotoras* or “health promoters” to lead both physical activity sessions and cancer prevention workshops. Preliminary findings indicate an increase in physical activity, weight control and earlier detection of cancer.

Dr. Arredondo and her team are also studying the relationship between modes of transportation, travel patterns and physical activity. And, with a grant from The Doris A. Howell Foundation for Women’s Health, Dr. Arredondo is examining the barriers to engaging in physical activity and healthy eating during pregnancy and developing an intervention to improve the lifestyle behaviors of pregnant Latinas.

**Top:** Walking group at Christ the King Church. Photo by Jacqueline Montañez

**Middle:** Stretching class at Holy Spirit Catholic Church. Photo by Jacqueline Montañez

**Bottom:** Cancer prevention workshop at St. Mary, Star of the Sea Catholic Church. Photo by Jessica Haughton



## Lessons in Stem Cell-Based Tissue Regeneration

**RICARDO ZAYAS**  
*Biology*

Freshwater planarians (flatworms) have the remarkable ability to completely regenerate from small body fragments after injury or amputation, and quickly regain normal function. With their high volume of stem cells and defined organs such as a central nervous system, planarians provide an excellent opportunity to investigate conserved molecular mechanisms that regulate stem cell-based tissue regeneration.

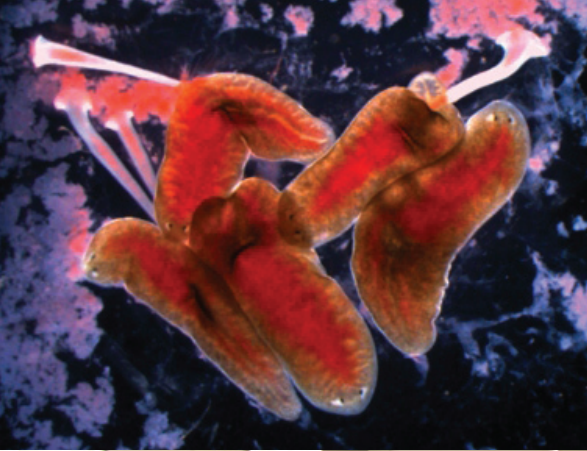
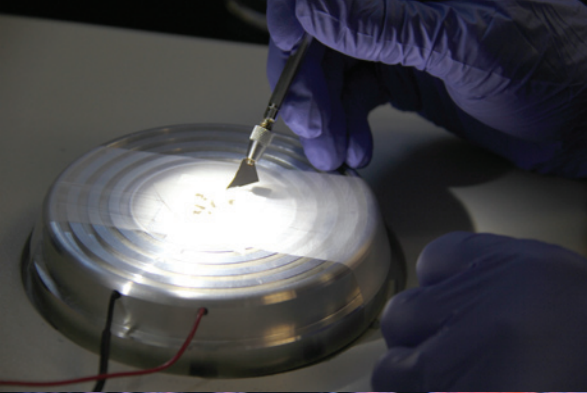
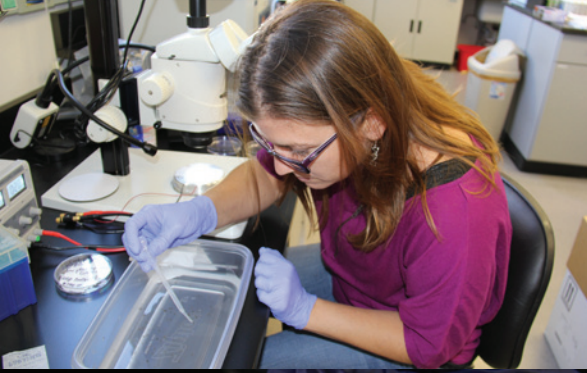
Dr. Ricardo Zayas has received a prestigious CAREER Award from the National Science Foundation to use the planarian model to examine how regulation of protein activity and longevity contributes to the regeneration process. Basic stem cell research has implications for biomedical purposes and can help us understand how to help humans restore missing cell types and restore function.

His work is also supported by the California Institute for Regenerative Medicine.

**Top and Middle:** Undergraduate research student Katrina Cable selecting and amputating planarians. Photos by Debbie Brighton

**Middle:** Planarians feeding on homogenized liver mixed with red food coloring. The white tubular structures are called the pharynx. The pharynx is connected to the intestine, which appears red as the animals ingest liver. Photo by Zayas Lab

**Bottom:** Graduate student Joi Weeks maintaining her planarian strains. Photo by Debbie Brighton



## Contributing to America's Energy Independence

### DAVID PEARSON

*Dean, Imperial Valley Campus*

With more than 350 days of sunshine each year and rich agricultural resources, the Imperial Valley is ideally suited for renewable energy production.

SDSU's Center for Energy Sustainability located at its campus in Brawley, California, is addressing renewable energy issues and creating jobs in this economically disadvantaged region.

With support from multiple federal agencies and local industry, the center has installed a power plant simulator to provide training, developed energy demonstration sites for companies to test their innovations and hosts the largest university-based solar field in the country – a 30-acre, 6MW generation field producing enough clean energy to power approximately 1,000 homes.

Dean David Pearson has led these efforts and is a champion of the Imperial Valley and renewable energy industry.

**Top:** *Hyperlight Energy solar thermal project. Photo by David Pearson*

**Middle:** *Leidos solar hydrogen production concentrator. Photo by David Pearson*

**Bottom:** *Aerial view of the Sol Orchard 37-acre "community solar" field. Photo by NRG Energy*

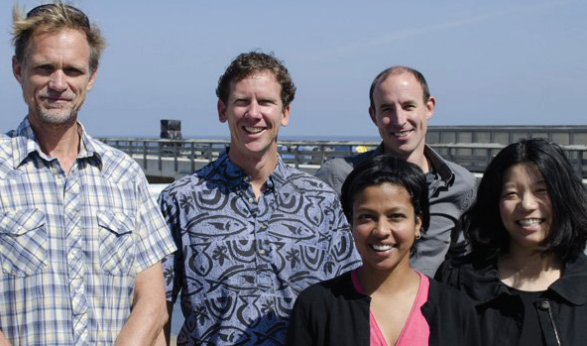




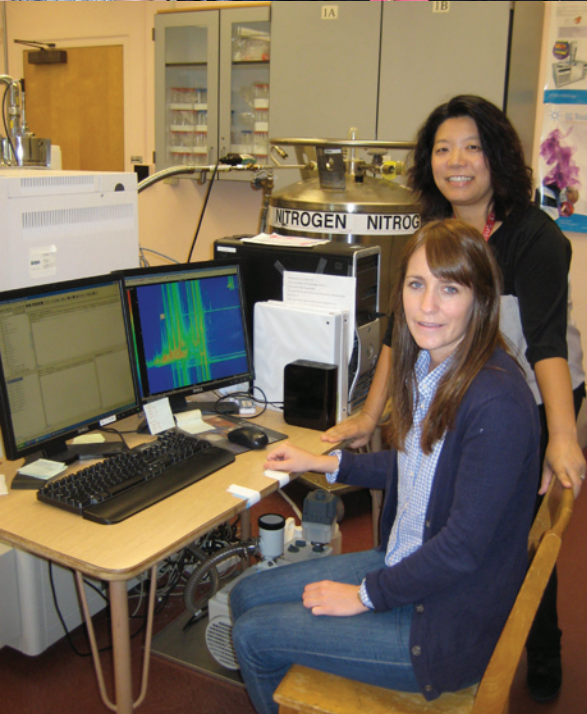
## Identifying Novel Contaminants

**EUNHA HOH**  
*Graduate School of Public Health*

Environmental chemist Eunha Hoh studies toxic organic contaminants and their impact on human health. Using novel instrumentation, she recently devised a way to detect organic chemicals in an unbiased manner and therefore, discovered previously unknown compounds and contaminants in fish oil and marine mammal blubber. She is currently implementing the method on other types of samples such as breastmilk, dust, and water for evaluation of human exposure to unknown contaminants. This research has important implications for environmental monitoring and food safety.



Dr. Hoh is a project leader of the Scripps Center for Oceans and Human Health sponsored by the National Institute of Environmental Health Sciences and the National Science Foundation. Her work is also supported by UCSD, the University of Minnesota, Oregon State University, and Orange County Water District.



**Top:** Research Technician Kayo Watanabe in operation of liquid chromatography with tandem mass spectrometry. Photo by Hoh Lab

**Middle:** Eunha Hoh (bottom right) with SIO colleagues Paul Jensen, Brad Moore, Eric Allen, and Lihini Aluwihare (not pictured William Fenical). Photo by Scripps Institution of Oceanography, UC San Diego

**Bottom:** Postdoctoral researcher Susan Mackintosh with Dr. Eunha Hoh (rear) conducting contaminant analyses using comprehensive two-dimensional gas chromatography with time-of-flight mass spectrometry. Photo by Hoh Lab

## New Faculty Join SDSU

SDSU welcomed 59 new faculty members across all disciplines for the 2014-15 academic year. An introduction to some of these talented scholars follows.

### **ILENIA BATTIATO**

#### *Mechanical Engineering*

Dr. Battiato specializes in computational sciences and fluid mechanics. Her research focuses on transport processes in porous media, such as contaminant migration in the subsurface, Lithium-battery dynamics in electrical vehicles, and flows above surfaces with microstructures. She uses models at different scales, and tools from computational sciences and applied mathematics.



### **MICHAEL BRAUN**

#### *Public Affairs, Imperial Valley Campus*

Dr. Braun is a social ecologist specializing in criminal justice policy, incarceration, and prisoner re-entry. His areas of interest include causes of violent crime, social context of delinquency and youth violence, post-traumatic stress, trauma informed care, and community-based alternatives to incarceration. He is presently researching linkages between child abuse and neglect, poor interpersonal boundaries, and violence.



### **ERIC BUHI**

#### *Graduate School of Public Health*

Dr. Buhi's research focuses on understanding and promoting sexual health among young people and employing innovative technologies for health promotion/behavior change. He is currently working on a teen pregnancy prevention and positive youth development program.



### **WHITNEY FERNANDEZ**

#### *Management*

Dr. Fernandez studies corporate governance, mergers and acquisitions, and stakeholder management. His current research examines the individual, team, and firm-level factors that enable boards of directors to effectively serve as strategic advisors to companies that are expanding internationally.





## **AURORAE KHOO**

### *School of Theatre, Television and Film*

Aurora Khoo is a writer and producer with television credits that include the CBS dramas “Unforgettable,” “JAG,” and Showtime’s “Nurse Jackie.” Her plays have been produced and developed across the country. Currently developing original television content with her agency and management, Ms. Khoo is represented by Creative Artists Agency (CAA).



## **LAURA OWEN**

### *Counseling and School Psychology*

The “summer melt” phenomenon occurs when students intend and take steps to enroll in college during spring semester of their senior year, but fail to show up in the fall. Dr. Owen’s research looks at school counselor interventions to address summer melt and the influence of customized text messages on financial aid (FAFSA) completion and college enrollment.



## **JENNIFER STARKEY**

### *Classics and Humanities*

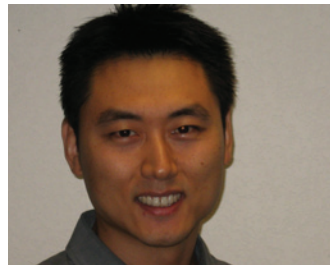
Dr. Starkey is a Greek philologist and expert on Sophocles and other fifth-century Athenian drama. Her current research focuses on intertextuality among the Classical Greek playwrights, ancient actors and acting competitions, and the history of Greek theater.



## **WEI WANG**

### *Computer Science*

Dr. Wang specializes in wireless networking and computer-aided healthcare systems. He is currently studying innovative wireless and portable solutions for seizure patient monitoring, microwave tomography imaging for breast cancer screening and resource-constrained wireless multimedia networking solutions.



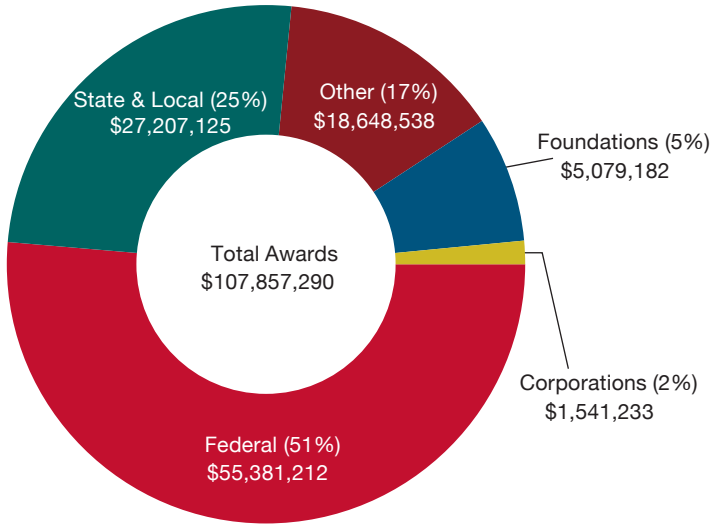
## **JENNY WONG-WELCH**

### *Library and Information Access*

Jenny Wong-Welch is a STEM Librarian specializing in engineering and mathematics librarianship. In addition to supporting the STEM disciplines with library services, her research is focused on understanding the information gathering habits and attitudes of engineering students, academics, and professionals.



## Awards by Sponsor Type Fiscal Year 2013-2014



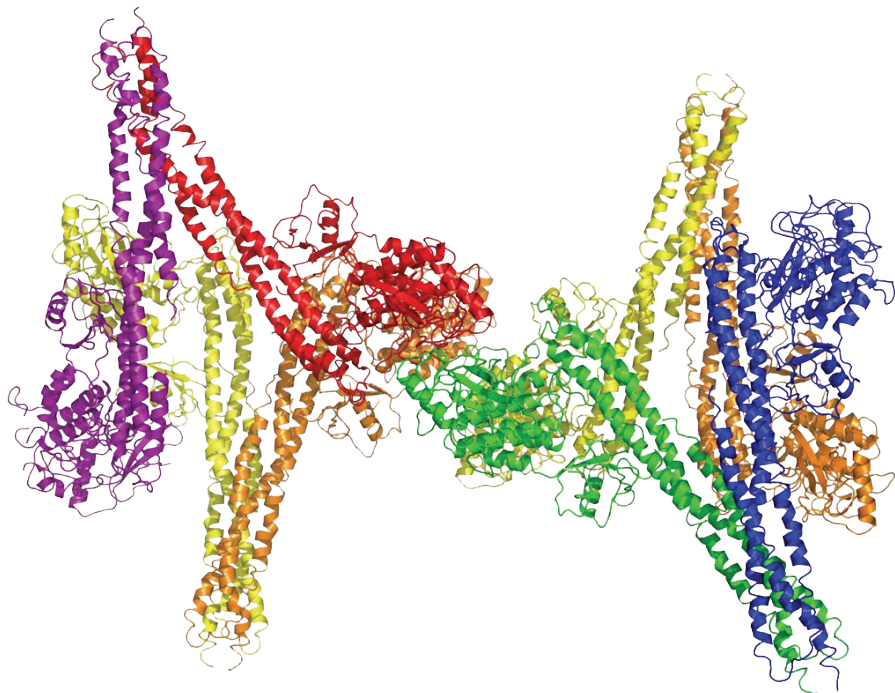
## SDSU Doctoral Programs

SDSU is proud to offer these joint 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
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 garnered \$107.8 million in support of their research programs.
- SDSU faculty and staff received 110 awards and \$26 million from the National Institutes of Health.
- The National Science Foundation provided \$9.6 million in awards to SDSU researchers.
- SDSU is classified as a research university with “high” research activity by The Carnegie Foundation.
- A major public research university, SDSU offers bachelor’s degrees in 90 areas, master’s degrees in 78 areas and doctorates in 23 areas.
- Last year’s Student Research Symposium showcased the work of more than 375 students from 86 majors in posters and oral presentations.
- SDSU continues its climb up the list of the top “Up-and-Coming Schools” in the nation, according to U.S. News & World Report’s annual ranking of America’s Best Colleges, having risen another notch to #13.
- SDSU is a top producer of Fulbright awardees.
- SDSU’s graduate programs in international business and rehabilitation counseling are ranked in the top 10 in the nation by U.S. News and World Reports. Other SDSU programs ranked among the top in the nation include: clinical psychology, audiology, nursing-midwifery, health care management, social work, education, public affairs, fine arts, biological sciences, speech language pathology, public health, psychology, business, and mechanical engineering.
- SDSU’s Confucius Institute promotes the teaching of Chinese language and culture and has been identified as one of eight model institutes worldwide.
- The SDSU Communication Master’s program has been named the tenth best in the world and the sixth best in the U.S. by Eduniversal Best Masters Ranking.
- A top LGBT-friendly campus, SDSU holds a five of five stars ranking. SDSU was the second university in the U.S. and the first in California to offer an undergraduate degree in lesbian, gay, bisexual and transgender studies.
- SDSU ranked #18 in Forbes’ list of “America’s Most Entrepreneurial Universities.”
- SDSU is nationally recognized as a military-friendly university, serving more than 3,000 student veterans, active duty, reservists and dependents each year.
- Thomson Reuters identified biology professors Walter Oechel and Forest Rohwer as two of the “World’s Most Influential Scientific Minds.”
- Mechanical engineer Karen May-Newman, founder of SDSU’s bioengineering program, is working with surgeons to improve heart pumping devices.
- Professor Peter Larlham, of SDSU’s theater department, was selected as the first recipient of the Phi Kappa Phi Distinguished Service Award for his global achievements, particularly in helping young Tanzanian students.
- Professors Frank Harris III and J. Luke Wood are working with higher education institutions across the U.S. to enhance access, achievement and success among minority male community college students.
- Bioinformatics professor Rob Edwards and colleagues identified a previously undetected virus present in half the world’s population.
- SDSU exceeded the \$500 million goal for its first comprehensive fundraising campaign. The campaign was extended to reach the new goal of \$750 million.



# SAN DIEGO STATE UNIVERSITY

5500 Campanile Drive  
San Diego, CA 92182-8220  
619 594-5213  
gra@mail.sdsu.edu  
gra.sdsu.edu

