

360

Sea Change

NEW THINKING
FOR A BLUE PLANET

360

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**SAN DIEGO STATE
UNIVERSITY**

Leadership Starts Here

FROM THE PRESIDENT



Photo: Lauren Radack

As the population of California, the American West and our binational region has grown, water scarcity has been a critical and enduring issue. While public works projects have built significant infrastructure (e.g., the Hoover Dam) to address these challenges, our cities, farms and industries continue to put extraordinary demands on water supplies. The possibility that climate change is exacerbating our region's historic drought cycles places an even greater focus on water management and use.

At San Diego State, our educational, research and service programs address acute societal challenges such as these. A new water research initiative, "Blue Gold: Mitigating the Effects of Water Scarcity," has been designated as one of our university's seven areas of research excellence. Each area of research excellence is focused on one of today's pressing challenges. Our scientists, engineers and policy experts in the "Blue Gold" initiative are identifying new technologies and creating new policy approaches to ensure that our region has sufficient clean, safe water. These research approaches are, in turn, influencing our educational programs and the service we provide.

In this issue, we meet some of the university researchers and alumni leading these efforts: Rick Gersberg, who studies the health impacts of wastewater reuse; Halla Razak, director of public utilities for the City of San Diego; and Trent Biggs and Paul Ganster, who are among the SDSU faculty members studying water policy and management in our binational region.

Also in 360, you will learn more about our students involved in water-related research and co-curricular activities—from doctoral researcher Mariangel Garcia, working toward more precise models for ocean forecasting, to the Mechatronics Club team that won an international robotic submarine competition and the students who have contributed to beautifying the university's Mediterranean Garden—a living reflection of our changing attitudes toward water.

I hope you enjoy this edition of *360: The Magazine of San Diego State University*.

Elliot Hirshman

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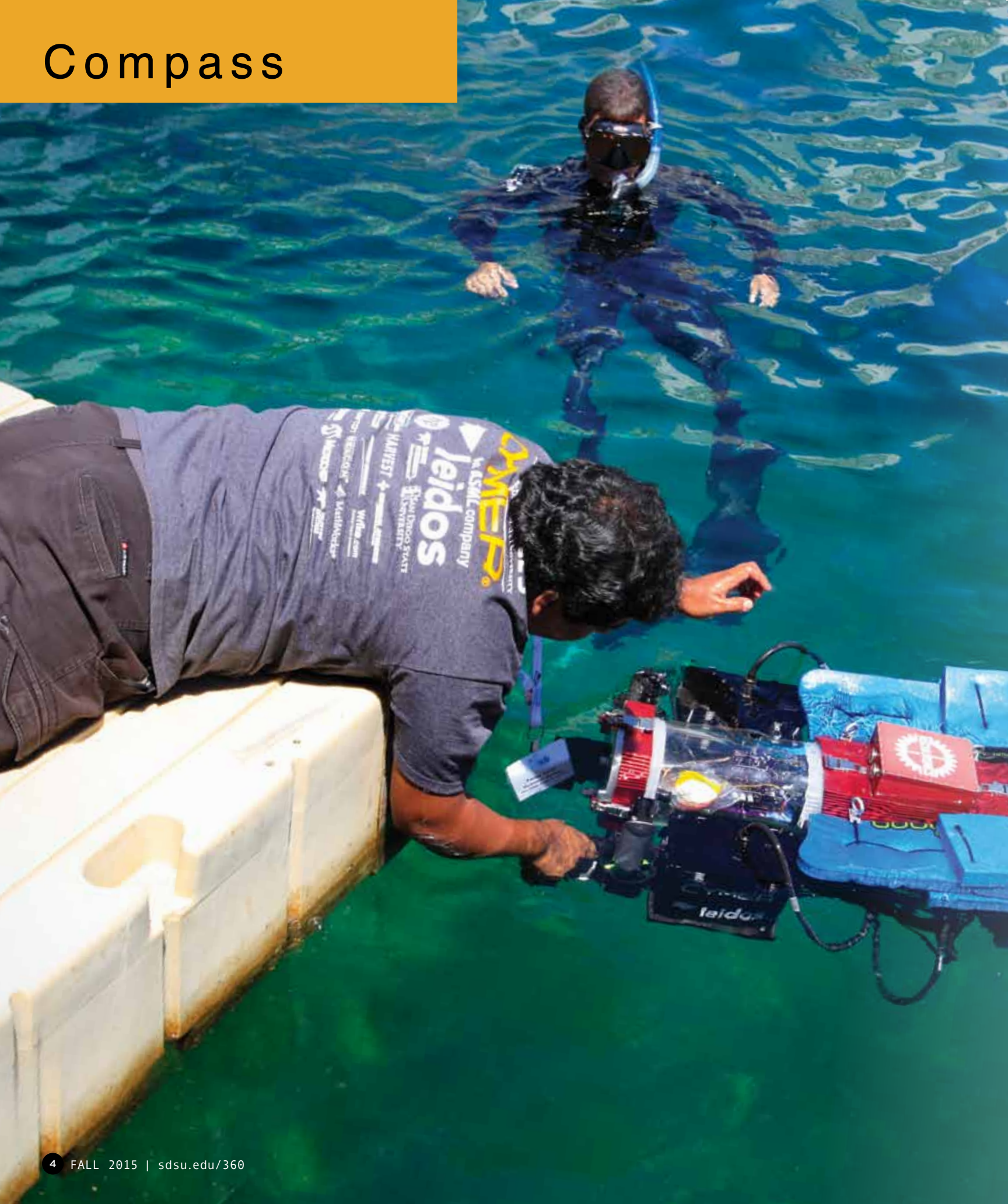
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Compass





No more obstacles

Competing against teams from Caltech, Cornell University and the National University of Singapore (that country's equivalent of MIT), students from San Diego State University's Mechatronics Club took top prize in the 2015 RoboSub competition. It was the first victory for the Aztecs in this tournament, which tests a team's ability to build and program an autonomous underwater vehicle that can perform realistic missions and navigate obstacle courses.

Austin Owens, a mechanical engineering major, designed software for the vehicle. "It was intuitive to the point that people who don't understand software could easily learn to program the sub," Owens said. That was the key to the Aztec victory, as the vehicle is constantly reprogrammed during the competition to account for changes in the course. The Mechatronics Club stays afloat with philanthropic donations, including \$40,000 in support from Cymer, Inc.

Seabird sentinels

Thousands of known and unknown contaminants called persistent organic pollutants (POPs) make their way into our oceans and waterways every year. POPs bind to the fats of many organisms, and can cause reproductive issues and other health problems for marine life, especially seabirds. Many organizations screen for the presence of known POPs, but the list of known compounds represents only a fraction of the toxins potentially present in the environment.

To look for these hidden threats, a team of ecologists and environmental chemists led by former SDSU graduate student Christopher Millow, biologist Rebecca Lewison and environmental scientist Eunha Hoh performed a powerful type of non-targeted chemical analysis on eggs of the California black skimmer (*Rynchops niger*). They identified several unmonitored and potentially dangerous contaminants. Their findings suggest these contaminants can transmit to offspring and accumulate and magnify in food webs. It also suggests that non-targeted analysis is a valuable tool for assessing environmental health.



Photo: Dick Daniels

Ahoy matey!

Students come to San Diego State for a great education, but while they're enrolled, they can also enjoy the unique San Diego lifestyle. Just a few miles from campus is SDSU's Mission Bay Aquatic Center, which offers lessons in sailing, kayaking, water skiing and Olympic rowing—all available as one-credit courses through the Department of Exercise and Nutritional Sciences.

Alumnus Paul Lang, '05, who teaches beginning sailing and wakeboarding, said capsizing recovery day is his favorite part of the course. "Once students experience a controlled capsize and recovery, a lot of their fear of water just disappears," he said.

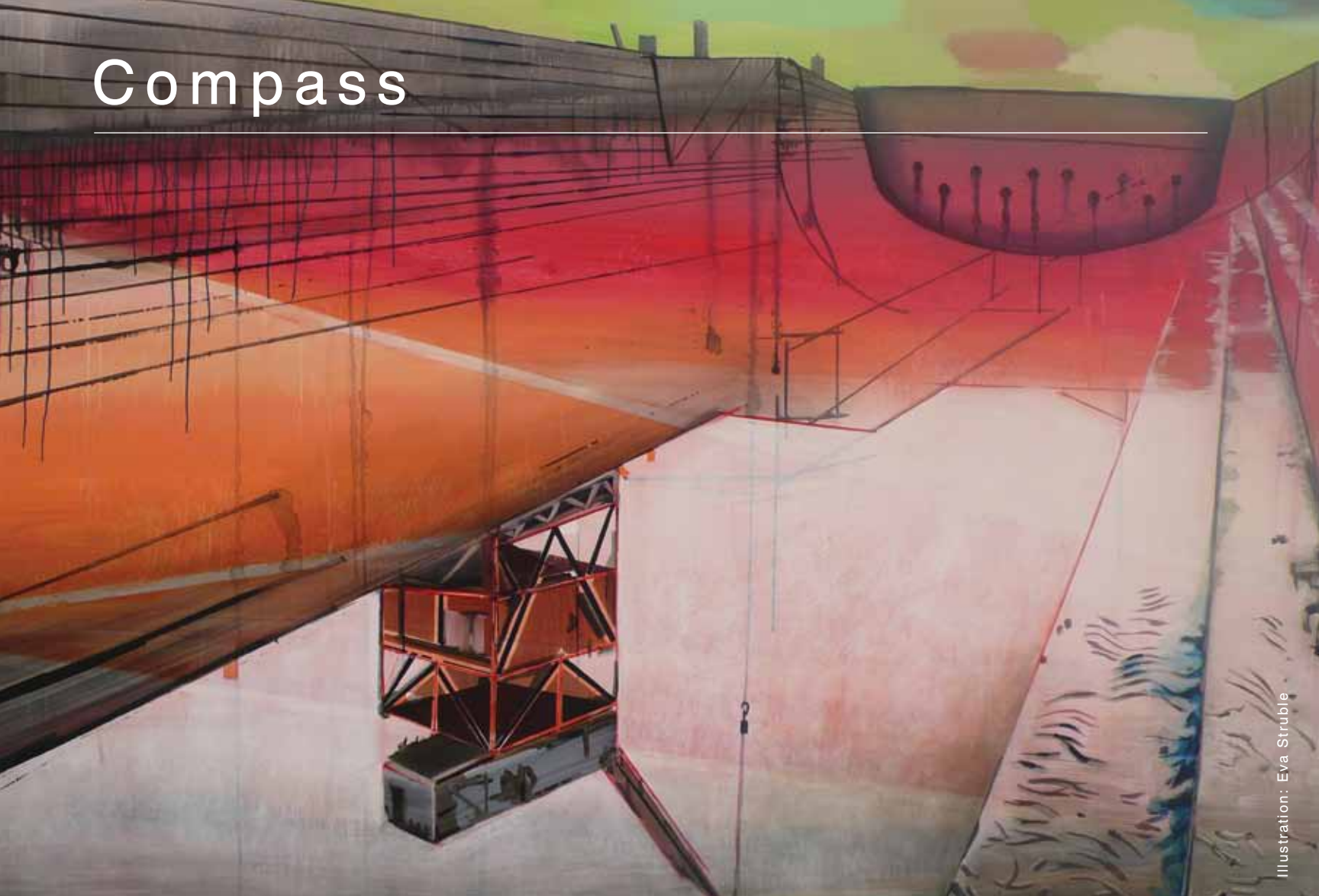


Illustration: Eva Struble

Remembering the rain

“What would our world be without water?”

The question hangs in the air at the San Diego Central Library art gallery, high above the harbor. There, Eva Struble’s painting is among the first pieces to greet visitors to the “Rainmaker” exhibition, which runs through Nov. 29. The canvas depicts not San Diego, but an empty dry dock in Brooklyn’s Navy Yard, and like many of Struble’s paintings, it appears moist with color saturation.

Struble is a professor of painting and printmaking at San Diego State University with an MFA degree from Yale University. In 2014, her project, “Produce,” which deals with agriculture, labor and immigration in North County, was displayed in a solo exhibition at the Museum of Contemporary Art San Diego.

Hacking big data

In October, more than 200 participants—some of them San Diego State students, others members of the community—descended upon Peterson Gym for a hackathon sponsored by the university’s Center for Human Dynamics in the Mobile Age (HDMA). Organizers gave these “hackers” access to databases with the goal of addressing one of three societal challenges: water conservation; disaster response; or crime monitoring.

Programmers, statisticians, math whizzes, journalists and others formed teams and brainstormed for two days, developing apps and other forms of technology to benefit society. A group called Team WaterSaver took first prize overall for developing an app that helps users calculate their household water usage and find ways to reduce their water consumption. The organizers hope the ideas generated during the hackathon will continue to develop.

What lies beneath

Groundwater makes up 40 percent of all fresh water consumed in California in an average year and far more in drought years. Concerns about groundwater depletion led to the passage of the Sustainable Groundwater Management Act in 2014 to regulate groundwater pumping in the state. The economic effect this policy will have on agriculture is unknown.

Ryan Abman, assistant professor of economics at San Diego State University, is working with Eric Edwards from Utah State University to study the effects of groundwater management on the High Plains Aquifer, also known as the Ogallala Aquifer, which lies beneath eight Great Plains states.

In the 1970s, communities in southern Kansas, the Oklahoma Panhandle and northern Texas began to experiment with groundwater management policies. By combining data on agricultural land sales, aquifer characteristics and data regarding the land itself, Abman and Edwards are seeking answers to questions about the impact groundwater management has on agricultural productivity, water use and land values.

A better forecast

Thanks to science and technology, you can now check the forecast and surf report with a smartphone. The accuracy of weather and ocean forecasting is the result of data assimilation (DA), which combines the best results from a mathematical model with data from satellite and/or radar to estimate weather variables.

Still, many ocean phenomena are not well understood, especially events that occur near the shore. Jose Castillo and his Ph.D. students in the Computational Science Research Center have developed a three-dimensional mathematical coastal ocean model to make forecasting more precise. Doctoral researcher Mariangel Garcia is using the DA method to address the forecasting of environmental variables in areas like San Diego and Monterey bays, where abrupt changes in the sea floor make predictions especially difficult.

VIDEO



[SDSU.EDU/OCEANFLOOR](https://www.sdsu.edu/oceanfloor)

Fish story

Reefs are dynamic ecosystems with populations that rise and wane depending on a host of variables. Changes in water temperature, nutrient abundance, predator populations and catch by humans can swiftly alter population dynamics.

San Diego State doctoral student and Coastal Marine Institute Laboratory researcher Jeff Barr—a self-described number cruncher and fisherman—studies how San Diego's fish populations shift as a result of changes to the local reefs and kelp forests. That's important information to have when managing fisheries and promoting species conservation.

Based on his findings, Barr supports strategies that review and reclassify protected marine areas depending on where fish are thriving and the timescale needed to maximize population health.

How long is long enough to leave an area protected before shifting it? "It seems like the fish's age of maturity is sort of a sweet spot," Barr said. "For most San Diego species that are fished, that's about four to seven years."

Photo: Miranda Brett



Fearless buyer

Grocery chain Trader Joe's has announced that it will occupy a 10,200-square-foot space in South Campus Plaza, the mixed-use project under construction along College Avenue near Lindero Paseo.

South Campus Plaza will include housing for more than 600 San Diego State University students and retail outlets designed to serve both the campus and the community. Slated for completion in 2016, South Campus Plaza will create a pedestrian-friendly destination for shopping, dining and living.

Hope Floats. Development vs. preservation in the Tijuana River Watershed.

By Michael Price

The Tijuana River laughs at the idea of a border, of an impenetrable demarcation between the United States and Mexico. We humans fret over a line in the sand, but the water that flows into the river originates from both sides of that line, then wanders back and forth across it for many miles before finally emptying into an estuary that presses up to the boundary separating its parent nations.

More than 1.3 million people live within the 1,724-square-mile watershed; the San Diego-Tijuana metropolitan zone has more than 5 million residents. When the watershed faces environmental hazards, it's everyone's problem.

For more than four decades, San Diego State University researchers and students have conducted science and policy research on the watershed. Pioneering ecologist Joy Zedler was among the first to bring attention to the ailing estuary, which has been disturbed by human activity.

Largely, the culprit behind the watershed's problems remains the same today as decades ago: Development in Tijuana and Tecate has outpaced efforts to preserve wetland space or protect water quality.

"Contamination from the Mexican side has always driven these issues," said transborder expert Paul Ganster, director of SDSU's Institute for Regional Studies of the Californias. "Development forces have outstripped conservation forces."

MAPPING THE PROBLEM

Over the years, an army of SDSU scientists and student researchers have achieved some success on these issues. They've fostered partnerships with colleagues from El Colegio de la Frontera Norte, Centro de Investigación Científica y de Educación Superior de Ensenada, and the Universidad Autónoma de Baja California, as well as with Mexican officials and environmental groups on both sides of the border. Together, they've published several influential bilingual atlases.

A big success story was the South Bay International Wastewater Treatment Plant in 1997. Before its completion, more than 10 million gallons of raw sewage flowed across the border and into the estuary every day. Now, the plant treats the sewage, then pipes it offshore. SDSU hosted meetings and provided research instrumental in the binational agreement to build the plant.





While the facility has improved water quality downstream from the plant, the rest of the watershed still faces daunting challenges. Land developers in Mexico favor rerouting segments of the river using concrete channels, which increase flooding risk downstream and don't provide the same water filtration and wildlife habitat as natural or man-made riparian areas or wetlands. And pollution remains a serious problem.

Proposed solutions are often derailed by political shortsightedness, Ganster explained. Many U.S. politicians balk at the idea of spending U.S. dollars on Mexican infrastructure, and border travel restrictions make it difficult for academics and public sector officials to collaborate.

"You can't have proper cooperative work with your colleagues in Mexico when you can't easily travel across the border," he said.

HOPE FLOATS

Ganster remains optimistic, though. The U.S. and Mexican governments recently negotiated a binding addendum to a 1944 water treaty. It establishes a framework for binational cooperation on sediment control, solid waste management and water quality. SDSU researchers participated in a number of workgroups and hosted citizen forums to facilitate this agreement.

Several lines of watershed research continue at SDSU, such as geography professor Trent Biggs' work on keeping sediment out of the estuary.

"The estuary is like a big bathtub," Biggs said. "If too much sediment flows in, it fills up. That kills wetland vegetation, prevents normal tidal fluctuations and turns it into a weedy upland environment."

Sediment traps along the river catch some of this, but with the looming rainy El Niño weather pattern, sediment outflow could be a big problem this year.

Biggs is working with U.S. and Mexican agencies to stop sediment at its source. Unpaved roads along the river contribute much of it. These roads are also a problem for residents, who can't drive on them when gullies form after storms.

"So what would happen if we paved all those roads?" Biggs asked. "It might significantly reduce sediment runoff, but it might also increase storm discharge into the river, causing flooding downstream."

If paving and low-impact development practices wind up being viable solutions, they will almost certainly require U.S. investment. Ganster would like to see that become the norm.

"You have to have solutions that benefit both the U.S. and Mexico," he said. "These are shared problems, so there should be shared solutions. I hope this leads to a more open flow of resources both ways. It might take a long time, but we need to work together."

VIDEO  [SDSU.EDU/ESTUARY](https://www.sdsu.edu/estuary)

PLUGGING THE LEAKS

As drought stresses San Diego's water system, the city and SDSU are finding ways to make every drop go further.

Our experience with water is a disjointed one. Our dishwater comes from the sink tap, our drinking water from the fridge or a bottle, our bathing water from the shower faucet. Farmers draw their water from the canals. We swim in lakes, monitor reservoir levels and try to treat our waste before it's washed out to sea. Clean, reliable water is critical to our daily lives, yet it flows from so many different sources for such a wide variety of uses that it's easy to overlook the complex network that links our region's water sources.

"They are all very interconnected," said Halla Razak, director of public utilities for the City of San Diego, as well as a civil engineer and a San Diego State alumna (profiled on page 14).

In times of drought—like the present severe one California has endured for the better part of the last decade—that interconnectedness is magnified. The lack of precipitation throughout the state means Southern California must rely more on importing water to keep its reservoirs at acceptable levels. That means higher prices for consumers. It also costs more for farmers to water their crops, forcing them to raise prices, plant more drought-tolerant crops, or both.

The effects of drought on our water supply ripple outward and underscore the need for new approaches to water conservation, policy overhauls and reuse strategies. At San Diego State University, several researchers are exploring ways to make our parched water supply go a little bit further to help alleviate drought's stress on the water system.

Don't just dump it

Every day, the City of San Diego collects, treats and disposes of about 180 million gallons wastewater. Most of that gets piped out into the ocean and discharged several miles offshore. But is that really the best thing to do with it?

"We spend a lot of money and resources to pipe wastewater into treatment facilities, treat it to high quality, and then just dump it into the ocean—that is quite wasteful," Razak said.

The City of San Diego currently takes its wastewater treatment a step further: tertiary treatment. Here, further treatment employs filtration and chemical disinfection to remove close to

Rinse vegetables and fruits in a sink or a pan filled with water instead of under running water.

— Halla Razak



Catch roof runoff in a rainwater drum, then use that water for irrigating your shrubs and garden.

— Rick Gersberg

By Michael Price

99 percent of impurities in the remaining water. Voilà, you've got water that can be used for irrigation, wetlands discharge, cooling towers, industrial processes and other non-potable uses.

After tertiary treatment, it's nearly impossible to tell the resulting water came from sewage. "But then people started thinking, 'If we can treat it even more, we can find more uses for it,'" said Rick Gersberg, professor of environmental health at SDSU and interim director of the School of Public Health.

Pure, potable and plentiful

Enter the City of San Diego's ambitious Pure Water Reuse Plan. Under this plan, the city would go beyond tertiary treatment of its sewage, introducing processes known as ultra-filtration

and advanced oxidation, as well as reverse osmosis through a membrane filter, to turn wastewater into water that's perfectly safe to drink.

"By the time they do all that, by most parameters of measurement, it's cleaner than most of the water we drink from the tap," Gersberg said.

He has worked with colleagues in Singapore to test the water quality of a comparable system presently in place at several wastewater treatment facilities in that country. There, the reclaimed water goes straight into a brand of bottled water called NEWater. When Gersberg spoke to 360, he had a half-empty bottle of it on top of his filing cabinet.

"I'm not an aficionado," he said, "but I can't tell the difference."

Bringing his expertise to San Diego, Gersberg sits on the City of San Diego's Pure Water Independent Advisory Panel. The city's reclaimed water wouldn't go into bottles but instead into the San Vicente Reservoir in East County. Once there, it would feed into the city's normal potable water supply. Razak figures that for every 100 million gallons of wastewater taken in, the Pure Water treatment

system could produce 83 million gallons of potable water. Pure Water's stated goal is by 2035 to have about a third of San Diego's tap water come from treated wastewater.

Safe waters

Once the water is in the reservoirs, Gersberg and several other SDSU researchers have another role to play: screening for toxic compounds that might not be caught by conventional treatment methods. Here, the risk isn't so much from the original reclaimed wastewater itself, but possible toxicity from byproducts of the treatment process, as well as from diverse sources in the environment.

"A lot of things are removed by reverse osmosis, but not everything," Gersberg said.

Climate change
will likely make
severe droughts
more frequent
and persistent in
our region.

He specializes in hunting for pharmaceutical compounds that can slip through treatment procedures. Another active line of research carried out by Gersberg, along with environmental scientist Eunha Hoh of SDSU's School of Public Health, focuses on how discarded cigarette butts contribute to water toxicity. The end goal is for the water in San Diego's reservoirs to be as safe as possible when it comes out of the tap, whether it originated from rainwater or was reclaimed from a treatment facility.

SDSU recently announced a new initiative, "Blue Gold: Mitigating the Effects of Water Scarcity," to delve even deeper into new technologies and approaches to ensure our region has enough clean, safe water to sustain its population and industries. In the coming years, the university will hire a number of public health specialists, water treatment engineers, geochemists and water-resource geographers to support this effort.

Gersberg sees Blue Gold as an opportunity for SDSU and the San Diego region

at large to do globally important work.

"My vision is that San Diego will become a world-recognized hub for water research," he said.

A world away

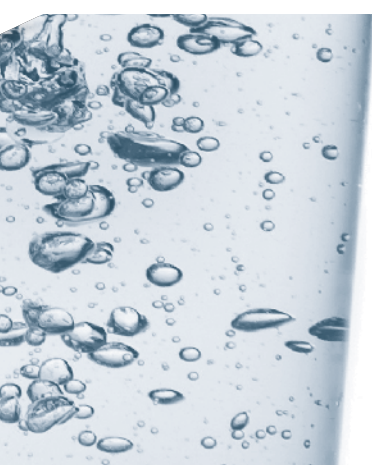
On the other side of the world, SDSU environmental engineering professor Natalie Mladenov and a handful of students are experimenting with lower-tech solutions for water reuse. Mladenov leads a National Science Foundation-funded program that gives students an international perspective on water treatment through first-hand work in the impoverished outskirts of Durban, South Africa.

"South Africa's urban centers are first-world, but its surrounding areas are very poor and there's a major lack of sanitation infrastructure," said Mladenov, who is also a core faculty member of SDSU's Blue Gold initiative.

This past summer, she led the program's first cohort of students—two undergrads and a grad student from SDSU, plus one professor and two undergrads from California State Polytechnic University, Pomona—as they teamed up with scientists from the University of KwaZulu-Natal to explore the potential of implementing a simple and cheap

The City of San Diego currently takes its wastewater treatment a step further: tertiary treatment. Here, further treatment employs filtration and chemical disinfection to remove close to 99 percent of impurities in the remaining water.





water treatment system to improve community life. The goal isn't to produce potable water, but to purify it enough to make it safe to reintroduce to constructed wetlands, where natural environmental processes eventually render it usable for agriculture.

In a tiny community outside Durban, the team has built what's known as a gravity-driven, multi-chamber anaerobic baffled reactor. In a large underground container, wastewater enters from the top, then flows through a series of chambers separated by seven gradually lowering walls. As each chamber fills up, the water breaches the walls and spills over into the next chamber. The solids and waste settle into the bottoms of the chambers and the water gets progressively purer as it passes through the system. All the while, bacteria break down the organic matter in the waste, further purifying it.

"By the time it gets over the seventh wall, it's pretty clean," Mladenov said.

Cost effective

It requires no energy input once the system is built, so it's incredibly cost effective. And as an added bonus, the methane produced in the reactor can one day be used for energy generation for the community.

As part of an experiment, Mladenov and the students are sampling the waste at different points as it passes through the system to see how the organic matter breaks down over time and under different conditions.

By learning more about this, they hope to be able to improve upon the reactor's design and find ways to optimize the purity of the output. And it's not just the residents of South Africa who can benefit from this approach. Mladenov believes there's a place for this kind of technology closer to home, as well.

"The technology may not be that innovative, but the community-focused approach is," she said.

"In the United States, at a community scale, something like this could be implemented as a decentralized system that produces water for watering lawns, flushing toilets, sustaining community gardens, and other uses."

Climate change will likely make severe droughts more frequent and persistent in our region, so it's important to explore everything we can do to get the most out of every drop.

"How well regions deal with climate change will be the difference between regions that will thrive and those that will wither," Razak said.

"My vision is that San Diego will become a world-recognized hub for water research."

Avoid using hygiene products with plastics like microbeads, which are not always removed by wastewater treatment and can degrade our waterways.

— Natalie Mladenov

Water Czar

Halla Razak is positioning San Diego for the next drought.

The qualities that drive a distance swimmer also mark an effective leader. Patience, resolve, confidence, focus. Halla Razak, '86, has them in spades.

Distance swimming is a hobby for the La Jolla resident and San Diego State alumna. During the week (and often on weekends) she sits in the director's chair at the City of San Diego's Department of Public Utilities, managing 1,600 employees and vast water and wastewater infrastructure. The 23 months since Razak took the position have been—in a word—eventful.

In November, the San Diego City Council approved plans to reduce its 85-percent dependence on imported water by constructing purification

facilities for turning wastewater into drinking water. The decision makes San Diego the largest city in the nation to launch potable water reuse with reservoir augmentation. Christened Pure Water San Diego, the project is expected to provide more than a third of the city's potable water by 2035.

Razak continues to elicit public support for the plan, but her more immediate concern is the sharply reduced state-wide water consumption objective set by Governor Jerry Brown in response to the California drought. To comply with its 16-percent reduction target, the City of San Diego has imposed mandatory watering restrictions and broadened its Waste No Water campaign encouraging conservation among homeowners and businesses.

"Right now, my world is overwhelming," Razak said. Vacation was "out of the question" this summer, though she did manage some weekend time at the beach with husband, Nagy Nosseir, chair emeritus of aerospace engineering at SDSU; daughter, Lara, an environmental studies student of the University of California, Santa Barbara; and son, Rami, a finance major at SDSU.

Love at first sight

Talking about water unleashes the policy wonk in Razak. But when the conversation turns personal, she becomes an animated storyteller, recounting her younger years in Spain and Kuwait, an eye-opening introduction to American college life as a freshman at the University of Dayton, and the unlikely romance of her Russian mother and Iraqi father who, upon first meeting, had no common language.

(Continued on page 16)

He's CHILL

Adam Ravetch documents a world few others have seen.

Before he filmed bowhead whales mating, before he worked alongside scientists to attach cameras to polar bears, even before he made his first ice dive into the Arctic's frigid depths, Adam Ravetch, '84, was fascinated with narwhals.

These legendary whales, sometimes called unicorns of the sea, grow spiral tusks exceeding eight feet in length and can weigh up to two tons. Ravetch, a zoology major, had never encountered the word narwhal until he saw it on the license plate of Mark Flahan, San Diego State University's diving safety instructor.

Flahan was a mentor to Ravetch in the world of sport

diving and spear fishing, which originated in 1930s San Diego with a group of men who called themselves Bottom Scratchers. Some say the name describes their practice of grazing the ocean floor for fish.

On summer evenings, San Diego families would gather to watch the Bottom Scratchers return to shore, hauling 10-foot, hand-fashioned spears and their day's catch. Hearing of their remarkable feats, Ravetch, too, was hooked—he wanted a piece of that briny world.

After graduation, he drove up the coast to California State University, Long Beach.

Ravetch sought out pioneering researcher Donald Nelson, the first to document the agonistic displays of gray reef shark—behaviors they exhibit before an attack. Nelson was the media's favorite shark expert, and Ravetch assisted the production crews that came to interview his advisor.

Arctic efficiency

Even then, he was drawn to the world of cinematography. In 1985, as a winner of the Our World Underwater scholarship, Ravetch globetrotted for a year, working with leading marine scientists, conservationists and cinematographers. Afterwards, he teamed up with Canadian filmmaker John Stoneman, protagonist of the wildlife documentary series, "The Last Frontier."

"John first led me to the ice in the Gulf of St. Lawrence," Ravetch recalled. "We dove underneath, and hundreds of seals were flying all around us. I was mesmerized. Every year since then, I've gone back to film in the Arctic."

(Continued on page 16)



ARCTIC TALE

Water Czar *(Continued from page 14)*

The animation spikes when she talks about San Diego. Razak arrived in 1984 to begin a master's program in civil engineering at SDSU and never left.



"It was love at first sight," she recalled. "My intent all along was to somehow improve life in San Diego. It seemed to me that working for the city would be a good place to start. When I finished my master's degree, I went to the engineering

department and told them I'd work for free."

That arrangement didn't last long, as the city recognized Razak's skill and work ethic. She managed water and wastewater facilities, implemented capital improvement programs and eventually

became chief deputy director of the Department of Engineering and Capital Projects.

In 2005, Razak left the city's employ to become Colorado River program director for the San Diego County Water Authority. There, her cultural aptitude and fluency in several languages were instrumental to the success of negotiations allocating Colorado River water rights among seven western states and Mexico.

"Unlike many engineers, I have a keen interest in conflict resolution and management," Razak said.

Long-term strategy

She returned to work for the city when interim Mayor Todd Gloria appointed her water czar in 2013. Shortly afterward, the city council approved the potable reuse plan and the public

utilities department was named one of three national winners of the 2015 U.S. Water Prize awarded by the U.S. Water Alliance, a non-profit organization advocating for integrated, sustainable management of water across the United States.

San Diego conservationists and environmental groups have also praised the city's Pure Water plan, but critics charge that steep water and sewer rate increases will be necessary to fund construction of three recycling plants and miles of new pipes. The city doesn't dispute this charge, but says that Pure Water will be cheaper than imported water in the long run.

The distance swimmer in Razak appreciates San Diego's far-sighted approach and has a long-term strategy of her own.

"While I am here, I want to position San Diego to be in better shape for the next drought," she said.

He's Chill *(Continued from page 15)*

A typical expedition lasts four to six weeks, braving temperatures of 30 degrees below zero. Ravetch said he prefers the frigid climate to the tropical. "Your food doesn't spoil. You make fresh water by melting snow and you can build an igloo so you don't have to carry a tent. There's efficiency to operating in the Arctic. You just have to figure out how to keep your cameras from freezing."

Ravetch's cameras have captured wildlife behavior for many of the most respected natural history series, including Frozen Planet, Planet Earth and National Geographic's Great Migration, for which he won an Emmy for cinematography.

He also co-directed and compiled more than 800 hours of footage for the 2007 documentary "Arctic Tale," narrated by Queen Latifah. The film documents young polar bears and walruses as

they experience the effects of gradually melting ice caps.

"When you're there, side-by-side with the animals, that's when it becomes intimate, that's when you witness their intelligence and the decision-making processes they use to survive," Ravetch said.

Secret nuggets

With each project, the goal is to document a behavior never before seen on camera. Ravetch describes it as "the secret nugget that keeps you coming back." This fall, the nugget was footage of the mating rituals of bowhead whales, which, unlike most others of the species, spend their entire lives in Arctic waters.

Ravetch's 25-year career has expanded the frontiers of scientific knowledge about inhabitants of the Arctic. For years, he dreamed of putting cameras

on polar bears to document how animals behave when humans aren't around. The dream is now a reality. Ravetch has worked with scientists from the U.S. Geological Survey and the Canadian Wildlife Service to gather more than 500 hours of footage recorded by the bears themselves.

He also founded the Arctic Exploration Fund (AEF), a nonprofit dedicated to outfitting wild animals around the globe with cameras in order to document their behaviors and uncover the mysteries of their world.

For his next act, Ravetch intends to return, in a sense, to the origin of his fascination with the oceans. Look for his documentary on the narwhal—coming to theatres soon.



The Forest Beneath the Waves

San Diego's kelp forests are teeming with life.

By Michael Price

Below the San Diego coastline's pristine horizon lies a parallel world more akin to an ethereal rain forest than the sun-soaked scenery above. The region's underwater kelp forests are home to an incredibly diverse population of sea lions, fish, sharks, invertebrates and countless marine microbes, as well as—on a temporary basis—divers from San Diego State University studying this otherworldly environment.

"When the sun comes up and the water is clear, the sunlight filters through the kelp canopy and it's just gorgeous," said Matthew Haggerty, a graduate student who studies how kelp decomposition affects the surrounding microbial communities.

Haggerty is part of a team of SDSU researchers dedicated to learning more about how the largest, fastest-growing species of kelp on earth (*Macrocystis pyrifera*) interacts with the microscopic bacteria and viruses surrounding it.

Marine ecologist Elizabeth Dinsdale leads these efforts. She grew up in Australia, where the seas are similarly packed with kelp forests. In 2009, Dinsdale joined an expedition to the Line Islands led by SDSU virologist Forest Rohwer, who needed an expert on Pacific corals for the trip. Dinsdale fit the bill, and afterward she came to San Diego to work with Rohwer.

Her research looks at the many factors, including pollution and rising ocean temperatures, that affect the health of the kelp forests and the makeup

of the microbes on and near the kelp. Lately, the range and density of local kelp forests have been fluctuating. Partly that's due to declining populations of sea otters in the area, Dinsdale explained. Sea urchins eat the kelp, and sea otters eat sea urchins. Without otters to keep the urchins in check, the urchins can decimate a kelp forest.

"When you lose the kelp, the species diversity plummets and you lose the fish, the sharks, the sea lions—basically everything but the urchins," she said.

And there's no telling whether the kelp will grow back. Researchers hypothesize that it may need help from specific microbes to survive. Dinsdale and her team perform a number of experiments off the coast of Point Loma and Catalina Island to learn how different microbes influence kelp growth and health. They take advantage of SDSU's Coastal and Marine Institute Laboratory in Point Loma as a research base for the kelp used in experiments.

Megan Morris, another graduate student who works in Dinsdale's laboratory, is trying to discover why the bacteria found on Catalina Island kelp seem to foster kelp growth while Point Loma kelp bacteria appear to inhibit it.

Morris said the effect might be related to a difference in growth hormone in the microbes. No one knows the answer yet, but solving this mystery will be one more step in the struggle to better understand and protect the kelp forests and their myriad watery residents.

How does your *garden*

By Coleen L. Geraghty

A prolonged drought is transforming San Diegans' perceptions of sustainable landscaping, and that presents new challenges for the people who maintain one of the most beautiful campuses in Southern California.

"We have to change the mindset of landscape management at San Diego State University and do it fast," said Josh Koss, recently hired for the new position of manager, landscape services.

Along well-travelled pathways bordering the SDSU Library and the new Conrad Prebys Aztec Student Union, thirsty shrubs have been replaced by colorful succulent gardens. Drought-tolerant lantana and ornamental grasses add color to the area outside the trolley station without adding to campus water consumption.

These examples of water-wise landscaping are just a piece of a comprehensive drought response plan to cut back water use on the 280-acre campus. In the January through August period SDSU's water consumption fell 12 percent from 2014 to 2015—the result of a strategy that includes reusing runoff from SDSU's cogeneration plant, collecting rainwater in storage tanks for irrigating the campus and changing out toilets, shower heads and sink aerators across campus.

As construction improves the campus, existing trees are transplanted when possible.



grow?



The conservation efforts have been led by Facilities Services, but next spring, SDSU students will take a turn at converting a 60-by-80-foot grass area on campus into a little piece of sustainable paradise. Diana Gauss Richardson, a geography department lecturer and adviser, is restructuring her



The university is caretaker for a 280-acre campus on Montezuma Mesa.

Recreational Land Use class into a laboratory for experiential learning.

Guided by Richardson and a professional landscape architect, students will find a grassy space at SDSU that's underutilized and redesign it with drought-tolerant plants, trees, benches, tile and stones.

"We'll talk about what makes a space appealing and how we can create that appeal while reducing the amount of water, chemicals, fertilizer and even the energy used by lawn mowers," Richardson said.

Eventually, students will work with Facilities Services to physically make over the space, supported by a \$28,000 grant from the California

State University Chancellor's Office that was submitted jointly by Richardson, Koss and Tom Abram, assistant director for campus sustainability.

There is precedent for student involvement in beautifying Montezuma Mesa. For years, students in Michael Simpson's biology lab have planted and tended campus gardens from which they harvest samples to study in class (read more about Simpson's role in creating the Mediterranean Garden on page 30).

But the endeavor between Richardson's geography students and Facilities Services takes campus collaboration to a new level, and at a time when students increasingly care about sustainability.

"Our aesthetics are informed by our ethics," Abram said. "We want SDSU to be a leader in conserving water and adapting to our changing climate conditions."

Drought-tolerant Plants for San Diego Gardens



Coast Prickly Pear
Opuntia littoralis



Ponytail Palm
Beaucarnea recurvata



Irish Rose
Aeonium arboreum



American Aloe
Agave americana

Illustration: Olga Griesinger

Ambitious Goals. Aztec seniors hoping for fourth straight championship season.

Three years ago as his San Diego State women's soccer team was about to play host to UCLA in the Sweet 16 of the NCAA Tournament, Mike Friesen stopped to savor the moment.

It was a beautiful Sunday afternoon in November on the SDSU Sports Deck. Friesen gathered his senior players together. He wanted them to soak up the sight of the packed stands and feel the electricity. He was proud of what they'd accomplished. At 21-1-1, they had won the Mountain West Conference regular-season and tournament championships and two games in the NCAA tournament.

"I told them, 'You guys came here on a vision that I painted. Thank you for giving me that opportunity,' " he recalled recently. "Look what you have accomplished."

The Aztecs lost that day, but such defeats have been rare during Friesen's eight-plus years as head coach. SDSU has won three straight MWC regular-season and tournament championships and played in the NCAA Tournament three consecutive years, both firsts for Aztec women's soccer. The program has a 49-14-5 record from 2012-2014.

Now the Aztecs are once more off to a great start, and three seniors have been part of their unprecedented run. The trio—defenders Tiffany Geer and Ashley Hauke, who were freshmen during that 2012 season along with goalkeeper Melanie Vaughn, who redshirted her first season in 2011—could graduate as four-time conference champions. As Friesen noted, no



players from any other conference school have held up an MWC trophy since 2012, yet this senior trio could earn the honor of doing so four straight years.

“This group now, that was the start of their time,” said Friesen. “And to have created the consistency we’ve had over the past four years—that says a lot about these women because it hadn’t been there. Each class is creating its own legacy, which is fun to see.”

The seniors know they have an important leadership role to play this year. In order to keep the program rolling, they say it’s up to them to help freshmen feel at home and embrace the winning culture established by Friesen. It’s a formula that includes hard work along with some room for fun and being “goofy.” Friesen encourages athletes to strive for balance between athletics, academics and a social life while pursuing “the ultimate goal” of an NCAA championship.

To Hauke, that means leading by example. During her career, she’s been asked to switch positions several times for the good of the team. The energetic, 5-foot-5 dynamo has adapted and thrived each time to become leader of the defensive back line. Last season she was selected to the MWC all-tournament team.

Defeats have been rare during Friesen’s years as head coach.

Vaughn also has been a key on-the-field piece to SDSU’s winning puzzle. A junior in 2014, she had six shutouts and allowed an average of just 1.08 goals per game. Friesen said she’s become a great shot-stopper, playing “a huge role” in the team’s success.

Geer, meanwhile, hasn’t played as prominent a role on the field, but Friesen said she brings a team-first mentality to the Aztecs. “She’s vocal in training. She keeps people doing what they’re supposed to be doing.”

For all three, the journey through the program has gone by far too quickly, but they are starting to think about commencement next spring. Vaughn has big plans for graduation day.

“My goal, honestly, by the end of this year is to have four rings and to wear my cap and gown and take a picture with the eight trophies that we won over all the years,” she said, laughing. It could happen.

—Doug Williams

ASHLEY HAUKE



MELANIE VAUGHN



TIFFANY GEER



\$5.1-Million Gift Expands Entrepreneurial Programs

Multi-pronged endowed gift creates design thinking platform, professorship and graduation prize to energize the campus around entrepreneurial thought and action.

A new \$5.1-million gift to San Diego State University from the Moxie Foundation will strengthen the university's capacity to prepare students for bold and innovative problem-solving in the 21st century.

The endowed gift will create the Zahn Innovation Platform (ZIP), the Zahn Chair of Creativity and Innovation, the Zahn Professorship of Creativity and Innovation, and the Irwin Zahn Spirit of Innovation Prize.

"On behalf of the entire university, I wish to express our gratitude to Irwin Zahn and the Moxie Foundation for its extraordinary generosity and vision," said SDSU President Elliot Hirshman. "The Moxie Foundation's comprehensive support of design thinking will advance academic programs and entrepreneurship across our campus."

Through the President's Budget Advisory Committee process, the university is also investing funds to support these initiatives.

Zahn Innovation Platform

ZIP will be a campus-wide hub for collaboration across disciplines, the exploration of new ideas and the launch of new ventures. ZIP will facilitate problem-solving and inspire students, faculty and staff to pursue their creative ideas. The Zahn Chair of Creativity and Innovation is a new staff position that will help lead ZIP initiatives, such as the ZIP Launchpad and the ZIP Lounge.

The ZIP Launchpad is an expansion of the incubator capacity that has been central to SDSU's entrepreneurial mission. This includes the HG Fenton Idea Lab, which offers state-of-the-art experimentation and prototyping.

The ZIP Lab will use design thinking to facilitate collaborative problem-solving for all types of design challenges across campus and in the community.

The ZIP Lounge is an open, creative space for informal brainstorming, co-working and planned events, which will also serve as shared space with SDSU's Lavin Entrepreneurship Center.

ZIP will expand SDSU's Zahn Innovation Center, established in 2012 as a commercial and social incubator to support entrepreneurship on campus. The success of Zahn Center startups has helped SDSU break into the top 25 on *Forbes'* list of America's Most Entrepreneurial Universities.

The expansion and reorganization of the Zahn Innovation Center will provide new opportunities for collaboration between ZIP and SDSU's Lavin Entrepreneurship Center. Both will be located in the Engineering and Interdisciplinary Sciences (EIS) Complex, scheduled for completion in 2018. The



ZAHN INNOVATION PLATFORM

\$90-million EIS Complex will become a campus hub of interdisciplinary STEM research that has potential for real-world application.

“We are enthusiastic to bring these new initiatives to fruition at SDSU,” said Peter Zahn, president and director of the Moxie Foundation. “ZIP will give all students, faculty and staff opportunities to solve problems in new ways and gain skills they can use for the rest of their lives. We foresee SDSU teams collaborating, not only as entrepreneurs, but also as agents of change in the community.”

Zahn Professorship of Creativity and Innovation

The Zahn Professorship of Creativity and Innovation is a rotating two-year appointment for SDSU faculty members from different disciplines to pursue work that accelerates entrepreneurship across campus. Every two years, a professor will be selected to advance curricular, experiential and cross-disciplinary opportunities for students and fellow faculty. The inaugural Zahn Professor of Creativity and Innovation will be selected by May 2016.

Irwin Zahn Spirit of Innovation Prize

The endowment will also create the Irwin Zahn Spirit of Innovation Prize. This is a significant financial award intended to cover a student's entire debt, empowering honorees to pursue their dreams without barriers. Presented to one SDSU graduate each year, the prestigious prize will recognize work that exemplifies the entrepreneurial spirit.

“We believe that entrepreneurial thought and action extend far beyond starting a venture; it's a critical skill set that we want every member of the SDSU community equipped with,” said Irwin Zahn, CEO and chairman of the Moxie Foundation, describing the impetus behind the recent gift. “We have enjoyed watching the success of those involved with the Zahn Innovation Center and believe that this endowment will help expand the influence of innovation and changemaking to all corners of the campus...and beyond.”

Irwin Zahn is the founder of Autosplice, Inc., a global electronic interconnect company. Zahn sold his company in 2011 and started the Moxie Foundation with a vision to advance entrepreneurial achievement through cutting-edge, experiential education. The Moxie Foundation, based in San Diego, is dedicated to empowering individuals and communities by fostering innovation and entrepreneurship.

This endowment is the Moxie Foundation's third gift to SDSU. The Moxie Foundation's endowment is one of 114 gifts of \$1 million or more to The Campaign for SDSU. Since 2007, the campaign has raised more than \$635 million in support of students, faculty, staff and programs.

THE Campaign FOR SDSU

SHORT TAKES

Linda Lang, '91, '13, CEO of Jack in the Box from 2005-2013, will join the Campanile Foundation, San Diego State University's philanthropic auxiliary. Lang is a member of the College of Business Administration's advisory board and a former trustee of the California State University system.

The local chapter of Achievement Rewards for College Scientists (ARCS) donated \$112,500 to support San Diego State University students this year. The foundation awards scholarships to students studying natural sciences, biomedicine and engineering at San Diego area universities. More than \$1 million in scholarships has gone to SDSU students over the last decade.

An estate gift from David Stepsay, '83, will establish the Stepsay Post-doctoral Fellowship at San Diego State University. It will support a new or recent Ph.D. in classics who shows significant promise as a scholar and teacher as well as an advocate for classics in the wider community.

Aztec parents Bradley and Francesca Malkin have pledged financial support for the Viral Information Institute in the Engineering and Interdisciplinary Sciences Complex, now under construction.

Photos: Lauren Radack

SDSU Fundraising Campaign Recognized for Sustained Excellence

SDSU is among 15 in the nation to be honored for overall performance.

San Diego State University is one of 15 universities nationwide to be recognized this year for the comprehensive excellence of its fundraising program.

The award is from the Council for Advancement and Support of Education (CASE), the premier professional association serving educational institutions worldwide and the advancement professionals who work on their behalf in alumni relations, communications, development and marketing.

CASE recognized The Campaign for SDSU for superior overall performance in 2015 and for sustained excellence based on the judges' analysis of the last three years of fundraising data.

Launched in 2007, the campaign has raised more than \$635 million to support students, faculty and academic programs. The university raised a record \$96.3 million in fiscal 2015.

"This honor recognizes three consecutive years of fundraising excellence

and professionalism—placing the university in the company of schools like Harvard and USC—and brings national distinction to San Diego State University," said SDSU President Elliot Hirshman.

More than 53,000 donors have contributed to The Campaign for SDSU, including 114 who gave more than \$1 million, and 1,500 newly minted donors from the Class of 2015. Recent graduates were asked to contribute at least \$10 to SDSU's general scholarship fund when they picked up their caps and gowns, and 16 percent of them did so.

Through the campaign, SDSU has endowed the Susan and Stephen Weber Honors College and is raising support for the construction of a new Engineering and Interdisciplinary Sciences Complex, where researchers and entrepreneurs will work collaboratively to develop real-world applications for research discoveries that address the complex interdisciplinary challenges of our time.



A Teacher's Story

Before he came to San Diego State College at age 20, William Wade witnessed things no one should see.

He saw the "utter devastation" of Tokyo after U.S. pilots firebombed the city during the Pacific Campaigns of WWII. And he saw Japanese women begging for the garbage from American ships harbored in Tokyo Bay after Japan surrendered in August 1945.

Wade had been deployed to the Philippines on a ship scheduled to engage in the U.S. invasion of Japan. Surrender changed the script, however, and Wade's convoy instead took part in the post-war occupation.

After his military service, Wade found a job at the Naval Air Station in San Diego and joined what was then the largest class of incoming students ever to enroll at San Diego State College. Many were fellow veterans. Wade began as an engineering major, but switched to business, then known as commerce. There would be one more switch before he left campus.

"When I became a senior, I had not yet decided to be a teacher," Wade said. "But I liked college so much that I wanted to stay connected with educa-

tion. I had to take an additional year of classes to qualify as a teacher, but it was a good decision. My time at San Diego State was one of the best times of my life."

Wade taught math and business for 31 years in four different junior high and high schools within the San Diego Unified School District and at Mesa Community College. Drawing on San Diego State coursework in economics, he also invested in the stock market, starting small in the 1960s, and continuing to build his portfolio through the decades.

This year, he established a \$2.7-million endowment to fund scholarships for students in the Division of Undergraduate Studies at SDSU. "Naturally, I'd like to do something to make a difference in the lives of students who could not go to college without financial help," Wade said. His support combines annual gifts of cash with a large planned gift so that SDSU can immediately begin awarding scholarships in his name.

"My plan is to contribute cash each year and then my estate will go mostly to the university," he said. "I believe that providing scholarships for deserving students is an extremely good investment."

SDSU Strive

San Diego State University has launched a crowdfunding website designed to generate more individual donations to the university from a wider variety of sources than ever before.

Led by the Office of Alumni Engagement, SDSU Strive will provide opportunities for the Aztec community to promote fundraising initiatives using a customized, internally hosted crowdfunding platform, keeping more funds at SDSU than traditional crowdfunding options.

Since July 21, Strive has launched 10 initiatives, four of which are fully funded:

- \$5,000 for entrepreneurs from the Zahn Innovation Center to build low-cost, human-powered teff threshers for Ethiopia's agricultural sector
- \$5,000 toward the restoration of SDSU's Rock N' Roll mural
- \$4,000 to make SDSU's Comic Archive available to the public
- \$1,500 for uniforms, instruments and equipment for The Marching Aztecs.

"The alumni community is expected to be the driving force behind the success of SDSU Strive," said Dan Majors, electronic solicitation manager for the Office of Alumni Engagement.

Majors said future Strive campaigns will support:

- The Sage Project, through which students in participating courses focus on projects that impact the sustainability and resilience of a selected community partner, one of San Diego's 23 cities
- Paid summer internships for students to advance their professional careers, in conjunction with SDSU Career Services.

For more information on SDSU Strive, visit sdsu.edu/strive

On the Way to \$750M



J.E. Carter—the Shape of Success

J.E. Lindsay Carter is one of the longest serving faculty members in San Diego State University's Department (now School) of Exercise and Nutritional Sciences and also one of the most widely travelled.

Carter was a key investigator in studies of Olympic and World Championship athletes in Mexico City, Montreal, Perth, Uruguay and



Photo: SDSU Athletics Media Relations

Zimbabwe, as well as a co-investigator for anthropometric studies in 18 countries. During a 30-year career at SDSU, he co-developed the Heath-Carter Somatype Method, the most widely used technique of appraising body shape and composition.

Born in New Zealand, Carter came to the United States in 1956 as a

Faculty & Staff GIVING FROM THE HEART

Faculty and staff play a crucial role in the success of The Campaign for SDSU. Cash gifts and irrevocable bequests from SDSU faculty and staff have added more than \$50 million to the campaign since its launch in July 2007. On these pages, 360 Magazine features four Aztecs who've created endowments to support initiatives that have special meaning to them.

Fulbright Scholar and research assistant at the University of Iowa. While earning his Ph.D., he met Lolita Diñoso, who had studied Filipino folk dance at the University of the Philippines.

They relocated to San Diego in 1962, and over the next three decades, Carter taught classes in biomechanics and applied anatomy and kinesiology. He received both the Outstanding Faculty Award and the Exceptional Merit Service Award from SDSU.

For his contributions to kinanthropometry—the study of human size, shape, proportion, composition, maturation and gross function—Carter also received honorary degrees from Semmelweis University in Budapest, Hungary, and Vrije Universiteit Brussel in Brussels, Belgium.

In 2003, the Auckland University of Technology, School of Sport and Recreation, opened the J.E. Lindsay Carter Kinanthropometry Laboratory at the AUT-Akoranga campus. The J.E. Lindsay Carter Kinanthropometry Clinic and Archive opened nine years later at the AUT-Millennium campus.

In 2013, through a bequest supporting the SDSU College of Health and Human Services, Carter established the J.E. Lindsay Carter Endowed Scholarship for graduate students in the School of Exercise and Nutritional Sciences. His gift will help students facing financial obstacles on the path to career success.



Photo: timtadder.com

Deborah Dexter—Ahead of her Time

When Deborah Dexter joined San Diego State University in 1967, she was the only woman in the Department of Zoology. She quickly became a role model for those who would follow, winning multiple research grants, recognition for her expertise in ecology and zoology and, in 1985, a Fulbright Scholar/Research award.

The Fulbright took her to Egypt to teach oceanography at the University of Alexandria, while simultaneously doing field work through a National Geographic Society research grant. During more than three decades at SDSU, Dexter also lived and worked in Australia, Panama, Israel, Hong Kong, Thailand, Portugal and elsewhere.

Her appreciation for cultural interchange led her to establish the Deborah M. Dexter Endowed Scholarship for International Students in 2013.

"I feel strongly that every college in the United States should have interna-

tional students on campus," she said. "The interaction between American and international students is enlightening for both parties and creates a good impression of our country."

At SDSU, Dexter taught marine invertebrate biology, biological oceanography, marine ecology and the popular course, Life in the Sea, for non-science majors.

She received six awards for outstanding teaching and multiple research grants from federal agencies such as the Smithsonian Institution, Panama; the U.S. Bureau of Reclamation, Colorado Region; and the U.S. Environmental Protection Agency.

Dexter now lives in Northern California, and misses the SDSU theatre productions. She had been a season ticket-holder.

"Musical theatre is my favorite, and SDSU is the only university to offer a

master of fine arts in musical theatre that integrates performance training with academic study," she said.

This year, she established the Deborah M. Dexter Endowed Scholarship in Musical Theater with a pledge of \$200,000 to support graduate students in this unique and challenging program.

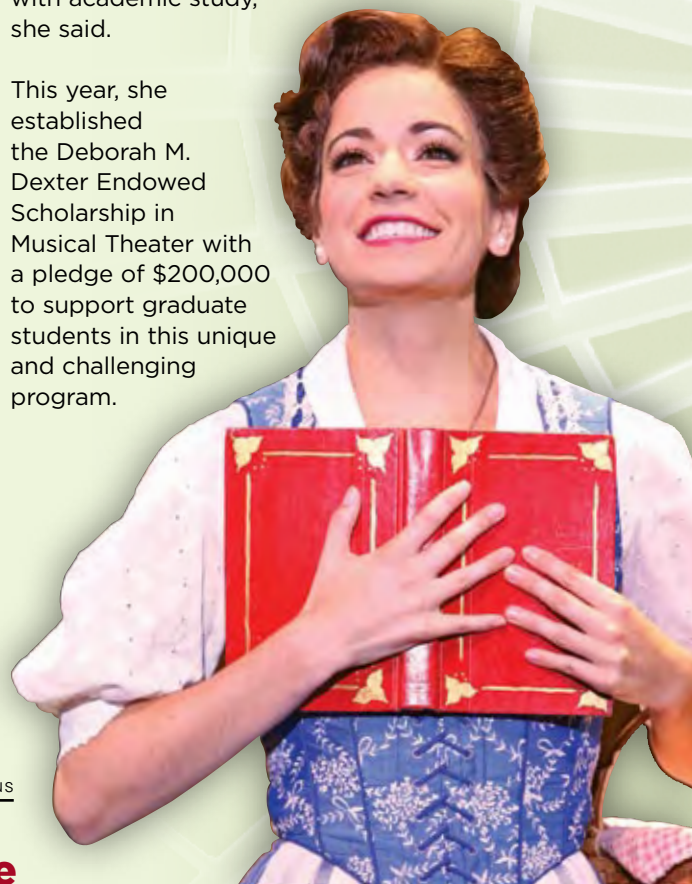


Photo: Joan Marcus

Brock & Barbara Allen—Six Decades of Service

Professors Emeritus Brock and Barbara Allen regard their combined six decades of service at San Diego State University as a calling rather than a job.

"We have always thought of SDSU as an extended family," Barbara told a gathering of retired faculty several years ago. For that reason, they have made a bequest intention to donate a portion of their estate to improve teaching and learning at SDSU.

This recent gift follows a 2003 endowment established in the name of Barbara's mother, Erma Woike, to provide professional opportunities for staff in the College of Education.

During the 10 years before retirement, Brock was director of the Center for Teaching and Learning. Previously, he was a faculty member in the Department of Educational Technology and co-founder of SDSU's joint doctoral program in education and the Language Resource Acquisition Center.

Barbara served as assistant dean in the College of Education, faculty member in the Departments of Special Education and Teacher Education and assistant director in the latter department. She was also training coordinator and SDSU liaison with the San Diego Unified School District for the U.S. Teacher Corps program.

Jointly, the Allens acted as consultants for programs of education in the United States, China, Brazil, Canada, and Australia. Both are recipients of Monty Awards from the College of Education, he for outstanding faculty achievements, and she for outstanding alumni achievements.

More than ever, the Allens believe that universities have a responsibility to make the world a better place by addressing both societal challenges and the needs of the marginalized. Their gift will help ensure that high quality instruction remains a priority at San Diego State University. And their children heartily support the bequest as an affirmation of their parents as true Aztecs for Life.

ALUMNI ENGAGEMENT

2015 - 2016

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sdsualumni.org/pastpresidents

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1970s

'71 **George Bagwell** (social sciences; '73, MA anthropology) retired after 39 years as a faculty member and administrator at Colorado Mountain College.

'74 **Ken Kramer** ★ (television, film and new media) recorded his last episode of "About San Diego" this summer. Honored with Emmy and Golden Mike awards, the show ran for 30 years on KPBS and NBC 7.

'78 **Marla Black** (journalism and media studies) joined Junior Achievement of San Diego County as president and CEO; **Ron Yukelson** ★ (journalism and media studies) is chief business development officer for Tenet Healthcare's central coast service area.

'79 **Kathleen Kennedy** ★ (theatre, television and film; '04, Honorary Doctor of Fine Arts), president of Lucasfilm, is among *Fortune* magazine's 50 most powerful women for 2015.

1980s

'80 **Ellen Ochoa** ★ (physics) was inducted into the California Hall of Fame in October, joining 95 other individuals who exemplify California's spirit of innovation.

'82 **Richard Graham** (English) published his second book, "Graham Cracks: Turning Beer into Literature One Joke at a Time" (LA NY 2015).

'83 **Gregory Papadeas** ★ (biology) was selected as one of Denver's top dermatologists by local physicians surveyed for *5280* magazine.

'85 **Mike Osterling** (management; '92, MBA international business) is co-winner of the 2014 Shingo Prize for the book "Value Stream Mapping: How to Visualize Work and Align Leadership for Organizational Transformation."

'89 **Graciela Cowger** (electrical engineering) joined the Pacific Northwest law firm of Schwabe, Williamson & Wyatt.

1990s

'90 **Stacy Roberts Mines** (political science) was promoted to principal from senior manager at Ernst & Young LLP.

'91 **Jeffrey Cummings** ★ (finance; '00, MS finance), chief financial officer for SenDX Medical, Inc., is enrolled in the executive MBA program at the University of Southern California; **Julianna Barnes** (counseling; '10, Ed.D, community college leadership) was named president of Cuyamaca College.

'92 **William Ashbaugh** (MA history), formerly adjunct professor of history at SDSU, is professor and chair of history at SUNY Oneonta.

'94 **Dominique Rissolo** (anthropology) is consultant and spokesperson for the San Diego Natural History Museum's exhibit, "Maya, Hidden Worlds Revealed;" **Samuel Coleman** (economics) earned an Ed.D. in educational leadership and management from Alliant International University.

Please send your news to the SDSU Alumni Association, aluminfo@mail.sdsu.edu. | ★ = life member

YOU KNOW YOU'RE AN

AZTEC

WHEN



Your closet's bulging with red and black



You find yourself singing the Fight Song at inappropriate times



You get homesick when you see photos of Hepner Hall



You've been lost in Adams Humanities



You've taken a nap in Love Library



You know exactly where to find a burrito at 2 a.m.



You can pronounce Chapultepec (fast, three times)



You plan your social life around Aztec men's basketball games



You've listened to a concert from outside the CCCU Open Air Theatre

You believe that **WE WILL WIN** against Wyoming

on **HOME COMING** weekend Nov. 14!



Class Notes

1990s

'95 **Laurie Firestone Siedelman** ★ (psychology; '97, MA rehabilitation counseling) is director, productivity and performance improvement, for Regal Medical Group; **Chad Crocker** (accounting; '96, MS accounting) was promoted to executive director from senior manager at Ernst & Young LLP.

'96 **Josh Suchon** (journalism and media studies) has published a third book, "Murder in Pleasanton: Tina Faelz and the Search for Justice" (The History Press 2015).

'98 **Tyler Dickinson** (marketing) is regional vice president, sales, for the west division of Coverall North America, Inc.

2000s

'00 **Brody Smith** (political science), an attorney with Bond, Schoeneck & King, was recognized in the 2015 list of Upstate New York Super Lawyers Rising Stars.

'02 **Katie Culler Yee** (psychology) joined Latitude Planning and Engineering as director of business development and marketing.

'07 **Karemi Alvarez** (advertising), senior manager at the University of California, San Diego Center for Community Health, was selected by Union Bank and KPBS as a local hero during Hispanic Heritage Month; **Melissa Deleon** (journalism and media studies), named a 2015 rising star by Super Lawyers magazine, has joined CaseyGerry.

2010s

'11 **Antoinne Didiene** (MA communication) launched the fair trade accessories company Vavavida.

'14 **Daniel Citron** ★ (international security and conflict resolution) received one of eight fellowships from the national honor society Mortar Board; **Rebecca Haines** (MBA) is an associate attorney at the law firm of Jeffrey L. Burr & Associates in Nevada.

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San Diego State University

We're big music fans here at SDSU. What's the best concert you've seen on campus?



Sonia Feiler I've seen many concerts at SDSU over the years starting in the '50s but the best were actually the San Diego Symphony open rehearsals in the OAT. We would bring the kids and we saw the most amazing artists like Benny Goodman. Made lifelong music lovers of my children.



Debi Marshall Pruitt Oingo Boingo in '93 and Duran Duran in '94. Came face to face with Simon Le Bon while in line for the bathroom at the open air theater.



Patrick Bailey The Police Sept. 1984 @ Aztec Bowl. Madness & Oingo Boingo opened. Ramones 1986. English Beat 1983. Hüsker Dü 1985. Replacements '85 & '87. The Cult OAT 1988.



Lynn Bedard Gagne Jimmy Buffett 2012 at Viejas Arena!



Brad Rothman Many-Grover Washington, Weather Report, Sonny Rollins, Larry Coryell, Pat Metheny, George Benson, Spyro Gyra, Lester Bowie, all '78-'80



Randall Pogue Mothers Day 1969...Aztec Bowl.. Santana, Grateful Dead, Canned Heat, Lee Michaels. ...noon to dusk... \$2.50!



Kelly Ballantyne Rob Thomas, One Republic, and Carolina Liar...or Jimmy Buffet...or Oingo Boingo...no, definitely Rob Thomas



Tod Petty Inspiral Carpets, Transvision Vamp & Stan Ridgway in 1991 at the Backdoor. Also, Violent Femmes in 1992 at Montezuma Hall. Good times..



Lorine Bondra Guns N' Roses and The Cult in the '80s



Rachel Haven I worked in the ticket office during that time. Best job on campus!



The Grateful Dead at Aztec Bowl in 1969.

In Memoriam

1932: Hugh McArthur; **1934:** Philip Klauber; **1939:** Andrew Olson Jr.

1940: Andrew Kay, Harriet Miller Kull; **1941:** Annette Lux Curtis, Col. George Malliot; **1942:** Ellen Black, Patricia Hodgetts; **1943:** Harriet Miller Hutchins; **1944:** Nancy Vere Bosley, John Boyer; Evelyn Oberg Rossman; Joan Kittridge Vitalich **1945:** Marjorie Cuesta Martin; **1946:** Barbara Hinton; **1947:** Laurence Berger, Michael Hallahan, Ann Kirkland, Jane Smith, Irene Stockton; **1948:** Joy Curry Egan, John Orcutt, John Ross; **1949:** Hugo Baldelli, Kenneth Eason, William Garbett, Wallace Rick, Delbert Walden, Marion Jepsen Warburton.

1950: Eugenia Milroy, Donald Ravey, Harold Schaper, Chester Widmann; **1951:** Col. Fred Bates, Maria Fielding, Beverly Gosnell, Kenneth Madsen, Harold Moore, Gerald Rundle, Daniel Weikel; **1952:** Lawrence Kafor, Ben Ketchum Jr., James Kuhn, Lawrence Rasmussen; **1953:** William Harrington, Vivian Heid, Richard Meads; **1954:** Mary Clingman; **1955:** Carolyn Benton, Jaqualyn Johnson, Dean Leptich, Noel Mickelsen; **1956:** Amos Bailey, John Dooley, Patricia Rickon, Martin Schroeder Jr.; **1957:** Donna Blaisdell, Patricia Dugger, Robin Larson, Hon. Claude Lewis, James Marks, Frances Quon; **1958:** Carol Casper; **1959:** Elsie Antonicelli, Raymond Glaze.

1961: Roger English; **1962:** Larry Bennett, Joanne Hinchliff, Harry Knorr, Teresa Schneider; **1964:** Stephen Bailey, Ray Garriott, Ronald Moody; **1965:** Paul Holmes, Allen Lee, Sharon Stewart, James Wainwright; **1966:** Patricia Carter, Paul Farrar, Donald Frinell, Carl Gorham, Royce Riggan, John Wishon; **1967:** Roy Ragle; **1968:** Patrick Moran; **1969:** Terry Bourne, Joy Gorian, Douglas Holbrook, Kathie Leach, Anthony Mellusi, George Smith, Jane Yagade.

1970: Edward Arias, William Burton, Robert Mays Jr.; **1971:** Roland Bible, Ruth Fornaca, Walter Metcalf; **1972:** Patricia Magalski, Augustine Montfort, Calvin Robinson, John Weldon; **1973:** Calvin Cox, John Green, Ray Sigwalt, Verta Simon; **1974:** Stephen Abele, Harry Comer, Patrick Conway, Kenneth Cooley, Jacqueline Watts; **1975:** Richard Danilevich, Carl Pendell Jr., Kevin Sturdy; **1976:** Charles Burnett, Elena Cota, Jule Dubner, Jeffrey Herman, Jesse Jones, Barbara Peters, Jerry Peterson, Gregory Petro, William Simpson; **1977:** Jaci Hopper, Frank Vilics; **1978:** Terry Ash, Beatrice Firl, Douglas Gardner, William Knight, Col. Thomas Richards; **1979:** Raymond Cundiff Sr., Clyde Jenkins, Brad Powell, Bruce Rifkin.

1980: Anthony Dunn, Howard Rolan; **1981:** Tony Gwynn, Samye Hill, Colleen Osburn Loper, Esther Rains; **1982:** Scott Johnston, David Lapota, Neena Norris, Jon Rockeman, Mary Spicher, Deloris Von Nordheim; **1983:** Edward Hendricks, John Phillips, Denise Stukes, Robert Watson; **1984:** Michael Brayer, Mark Burns, Marnie Carroll, Christine Parker, Antoinette Poole; **1985:** James Cushing, Shirley Mackey; **1986:** Margaret Calvin, Terri Decker, Christopher Lawrence, Martyn McKay, Laura Oswald, Patricia Peterson; **1987:** Stephen Ardzrooni, Sharon Cornelison, Patricia Schlehuber; **1988:** David Emmey, John Roy; **1989:** Eric Bjorge, Jeffrey Gaines.

1990: Dennis Cordova, Carole Ringham; **1991:** James Beadles Jr., Curtis Cordell, George Dominguez, Peter Konzen; **1993:** Steve Hwang, Blanche Landis, Jennifer McIntosh; **1994:** Anna Woo; **1996:** Araceli Osuna, Christine Pierog; **1997:** Kristin Likos; **1998:** Margay Edwards, Anthony Scarpelli; **1999:** Jennifer Fuller.

2000: Janet Kawakami, Michael Payne; **2001:** William Cherry, Tiffany Langston; **2002:** Greg Gladd, Richard Telles; **2003:** James Duff III, Sage McCollister; **2004:** Warren Hoyt III, Hilda Mercado; **2005:** Betty Crawford; **2007:** Melissa Taylor; **2008:** Doris Layton; **2009:** Benjamin Fanale, Chris Hoobler.

2010: Ambassador Charles Hostler; **2011:** Amber Evans.

YEAR UNKNOWN: Lucien Bonnatoux, George Chapman, Betty Curry, John Darracq, Peter Eldridge, David Erickson, Faustino Escalera Jr., Andrea Freedman, Charles Gietzen, Elmer Kiener, Donald Lane, Barbara Mackintosh, Joseph Price, Murray Smith, John Williams.



The 2015 Faculty Monty Award Winners

Seven exceptional San Diego State University faculty members have received 2015 Alumni Association Awards for Outstanding Faculty Contributions. The honors—also known as the Faculty Montys—were awarded at the All-University Convocation in August.



College of Arts and Letters

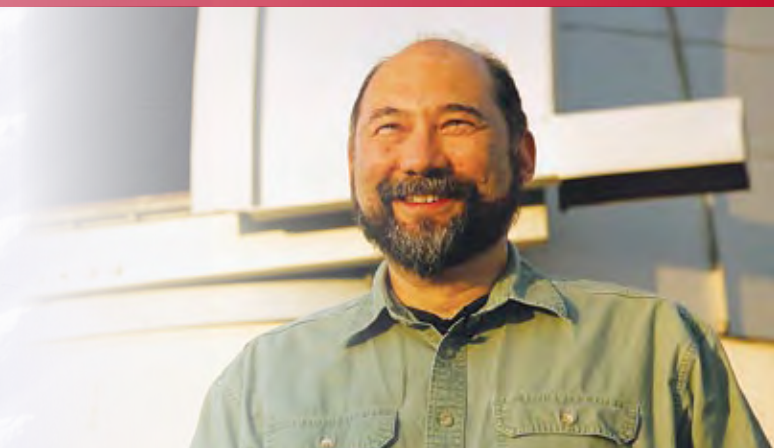
Risa Levitt Kohn, Ph.D.

Risa Levitt Kohn brings ancient history to life for today's students. As chair of religious studies, she helps ensure that the department has contemporary relevance and reflects a diverse range of perspectives. Kohn has curated exhibitions of the Dead Sea Scrolls in Moscow, Toronto and cities across the United States, giving SDSU national and global visibility.

College of Sciences

William Welsh, Ph.D.

William Welsh brings distinction to San Diego State University with his work for NASA's Kepler Science Team. He and fellow SDSU astronomer Jerome Orosz analyzed Kepler data to discover extrasolar planets with two suns, a finding published in the journal *Nature*. Welsh's collaboration with NASA has enabled SDSU students to use Kepler data in their research.



College of Business Administration

Gary Grudnitski, Ph.D.

Gary Grudnitski has been a pioneer in research and teaching throughout 27 years at San Diego State University. As director of programs for the college, he has made extraordinary contributions to the undergraduate curriculum, including the design and implementation of a new model for teaching financial accounting fundamentals in the Charles W. Lamden School of Accountancy.





College of Health and Human Services

Guadalupe Ayala, Ph.D.

Guadalupe X. Ayala researches the connection between human behavior and health. Since 2005, she has been principal investigator (PI) or co-PI on more than \$17 million in externally funded research grants. Her current project targets commercial producers, as well as consumers, in promoting healthy eating habits to reduce high obesity rates among Latino children.

College of Professional Studies and Fine Arts

Greg Durbin, M.F.A.

Greg Durbin is a prizewinning filmmaker, teacher and advocate for the arts. His films are in the permanent collections of the New York Museum of Modern Art and the Pacific Film Archive in Berkeley, California. In 2010, he served as an envoy for the U.S. State Department's American Documentary Showcase Tour to Honduras.



College of Education

Carol Robinson-Zanartu, Ph.D.

Carol Robinson-Zanartu focuses on cultural proficiency and social equity in education. Among her specializations is the preparation of graduate students for work in Indian country with Native American youth. Chair of the counseling and school psychology department for 16 years, she has been principal investigator (PI) or co-PI on nearly \$10 million in externally funded research grants.

College of Engineering

Sunil Kumar, Ph.D.

Amidst explosive growth in multimedia and telecommunications, Sunil Kumar is advancing technology in video processing over wireless networks. He has multiple research collaborations with faculty members in geography, statistics and engineering. A dedicated teacher-scholar, he mentors seven Ph.D. students and has developed or updated courses in wireless networks and image/video processing.



Common Chords

CHAPTERS FROM AZTEC HISTORY

Twenty years ago, there was no Mediterranean Garden on the San Diego State University campus. But despite its relatively recent birth, the garden grows thick with Aztec history.

Tucked into a rectangular space between the Physical Sciences and Life Sciences Buildings to the east and Hepner Hall to the west, the garden contains plants from five continents, gifts from three separate graduating classes and the labors of dozens of former Aztec faculty, staff and students.

This peaceful enclave, now a popular spot for meeting friends, eating lunch and taking a break between classes, was originally called the Freshman Quad. At its entry point—just west of the current Faculty-Staff Club—is the Hello Walkway, a nod to the once-popular Aztec traditions of having seniors formally welcome incoming freshmen and those same freshmen wish seniors farewell at graduation.

In the mid-1990s, three SDSU faculty members teamed up with staff in Facilities Services (formerly known as Physical Plant) to create a botanic display in the one-acre space. Professor Emerita Barbara Fredrich of the geography department; Professor Emeritus Pat Abbott of the geological sciences department and Michael Simpson, current professor of biology, led the project.

They decided to borrow from the original landscape plans for the campus, developed by Mark Daniels in collaboration with Howard Spencer Hazen, then the senior designer for the California State Division of Architecture. Hazen designed Hepner Hall, Hardy Memorial Tower, the Faculty-Staff Club (then a café and bookstore), the Little Theatre and other original structures on Montezuma Mesa in the style known as Hispano/Moresque.

Complementing the architecture of these early buildings, Daniels envisioned planting drought-tolerant species from Southern Europe and North Africa. The Mediterranean Garden committee added flora from Chile, the South African Cape region, our own California and southern and southwestern Australia to the mix. These so-called Mediterranean ecosystems experience the same wet, mild winters and warm dry summers typical of San Diego.

Simpson and Abbott arranged for a fountain from Baja California—a gift from the senior class of 1997—while Facilities Services staff hauled a 1.5-ton block of granite to the garden from a quarry in nearby Mission Gorge. As work on the garden progressed, donations poured in from all corners of campus. The Class of 1998 donated brick patios and tables. The Class of 1999 funded the South African rock garden and benches. Support also came from the Alpha Delta Pi sorority, the Department of Biology and the Colleges of Sciences and Arts and Letters.

As the garden committee envisioned, the Mediterranean Garden is not simply a beautiful sanctuary, but also an educational resource. Simpson and his students have planted small vegetable gardens there, and they regularly harvest samples of the large diversity of plants to study in his courses on biodiversity, plant systematics and the taxonomy of California plants. In

addition, several specimens from SDSU's Mediterranean are part of the collection of the Consortium of California Herbaria based at the University of California, Berkeley.

—Coleen Geraghty





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