Engage + Innovate

2024

San Diego State University's Research, Scholarship and Creative Activities Magazine

SDSU

Agents of Change

Through community partnerships, education professors **Ana Dueñas**, **Vanessa Placeres** and **Jennica Paz** empower youth to thrive despite adversity.

inside

Eric Otterson, chairman of the board for Connect San Diego and mentor for Techstars San Diego powered by SDSU, takes a virtual reality tour of the Mission Valley Innovation District Entrepreneurship Hub.

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SDSU EXPANDS ENTREPRENEURSHIP
Startup company support programs extend into SDSU's innovation hub in Mission Valley.

FEATURES

IN THIS ISSUE

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PHOTOGRAPHY ON COVER AND ON THESE PAGES BY RACHEL CRAWFORD

SDSU | San Diego State University

From the Vice President for Research and Innovation

Research at San Diego State University exemplifies our institution's deeply rooted community engagement and impactful innovation. In the pages of this magazine you will read about the transformative work of our faculty, staff and students.

Record-breaking numbers for grant funding (Page 31) only tell part of the story. What matters more is what our artists, scholars and entrepreneurs do with those funds to improve the lives of those around them.

Our partnerships enable interventions and policies with far-reaching influence. SDSU faculty define best practices for caregivers and educators to be more inclusive and culturally responsive (Pages 12-13, 18-21). With input from local residents and grassroots organizations, SDSU-led problem-solving is ensuring a more sustainable future in Imperial Valley (Pages 26-27) and the western United States (Pages 10-11).

Through reputable university centers, SDSU researchers continue to provide health information for historically underserved populations. National investigations of Latino communities' healthy aging are managed here (Pages 22-23) and persons living with HIV and veterans can get much-needed hearing tests because of SDSU initiatives (Page 14).

Cooperation also pushes the boundaries of possibility. Artificial intelligence experts from business and engineering tackle challenges in transportation together (Pages 24-25). Students work alongside mentors in different disciplines to create products that are greater than the sum of their parts (Pages 16-17). International collaborations allow for creative exchanges (Page 13) and cultural preservation (Pages 28-30).

Most excitingly, the intentional co-location of researchers and industry partners at the SDSU Mission Valley Innovation District expands the region's entrepreneurial ecosystem and economic potential (Pages 4-5). Founders in the new global accelerator Techstars San Diego powered by SDSU join alumni throughout San Diego to invigorate their businesses (Pages 6-7).
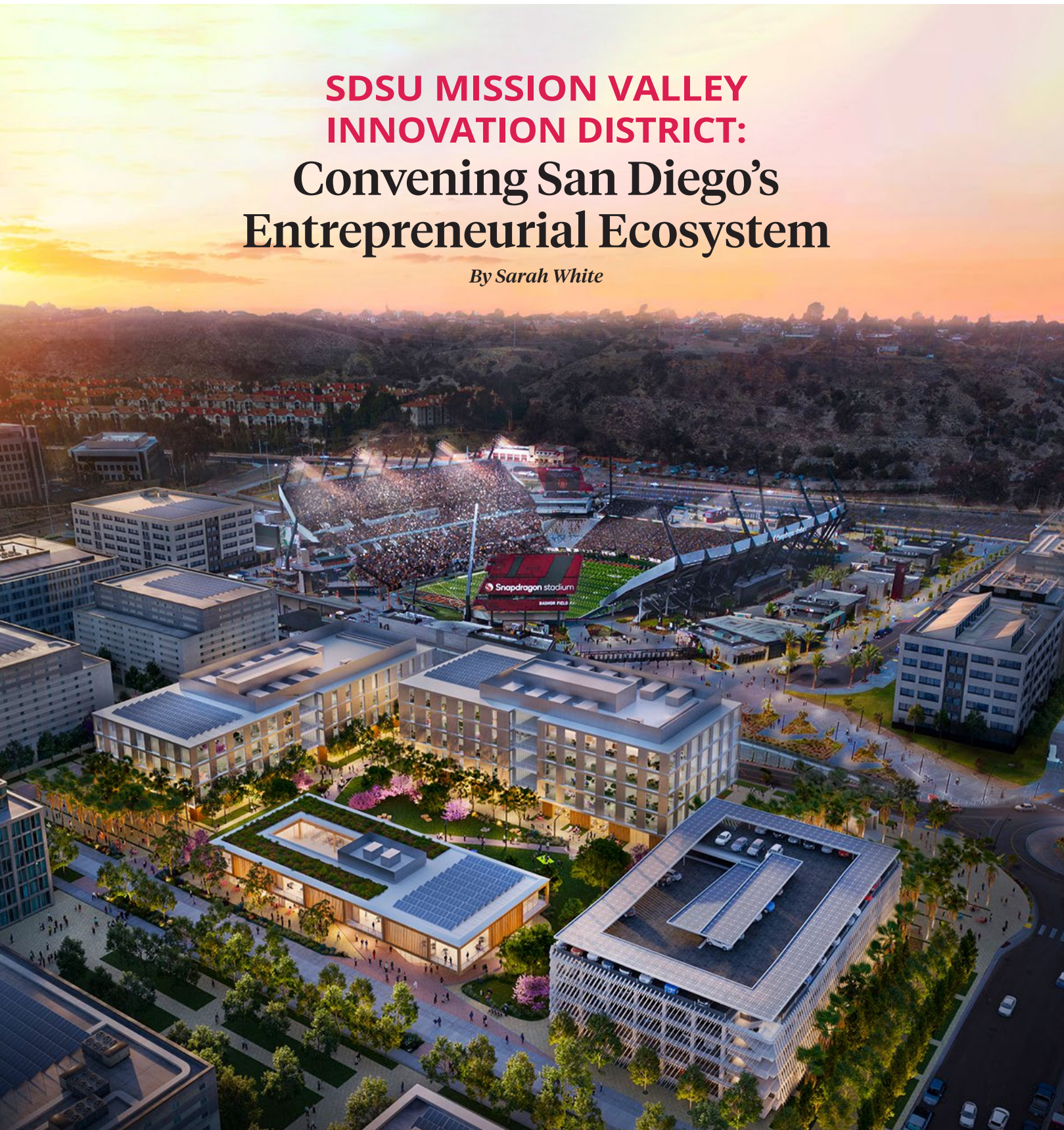
Every day, diverse SDSU teams advance ideas and address issues across our border-connected region. Working together, we can achieve a brighter tomorrow for all.

Hala Madanat
Vice President for Research and Innovation

SDSU MISSION VALLEY INNOVATION DISTRICT:
Convening San Diego's Entrepreneurial Ecosystem

By Sarah White

COURTYARD

SDSU Mission Valley is delivering on its promise to boost San Diego's economy. Since opening in fall 2022, the lively Snapdragon Stadium has achieved LEED Gold certification and hosted more than 150 events, including sold-out concerts, Aztec football games and pro soccer matches. Further growth is on the horizon, with the green light given to the first residential and retail developments and a Major League Soccer team set to arrive in 2025.

A short trolley ride from SDSU, the first phase of the Mission Valley Innovation District is planned to open in 2026. The Innovation District will facilitate new opportunities for students to pursue internships, contribute to new discoveries and connect with successful business leaders.

SDSU selected LPC West as the developer for the initial Innovation District project. This will include a parking garage, entrepreneurship hub and two buildings dedicated to research labs and offices, comprising

315,000 square feet of the total 1.6 million square feet for innovation.

Intended to foster collaborative and transdisciplinary partnerships,

ENTREPRENEURSHIP HUB

two of the multistory research buildings will house local companies, nonprofit organizations and SDSU researchers. They will collaborate to transform basic and applied science into marketable products aimed at combating diseases and addressing health injustices.

Located just south of the stadium,

the upper floors of these buildings will have exclusive and exceptional views of Snapdragon Stadium's Bashor Field.

The entrepreneurship hub will be built between the two research-oriented buildings, next to a lush courtyard. It is the planned home for San Diego's newest startup accelerator, Techstars San Diego powered by SDSU, and SDSU's award-winning startup incubator, the Zahn Innovation Platform (ZIP) Launchpad. Constructed of mass timber, the hub will serve as a dynamic gathering place for founders, community members and campus partners.

In addition to the entrepreneurship spaces, employees, faculty and students will be able to mingle and

exchange ideas in the café, fitness center, meeting rooms and open spaces in and around these initial Innovation District buildings.

These open spaces include the recently opened river park, which lies between the elevated trolley line and the San Diego River. This 34-acre park is designed to facilitate recreational opportunities for students and visitors while restoring the native ecosystem and naturally absorbing and filtering stormwater runoff. Throughout the park, visitors can discover art and interpretive signage that highlights the site's Kumeyaay origins and the surrounding riparian environment. ◄

RIVER PARK

Founders Take Flight

Twelve companies join global startup accelerator Techstars San Diego powered by San Diego State University

By Sarah White

A 13-week sprint to expand business and secure investments started not with a whistle or waving of a flag but with an enthusiastic exchange of handshakes and elevator pitches. The inaugural cohort of Techstars San Diego powered by SDSU descended upon San Diego State University's on-campus entrepreneurship space clad in polos and T-shirts emblazoned with their company logos.

Thirty-one cofounders from 12 startup companies—representing less than 1% of applicants—participated in the globally renowned accelerator program that trains founders to fundraise, network and build their companies.

Ryan Kuder, managing director of Techstars San Diego powered by SDSU, has his own variation on the saying, "If you want to go fast, go alone. If you want to go far, go together." His version: "If you want to go farther and faster, join Techstars."

And go farther and faster, the founders did. Hailing from San Diego, San Francisco, Boston and as far as Norway and Sweden, they hit the ground running.

Within the first week, they pitched their companies at San Diego Innovation Day at Petco Park. With guidance

from Entrepreneurs-in-Residence—mentors with previous Techstars success—they identified their biggest obstacles to growth. In the first month, they balanced experiencing San Diego's great outdoors with networking across borders in the region's weeklong startup week at events throughout the city and Tijuana.

By the culmination of the program in early December 2023, the founders perfected their explanations of the problems they were trying to solve and why they were the right people to solve them.

Going together

The Techstars San Diego powered by SDSU founders would not have made as great of strides without the abundance of mentors and interns available to them.

"One of the things I'm most impressed with is the way the SDSU and San Diego startup communities united to support these founders," said Kuder.

Over the course of the three-month program, more than 100 mentors lent their expertise to the founders at the equivalent of speed-dating events. Dozens of SDSU undergraduate and master's students interned with the startups, developing their own skills through conducting market research and outreach to potential customers.

"The combined support, mentorship and resources the university and Techstars provide increases the longevity of the startups involved," said **Misti Cain**, investment manager for the accelerator program. "Longevity helps increase R&D, tech advancements and investment in the region, making San Diego a known tech mecca for other founders and investors."

Homegrown success

To **Arman Assadi** ('09), an SDSU alumnus and cofounder of Steno.ai, participating in Techstars represents the culmination of his entrepreneurial dreams, ambitions that formed when the entrepreneurship major first launched during his senior year at SDSU.

He said the mentors he and his cofounders met through the program were invaluable. "They offered expertise in product development, fundraising and go-to-market strategies," he added.

Over the course of the accelerator, Steno.ai pivoted from targeting its AI-powered, multi-platform services to content creators themselves rather than the creators' followers. Now, it's ramping up its fundraising efforts and aims to onboard 400 brands and creators by the end of 2024.

"My younger self would be profoundly proud and impressed by the leader and CEO I've become," Assadi said. "Patience is everything. And what's funny is, I feel like I've only just begun." ◣

PHOTOGRAPHY BY RACHEL CRAWFORD

Through Techstars San Diego powered by SDSU, Arman Assadi and his **Steno.ai** cofounders revamped the user experience of their product to something unique in their market. On the company's horizon? A projection of $1 million in annual recurring revenue.

SDSU interns and investors alike were buzzing about **AirBuild** during the program's final pitch event. Local partners have committed to sustainably reducing their energy costs by installing AirBuild's algae-based, carbon-sequestering, water-filtering solar panels.

STENO.AI

AIRBUILD

OBLIO, INC.

MOSQITTER

Oblio, Inc. aims to simplify and personalize university admissions marketing and email communications with artificial intelligence. After Techstars, it was chosen from thousands of applicants to join the inaugural AWS Education Accelerator program to further expand its network.

Women-led and started in Ukraine, **Mosqitter** has sold more than 1,500 of its weatherproof mosquito-killing machines worldwide. Since the end of the Techstars San Diego powered by SDSU accelerator, San Diego customers have purchased units. A smaller version of its flagship product is in the works.

Support Future Founders!

Techstars San Diego powered by SDSU is made possible by donations of time, expertise and financial resources from our community members. We are grateful to **Andy Ballester** and **Ron Fowler** for their investment in the first cohort and operations of Techstars San Diego powered by SDSU.

Invest in the future leaders of San Diego's startup ecosystem today.

The SDSU Treadmill

Partnership between startup and researchers advances careers and cancer care

By Sarah White

As a graduate student, **Matt Giacalone** had mentors and opportunities to bridge research in academia and industry. Twenty years later, as CEO of Vaxiion, he is opening doors for more SDSU biologists while advancing cancer care.

Giacalone worked on using minicells — miniature bacteria without chromosomes that can be loaded with proteins or small molecules — to deliver vaccines or drugs, advised by biology professors emerita **Roger Sabbadini** and **Kathleen McGuire**. Sabbadini patented this technology and started Vaxiion as a spin-off company outside of the university.

When vaccine development and delivery proved to be too risky to take on as a small company before the COVID-19 pandemic, Vaxiion pivoted to using minicells to deliver drugs directly to cancerous tumors.

While the company pivoted, Giacalone pursued additional training in entrepreneurship and earned his M.B.A. and doctorate in biology through joint SDSU/UCSD programs. Believing in and championing Vaxiion's technology led him to becoming the company's CEO, although his true passion lies in pursuing questions about humans' immune response.

He keeps his feet firmly planted in both business and research by continuing to partner with McGuire, SDSU biologist **Carrie House** and their students in what Giacalone calls the "SDSU treadmill model." His company provides

Left to right: Katie Reil, Kinsey Nelson, Amanda Parikh, Matt Giacalone and Shingo Tsuji ('06).

funding for SDSU alumni to pursue their master's or doctoral degree while encouraging them to find and mentor the next student to continue the work.

For the past few years, their joint research has focused on what happens in the immune system when minicells are used to treat cancerous tumors.

"Once Vaxiion decided they wanted to know more about the biology and the immunology of their product, they've been very committed," McGuire said.

McGuire added that part of the reason that the partnership between her lab and Vaxiion has been so successful and long-lasting is because Vaxiion's team is very proud of being part of SDSU.

One of the students who has benefited from this treadmill is **Kinsey Nelson** ('19, '23). As an undergraduate student at SDSU, Nelson had a strong interest in science and medicine, but she did not find herself gravitating toward patient care. In her senior year, she decided to try research by joining McGuire's lab.

Working closely with **Katie Reil** ('13, '20), Nelson learned about Vaxiion and joined the company as a research associate after graduation. Two years

later, she had the opportunity to earn her master's degree while continuing to work full-time at Vaxiion, finishing her degree last summer.

"It's been really cool to see research from multiple points of view," Nelson said. "And to experience research in academia and industry at the same time."

Following in Nelson's footsteps, undergraduate biology student **Amanda Parikh** ('23) presented results at the 2023 SDSU Student Symposium. She successfully turned off specific immune response genes in cell models, setting the stage to further test the genes' role in treating tumors. After graduation, she also joined Vaxiion.

Collectively, their experiments have been integral in explaining how Vaxiion techniques deliver drugs to tumors and activate the body's immune system. The team of industry and academic scientists has recently published two papers in high-profile immunology journals. The company's pharmaceuticals have since completed a Phase 1 FDA trial in bladder cancer and recently opened another trial for the treatment of advanced solid tumors. ◢

PHOTO COURTESY OF VAXIION

Faculty-Fostered Innovations

New technologies and techniques are emerging from SDSU labs with applications in pharmaceuticals and materials manufacturing

Chemical connections

Detecting genetic sequences and delivering drugs to cancer cells will be more accurate, thanks to techniques patented by SDSU biochemists.

The human genome is made up of more than 3 billion genetic letters. Small changes in this genetic sequence explain parts of human health, including diseases like sickle cell and some types of cancer. Identifying single changes in DNA or RNA typically involves expensive and time-consuming amplification and analysis.

Precise and immediate pinpointing is possible using chemically modified, fluorescent DNA probes designed by SDSU organic chemist **Byron Purse** and his students. These probes bind to snippets of DNA or RNA and emit fluorescent light in response to a perfect match.

> *"We're developing applications of these probes for the rapid identification of specific genetic material in complex biological samples and for monitoring changes in genetic information."*
>
> **—Byron Purse, organic chemistry professor at SDSU**

Cancer drugs often have negative side effects because they destroy tumors and healthy cells. To create better pharmaceuticals that specifically bind to cancer-causing proteins, chemist **Jeff Gustafson** is leveraging how readily atoms rotate around bonds within a chemical compound.

He and his team of student researchers have patented methods to synthesize and study molecules that are in a particular orientation instead of another. With more molecules in the preferred orientation, the less likely future patients are to experience undesirable symptoms of treatment.

Smarter safety gear

SDSU mechanical engineers are creating new materials to protect senior citizens and athletes alike.

A lightweight bone found in squid-like cuttlefish inspired engineering professors **Yang Yang** and **Wenwu Xu** to make wearable devices with self-healing properties.

Along with doctoral students **Qingqing He** and **Runjian Jiang** and other collaborators, they replicated the cuttlefish bone structure and included salts that conduct electricity when force is applied. The conductive salts enable the addition of wireless sensors that can detect rapid movement or impact. Any potential cracks in the structures can be healed within half a day by adding more of the novel material in liquid form, reducing waste compared to traditional ceramics.

The researchers can shape this 3D-printed composite material into a personalized kneepad that activates an alert if the wearer falls. The researchers' next step is to work with a National Football League partner company to adapt this material into concussion-sensing helmets.

From head to toe, mechanical engineer **George Youssef's** patented low-density foam has the potential to make safer helmets and athletic shoes because it absorbs more impact than commercially available options. Manufacturing his foam also requires less energy and more readily enables custom and complex shapes. **—Sarah White and Taylor Slane**

Cuttlefish bone is an intricate shell structure that allows the cephalopods to control buoyancy underwater.
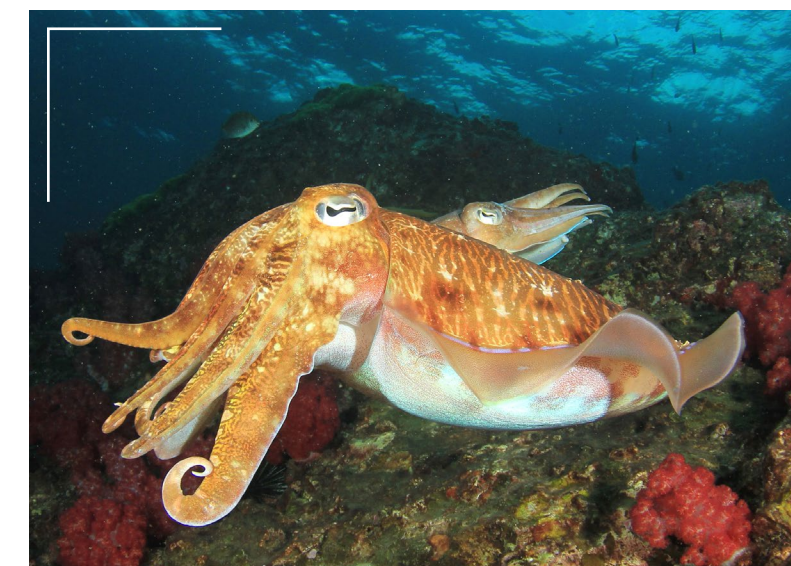
Regional, cooperative planning can revitalize areas that have historically received less funding from state and federal agencies. Learn more at **crs.sdsu.edu**.

This is one of the brownfield sites, currently underutilized, in downtown National City. Members of the Brownfields Assessment Project meet regularly with the community to discuss their findings.

Sustainability for San Diego and Beyond

SDSU is leading collaborative efforts to prepare the region to prosper in the face of climate change

By Sarah White

Local policies transform neighborhoods

A welding shop, a former educational center, an abandoned dry cleaner and a vacant lot of overgrown grass. These are some of the sites across National City identified as having potential for redevelopment into affordable housing, community gardens or public transit centers.

However, they are also likely to be brownfields — sites with potentially unsafe levels of hazardous substances like heavy metals, chlorinated cleaning products and petroleum derivatives. Researchers with SDSU's Brownfields Assessment Project, part of the SDSU Center for Regional Sustainability, are cataloging these locations and testing the soil for pollutants.

This team is sharing their findings with government officials and National City residents so community members can be more informed of the environmental and health concerns in these areas and make plans to remediate any toxic threats.

"They prioritize certain parcels that have the potential to do more than just clean up the soil," said **Carlos Aguirre**, director of the National City Housing Authority. "They will actually be developed into areas where the community can thrive economically, socially and academically."

Also in National City, sixth graders learned to express their experiences with climate change through music. Through the EARTH-Hop program (short for Environmental Action and Response Team Hip-Hop), SDSU student mentors led workshops on sustainability, poetry, music production and art. The young artists wrote lyrics, recorded songs and created album artwork about the ocean, pollution and other aspects of sustainability.

EARTH-Hop participants from the National School District created album cover art for their individual songs.

CALIFORNIA JOBS FIRST PARTNERS

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Universidad Popular

SDSU San Diego State University

PHOTOGRAPHY BY RACHEL CRAWFORD; EARTH-HOP ALBUM COVER BY BARBARA MACZ

Ramping up efforts for the region

In alignment with California's push toward achieving carbon neutrality, SDSU has been working closely across sectors throughout Imperial and San Diego counties to plan ways to sustainably invigorate the economy in the border-adjacent region.

As part of the Southern Border Coalition for the California Jobs First initiative, SDSU and its partners are engaging with and learning from disinvested community members, grassroots and nonprofit organizations, government agencies, labor organizations and other stakeholders about their visions for a local economy that benefits everyone.

The coalition and local leaders representing LGBTQIA+, youth, tribal and other communities are conducting economic analyses of the kinds of jobs that are most needed.

Collectively, they will decide how to funnel $14 million in funds for opportunities to grow in clean tech, green energy and other industries while balancing concerns about equity and safe working conditions.

"Disinvested and marginalized communities often bear the brunt of carbon-intensive industries," said **John McMillan**, principal investigator for the Southern Border Coalition grant and SDSU's assistant vice president of economic development.

"The coalition is intentionally designed around addressing that inequity and ensuring that these communities not only benefit from the transition to a net-zero economy but are empowered to take an active role in the economic development planning and implementation process."

Assistance for all

Throughout the western United States and territories, communities are looking to SDSU leaders for help realizing their climate justice goals.

The Environmental Protection Agency named SDSU as the home of one of 17 technical assistance centers nationwide with the mission of connecting organizations and individuals with funding for climate justice initiatives.

These connections are made possible through the new SDSU Center for Community Energy and

Environmental Justice, which builds on SDSU's decades of community-embedded research and outreach, particularly with Indigenous communities and climate-focused projects.

The center is the starting point for community organizers in California, Arizona, Nevada, Guam, Hawaii, American Samoa and the Northern Mariana Islands to access services that increase their capacity to successfully obtain grant funding.

Initial services include data collection and analysis, translation and interpretation, as well as guidance to identify grants and navigate government application processes. SDSU President **Adela de la Torre** said, "As the only California university selected to lead this work, this is clear recognition of our faculty's ability and passion to foster mutually beneficial relationships with tribal and other key communities. And this empowerment focus is exactly what makes SDSU distinct as a major research university. Our focus is not just on the idea but on creating a sustainable and positive impact." ◣
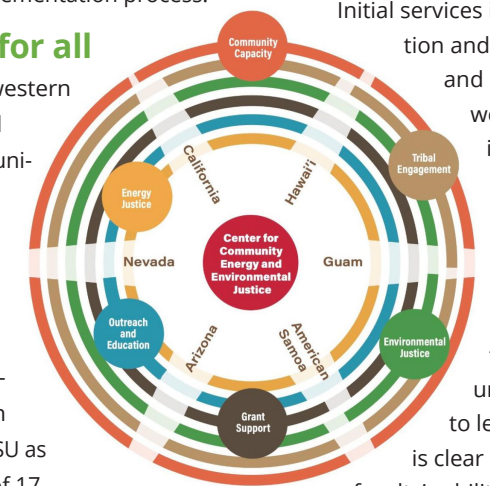
Associate professional clinical counselor Fernanda Vaz interacts with child clients and parents in SDSU's Healthy Early Years clinic.

Ensuring a healthy start has 'exponential impact'

SDSU's Center for Excellence in Early Development (CEED) is bringing its early childhood mental health consultation services into more San Diego County schools.

Previously, CEED sent graduate student clinicians from its Healthy Early Years (HEY) clinic into about 20 early education classrooms, programs and family childcare centers per year across San Diego County, mostly in moderate- and low-income communities. With funding from the U.S. Department of Education, these consultations are set to expand threefold and will extend services to older children.

For four hours per week for more than a dozen weeks, HEY clinicians work with teachers to address children's social-emotional challenges and help get to the root of the issues at the source of such challenges — often instances of past trauma.

Lisa Linder, who leads CEED and HEY, said clinicians' classroom consultations significantly increase children's social-emotional skills, according to teacher ratings. Additional evidence indicates the program lessens harsh teaching practices and boosts teacher sensitivity to children's emotions and needs. There's also recognition of its capacity to be a preventive approach to the preschool-to-prison pipeline — the phenomenon of exclusionary discipline on young children correlating to juvenile detention later in life — and a shift away from believing the problem is within the child. "The funding [for these programs] is really setting the stage to create that infrastructure in San Diego County," said Linder. "This is a great way to provide mental health services in a very cost-effective way that makes an exponential impact." **—Michael Klitzing**

Partnerships expand to diversify social work profession

California faces a growing shortage of mental health providers, especially social workers. To fulfill this need and increase the diversity in the profession, SDSU's School of Social Work expanded its Master of Social Work programs and internship placements.

With funding from the California Department of Health Services and the California Social Work Education Center, SDSU offers stipends and tuition reimbursements to master's and undergraduate students pursuing a career in child welfare. Some of these funds are prioritized for current county social service agency employees and Native American students.

Master's in Social Work (MSW) students must complete two years of on-the-job training to qualify for licensure. In addition to field practicum positions in several on-campus and community clinics, some MSW students have paid internships with the San Diego Center for Children and programs managed by the nonprofit Vista Hill Foundation.

With these efforts, SDSU's School of Social Work continues its dedication to preparing an ethnically diverse child welfare and behavioral health workforce capable of providing culturally aware and linguistically competent care for the betterment of the region and the state. **—Sarah White**

PHOTOGRAPHY BY RACHEL CRAWFORD

State policies to protect LGBTQIA+ youth take shape

For many LGBTQIA+ young people, the past few years have been particularly trying. State legislatures nationwide have passed a spate of legislation to restrict discussion of LGBTQIA+ matters in schools.

"It's a scary time period," said **Vinnie Pompei**, SDSU's assistant professor of educational leadership. "What we're seeing is rhetoric that's regurgitated from many decades ago — words like 'eradication,' words like 'grooming,' accusations of sexualizing children and calling LGBTQIA+ people pedophiles. All of this results in more bullying, more harassment and more mental health challenges, including suicide."

According to a survey by The Trevor Project, 50% of LGBTQIA+ youth between the ages of 13 and 17 have seriously considered attempting suicide.

To address this crisis, Pompei is serving as the only higher education representative on a California Department of Education committee to create materials to train K–12 teachers how to foster safe, LGBTQIA+ affirming classroom environments.

The training curricula will provide information on state laws and policies protecting LGBTQIA+ students in public schools as well as evidence-based practices that improve school safety, particularly for learners who are multiply minoritized. Such practices include using gender-inclusive language (think using "students" instead of "boys and girls"), integrating diverse voices into lesson plans to break down negative biases and supporting student Genders & Sexualities Alliances organizations.

Pompei hopes to work with colleagues at SDSU to integrate the trainings into teacher, school counselor and educational leadership education programs in the College of Education. **—Michael Klitzing**

Vinnie Pompei, professor, College of Education.

PHOTOGRAPHY BY IAN ORDONIO FOR VINNIE POMPEI | SABRINA SMILEY COURTESY PHOTO

Culture-specific care may improve cocaine users' cognition

SDSU social and behavioral health scientist **Sabrina Smiley** is trying to understand the social experiences and cognitive performance of older Black individuals with cocaine use disorder (CUD).

From 2012 to 2018, the death rate from cocaine overdoses increased by an average of 27% annually and is highest among non-Hispanic Black communities at a rate of 8.3 per 100,000 population, which is nearly double the rate of overdose deaths attributed to cocaine among non-Hispanic whites.

Sabrina Smiley, professor, School of Public Health.

Smiley and her team will interview women over 50 years old to identify and map out concrete, culture-specific strategies to develop, implement and evaluate clinical trials to reduce risks for cognitive impairment, such as dementia, in Black individuals with CUD. They'll identify how their drug use is linked to social isolation, loneliness and the risk for Alzheimer's disease. The findings could inform better policies and ways to care for this population.

Because of this project, Smiley is SDSU's first recipient of the National Institutes of Health Racial Equity Visionary Award, which is bestowed upon fewer than a dozen researchers nationwide. Smiley earned a $5.2 million grant to advance racial equity in addiction treatment.

Smiley's research is funded by the National Institute on Aging through the San Diego Alzheimer's Disease Resource Center for Minority Aging Research, a partnership between UCSD and SDSU. **—Melanie Patton**

Fluency for the armed forces

Since 2006, SDSU has delivered research-based training programs for U.S. military personnel to develop proficiency in critical languages and cultures.

With funding from the Department of Defense, the university's Language Acquisition Resource Center provides intensive online, in-person and hybrid courses for languages including Chinese, Indonesian, Korean, Levantine, Iraqi, Modern Standard Arabic, Pashto, Persian-Farsi, Ukrainian and Russian.

LARC's programs serve approximately 200 military students each year, improving the language skills, regional expertise and intercultural communication skills of ROTC students, enlisted personnel and current officers in the U.S. Army, Air Force and Navy.

Professor **Chris Brown**, co-director of LARC, said, "The SDSU-LARC LTC and Project GO programs are a force multiplier for the U.S. Department of Defense. This training enhances the readiness and global interoperability of DoD personnel and, as a result, helps to make the world a safer place." **—Cody Lee**

"This training enhances the readiness and global interoperability of DoD personnel and, as a result, helps to make the world a safer place."

—Chris Brown, co-director of LARC

Accessible hearing healthcare for veterans

Nearly 1.4 million veterans received compensation for hearing loss benefits in 2022. Hearing loss can lead to negative health impacts, including cognitive decline, depression and social isolation, if not addressed. The most commonly recommended intervention options include aural rehabilitation and the use of hearing aids and assistive listening devices. But veterans living in rural areas may not be able to access these audiology services because audiologists are more concentrated in urban areas.

With funding from the U.S. Department of Veteran Affairs, **Laura Coco**, an audiologist and SDSU assistant professor, is evaluating how readily rural veterans can access timely hearing health care. During the first year of this project, Coco is looking at data from the past 10 years to examine the differences between rural and urban veterans' use of audiology services to build evidence for the potential expansion of these important services. **—Melanie Patton**

Differentiating dementia from persons living with HIV-related hearing loss

Persons living with HIV are living longer, but they're approaching the age demographic that's at a higher risk of developing Alzheimer's disease. Fifty percent of persons living with HIV will experience cognitive impairment or memory loss from the virus. As a result, Alzheimer's may go undetected in a significant number of older individuals in this population.

To improve the diagnosis of Alzheimer's disease in persons living with HIV, SDSU audiology professor **Peter Torre III** is working with UCSD researchers to study these patients' balance and hearing loss with funding from the National Institutes of Health.

Why focus on hearing loss? HIV has been shown to be associated with hearing loss, and hearing loss contributes to balance problems and a more rapid onset of dementia. Torre and his research team at the Recreational Noise Exposure and Hearing Lab have been conducting and analyzing data from ear examinations and hearing tests for the project since 2019.

They use a novel device as a sensitive screening tool to differentiate between healthy cognition, Alzheimer's and HIV-associated neurocognitive disorder, which is more associated with difficulties in physical coordination like the inability to maintain balance. The tool accurately measures changes over time in ear damage, body position awareness and balance in older persons living with HIV. **—Melanie Patton**

Gongs, gamelans and gender identity

In spring 2023, the Arts Alive SDSU Discovery Series partnered with music professor **Laurel Grinnell-Wilson** to present *Oh My Gong!*, a festival of Indonesian music and performing arts that explored musical and cultural diversity.

The program showcased music and dance from East and Central Java and Bali, and featured the SDSU Javanese Gamelan Ensemble with guest dancer Weny Michelstein, Canyon Crest Academy Javanese Gamelan Ensemble, Kembang Sunda Gamelan Degung and Balinese Gamelan Merdu Kumala.

A panel discussion featuring ethnomusicologist **Christina Sunardi** explored concepts of gender identity and expression through the arts, especially performances in Indonesian music and dance, and how broad cultural practices and beliefs are connected to and expressed through the arts. **—Cody Lee**

PHOTOGRAPHY BY ROBIN NORTH

SDSU Javanese Gamelan Ensemble performs with guest dancer Weny Michelstein.

Collaboration Is Key for Undergraduate Projects

SDSU students Gina Ferguson and Brad Dela Llana share their expertise with each other to create artistic robotic devices.

Engineering meets design

School of Art and Design professor Yin Yu mentored interior architecture student **Gina Ferguson** and electrical and computer engineering student **Brad Dela Llana** to design wearable soft robotic devices inspired by biological organisms.

In the process of creating a passionflower-like headpiece that moves according to the wearer's heartbeat, Ferguson stepped out of her comfort zone and learned new skills in 3D modeling, 3D printing and even soldering. Her ultimate design is intended to help individuals visualize their anxiety and emotions.

Side-by-side with Ferguson, Dela Llana solved pneumatic actuator problems, creating a glove with silicone-based peacock-like feathers that inflate and pulse according to hand movements. Drawing on his interests in music, Dela Llana took his device a step further, adding electronics so that the wearer's hand movements control song volume and speed. The end result is a device that provides haptic feedback and enhances the visual dynamism of a musician's performance.

Selling sound bathing

Anthropology undergraduates **Emma Fitzpatrick** and **Amara Golden** transcribed interviews under the guidance of professor **Elisa (EJ) Sobo** to investigate the popularity and perceived effectiveness of sound baths. Sound bathing is a form of therapy that uses resonant bowls, chimes and other instruments to elicit a relaxed, meditative state.

Fitzpatrick extended this research through an independent study project, conducting a survey of students' awareness and opinions of alternative wellness practices. She also systematically analyzed sound bath advertisements for their most prevalent characteristics.

"Master's students don't always get to design their own project, so this felt like a really unique opportunity," Fitzpatrick said. Completing the project without the end goal of a final grade helped her gain more self-confidence in academic settings.

Applying their findings, Fitzpatrick and Golden organized and advertised a free on-campus sound bath to address the financial and physical accessibility barriers students face when considering participating in such an experience.

Deception detection

Computer science major **Christopher Fisher** and linguistics major **Emily McHale** worked with computational psycholinguist **Gabriel Doyle** to detect lies told by ChatGPT.

Fisher annotated ChatGPT-generated text about common and obscure topics (e.g., facts about Robert F. Kennedy versus a niche Soundcloud rapper) for how accurate each statement was, finding that over one-third of responses generated by ChatGPT contained partially or completely false information.

Students attended a sound bath provided by Wellness with Nazli and organized by anthropology undergraduates Emma Fitzpatrick and Amara Golden and the SDSU Association of Anthropology Students.

McHale assessed perceptions of how human-like, trustworthy and convincing ChatGPT-generated film reviews were compared to reviews written by humans, identifying features that readers thought differentiated them.

"This was one of the first times I have felt that my contributions to a subject could matter in the sense that they could serve for others to expand and test more than I could," McHale said. She hopes her experience conducting her own experiment has prepared her to succeed in a linguistics graduate program.

Dance professor Jess Humphrey, along with dance students Alyssa Moreno (left to right) and Chasley Schoettle and alumna Savanna Torres, reflect on and discuss video footage of their choreography.

Dancing through life

"Engaging in dance research is a unique adventure with surprising outcomes," said **Chasley (Chazz) Schoettle**, dance and kinesiology major. She and fellow dancer **Alyssa Moreno** asked the question, "What if my most technical dancing is fiction and my drama is truth?" through iterative reflection on emergent choreography.

They rehearsed with specified roles as mover and witness, attending to each others' gestures and learning to be vulnerable in the process of allowing their partner to control their body movements. Their movement explorations were incorporated into a larger, binational dance project by their mentor, **Jess Humphrey**.

Schoettle infused what she learned about the mind-body connection from her collaborative dances with Moreno into a routine that incorporates both ballet and breaking.

Moreno said this experience helped her heal internal turmoil related to her challenges frequently crossing the Tijuana-San Diego border. She expressed these reflections on her bicultural identity and further dance research into a subsequent performance at the SDSU Student Symposium.

Ensuring water safety

The Tijuana-San Diego border region is facing a public health crisis due to sewage leaking into waterways and into the ocean. Environmental engineering student **Charisma Tanaka-Herrera** and microbiology major **Aaliyah Ringor** joined engineering professor **Matthew Verbyla's** Safe WaTER lab to devise new methods to trace the sources of human fecal pollution.

With additional mentorship from doctoral student **Maryam Fani**, the team measured how quickly bacteria and viruses commonly found in human waste traveled through soil. Replicating environmental conditions that would be found in San Diego locations, they were able to determine how far away pollution likely originated, narrowing down the possible leaks, runoff or sewage treatment plant contamination sources.

Ringor said participating in this project helped her grow as a scientist and gave her the preliminary knowledge and experience she needs to achieve her dream career working in research. **—By Sarah White**

Charisma Tanaka-Herrera (left) and Maryam Fani set up a soil column experiment to improve fecal pollution tracing.

Equity and Empowerment for Emotional Well-Being

By Michael Klitzing

Working out of K–12 school sites, community settings and living rooms — spaces that would never be mistaken for the ivory tower — three SDSU College of Education researchers are striving to improve mental and emotional well-being for children and youth in diverse communities across California.

And each does so in settings that often mirror their own experiences growing up in the Golden State.

A mural in the North Education building celebrates diversity in schools. Symbols from multiple cultures representing life, knowledge and learning intertwine with depictions of family members, laborers and community members who contribute to educational environments where children can thrive.

Flipping the narrative

Decades of research have focused on childhood trauma as a predictor of poor mental health outcomes. But as **Jennica Paz** studies youth well-being, the associate professor in SDSU's Department of Counseling and School Psychology is out to find something different.

"Ever since high school I've viewed helping others as the golden ticket to break cycles."

—Jennica Paz, professor, College of Education

"I'm interested in discovering the internal and external resources in one's environment that enable young people to thrive despite the fact that they're experiencing adversity," she said.

Paz, a licensed clinical and school psychologist, experienced her own adversity while growing up in the foster care system in San Diego. But that experience did not define her: It gave her a sense of purpose.

"Ever since high school I've viewed helping others as the golden ticket to break cycles," Paz said. "To be able to live a life determined by yourself and not by your generational patterns."

Her work centers on the concept of "positive youth development"

(covitality) — focusing on the factors in schools, home environments and communities that help young people thrive. Paz conducts her research through mutually beneficial community partnerships. She is frequently contacted by San Diego–area schools asking her to assess student mental health through wellness screeners.

"A lot of my research begins at the screening level," said Paz, who works with students primarily in grades 3–12. "We're asking the youth themselves to identify different assets and positive psychological constructs that are going well in their lives."

Collecting and analyzing survey data and other metrics, she works with partners to build systems of support, which could be at the schoolwide, group or individual levels depending on needs. Interventions include topics such as fostering a growth mindset, which have been proven to build self-efficacy.

The efforts are certainly timely. Paz points to a youth mental health crisis, exacerbated by factors such as pandemic isolation and online bullying. School-initiated referral rates to residential treatment centers, she said, have skyrocketed.

"This is particularly impacting diverse communities and students of color," Paz said. "And with students who are LGBTQ-identified and those who are in foster care, those rates have spiked even more. I think the intersection of these needs deserve so much more attention and a comprehensive approach."

Breaking cycles of disparity

In the U.S., there are many research-tested interventions available for families of autistic children. But for Latine families in the U.S.-Mexico borderlands, where families often live fluid lives between two countries, there is a dual barrier to care. The services are both hard to access and a poor cultural and linguistic fit.

Ana Dueñas, an assistant professor of special education, has seen these barriers play out not only as a researcher but also as a former social worker for families of autistic children in San Ysidro, a border community.

"There is a cycle of service disparity," she said. "It starts from early diagnosis and timely diagnosis to the lack of services that are culturally and linguistically appropriate for families."

Dueñas, who proudly identifies as *transfronteriza* (transborder), having grown up between Tijuana and San Diego, is out to break the cycle. She recently became the first ever SDSU recipient of the Institute of Education Sciences Early Career Award, which supports the research and career development of promising researchers.

The award will support her work in the Imperial Valley, a rural community where disparities are particularly acute. She will assess community needs and adapt proven therapeutic autism

interventions — typically designed for white, middle-class families — to better fit transborder culture and context.

Going beyond mere translation from English to Spanish, Dueñas will focus on ways to best provide education and coaching to families about what autism is and means, and how to leverage the strengths of multigenerational households.

Using a community-engaged model, Dueñas plans to partner with Imperial Valley community organizations and allow families to select which existing caregiver-mediated strategy she should adapt.

"To me, success means fully integrating into the community," she said, "or at least having the community see me as a resource."

Well-being through empowerment

As she works to improve the schooling experiences for K–12 students, **Vanessa Placeres** often thinks of her own childhood. Born into a large, tight-knit Mexican-American family in the small Northern California town of Tracy, she never saw herself as someone who could move away from her loved ones, let alone hold a Ph.D. and make an impact as a researcher.

"I want kiddos to be able to see themselves in spaces that are bigger

"To me, success means fully integrating into the community or at least having the community see me as a resource."

—Ana Dueñas, professor, College of Education

than what they might otherwise believe possible," said Placeres, assistant professor of school counseling.

Placeres is working through the California State University Center to Close the Opportunity Gap to study the implementation of new programs to serve marginalized student populations in Southern California school districts — hoping to glean lessons that might apply more broadly to future initiatives in other locales.

Within Los Angeles Unified School District, Placeres is interviewing principals, teachers and families about the Black Student Achievement Opportunities Program, which aims to strengthen the academic performance, social-emotional well-being

and positive cultural identity of Black students.

Further down Interstate 5, she's examining Santa Ana Unified School District's implementation of Xinachtli, a gender-responsive support group for Latine middle school and high school cis and trans girls and non-binary youth. The program's scope is notable, as Placeres called a lack of inclusion and visibility for gender-diverse students in district programming one of the biggest obstacles she has encountered during her research.

Placeres is excited to interview students in person this fall, calling the opportunity to be invited into their space "a gift."

"Growing up, even well into my academic career, I saw the implications of not having folks who looked like me or who could even understand a lived experience like mine," she said. "It's tremendously important to get this right — not only for their academics but for their mental health and their ability to see themselves as something larger than they've been given the opportunity to dream." ◢

PHOTOGRAPHY BY RACHEL CRAWFORD

"Growing up, even well into my academic career, I saw the implications of not having folks who looked like me or who could even understand a lived experience like mine."

—Vanessa Placeres, professor, College of Education

HOLISTIC APPROACHES TO HISPANIC HEALTH

Exploring cultural and cardiovascular links to dementia in Latino Americans

By Peggy Pico

Taking better care of one's heart can protect against Alzheimer's disease and other forms of dementia.

But, new evidence suggests that Latino Americans are at an increased risk of developing Alzheimer's and tend to display symptoms at a younger age than non-Latino populations in the U.S.

"Having high blood pressure and obesity, or other cardiovascular-related illnesses, seems to accelerate cognitive decline among Latinos more than in non-Latino whites, and we want to know why," said **Ariana Stickel**, Ph.D., assistant professor of psychology at San Diego State University.

Cognitive decline is a condition that leads to memory loss, reduced or slower thinking and impaired mental capabilities. It often begins slowly, when forgetting a familiar route home or having difficulty understanding a simple conversation. It frequently progresses to the inability to recognize family, friends and even one's own reflection.

Alzheimer's disease is an irreversible deterioration of the brain. It results in severe cognitive decline, personality changes, the inability to perform basic daily activities and ultimately death.

There is no cure. But identifying and understanding the biological, cultural and socioeconomic risks for specific groups, including Latinos, is critical for prevention, early diagnosis and the development of treatments, said Stickel.

"One piece missing from the existing research is that Latinos often go longer periods of time with undiagnosed and untreated cardiovascular-related illnesses than other ethnic and racial groups," she said.

According to the National Institutes of Health (NIH), the disproportionate incidence of cardiovascular illness and Alzheimer's disease among Latinos may be linked to biological and cultural factors including acculturation.

Acculturation is when an individual, family or group adopts, replaces or modifies their customs, values, dietary habits and other behaviors to another (typically) dominant cultural norm.

Several NIH studies are underway to determine acculturation's effect on health and health disparity in minority populations. Stickel's research project is among them.

"My research explores the relationships between cardiovascular disease risk factors, brain structure and small vessel disease, and cognition, while also investigating external influences, including acculturation and health disparities among Latinos living in the U.S."

Diversity and scope

Stickel's study is part of two massive research projects on cognitive aging and cognitive impairment among diverse Latino populations in the country.

The Hispanic Community Health Study/Study of Latinos collected data on heart and lung diseases from more than 16,000 participants from San Diego, New York, Chicago and Miami. Participants had heritage from Cuba, Central and South America, the Dominican Republic, Mexico and Puerto Rico. More than half of the participants, aged 45 years and older, also underwent cognitive testing.

Among the study's principal investigators are SDSU's Linda Gallo, Ph.D., professor of psychology, and Gregory Talavera, M.D., distinguished professor in the Graduate School of Public Health, who serve as co-directors at the SDSU South Bay Latino Research Center.

The Study of Latinos-Investigation of Neurocognitive Aging looked at cardiovascular and genetic risk factors for cognitive change and mild cognitive impairment as a precursor of Alzheimer's disease in more than 6,000 participants. Its follow-up study, SOL-INCA 2, is underway and examines the original participants to identify which risk factors lead to Alzheimer's disease or other forms of dementia.

Risks and prevention

Stickel's current work contributes to and expands on both studies.

"Specifically, I investigate lifestyle, migration history and acculturative factors, health disparities and socioeconomic issues that may lead to biological risk for dementia," she said.

Multiple long-term studies have found evidence that people who make healthy lifestyle changes, such as controlling high blood pressure and excessive weight gain, and doing heart-health exercise, may reduce the risk of getting Alzheimer's or other dementias.

"So, there is something you can do right now that may reduce your risk of cognitive decline. That is preventing or managing cardiovascular risk through exercise, diet or medications to help your brain in the long term," Stickel said.

She explained that her ultimate goal is to find ways to prevent cognitive decline from Alzheimer's disease and related dementias.

3.5 MILLION
Number of Latino Americans projected to have Alzheimer's by 2060

1.5 TIMES
Hispanic older adults are 1.5 times more likely to have Alzheimer's or other dementias than non-Hispanic whites.

12.2 PERCENT
Percentage of Hispanic older adults diagnosed with Alzheimer's or other dementias

"Our research is meant to inform public health care among Latinos and all aging adults," she said. "We want to prevent dementia or slow its development, and for those already facing dementia, we want to pinpoint treatment interventions to improve their quality of life.

"The long-term solution to addressing cognitive impairment and dementia must include population-specific research and strategies that recognize biological, ethnic and racial lifestyle differences."

When Artificial Intelligence Takes the Wheel

PHOTOGRAPH OF VIVIAN HUANGFU BY RACHEL CRAWFORD | RENDERINGS BY RONG QIN, VIVIAN HUANGFU, DEVON HOOD, JAMES MA, SHENG HUANG

From where the rubber meets the road to turn-by-turn decisions, SDSU researchers are shaping the future of driving by applying artificial intelligence and machine learning.

By Suzanne Finch and Sarah White

From the ground up

California's roads are some of the worst in the nation. Potholes, bumps and cracks are ever-present, despite the state government budget spending more than $3 billion on streets and roads in 2022–2023.

"Traditionally, identifying pavement problems is done manually by professionals, and this requires a large amount of labor and extensive domain knowledge," said **Vivian Huangfu**, a management information systems professor and the director of SDSU's AI4Business Lab. "Given the complex and vast network of roadways, it is almost impossible to inspect them all manually."

Automating detection of pavement hazards is therefore essential to save time and taxpayer money.

Huangfu, together with a team of researchers including SDSU undergraduates, applied artificial intelligence to the costly problem of identifying potential road hazards in need of fixing.

The team divided high-resolution images of pavement into smaller patches, then fed these images into an AI algorithm that combined them into a large-scale image of a stretch of pavement.

With these larger composite images, another machine learning algorithm could extract details about cracks and flaws. This algorithm was able to classify images into different types of hazards, easing engineers' burden of deciding which problem areas to prioritize.

Eyes in the sky

Huangfu and her collaborators also developed technology that can follow a single car or truck as it appears in traffic camera feeds around a city.

The researchers accomplished this by analyzing the brightness and color of pixels in traffic camera footage to outline features of individual vehicles and assign each feature a level of importance.

The team next used a second set of artificial intelligence algorithms, called a convolutional neural network, to match identical vehicles across snapshots. Matches were identified even with photos taken in varying weather conditions and from different camera angles.

Prioritizing features based on their uniqueness reduced the time taken to visually match vehicles and was more accurate than other algorithms, said Huangfu. "This process eliminates time and cost needed to visually match vehicles and increases identification accuracy," she said.
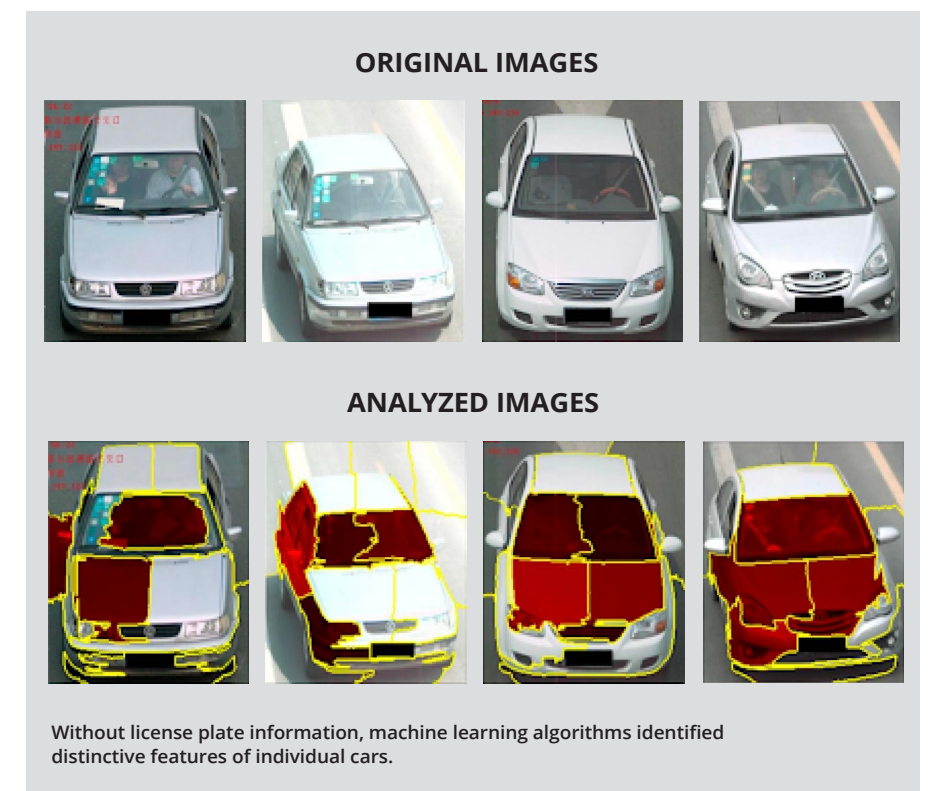
This computer vision algorithm has the potential to streamline traffic patterns and assist in criminal investigations that require information about vehicle locations.

Modeling materials

With funding from SDSU's Division of Research and Innovation, **Sara Adibi**, a mechanical engineer, is using machine learning-based models to enhance the design of damage-resistant materials.

"By making extremely precise adjustments at the atomic level, we can achieve different material properties, effectively tailoring them to our specific needs," she said.

Applying the laws of physics to computer-generated data, Adibi and her students are simulating what would happen if they make small changes in the ratio or position of steel, aluminum and titanium atoms within a material.

These physics-informed computational models can predict how adding pores or some form of reinforcement would enhance a material's strength or ability to withstand sudden impact.

Adibi says these models save the years and thousands of dollars it would take to run experiments, accelerating the development of potentially indestructible cars and protective gear.

ORIGINAL IMAGES

ANALYZED IMAGES

Without license plate information, machine learning algorithms identified distinctive features of individual cars.

Autonomous automobiles

Self-driving cars also need to recognize objects like traffic signs and other vehicles, but they have the added challenge of needing to perform calculations in fractions of seconds to avoid collisions.

To enable such quick responses, SDSU researchers are optimizing how the computers within self-driving vehicles allocate their finite resources to their cameras, sensors and operating systems. They are also adapting these algorithmic decisions to perform equally well in cold weather and on dangerous roads.

Watch to learn more

Vertical farms, similar to those used at SDSU (above), are part of Saeed Manshadi's recommendation for more eco-friendly agriculture.

The Future of Farms: It's Electric!

SDSU electrical and computer engineering professor Saeed Manshadi is helping farmers use less energy and transition to more renewable sources

By Melinda Sevilla and Sarah White

After building a successful career optimizing the efficiency and safety of electrical grids and power lines, **Saeed Manshadi** did not expect that a new project would take him back to his roots.

Visiting SDSU Imperial Valley, Manshadi has observed many parallels to his childhood home in Tehran, Iran. Imperial Valley has a hot, arid climate with limited access to water. Despite the desert environment, Imperial Valley has over 500,000 acres of farmable land and an agricultural industry dating back over a century producing midwinter vegetables such as lettuce, cabbage, cauliflower and broccoli.

Like Tehran, the Southern California region also has its fair share of air quality issues, caused by agriculture and border-crossing traffic, which often exacerbate chronic health conditions in local communities.

"We found that many of these air quality issues are coming from how we transport foods from farms to processing facilities," said Manshadi.

The farming industry in the United States contributes 10% of the country's greenhouse gas emissions. In Imperial Valley, the agricultural sector accounts for over 60% of the county's greenhouse gas emissions. Manshadi wanted to know where exactly these carbon emissions were coming from, and whether his expertise in renewable energy sources could help move the local agricultural industry toward a net-zero carbon footprint.

Identifying community needs

With a Climate Champion grant from the Southern California Gas Company, Manshadi talked directly with Imperial Valley farmers, laborers and community organizations about their livelihoods.

They told him they rely primarily on diesel gas to power tractors and trucks. To conserve precious water resources, farmers use irrigation pumps, also powered by diesel. This fossil fuel releases carbon dioxide and nitrogen gases into the air, further increasing the global temperature.

"The currency of energy in these farming communities is gallons of diesel; I want this to change to kilowatt-hours," Manshadi said.

Switching to electric-powered equipment, supplied by cleaner, less carbon-dependent energy sources like solar panels, has the potential to cut down on carbon emissions and improve air quality.

But community members also described trade-offs and barriers to adopting renewable energy solutions. Electric machinery is often heavier, requires hard-to-find charging stations and costs more than already-purchased diesel options.

"The economic incentive might not be there yet," said Manshadi.

Allocating land for solar panels or electric vehicle charging stations to generate more electricity means there may be less space available for crops.

To make up for the loss of space, Manshadi suggests implementing vertical farming, or the practice of growing crops indoors, in irrigated columns. Cooling vertical farms requires less energy and water than traditional farming, further lowering costs.

Vertical farms can also help save the roughly 20% of solar-generated electricity that goes to waste by flexibly storing or using excess electricity when supply is high and demand is low, such as in the middle of a cool spring day.

"In a nutshell, we are generating food out of unwanted solar energy," Manshadi said.

Envisioning an electric future

To help farmers weigh the pros and cons, Manshadi developed mathematical models to present the possible outcomes of implementing more sustainable operational changes.

"We tried to answer the question: Can we find a way to stop using diesel and use renewables, yet still deliver the energy needed to grow?" said Manshadi.

One of his computational models showed infrastructure changes could reduce carbon emissions by up to

"In a nutshell, we are generating food out of unwanted solar energy."
—Saeed Manshadi

70% and decrease demand on the electrical grid by 10%. And he can customize some of the variables to account for individual farmers' budgets and greatest concerns to identify the most sensible solutions for them.

Armed with these tools and some Spanish-English bilingual brochures, he showed farmers their potential futures. Without risking damage to crops, the digital demonstration proved that farm electrification has long-term benefits for farmers' bottom line and health, despite higher upfront costs.

Together with these farmers, he hopes to reduce carbon emissions from agricultural transportation and irrigation in the region by 30% and help improve air quality.

Manshadi will keep optimizing his artificial intelligence model to predict energy needs and solar energy generation on farms based on seasonal weather forecasts. The ultimate goal is to eliminate dependence on fossil fuels entirely.

"Farming is a business, so we want to make sure that the ideas are going to make sense for farmers to grow their renewable capabilities," he said.

At the root of it all, this research promises a more sustainable future for the farmers, communities and planet.
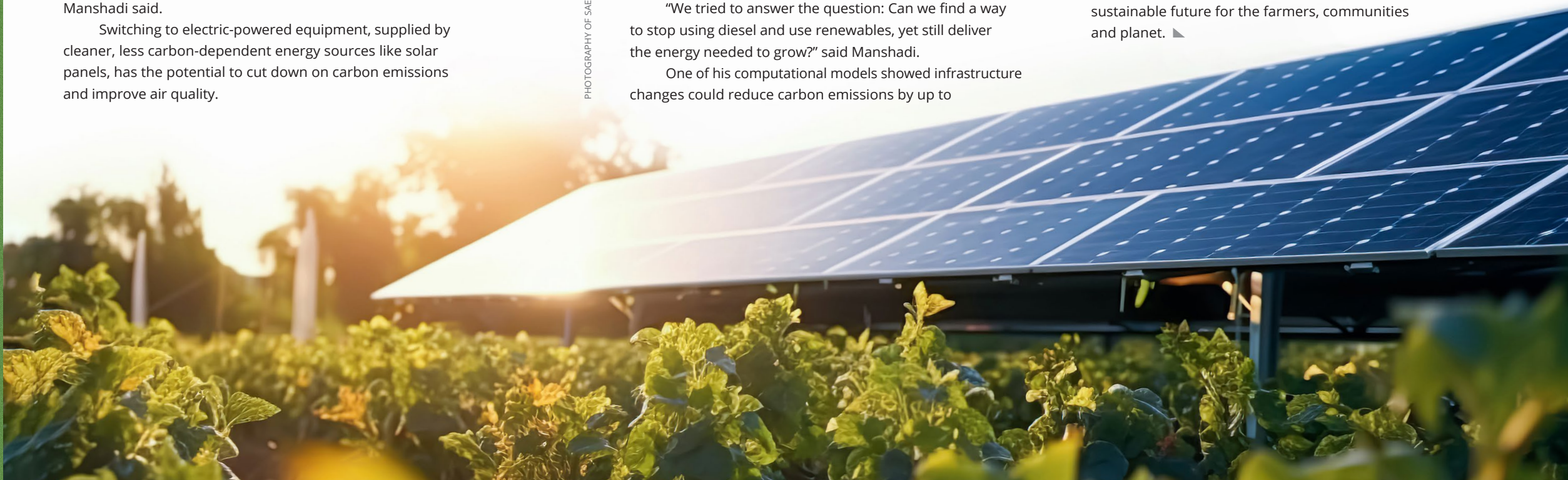
Digitizing tijuana's history

Teams from SDSU's University Library and the Center for Regional Sustainability take the lead on a massive binational project.

By Leslie L.J. Reilly

Hundreds of stacked file boxes and shelves filled with news clippings, vinyl records, cassette tapes, videos and other ephemera represent the rare recorded history of Tijuana since its founding in 1889. The Archivo Histórico de Tijuana, housed in the Instituto Municipal de Arte y Cultura (IMAC) in downtown Tijuana, is set to receive a new space — online.

San Diego State University's **Lisa Lamont**, head of Digital Collections at the University Library, and **Jessica Barlow**, director of the Center for Regional Sustainability, are leading digitization of the archives with support from staff and students. Providing metadata, or searchable descriptive tags, in both English and Spanish about each of the tens of thousands of items will make it easier to glean information directly from the region's primary sources.

"Together, we are building a new model for promoting equitable access to scholarly materials supporting

The Tijuana Archives project is a binational collaboration of team members from SDSU's University Library and the Instituto Municipal de Arte y Cultura.

binational learning, scholarship and engagement," said **Scott Walter**, dean of the University Library.

According to College of Arts and Letters (CAL) Interim Dean **Ronnee Schreiber**, the project brings to light

SDSU's commitment to the binational region and peoples, and to SDSU's support of this first-ever IMAC dual language database.

"By collaborating with the University Library, CAL provides valuable resources that will ultimately aid researchers around the world," she said.

Snapshots of history
Since the IMAC was severely underfunded for so many years, the biggest

issue is disorganized files. Nearly 68,000 visual images, including printed photos, slides and negatives, need to be digitized.

Print materials and other ephemera that document the people, buildings, political activism and public events in history, once digitized, will

"To see the evolution of the city through these photos is remarkable."

—Kristofer Patron-Soberano

give researchers and the public access to these hundreds of thousands of documents that have never been shared outside the walls of the IMAC in Tijuana.

"The archive shows the vibrancy of the region — the music, maps, photos and government documents," Barlow said. "It provides a peek into a city often overshadowed by stereotypes."

COLOR TRANSPARENCY

COLOR TRANSPARENCY

Scan to watch video about the Tijuana archives

Barlow added that there is an urgent need to preserve the archive since the IMAC space is not humidity controlled. Changes in humidity can cause documents to warp and decay.

Lamont and University Library digitization specialist **Matt Ferrill** commute to Tijuana once or twice a week to oversee the work of two graduate students from Mexico who are scanning images in a very large format.

"Right now the students work 20 hours a week to scan thousands of photos. They are scanning 13 to 14 images per hour and assisting with dual language metadata," Lamont said.

One student found 3,000 images — not in any particular order — and she created and organized them with a new numbering system. Another photo collection of Tijuana's origins in the first 20 years (1889–1909) provides a historical context not seen elsewhere.

"To see the evolution of the city through these photos is remarkable," said **Kristofer Patron-Soberano,** the SDSU Center for Regional Sustainability programs administrator.

"It's very important to remember that this is one region and one metropolitan area that has been there for a very long time with plenty of cross-border interaction and collaboration," Patron-Soberano said. "It's not just important for Tijuana, it's [also] important for San Diego County."

The Tijuana archived materials and their bilingual metadata will be broadly accessible at both UCLA and SDSU libraries, thanks to a grant from the UCLA Modern Endangered Archives Program. ◣

Archives from Oaxaca

Beyond Tijuana, this project complements ongoing work led by **Ramona Pérez** and the SDSU Center for Mesoamerican Studies in Oaxaca to digitize documents in Oaxaca, Mexico, as well.

"The opportunity to work with the staff at the Archivo General del Estado de Oaxaca to preserve a wide range of textual and visual documentation of the history, cultures and languages of this diverse state is a reflection of our commitment to participatory and community-engaged research and scholarship," said Pérez.
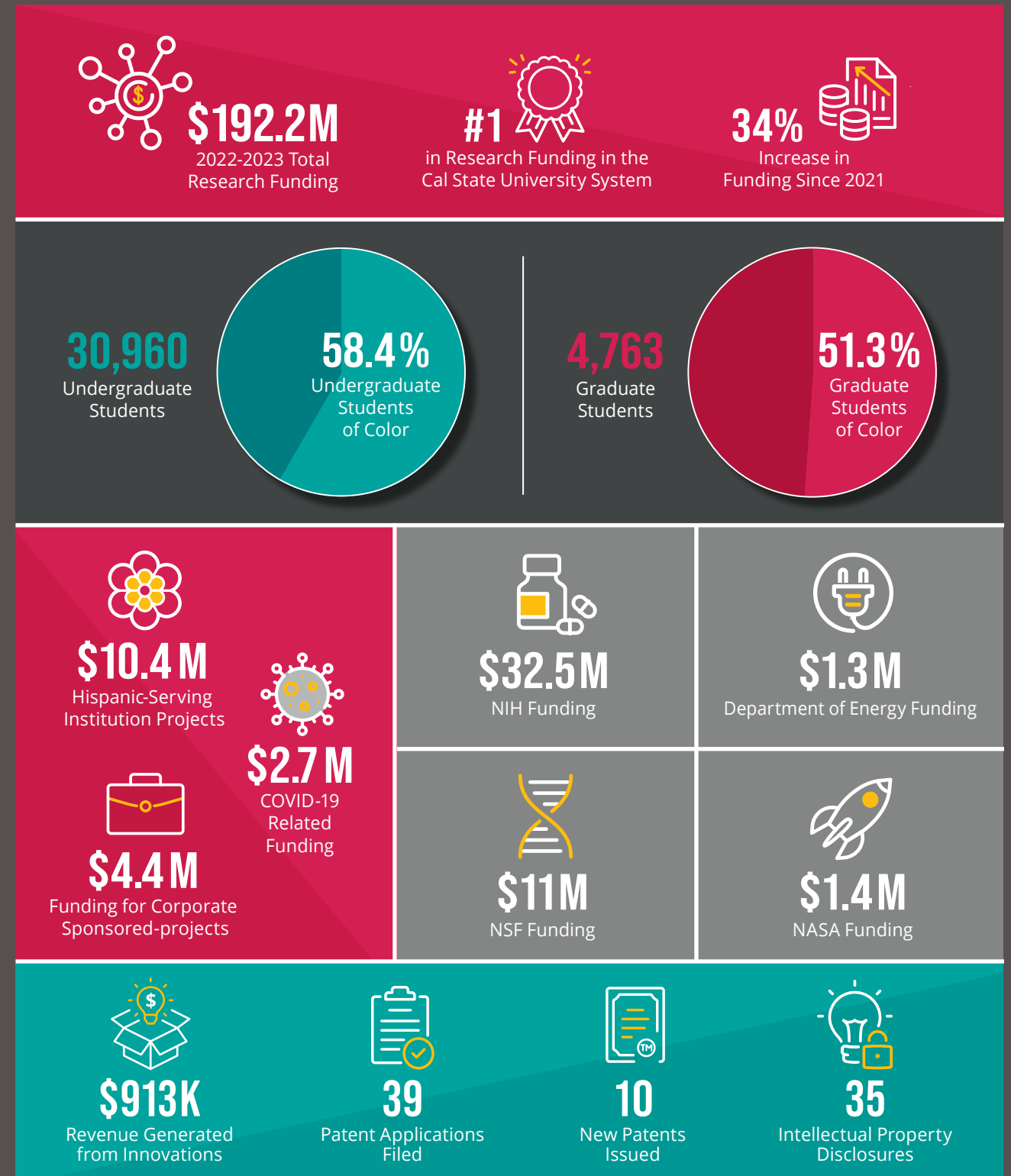
The Oaxaca archives are also available in the SDSU University Library Digital Collections.

Scan to view the Oaxaca archives
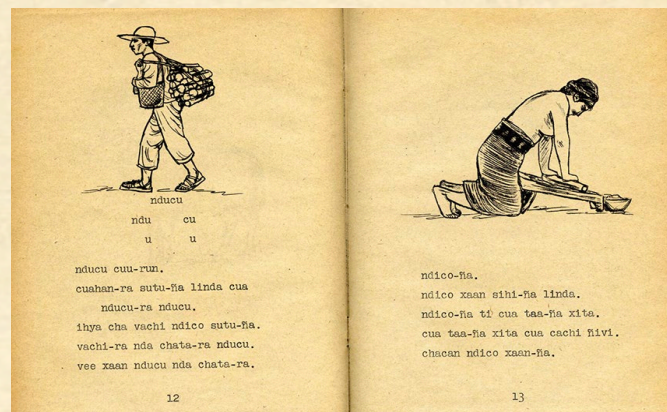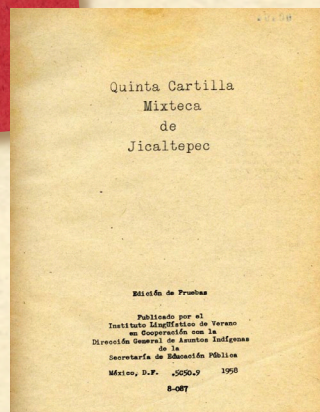
The Oaxaca archives include several *cartillas,* bilingual booklets for promoting literacy among Indigenous communities.

Another Year of Record-Breaking Research Funding for SDSU

$192.2M
2022-2023 Total Research Funding

#1
in Research Funding in the Cal State University System

34%
Increase in Funding Since 2021

30,960
Undergraduate Students

58.4%
Undergraduate Students of Color

4,763
Graduate Students

51.3%
Graduate Students of Color

$10.4 M
Hispanic-Serving Institution Projects

$2.7 M
COVID-19 Related Funding

$4.4 M
Funding for Corporate Sponsored-projects

$32.5M
NIH Funding

$11M
NSF Funding

$1.3 M
Department of Energy Funding

$1.4 M
NASA Funding

$913K
Revenue Generated from Innovations

39
Patent Applications Filed

10
New Patents Issued

35
Intellectual Property Disclosures

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