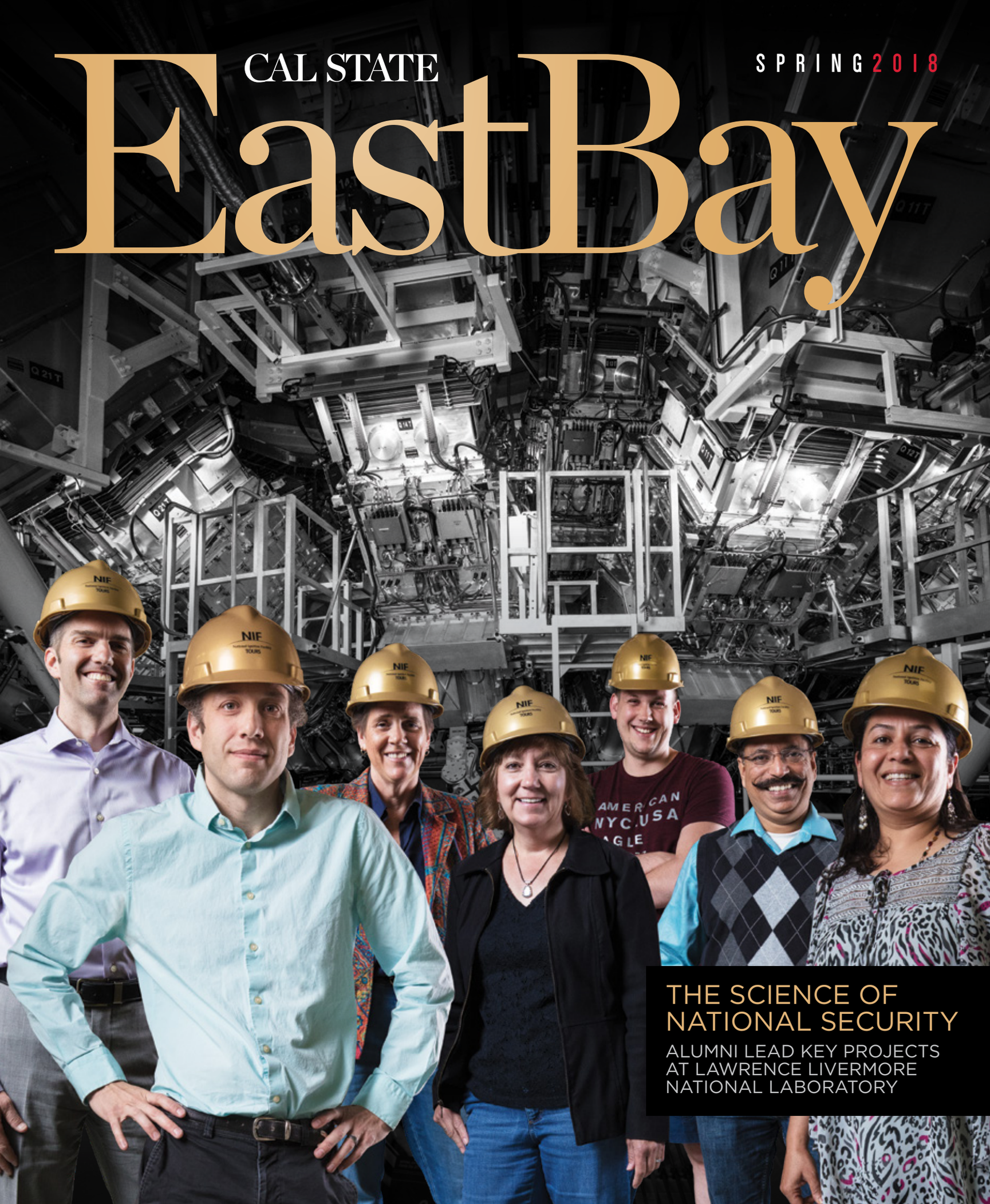
CAL STATE

EastBay

SPRING 2018



THE SCIENCE OF NATIONAL SECURITY

ALUMNI LEAD KEY PROJECTS AT LAWRENCE LIVERMORE NATIONAL LABORATORY

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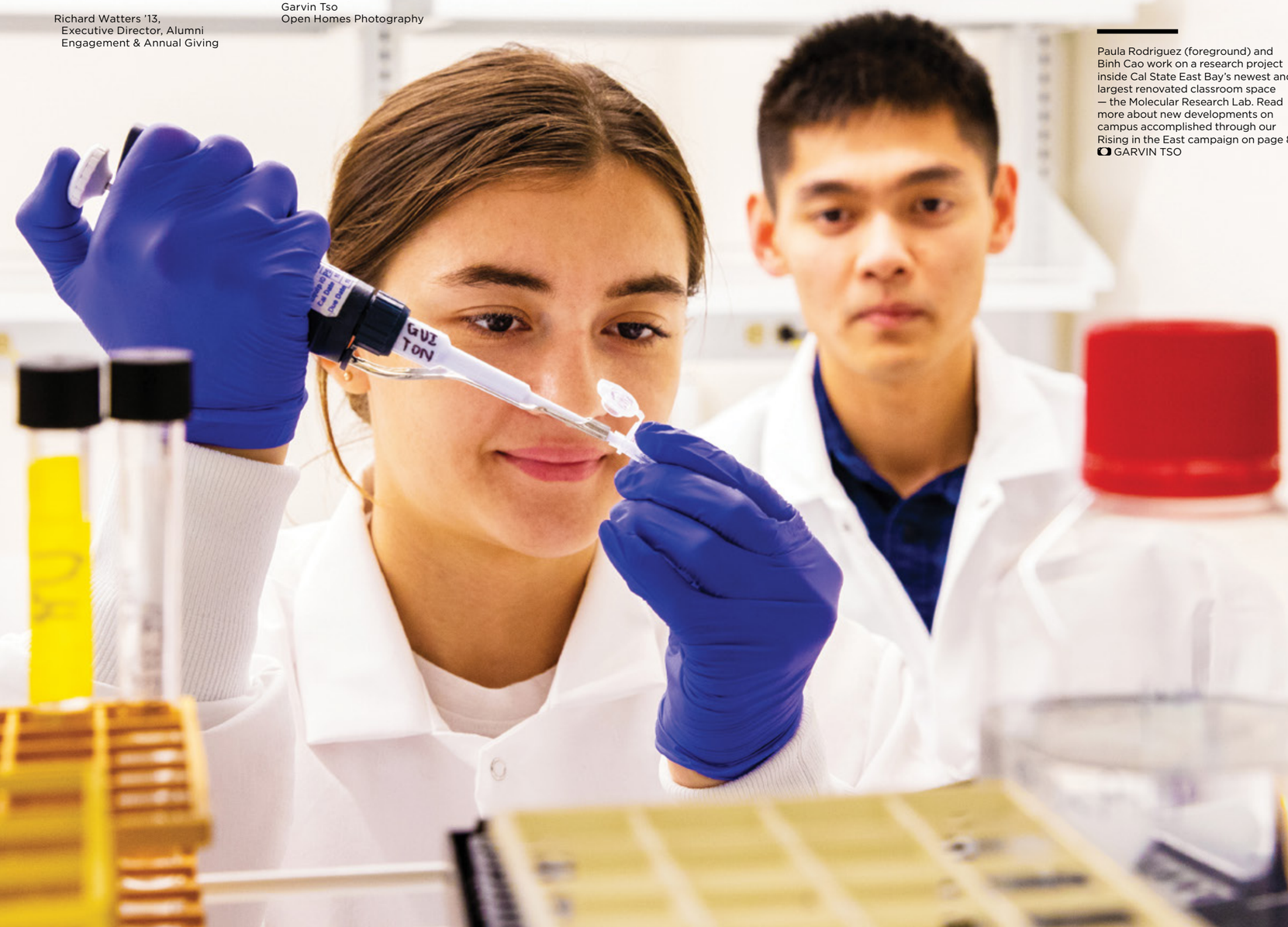


COVER: The National Ignition Facility, also known as NIF, is a large laser-based inertial confinement fusion research device, located at Lawrence Livermore National Laboratory. It is the world's largest and highest-energy laser featuring 192 laser beams that can create temperatures and pressures similar to those found in the cores of stars and nuclear weapons.
GARVIN TSO

Paula Rodriguez (foreground) and Binh Cao work on a research project inside Cal State East Bay's newest and largest renovated classroom space — the Molecular Research Lab. Read more about new developments on campus accomplished through our Rising in the East campaign on page 8.
GARVIN TSO

FEATURES

DEPARTMENTS

CAL STATE EAST BAY

PRESIDENT'S MESSAGE

Where Technology and Diversity Converge — and Prosper

Our university is fortunate to be located in the middle of the world's technology and innovation capital, an engine of our regional economy and a huge generator of employment opportunities. Cal State East Bay is deeply engaged in the scientific community and technology industries, as our cover story attests.

Lawrence Livermore National Lab is an East Bay institution of international renown. The article tells the story of university alumni working on the lab's nuclear ignition project, which has the potential to create enormous new reserves of energy at a minimal cost. We take great pride in our association with this vital initiative.

We are equally fortunate to be situated in one of the country's most culturally diverse metropolitan areas, and our student population is a reflection of that diversity. Cal State East Bay is, in effect, at the intersection of these two dominant regional themes: technological innovation and cultural diversity. We believe that when you put the two together, remarkable results can be achieved.

For many years, Cal State East Bay has led the drive for greater diversity in science, technology, engineering and math education, and in the STEM workforce. Indeed, we see it as a critical part of our mission to equip more students with the knowledge and skills to excel in STEM fields. Judging by the accomplishments of our graduates, we are doing a great job — and we plan to do even better.

One of the top priorities of our capital campaign, "Rising in the East," is the construction of a world-class center for applied sciences. We envision a state-of-the-art facility, a place that will provide our students with unrivaled opportunities for experiential, collaborative and interdisciplinary learning. The center will also take our faculty's participation in scientific scholarship and research to a new level. Moreover, it will send a strong signal to the region's science and technology community that we are a key contributor of knowledge, resources and talent.

I hope you will join us and support the effort to turn this vision into reality. With the help of our alumni and our extended university community, we have an exciting opportunity to make an even bigger impact in the Bay Area's pre-eminent industries.

With our pioneering spirit, we will continue our leadership and commitment to STEM education, creating a pathway to high-quality jobs for our outstanding graduates to make our world a better place.

Go Pioneers!

Leroy M. Morishita

Dr. Leroy M. Morishita
President

CAL STATE EAST BAY
University News

Cal State East Bay's Hayward Promise Neighborhood Receives Nearly $30M

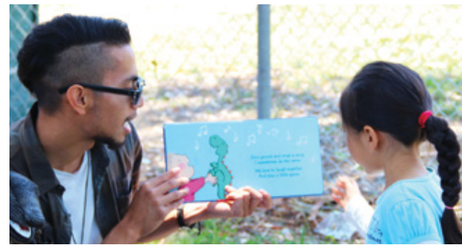
The U.S. Department of Education announced it will grant $29.8 million to Cal State East Bay and its partners for the Hayward Promise Neighborhood initiative, making it one of just four programs in the country to receive funding this year.

Hayward Promise Neighborhood serves more than 10,000 residents and 6,000 students in South Hayward neighborhood where families struggle with poverty, a high rate of single-income households and nearly twice the state average of English as a Second Language speakers. The new federal grant will allow HPN to expand its services within the Jackson Triangle and beyond.

A collaboration of 10 local organizations, HPN is dedicated to alleviating generational poverty and supporting children from infancy through college.

Since programming began, both Cal State East Bay and Chabot College have seen marked increases in cumulative enrollment from Tennyson and Hayward high schools, likely due to HPN's "promise interns" — Cal State East Bay students who work as mentors and tutors in local schools.

"Even though their parents might tell them or their teachers [that they can go to college], it's easier for them to connect with people who look like them, who are similar in age, who are from their neighborhood — it helps them believe college is real for them," said Roxana Cruz, HPN outreach coordinator for service learning.



HPN "promise interns" work in local schools, exposing younger children to the possibilities of college.

Cal State East Bay Professor Collecting 'Untold' University Oral Stories

When Cal State East Bay Professor Linda Ivey thinks about the university's history, what mostly comes to mind are black and white photos of various presidents signing documents, or Warren Hall imploding.

But she knows there's so much more. So, Ivey has set out to record and organize the "untold" history of Cal State East Bay.

"The goal of the project, the really big picture, is to create community," she said. "When you have a shared past, it gives you strength, it gives you dignity ... and I think that's really essential for East Bay students." Many important artifacts from Cal State East Bay's 60-year legacy are located in the library's archives and some information is available on the university's main website, but Ivey wants to see more, especially from women, students of color and other historically marginalized groups on campus.

To do that, Ivey and her students will spend the next year researching and recording the stories of alumni, faculty and staff — both past and current. Their work on the project is being commissioned by Provost Edward Inch as part of the university's 60th anniversary celebration, and the information gathered will make up the bulk of a new website that will serve as a sort of living historical document.

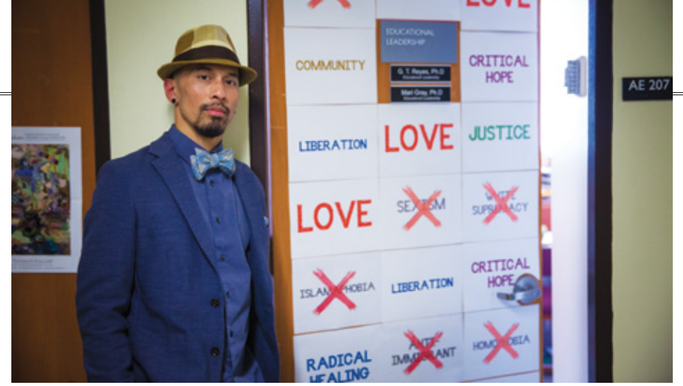
"There is something here that makes the student experience unique, and if we can find that in our campus history and share it with our students today, it will become part of their identity and they can take it with them," Ivey said.

Focusing on the oral histories of everyday people is a relatively new idea for historians, Ivey said. In the past few decades many, including herself, have found great value in the stories of everyday events passed down from generation to generation. It's through those stories that the sense of shared community and pride is built, and she's hoping the East Bay stories will be no different.

"There are all these different populations who can come here and feel safe and I want to capture those voices," Ivey said.

Beyond historical archives like the picture above, Professor Linda Ivey is focusing on capturing the untold stories of Cal State East Bay.

Assistant Professor G.T. Reyes' Response to Vandalism Gains National Attention



The words taped to the outside of Cal State East Bay Assistant Professor G.T. Reyes' office door are simple — "love," "justice," "community."

But the ideas behind the words represent something far deeper and more complex, similar to the act of vandalism that inspired Reyes to post the positive messages in the first place.

In late November 2017, a colleague of Reyes' called him after work to tell him that several of the solidarity-themed posters taped to his office door, bearing phrases such as "Black Lives Matter" and "Brown and Proud," as well as his nameplate, had each been crossed out with a large letter "X."

"It felt personal to me, because our door was the only one crossed out, and my name was also crossed out while [my colleague Dr. Mari Gray's] name plate was reversed as if to draw attention to me," Reyes said. "As a man of color … it really started to weigh in on me."

But he chose not to fight. At least not in the traditional sense.

Instead, in the days that followed, Reyes created a quilt — a patchwork of new, empowering phrases to place on his door, including an array of words he would like to see crossed out in the world: "racism," "sexism" and more. Through social media, the idea for the quilt has spread to doors at both the Cal State East Bay and UC Berkeley campuses, and to several public schools in the East Bay, as well as Iowa and New York.

Media outlets covered Reyes' response too, including KCBS Radio and NBC Bay Area, and his action has elicited the attention — and backing — of the university community.

University Receives Grant to Support Hungry, Homeless Students' Success

At just a year in, it's already hard to imagine Cal State East Bay without the Pioneers for HOPE program. Students regularly stop by the three pantries located at the Hayward and Concord campuses for access to food and personal hygiene products. Faculty and staff support drives for items such as shampoo and other toiletries.

Now, thanks to a $400,973 grant from the Stupski Foundation, Cal State East Bay will be able to go beyond meeting the urgent needs of the university's students and focus on creating the long-term strategies at-risk students need to not only complete their degrees, but also to become leaders in their communities.

Provost Edward Inch is principal investigator on the grant, and Sarah Taylor, associate professor of social work, is co-investigator.

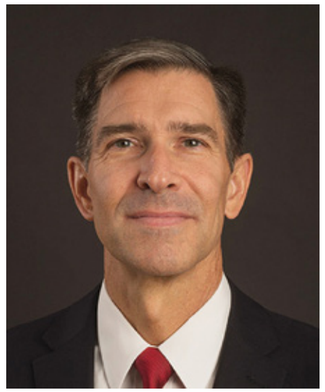
"At the strategy sessions we held, participants described [the term] 'student success' as [meaning] much more than retention and graduation," Taylor said. "Although we all agreed that we would like students to graduate, many people also expressed a desire for our alums to contribute meaningfully to their communities [and be] engaged global citizens."

With those goals in mind, Taylor said setting students up for success is going to take more than making sure they are fed and have a roof over their heads. Examples could include creating a student ombudsperson position so students have a confidential place to seek advice. Another idea is specific opportunities for low-income students to access jobs and internships, and planning volunteer days for them to serve in the community.

"It's essential to use an approach that supports students in their broader life goals, which means going beyond helping students to meet their critical needs," Taylor said.

In the first year of the grant funding, Taylor and Inch will conduct a "needs assessment," which will help them understand the characteristics of the students who are at risk for food insecurity and homelessness, or have other emotional and academic needs, and how these needs relates to their overall success. During the second year, Taylor and others will apply the data they collect to a pilot program that tests and evaluates strategies, and also conduct campus education workshops. According to the Stupski Foundation, the organization awarded grant funding to the Pioneers for HOPE program in part because of the university's data-driven approach to tackling food and housing insecurity.

George Low Named Dean of College of Business and Economics

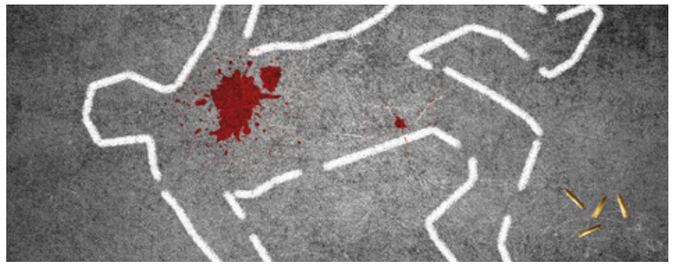


Cal State East Bay recently named Dr. George S. Low dean of the College of Business and Economics after an extensive national search. Low comes to Cal State East Bay from Radford University in Virginia, where he had served as Dean of the College of Business and Economics since 2014. While at Radford, Low helped the college develop its strategic plan, perform outreach to alumni and increase its endowment by $2.5 million. He also launched a program in which executives return to campus for residencies to interact with current students, and he established a Student Venture Lab to encourage entrepreneurship and innovation.

Low has extensive experience with the Association to Advance Collegiate Schools of Business and has served on a site visitation team. He was competitively selected as an American Council on Education Fellow and was hosted by the University of Texas in Arlington for a year. He earned his Ph.D. in Business Administration from the University of Colorado, Boulder, his MBA from the University of Western Ontario and his B.A. at Brigham Young University. His expertise is in the areas of sales, marketing and branding.

"George Low has had great success in engaging many parts of his community to help the College of Business and Economics at Radford thrive and serve students in new and exciting ways," Cal State East Bay Provost Edward Inch said.

Mock Homicide Takes Place on Campus



A murder weapon. Shell casings. Evidence tents littering the grass. Investigators picking through a crime scene, identifying witnesses and suspects, and taking photos and notes.

It's a scene most of us have seen only on television, but for Cal State East Bay students in Assistant Professor Michelle Rippy's Advanced Criminal Investigation class, it was the setting for their final exam.

The process included not only an assessment of the crime scene itself, but submitting evidence for "analysis." If students requested the correct tests for the correct items, Rippy gave them lab results that built toward the conclusion of the case. A news conference stood in for a final exam, during which each team was questioned by "the press" about their respective roles in the case.

"Unfortunately, with [last year's] shooting in Las Vegas, we've had some opportunities to watch press conferences as a class and really go over the type of questions that are being asked and to think about the complexities of how evidence is handled, the details of the victims and what can be shared about them," Rippy said. "I hope the experience just adds a little bit of something extra for our students when they go out to look for internships or jobs."

CAMPAIGN UPDATE

OUR PURPOSE

We believe in the transformative power of education. The more we can help students reach their potential and achieve lives of purpose and success, the better our Bay Area economy and communities will be. Since launching Rising in the East: The Campaign for Cal State East Bay, we have raised $55 million toward the three pillars that have inspired our efforts: People, Place and Purpose. To date, we have been gifted $24.9 million toward those initiatives categorized under "Purpose."

IMPROVING STEM TEACHER PROFICIENCY: $7.1 MILLION

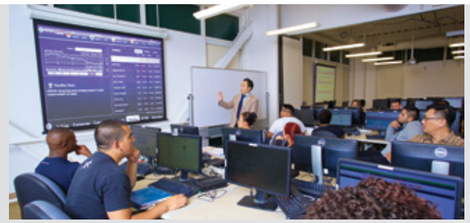
The Institute for STEM Education is improving the way teachers and faculty teach science, technology, engineering and math by focusing on the design and implementation of programs that increase access to STEM education and opportunities for students of all levels and backgrounds.

TEACHING REASONING THROUGH COLLABORATION: $3.5 MILLION

The Math Achievement Academies is an intensive program that prepares students for college preparatory mathematics through interactive classes and activities that emphasize collaboration, creative thinking and logical reasoning. Students in the MAA come from 11 school districts throughout the East Bay and include those taking Algebra I, Geometry and Algebra II.

SHARPENING THE MINDS OF SENIORS: $1.1 MILLION

The Osher Lifelong Learning Institute at Cal State East Bay's Concord campus provides learning opportunities for the community's mature students — those aged 50 and older — creating space for them to explore new topics and challenge themselves intellectually. The program is only $40 per class and offers courses and field trips in science, humanities and the arts, all led by Cal State East Bay emeriti faculty or other distinguished educators.



INVESTING IN BUILDING A FINANCIALLY LITERATE COMMUNITY: $121,525

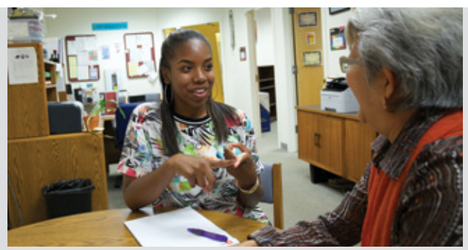
The Cal State East Bay Financial Literacy Center is transforming the way students, faculty, staff and members of the community manage money. Since its inception, the FLC has implemented several programs, including personal finance courses, one-on-one financial counseling and an online resource for the public to learn financial principles.

FEEDING HUNGRY HAYWARD FAMILIES: $2.1 MILLION

Cal State East Bay's Hayward Promise Neighborhood is a partnership of residents, local schools and nonprofits. The HPN Fresh Food for Families program provides thousands of pounds of food per month, and HPN's "promise interns" graduate from the university at a 14 percent higher rate than their peers.

FOSTERING A LOVE OF MATH AND SCIENCE: $1.6 MILLION

After 40 years, the Mathematics Engineering Science Achievement program has a proven track record of transforming thousands of educationally disadvantaged students into math and science college graduates. Through its classes, hands-on competitions, counseling and transfer support for students from middle school through college, the MESA program is helping students grow their love and knowledge of math, engineering and science.



SUPPORTING THE PSYCHOLOGICAL NEEDS OF THE BAY AREA'S MOST UNDERSERVED FAMILIES: $46,395

The Community Counseling Clinic at Cal State East Bay provides no-cost counseling services to some of the area's neediest residents while serving as a training lab for the university's graduate-level professional counselors-in-training.

USING SPORTS TO CREATE LASTING SOCIAL CHANGE: $16,365

The Center for Sport and Social Justice strives to make sports at every level more inclusive and democratic. Staff regularly host workshops such as a recent panel on sports and the #metoo movement, and participate in research and community outreach projects. The goal? To create a place where Cal State East Bay students and faculty can share ideas and use sports as a way to create positive, lasting social change.

BY KRISTA DOSSETTI
PHOTOGRAPHY GARVIN TSO

‘I WAS A SHADOW IN THE DARK’

STUDENT REHAN SIDDIQUE IS FIRST IN A NEW CAL STATE EAST BAY SERIES ON SOCIAL MOBILITY

The American dream. It means many things to many people — the ability to buy a home, go to college, enter a career of choice — but its most basic principle is that those aspirations can be achieved by anyone in this country who is willing to work for them. Yet a spate of recent studies finds that one of the fundamental ideals of American democracy, social mobility, has been on the decline for decades.

As just one example, according to the Equal Opportunity Project (a policy organization rooted in big data), a child’s likelihood of out-earning their parents has fallen 40 percent in recent years. Even more troubling, per the Brookings Institute, how you start off in life is a predominant indicator of how you’ll finish: “If you are born to parents in the poorest fifth of the income distribution, your chance of remaining stuck in that income group is around 35 to 40 percent. If you manage to be born into a higher-income family, the chances are similarly good that you will remain there in adulthood,” the 2016 analysis read.

Despite tides of tough news, awareness of the challenge of social mobility in this country, and the critical role that colleges and universities play in the ascension of low-income populations is increasing. A four-year degree can nearly double the lifetime earnings of a high school graduate, according to a 2014 study published in U.S. News & World Report, but opportunity, affordability and support for low-income students remain key challenges.

Founded on the premise that “the higher education degree has become the new high school diploma, an essential requisite for obtaining reasonable employment and achieving economic mobility in the 21st century,” CollegeNET.com has been compiling the Social Mobility Index in an effort to recognize institutions promoting social mobility since 2014. According to its rankings, California leads the charge in access to education for underserved students, and the 23-campus California State University system accounts for 13 of the top 30 institutions helping to reinvigorate the potential of the state’s young people and breathe new life into the American dream.

Cal State East Bay is ranked No. 21, or in the top 2 percent, of 1,363 colleges and universities nationwide.

Here, in the first installment of a new series on social mobility, we want you to meet the students whose lives, families and communities are being changed through the opportunity of a college degree. We also want to offer a snapshot of the very real statistics our students are up against when it comes to breaking through the barriers to creating their futures.

MEET SENIOR REHAN SIDDIQUE

Before he was the recipient of prestigious scholarships, including the CSU Trustee’s Award for Outstanding Achievement and Cal State East Bay’s Presidential Scholarship, student Rehan Siddique was a truant caught up in street gangs in Oakland. His mother, who had two boys before she was 18 and raised them alone, was frequently forced to bounce between housing situations in some of the East Bay’s roughest neighborhoods.

“For years at a time, there was just the feeling of not knowing what was going to happen,” Siddique said. “It’s the scariest feeling a person can have, like, you don’t know tomorrow. You don’t have control over your life. We would always move around — we were on food stamps. And my mom, bless her, would just work 18-hour days to take care of us. But that also meant that she was gone and didn’t know a lot of what [my brother and I] were getting involved in.”

> *In Oakland, 27 percent of homes are headed by single women, the highest rate of all East Bay communities, and 53 percent of unwed mothers live below the poverty level, according to 2016 U.S. Census Bureau data. The Progressive Policy Institute estimates less than 2 percent of teen mothers obtain college degrees.* ▶

Siddique said it's a common dynamic among the kids he grew up with, and one that frequently led to getting into trouble, along with early exposure to violence and drugs.

"You grow up in these situations ... I remember once as a kid my mom slapped me because I reached down and touched this puddle on the sidewalk and it was blood," he said. "And I had to go to the hospital once because I found candy on the basketball court at my school, it was in a little plastic wrapper, and it turned out to be crack."

As a teenager without much supervision, Siddique was eager to follow in the footsteps of older boys in his neighborhood, which meant becoming involved in the street gangs where they lived.

"I was a shadow in the dark, not even attending classes," he said. "I was more concerned about activities outside of high school: gang life, girls, fights, truancy. Disappointment. Everything besides school and studies."

> *A landmark 2016 data study from the U.S. Department of Education found that half of the nation's chronically absent students are concentrated in just 4 percent of schools — including high-poverty, high-minority districts in San Francisco, San Leandro and Oakland. The risks of truancy include juvenile crime, incarceration, drug and alcohol abuse, falling behind in classes and ultimately, dropping out of school.*

Siddique's wake-up call came when his mother was briefly hospitalized for mental health issues related to the family's continually changing living situations and financial strain. Although by that point Siddique had been expelled from several high schools in the East Bay, he managed to graduate from a continuation high school in Tracy, California, with a GPA of 2.75.

"With my mom in the hospital, it was the catalyst for me," he said. "When I saw her at the hospital ... there's a point in time when somebody has to take responsibility. Everyone has an anchor in their life, and for me, that's my mom."

Siddique began by enrolling in one community college class at a time, sometimes taking long breaks, while working full time to help support his family. In 2015, at 27 years old, he was accepted to UC Davis and Cal State East Bay. He chose Cal State East Bay for its attractive package of scholarships, grants and financial aid, and proximity to home.

> *According to a report from the National Center for Education Statistics published in the New York Times, students with the same academic achievement level are starkly divided by their parents' income and education levels, and corresponding graduation rates. While high school sophomores across the board had high hopes for college, 13 years later, just 14 percent of low-income students managed to finish four-year degrees, while two-thirds of high-income students completed the same achievement.*

He also began visiting his old neighborhood in Oakland to play basketball with his friends and organize younger boys to join in after school. The group never had a formal name — otherwise, Siddique said, it would have lost its "cool" factor among the kids — but eventually, he reports, anywhere from 40 to 60 elementary and middle school boys would be clamoring to play, and doing homework on the bench while waiting their turn.

The gathering dwindled as Siddique devoted more time to his studies and amassing volunteer hours (600-plus) at Highland Hospital, but he's currently looking into permits with East Bay Parks and Recreation to start it back up again — and ensure a consistent safe place for kids like the one he used to be.

> *The Afterschool Alliance, co-founded by the U.S. Department of Education, reports that 3-6 p.m. are "peak hours for juvenile crime and experimentation with drugs, alcohol, cigarettes and sex." Particularly for middle schoolers, the organization states, involvement in these activities at a critical point in students' life trajectory can lead to less engagement at school, less interest in college and preparedness, and ultimately, lower career potential.*

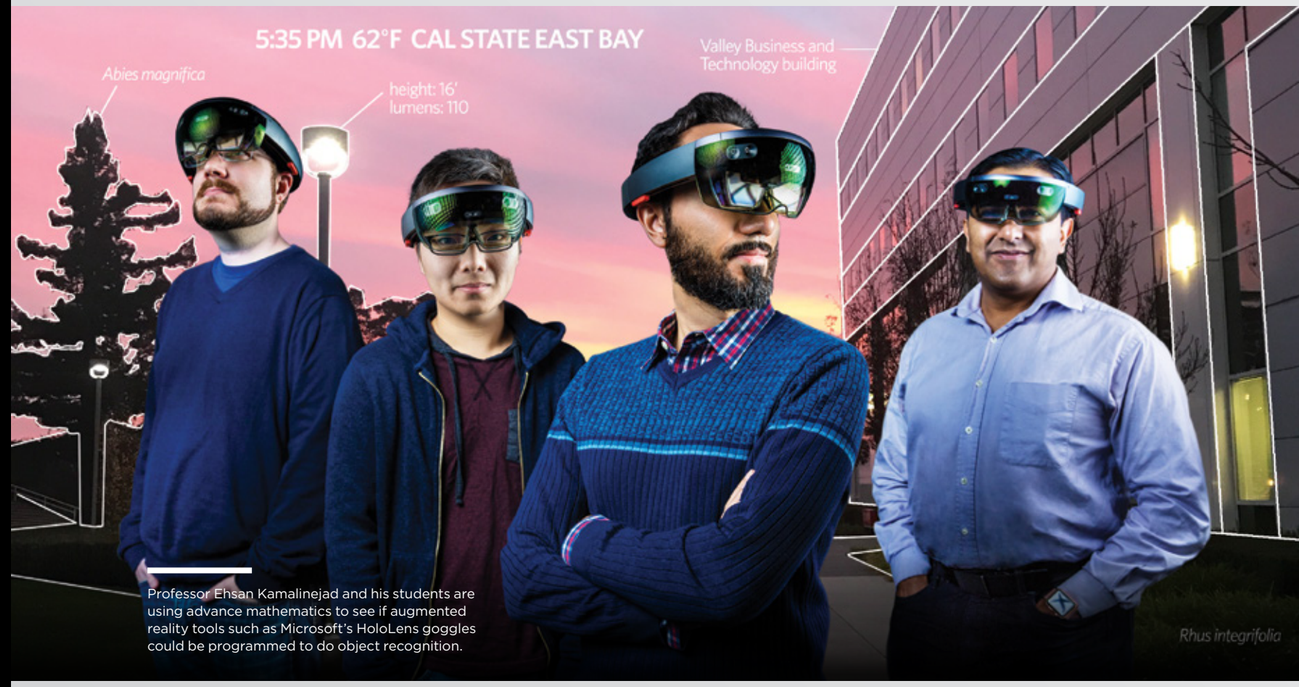
"I really do want to help people. It wasn't just a lie I told on my scholarship essays," Siddique said. "I actually really like giving back to those I know who can make it. A lot of those boys I played basketball with, they're smart — way smarter than me. But they're in situations that they're not able to use their gifts in school; they're putting that creativity toward other negative outlets."

Today, as he looks toward not only graduating with honors in spring 2018 but also being the first in his family to hold a college degree, Siddique is planning to attend a physician's assistant program — he hopes at Stanford — in preparation for a life in health care.

As for what that degree means to him?

"It means that anything is possible in that cliché sense," he said. "It means that I can give what I've always wanted to my mom. And it's validation for the hard work that I've done myself. It's a ticket."

> *According to the salary reporting company Glassdoor, the average base salary for a physician's assistant in San Francisco is 18 percent higher than the national average at $120,203 per year. It's also substantially more than what the Siddique family, with three members, has managed to live on for the past 30 years.*



Professor Ehsan Kamalinejad and his students are using advance mathematics to see if augmented reality tools such as Microsoft's HoloLens goggles could be programmed to do object recognition.

Augmented **Reality**

Cal State East Bay research project explores real-world applications of beta holographic goggles

BY DAN FOST PHOTOGRAPHY GARVIN TSO

Slip on the goggles in Professor Ehsan Kamalinejad's office, and a hologram of a wrestler, tattoos and all, appears on the desk. The wrestler, of course, is a 3-D hologram and not a real person, but the device used to create it may hold the key to helping the visually impaired better experience the world around them.

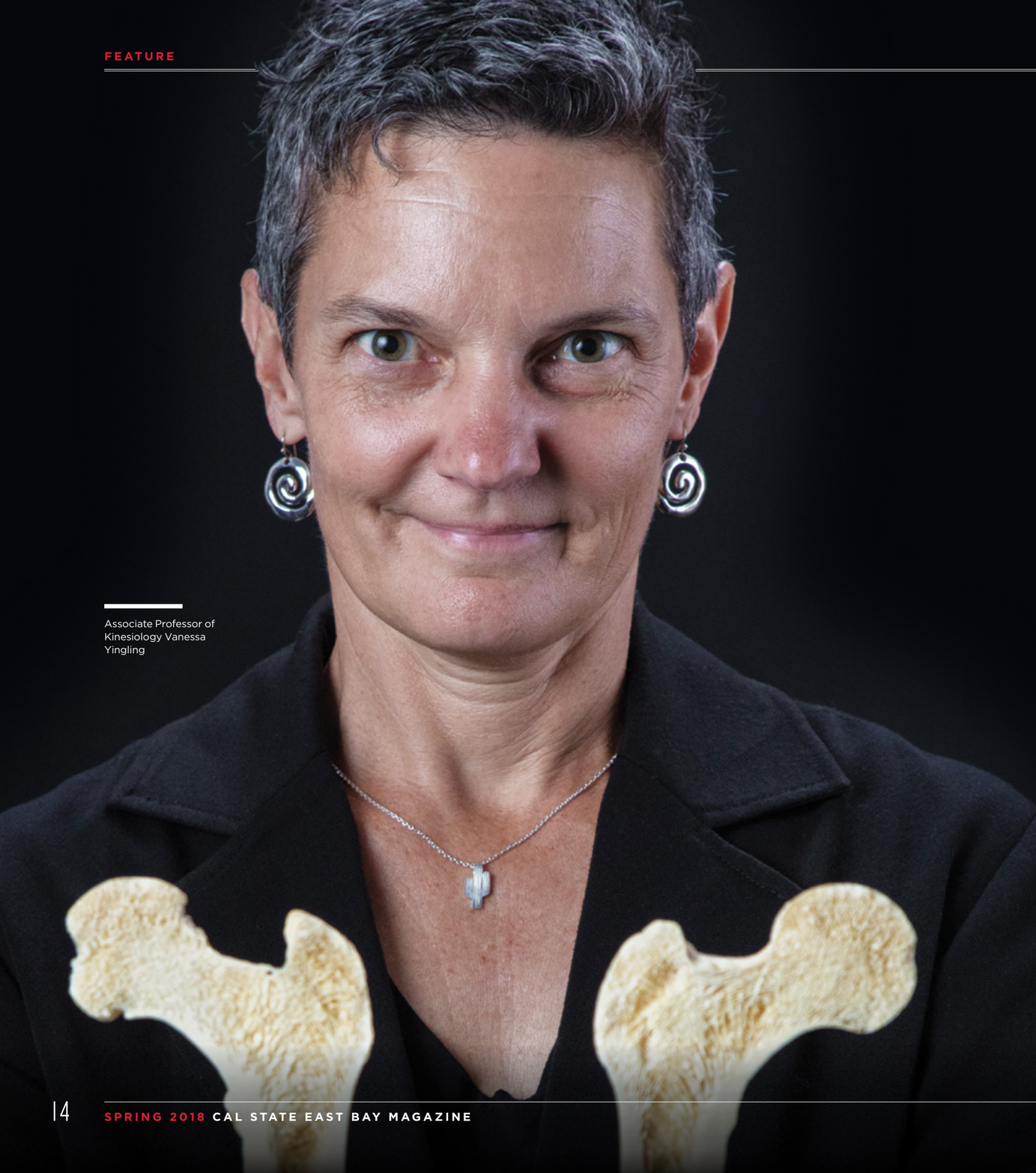
The goggles are the latest teaching and research device in Kamalinejad's toolbox and are preparing students for careers in a rapidly expanding field: augmented reality.

Unlike virtual reality, which creates an entirely artificial world for the user to navigate, augmented reality gives users an overlay of information on top of the real world (think Pokemon Go).

Kamalinejad won a grant last year to get the coveted Microsoft HoloLens goggles. He and his students are using advanced mathematics principles to push the technology forward and contribute to a larger body of research currently being done about artificial intelligence and its applications in everyday life.

"We wanted to find out where the industry is and then go further," Kamalinejad said. "We want to use the depth perception on these goggles to do object recognition ... a simple human activity, one most of us take for granted. When you're walking, you know what a tree is. You know what a pedestrian is. Can we teach computers to reach the same automatic, split-second conclusions?"

FEATURE



Associate Professor of Kinesiology Vanessa Yingling

How Late Is Too Late for Your Child's Bone Health?

Professor says exercise in adolescence is critical, spearheads program in Hayward Unified School District

BY KRISTA DOSSETTI PHOTOGRAPHY GARVIN TSO

WHEN THE BELL RINGS SIGNIFYING THE END of the school day throughout Hayward Unified School District, hundreds of students across the city flock to cafeterias, recess yards and multipurpose rooms for HUSD's Youth Enrichment Program. The program functions as both after-school care for working families and an extended learning opportunity for kids, which the school district has seized upon to work in lessons on healthy eating, exercise and lifestyle choices.

This year, through a federal grant from the Corporation for National and Community Service, AmeriCorps National Civilian Community Corps, Hayward schools have partnered with Cal State East Bay Associate Professor of Kinesiology Vanessa Yingling, who is leveraging her own research to put a special spin on the after-school program: She's focusing on bone health.

"Kids can't see their bones the way they can see their muscles, so it's a hard sell," Yingling said. "But we know that later on in life when a person breaks a hip, there's a high incidence of death within the next year. And there's research to suggest that kids who fracture bones become adults with lower bone mass and an increased risk of fracture. Osteoporosis is a pediatric disease with geriatric consequences — I can't take credit for being the first to say that, but it's true."

According to Kristal Brister, field coordinator for HUSD's "Viva Bien, Coma Bien, Siéntase Bien!" (Live Right, Eat Right, Feel Right) AmeriCorps program, there is a particular urgency to sharing Yingling's knowledge with children and families in the local community.

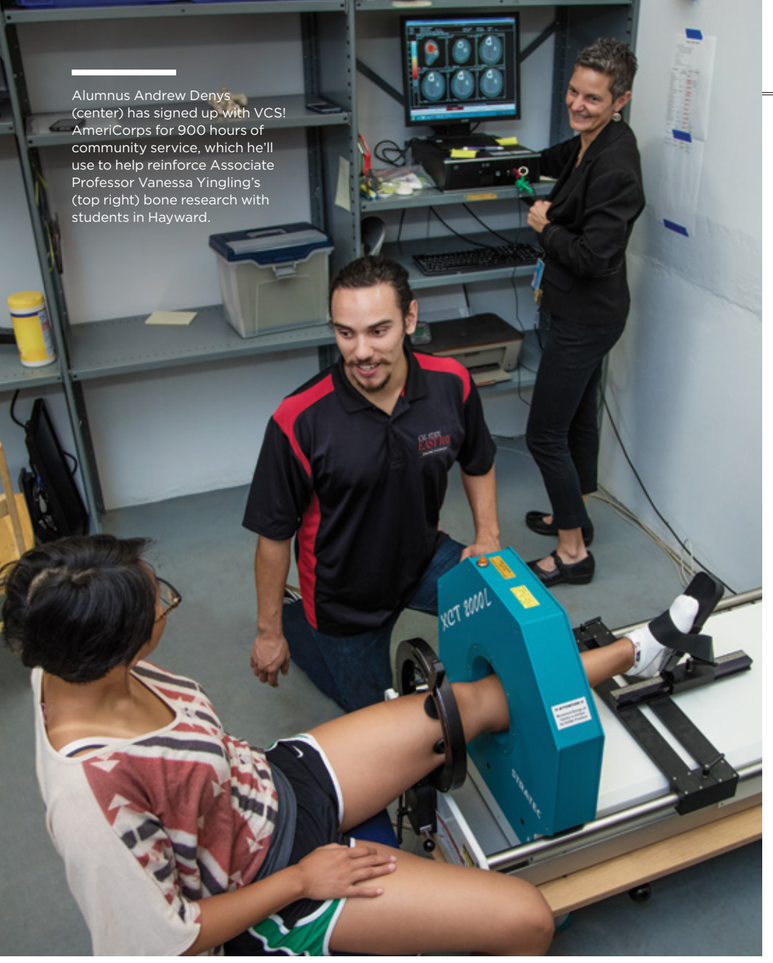
"The VCS! AmeriCorps grant was first received by Hayward schools from 2010-13 because Hayward has the highest incidence of overweight and obese children in Alameda County," Brister said. "And it's why we received continued funding again in 2016. It's really important that we focus on healthy eating and active living for our local students and families."

For Yingling, combating obesity is a critical challenge for all kinesiologists, and she wants to drive physical activity toward games and exercises that promote not only a healthy lifestyle but bone health specifically.

"The majority of a person's bone growth takes place during the pre-adolescent and adolescent years," she said. "If you sit on the couch, your bones will become good at sitting on the couch. If you exercise, your bones will adapt to that stress. So adolescence is the time when we need to be really focused on helping kids develop strong bones that will support them for the duration of their lives. If we miss this window, an opportunity is lost."

A BRITTLE FUTURE

Osteoporosis is a problem up to 55 million Americans may wish they could turn back the clock on. According to the National Osteoporosis Foundation, an estimated 10 million adults in the United States have the disease and an additional 44 million have been diagnosed with low bone density, putting them at a higher risk of bone fractures and breaks. Importantly, bone fractures and breaks are also associated ▶



Alumnus Andrew Denys (center) has signed up with VCS! AmeriCorps for 900 hours of community service, which he'll use to help reinforce Associate Professor Vanessa Yingling's (top right) bone research with students in Hayward.

with a range of devastating co-morbidities — related infections, conditions and physical injuries that lead to poor health, decreased quality of life and earlier death in the long run.

Yingling's answer is two pronged: She wants to encourage kids and their families to think about promoting bone growth through nutrient-rich foods and encourage them to play dynamic games and sports that put stress on the bones. Equally necessary is to integrate the importance of bone health into physical education curricula throughout the United States.

"FitnessGram is the national organization that disseminates testing for kids in physical education — the sit-ups, pull-ups and flexibility tests that kids do to measure their fitness each year in elementary school," Yingling said. "And they care very much about bone health and promote it in their literature, but there isn't actually a physical test that corresponds to measuring a child's bone health included within the FitnessGram program. It would be amazing to have that."

To come up with a solution for what that test might look like, the professor turned to the campus community at Cal State East Bay.

POWER JUMP

The traditional way to measure bone strength and quality, Yingling explained, is through a scanning machine, which is the most precise and reliable method to look at the components that contribute to a person's bone strength: how much bone a person has, the density and the distribution (thick rather than narrow).

But those scans are expensive and are typically used only when a bone is broken, or a child displays signs of developmental delays.

"Bone scans will simply never be used as a screening tool in children the way we screen for the health of other things, like vision and hearing," Yingling said. "The radiation from the machine is very low, but it scares people, and it's just a device we think of as limited to specialty use."

With that in mind, Yingling began thinking about the relationship between muscle and bone, and a physical test that might be used as a substitute for a scan. For the past few years, she's been tapping her students to run studies on the Cal State East Bay population that compare various muscle function tests (hand-grip strength, leg extensions, vertical jumping) to the results of bone scans performed in the kinesiology lab's state-of-the-art peripheral quantitative computed tomography machine — pQCT for short.

The end result?

"We found a strong correlation between a person's bone strength and their peak power," student Rebekkah Reichert, a co-lead on one of two studies said. "The participants with strong vertical jumps nearly always had higher bone strength."

The beauty of that outcome for Yingling, forthcoming in the Journal of Strength and Conditioning, lies in its simplicity.

"Kids [jump] naturally — they intuitively know how to optimize their bone," she said. "And the whole idea of how high you can jump gets into how fast your muscles contract. We're talking about muscle power and velocity, which has a stronger relationship to bone strength than muscle strength tests alone. High-impact activities that have a dynamic impact on the body, like jumping, turn out to be a great stimulus for your bones."

MOUNTING THE CAMPAIGN

In collaboration with Assistant Professor Jennifer Sherwood and an Oakland-based nonprofit called American Bone Health, Yingling has developed curricula for VCS! AmeriCorps to start integrating into the HUSD afterschool programs. She's also created seminar material for two different parent workshops that are a part of the Healthy Eating Active Living Family Workshop Series supported by Kaiser Permanente Community Benefit Program of Southern Alameda County.

"If you sit on the couch, your bones will become good at sitting on the couch. If you exercise, your bones will adapt to that stress."

Alongside Sherwood, Yingling will be teaching parents about the nutrition and exercise their children need to develop strong bones during the critical growing period. VCS! AmeriCorps volunteers will be focusing on integrating what Yingling calls "bone overlays" — questions, lessons, and sports and games that deliberately include jumping to raise kids' awareness levels.

Yingling also has some boots on the ground at local Harder Elementary School. Alumnus Andrew Denys (B.S. '16, Kinesiology), who is also a new lab technician at Cal State East Bay, co-led the study alongside Reichert. Through outreach on campus, Denys applied to VCS! AmeriCorps, and has signed on for 900 hours of service through the organization, starting with the after-school enrichment program in Hayward.

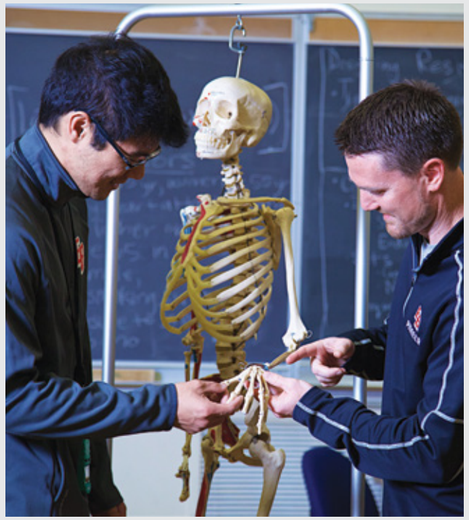
"Kids are little sponges," Denys said. "We're going to be focusing on physical activity and nutrition, and I think as long as I can make it fun, they'll get excited about being active. And I'm looking forward to trying out some new things with them. I've already noticed that with some sports the girls don't want to play and they sit down instead of engaging, so I'm thinking about bringing in some old school jump rope, double-dutch style games that appeal to them. I want to get them jumping."

It's only the beginning of a much longer and wider road for Yingling, who hopes to make the leap to physical education classes and FitnessGram in the coming years — but it's a strong start.

"It's important to me for people to understand that we're not saying, 'Your vertical jump is low, you have bone problems,'" she said. "We're saying, 'Whatever activities you can do to improve your vertical jump may also increase your bone strength.' And I'm really passionate about not pitting exercise and nutrition against each other. Campaigns like 'Got Milk?' are interesting because of the attention they bring to bone health, but they're oversimplifying what we need to do to create strong bones. I don't want to sacrifice truth for complexity — I think people can handle the whole picture."

Rising in the East

THE CAMPAIGN FOR CAL STATE EAST BAY



Preparing Students for Kinesiology Careers

By fusing cutting-edge body assessment tools with pressing questions about the function and movement of the human body, the College of Education and Allied Studies' Exercise Lab allows students to prepare for the future of kinesiology, physical therapy and health education — fields that are becoming ever-more rooted in technological applications. Cal State East Bay is committed to ensuring all students have the opportunity to work with the best tools in the field today and gain access to relevant work-study opportunities. To find out how you can support students such as Rebekkah Reichert and professors such as Vanessa Yingling, contact Director of Development Holly Fincke at 510-885-3032 or holly.fincke@csueastbay.edu.

TECHNOLOGY FOR CHILDREN WHO CAN'T SPEAK

Alternative Augmentative Communication has been around for 20 years, but with the help of Cal State East Bay's Elena Dukhovny, it's now getting easier to use

BY FRED SANDSMARK PHOTOGRAPHY GARVIN TSO

Emily* came to Cal State East Bay's Speech, Language and Hearing Clinic several years ago with an intense interest in strings and buttons — tying and untying them, stretching them out and rolling them up, organizing them by color — but almost no ability to talk about her interest, or anything else, because of serious physical disabilities.

With help from Cal State East Bay speech-language pathology student-clinicians, including recent graduates Giti Froz and Lyssa Rome, Emily began using an Augmentative and Alternative Communication app on an iPad. To say a word, the school-aged client would touch an image on the screen, and the device produced the sound for her.

For the first time in her life, she was able to actively put her own thoughts out into the world.

Froz and Rome's faculty supervisor, AAC researcher and Assistant Professor Elena Dukhovny, followed her students' sessions with Emily intently from behind the clinic's one-way mirror. She guided them to explore Emily's interest in buttons and strings in conversation while expanding into other topics that appealed to her.

Progress was slow and sometimes frustrating, but one day Emily's mother told Rome that her daughter had used the AAC device for something previously thought impossible: to communicate with another family member on the telephone.

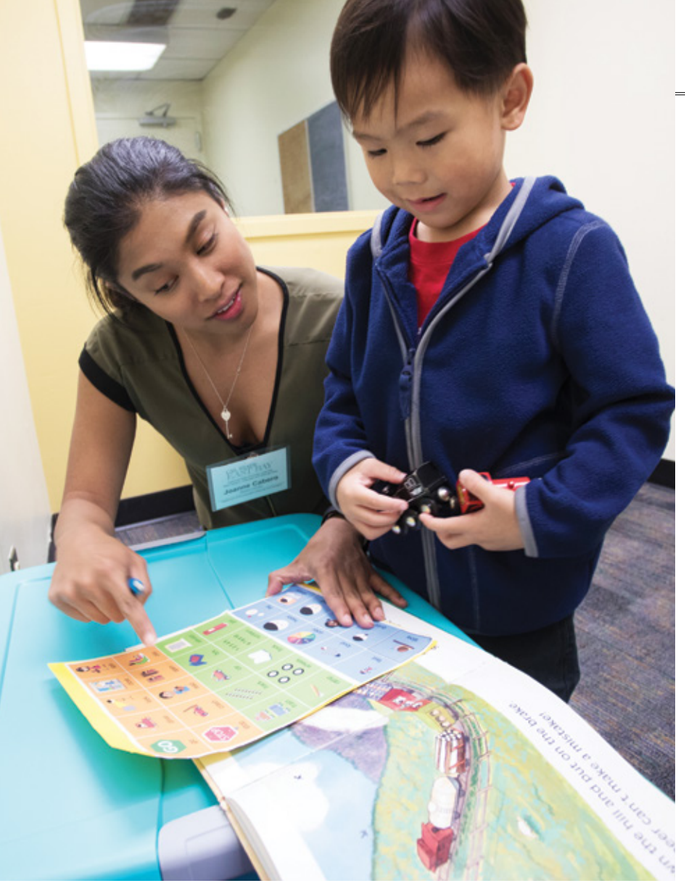
"They could suddenly understand the potential," Rome said. "We were just at a starting point, but it was exciting for the family to see how AAC might help their child communicate."

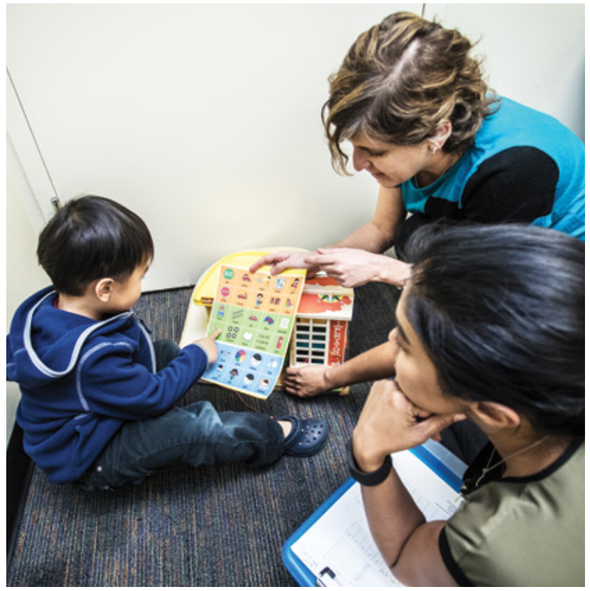
COACHING STUDENTS, CLIENTS AND FAMILIES

Studies show that as many as 4 million Americans are unable to reliably communicate using natural speech, and researchers estimate that about 3 percent of all U.S. children have a speech difficulty. Firm numbers are hard to come by, and not all of these people are candidates for AAC, but there is broad agreement among speech-language pathologists that technologies like touch-screen tablets and artificial production of human speech are opening the world of verbal communication to more people.

This means the professor's work at Cal State is more relevant than ever. In addition to teaching and research, Dukhovny oversees ▶

Details have been obscured to protect the client's privacy.





Graduate student Joanne Cabero (far left) works with Thomas, a new client of Cal State East Bay's Speech, Language and Hearing Clinic. Above, Assistant Professor Elena Dukhovny joins Cabaro working with Thomas.

students in the use of AAC, as part of more than 375 required hours of supervised clinical contact during their speech-language pathology training. Competition for spots in the multiyear graduate program is extremely intense, and Dukhovny said all her graduates (including Froz and Rome, who completed the master's program in spring 2017) move straight from Cal State East Bay to professional employment.

"For most of our students, focusing their careers on AAC is a specialty that they can work toward if they choose," Dukhovny said. "As technology continues to be more and more standardized in educational settings and schools, AAC will play a greater role in on-site therapies. The demand for practiced clinicians is already significant and growing."

INTELLECTUAL CHALLENGE

Dukhovny was drawn to studying AAC for the intellectual challenge.

For example, it's easy to turn a noun into a picture, but how does one make pictures for verbs like "is" and "are," or other words like "and" or "the"— particularly when the user can't read?

"Your first instinct when you're doing AAC with a child is to encode pictures that are easily recognizable," Dukhovny said.

But to learn to speak — and, logically, to understand spoken language — one needs other sorts of words as well. It's not enough to know whether an animal is a cat or a dog; for rich, meaningful communication it's also important to know what an animal is doing, when it's doing it and why.

Such questions led Dukhovny to research ways to improve AAC interfaces and understand how they can best grow with the user's fluency.

"I'm interested in figuring out the most effective way to put pictures on a screen, essentially," Dukhovny said. "It's a new field, so the research is kind of slim. Everybody has been doing it a little bit differently."

Specifically, Dukhovny is exploring the spatial relationship between icons, the physical motion (known as motor planning) that an AAC user performs to move between icons, and the connections that motor planning builds in an AAC speaker's brain.

"Every once in a while you see somebody who wasn't communicating [and] you put a device in their hands, and then they are. It's kind of a miracle."

Think of it this way: Every time you type the word "pie" on your laptop, you access letters in the same place on the keyboard. Eventually, you don't need to look down to find them anymore — you have developed a motor plan. Similarly, if an AAC speaker learns that the icon for pie can be found in the upper left corner of his screen, they will associate touching that part of the screen with the *concept* of pie. Based on that idea, Dukhovny has theorized that keeping icons' screen locations consistent as a user's vocabulary grows makes an AAC interface more effective.

FROM THEORY TO PRACTICE

Augmentative and Alternative Communication developers are taking notice of Dukhovny's ideas and applying them to their products. John Halloran, an Ohio-based speech-language pathologist and co-developer of the Language Acquisition through Motor Planning approach and a top-rated AAC app called LAMP Words for Life, believes that motor planning is key to success for many AAC speakers.

"Dr. Dukhovny's work really helped us," Halloran said. "She said that the more unique the motor plan is, the easier it is for the person to learn. I think her work has helped a lot of people with autism and other developmental disabilities be better communicators."

Dukhovny is excited — and perhaps a bit daunted — by the way her work is helping to guide new generations of AAC technology and apps that are now in the hands of people everywhere.

"This is the first time that anybody has used my research to inform a product, as far as I know," she noted, which takes her work far beyond the walls of the clinic at Cal State East Bay.

"It's not just a hypothetical question anymore," Dukhovny said. "Every once in a while you see somebody who wasn't communicating [and] you put a device in their hands, and then they are. It's kind of a miracle."

The Science of National Security

CAL STATE EAST BAY GRADUATES LEAD DEPARTMENTS, KEY EXPERIMENTS AT LAWRENCE LIVERMORE NATIONAL LABORATORY

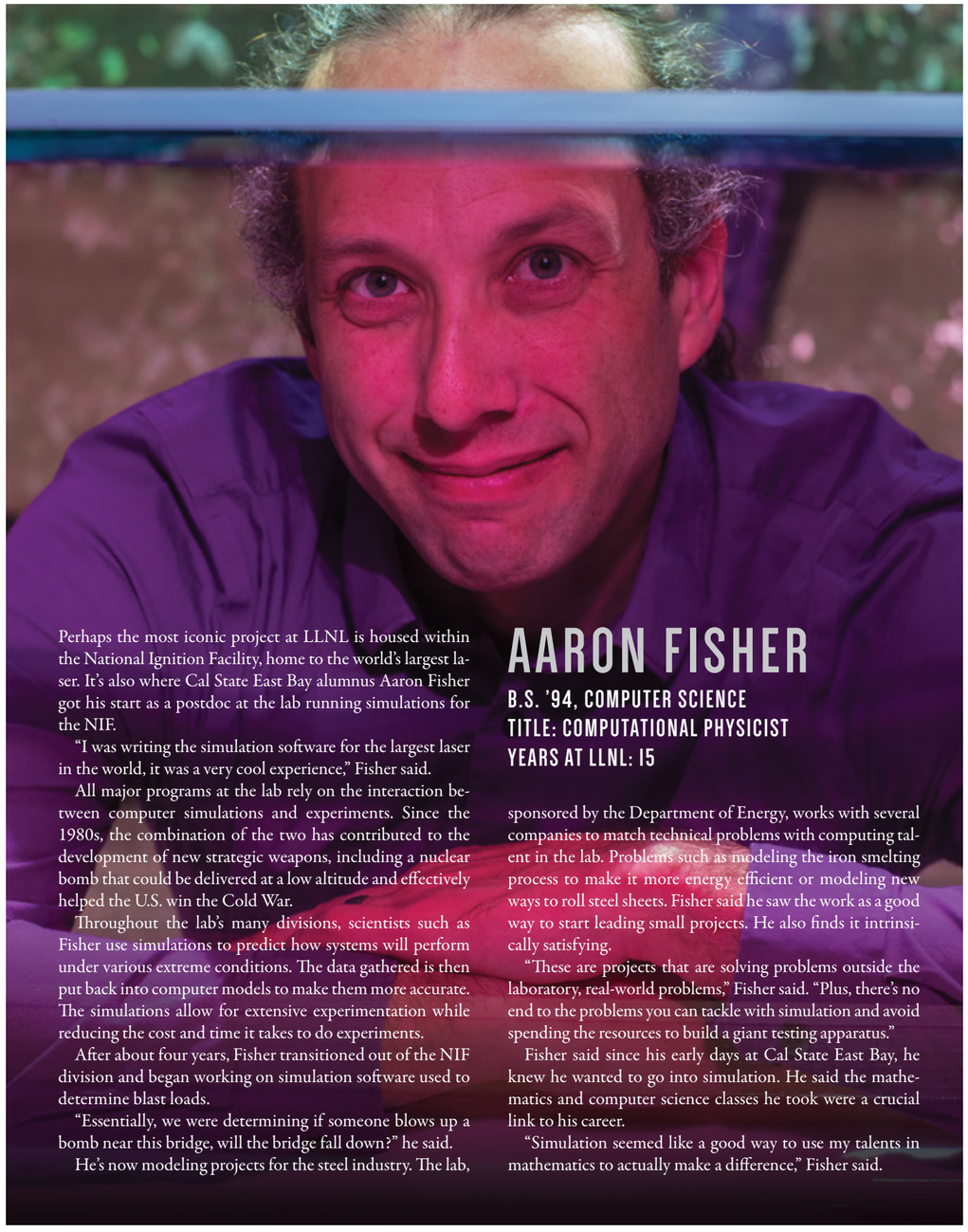
BY NATALIE FEULNER PHOTOGRAPHY GARVIN TSO

Behind its tall fences and guarded gates, Lawrence Livermore National Laboratory is an icon of the East Bay region — and a 7,700-acre campus abuzz with scientific and technological experiments that are changing the world.

Formerly a U.S. naval air station, the lab opened in September 1952 after the race to create a hydrogen bomb led Bay Area scientists Ernest O. Lawrence and Edward Teller to push the federal government for a second national laboratory to accelerate the program. These days, the lab employs several thousand people, all working to strengthen the nation's security through science and technology.

At the 10-story National Ignition Facility that means shooting 192 high-powered laser beams into a target no bigger than a pencil eraser to mimic the energy found at the center of planets and nuclear weapons. In a nearby building, it means refurbishing warheads and improving the assessment and condition of stockpiled weapons. Across campus, it takes the form of biologists conducting experiments to address challenges related to chemical security, bioenergy and human health. Still elsewhere, laboratory scientists use high-performance computing (simulation) to study everything from nanoscale mechanics to natural and human influences on the Earth's climate.

At LLNL's core — 226 Cal State East Bay graduates. They are scientists, accountants, public relations specialists and managers, each playing their own part in the work of the nation's largest federal lab. ▶



AARON FISHER

B.S. '94, COMPUTER SCIENCE
TITLE: COMPUTATIONAL PHYSICIST
YEARS AT LLNL: 15

Perhaps the most iconic project at LLNL is housed within the National Ignition Facility, home to the world's largest laser. It's also where Cal State East Bay alumnus Aaron Fisher got his start as a postdoc at the lab running simulations for the NIF.

"I was writing the simulation software for the largest laser in the world, it was a very cool experience," Fisher said.

All major programs at the lab rely on the interaction between computer simulations and experiments. Since the 1980s, the combination of the two has contributed to the development of new strategic weapons, including a nuclear bomb that could be delivered at a low altitude and effectively helped the U.S. win the Cold War.

Throughout the lab's many divisions, scientists such as Fisher use simulations to predict how systems will perform under various extreme conditions. The data gathered is then put back into computer models to make them more accurate. The simulations allow for extensive experimentation while reducing the cost and time it takes to do experiments.

After about four years, Fisher transitioned out of the NIF division and began working on simulation software used to determine blast loads.

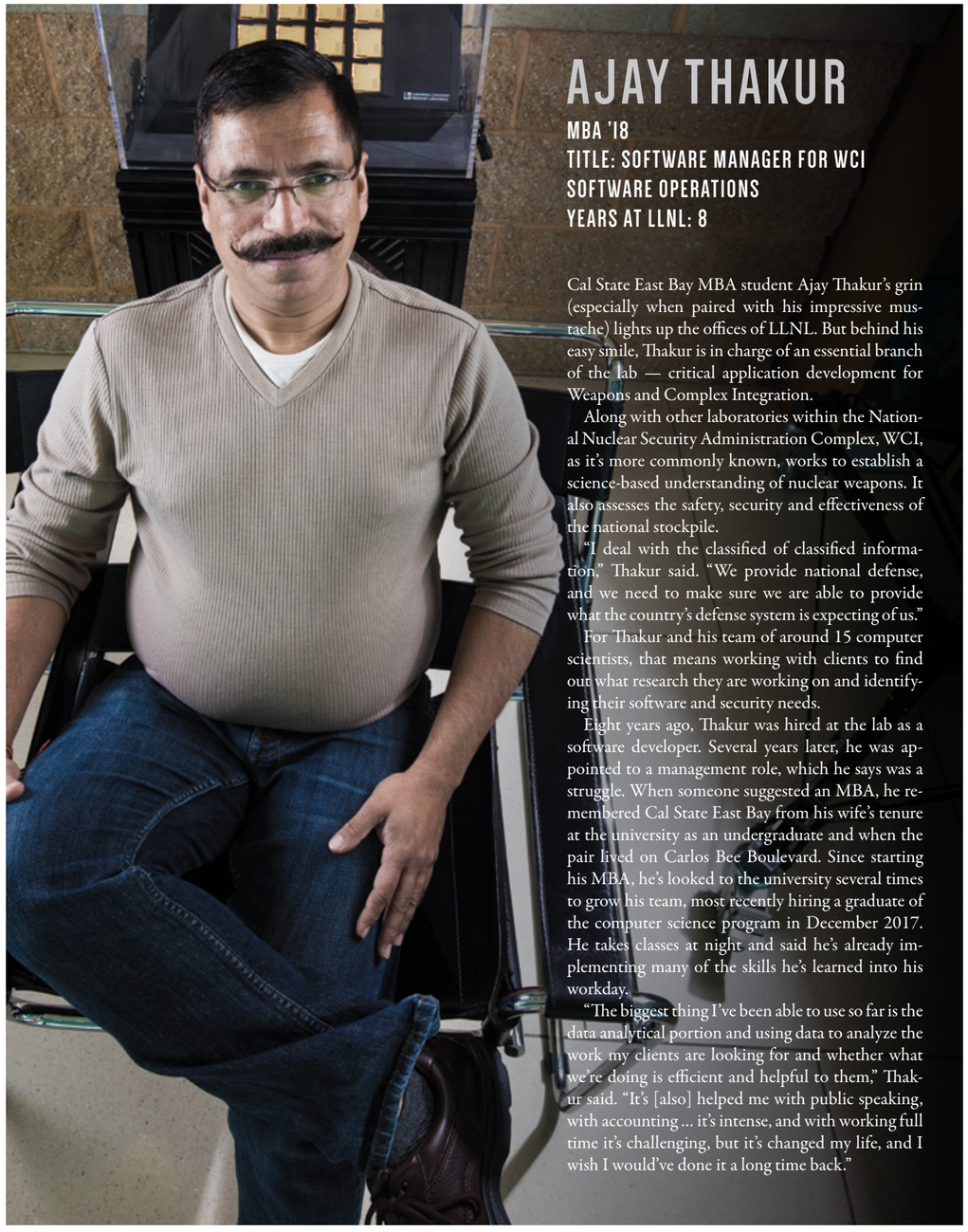
"Essentially, we were determining if someone blows up a bomb near this bridge, will the bridge fall down?" he said.

He's now modeling projects for the steel industry. The lab, sponsored by the Department of Energy, works with several companies to match technical problems with computing talent in the lab. Problems such as modeling the iron smelting process to make it more energy efficient or modeling new ways to roll steel sheets. Fisher said he saw the work as a good way to start leading small projects. He also finds it intrinsically satisfying.

"These are projects that are solving problems outside the laboratory, real-world problems," Fisher said. "Plus, there's no end to the problems you can tackle with simulation and avoid spending the resources to build a giant testing apparatus."

Fisher said since his early days at Cal State East Bay, he knew he wanted to go into simulation. He said the mathematics and computer science classes he took were a crucial link to his career.

"Simulation seemed like a good way to use my talents in mathematics to actually make a difference," Fisher said.



AJAY THAKUR

MBA '18
TITLE: SOFTWARE MANAGER FOR WCI SOFTWARE OPERATIONS
YEARS AT LLNL: 8

Cal State East Bay MBA student Ajay Thakur's grin (especially when paired with his impressive mustache) lights up the offices of LLNL. But behind his easy smile, Thakur is in charge of an essential branch of the lab — critical application development for Weapons and Complex Integration.

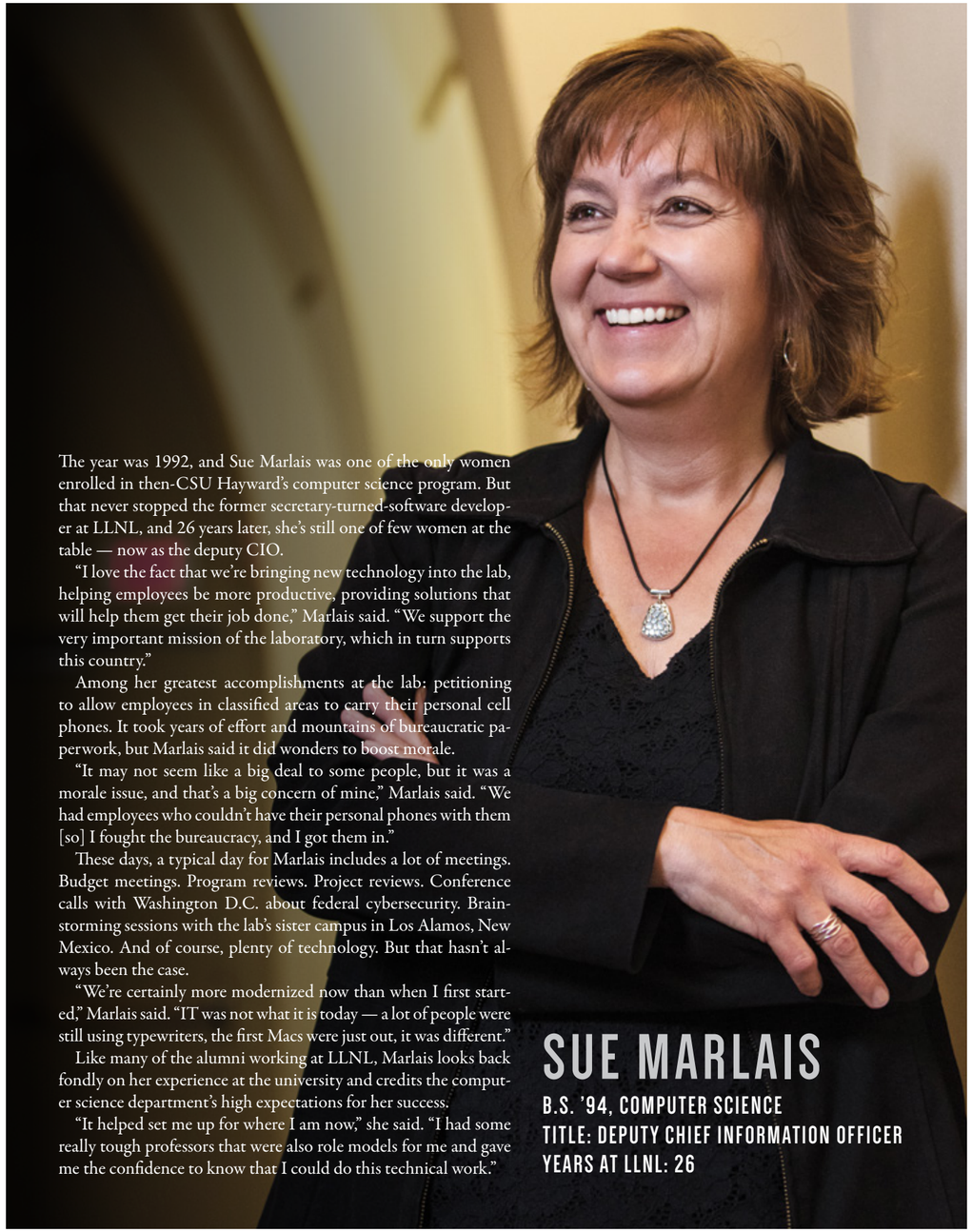
Along with other laboratories within the National Nuclear Security Administration Complex, WCI, as it's more commonly known, works to establish a science-based understanding of nuclear weapons. It also assesses the safety, security and effectiveness of the national stockpile.

"I deal with the classified of classified information," Thakur said. "We provide national defense, and we need to make sure we are able to provide what the country's defense system is expecting of us."

For Thakur and his team of around 15 computer scientists, that means working with clients to find out what research they are working on and identifying their software and security needs.

Eight years ago, Thakur was hired at the lab as a software developer. Several years later, he was appointed to a management role, which he says was a struggle. When someone suggested an MBA, he remembered Cal State East Bay from his wife's tenure at the university as an undergraduate and when the pair lived on Carlos Bee Boulevard. Since starting his MBA, he's looked to the university several times to grow his team, most recently hiring a graduate of the computer science program in December 2017. He takes classes at night and said he's already implementing many of the skills he's learned into his workday.

"The biggest thing I've been able to use so far is the data analytical portion and using data to analyze the work my clients are looking for and whether what we're doing is efficient and helpful to them," Thakur said. "It's [also] helped me with public speaking, with accounting ... it's intense, and with working full time it's challenging, but it's changed my life, and I wish I would've done it a long time back."



The year was 1992, and Sue Marlais was one of the only women enrolled in then-CSU Hayward's computer science program. But that never stopped the former secretary-turned-software developer at LLNL, and 26 years later, she's still one of few women at the table — now as the deputy CIO.

"I love the fact that we're bringing new technology into the lab, helping employees be more productive, providing solutions that will help them get their job done," Marlais said. "We support the very important mission of the laboratory, which in turn supports this country."

Among her greatest accomplishments at the lab: petitioning to allow employees in classified areas to carry their personal cell phones. It took years of effort and mountains of bureaucratic paperwork, but Marlais said it did wonders to boost morale.

"It may not seem like a big deal to some people, but it was a morale issue, and that's a big concern of mine," Marlais said. "We had employees who couldn't have their personal phones with them [so] I fought the bureaucracy, and I got them in."

These days, a typical day for Marlais includes a lot of meetings. Budget meetings. Program reviews. Project reviews. Conference calls with Washington D.C. about federal cybersecurity. Brainstorming sessions with the lab's sister campus in Los Alamos, New Mexico. And of course, plenty of technology. But that hasn't always been the case.

"We're certainly more modernized now than when I first started," Marlais said. "IT was not what it is today — a lot of people were still using typewriters, the first Macs were just out, it was different."

Like many of the alumni working at LLNL, Marlais looks back fondly on her experience at the university and credits the computer science department's high expectations for her success.

"It helped set me up for where I am now," she said. "I had some really tough professors that were also role models for me and gave me the confidence to know that I could do this technical work."

SUE MARLAIS

B.S. '94, COMPUTER SCIENCE
TITLE: DEPUTY CHIEF INFORMATION OFFICER
YEARS AT LLNL: 26

"It's amazing how much [of] what I learned [at Cal State East Bay] has applied to my career. No. 1, to study as much as you can about everything you can." — **Lynda Seaver** (B.A. '80, Mass Communication), director of public relations

"I grew up in an area that wasn't very diverse so Cal State East Bay taught me to work with partners and people who were not like me or from the same background." — **Stephen Jacobsohn** (B.S. '17, Computer Science), computer scientist

"There was a heavy focus on collaboration and partnership, skills I now use every day at the laboratory." — **Chris Brannan** (B.S. '98, Business Administration; MBA '03), CFO

SMARTEST SQUARE MILE ON EARTH: LLNL BY THE NUMBERS

The programs and facilities that make up the Lawrence Livermore National Laboratory span one square mile, what some call "the smartest square mile on Earth." Here are some stats to hang that claim on:

- Established in 1952
- 6,586 employees
- 2,700 scientists and engineers
- $1.92 billion budget
- 531 buildings/trailers
- 700 visiting scientists, teachers and students

'BEAM ME UP, LLNL'

Lawrence Livermore's National Ignition Facility serves as the backdrop for several scenes in the new Star Trek film.

In 2012, following the approval of the Department of Energy, the team behind "Star Trek: Into Darkness" filmed several scenes at the NIF, home to the world's largest laser. Filming was done during a routine maintenance cycle for the facility, and several tempered glass floors brought in for effect remain on the third floor of the NIF today.

According to LLNL, "Just as the Star Trek genre envisions a brighter future for humanity through exploration of the universe, the mission of NIF is to explore physical realms that were previously unobtainable in a laboratory setting."

"This is a haven for Star Trek fans," alumna Lynda Seaver, director of public relations, said.

A CFO, A CIO AND A PIO WALK INTO A LAB

Three Cal State East Bay alumni hold top positions (and coincidentally alphabet soup titles) at LLNL.

LYNDA SEAVER is the lab's director of public relations — also referred to as a PIO, or Public Information Officer — and graduated from then-CSU Hayward in 1980 with a degree in Mass Communication. She coordinates site visits between the press and the lab, and manages the department's many publications and press materials.

CHRIS BRANNAN graduated from then-CSU Hayward with an undergraduate degree in business in 1998 and an MBA in 2003. These days, he's CFO of LLNL, overseeing a $1.9 billion budget and around 150 employees — a long way from the entry-level job he took there a year after graduating.

SUE MARLAIS first started at LLNL as a secretary. The job fit her life at the time, but she always had a fascination with computers and technology. As a full-time employee of the lab, she was able to continue working while pursuing her undergraduate degree at night at then-CSU Hayward. Having worked her way up the ranks over the past 26 years, Marlais is now the deputy CIO at the lab, overseeing a staff of almost 300 and the lab's IT program.

Professor Ruth Tinnacher

THE RACE TO STORE WASTE

BY NATALIE FEULNER
PHOTOGRAPHY GARVIN TSO

CAL STATE EAST BAY PROFESSOR, STUDENTS CONTRIBUTE TO RESEARCH SURROUNDING RADIOACTIVE WASTE STORAGE

IF NUCLEAR WASTE WERE STORED IN A FOOTBALL FIELD, the 80,000 metric tons produced in the last century by the U.S. alone would fill the stadium up to 8 yards high. Of that waste, 96 percent of it is radioactive uranium. Which means scientists have a hefty task ahead — figuring out a safe and effective way to dispose of the radioactive materials.

Thanks to a three-year $785,000 research grant from the Department of Energy's Nuclear Engineering University Program, Cal State East Bay Professor Ruth Tinnacher and her environmental geochemistry students are playing a role in finding a solution. Or at least a portion of it.

Currently, radioactive waste — a byproduct of nuclear power generation — is stored in containers at temporary storage sites or at one of the 80 plants nationwide where it is produced. However, time is running out, since the containers currently in use were designed to last only up to approximately 60 years.

"We don't know how much longer we can get away with using what we have, but we also don't have a good sense of what the fuel looks like inside," Tinnacher said. "There are still a lot of questions to answer, and a huge body of research is being done right now, and we [at Cal State East Bay] are just focused on one small part."

Undergraduate Nicolas Hall, who is one of the students working with Tinnacher in the Department of Chemistry and Biochemistry, said he was excited to hear about her research because it would give him a chance to practice what he's learning in the classroom in a field he's passionate about — environmental science.

"It is science that is directed toward solving a real-world issue," Hall said. "I feel that it is not too common to see the science being done in labs actually applied to real-world situations and questions, and storage of radioactive contaminants is a huge question." ▶

A HISTORY OF HURDLES

According to the United States Nuclear Regulatory Commission, the U.S. commercial power industry has generated more waste than any other country, and the quantity is expected to increase to about 140,000 metric tons over the next several decades.

Tinnacher said when the U.S. storage program currently in place was designed in the 1970s and 80s, the assumption was that the hurdles — political, social and scientific — would be overcome and a long-term, deep geologic nuclear waste repository would be built. For about 40 years before that, everything from launching waste into outer space or to the sun by rocket to submerging it into deep seabeds was proposed.

Eventually, scientists proposed the solution of storing the waste in large containers deep in the subsurface at a site known as Yucca Mountain, located about 65 miles from Las Vegas on the edge of the Nevada Test Site — now known as the Nevada National Security Site. But according to the U.S. Government Accountability Office, the Department of Energy terminated its license of Yucca Mountain in 2010 before the site even opened. Since then, there has been no consensus between the administration and Congress on how to move forward.

So, while politicians are sorting out the question of where to store the waste, Tinnacher and hundreds of other scientists nationwide are attempting to answer the question of "how."

"The Department of Energy is strongly linked to the current political priorities in D.C.," she said. "For a long time it seemed like this was a problem of high priority, then the emphasis shifted to climate change-related questions, and now it seems like we may be going back [to finding a solution]."

TESTING A BARRIER

In the lab at Cal State East Bay, Tinnacher and her students are focusing on the role of an engineered barrier that would surround a container of radioactive waste and protect the surrounding area from contamination after the canisters erode — a process that is currently estimated to take about 4,000 years.

Tinnacher said the barrier is a layer of material known as bentonite, which is also used on highways and at other waste disposal sites. Bentonite contains a clay called montmorillonite that is highly effective at binding radioactive contaminants and has a very low permeability, which means any radioactive contaminants escaping the proposed containers would move incredibly slowly through the barrier layer. However, how much of these contaminants can move through this barrier is largely determined by their binding (sorption) to the clay matrix in the bentonite, which is again dependent specific chemical forms (or species) of contaminants found in these systems.

How the binding of uranium to the clay is affected by the presence of mineral impurities in bentonite and the heat produced by the radioactive decay of spent nuclear fuel is the question that Tinnacher and her students, including graduate student Jonathan Pistorino, seek to answer.

Materials used in Professor Ruth Tinnacher's lab include bentonite and small amounts of uranium.

"The overall goal of the project is how best to store uranium ... we need to find out what species of uranium is in the waste material based on the chemical conditions of that material, and how the intended barrier materials might impact the story," Pistorino said. "It's problem-solving — this type of science is about figuring out the puzzle."

To test uranium sorption to these materials as a function of pH, a small amount of bentonite or montmorillonite is placed in a tube and adjusted to a specific pH. From there, uranium is added, pH is adjusted again, and the entire tube is placed on a shaking table for about 48 hours to allow sorption to occur.

Afterward, pH is measured again, and with a bit of simple math, the sorption level is determined. The data gathered will determine how effective the bentonite barrier will be against various chemical solution conditions, in the presence of mineral impurities and after the bentonite has been exposed to heat in the subsurface.

"We know how much uranium we put in, we check how much is left, and the difference is how much has been sorbed," Tinnacher said. "From there, we change the conditions and do it again."

LOOKING FORWARD

In the coming months, Tinnacher and her students will continue their current experiments while following the national dialogue about where a site may be built. They'll also begin working with scientists at two national laboratories — Dr. Peter Nico and Dr. Patricia Fox at Lawrence Berkeley National Laboratory and Dr. Florie Caporuscio at Los Alamos National Laboratory, which the students say is a great opportunity for them to work with the scientists they hope to one day become.

"A major benefit I'm getting out of this is the experience and hands-on time with the instruments and techniques," Hall said. "[I think] having this experience will help me greatly as I move on and work in labs professionally or as I continue my academic career."

Since the project is funded through the DOE's Nuclear Engineering University program, the department encourages recipients to collaborate with industry and governmental partners. Before working at Cal State East Bay, Tinnacher was a scientist at LBNL, making her former collaborators at other institutions natural partners.

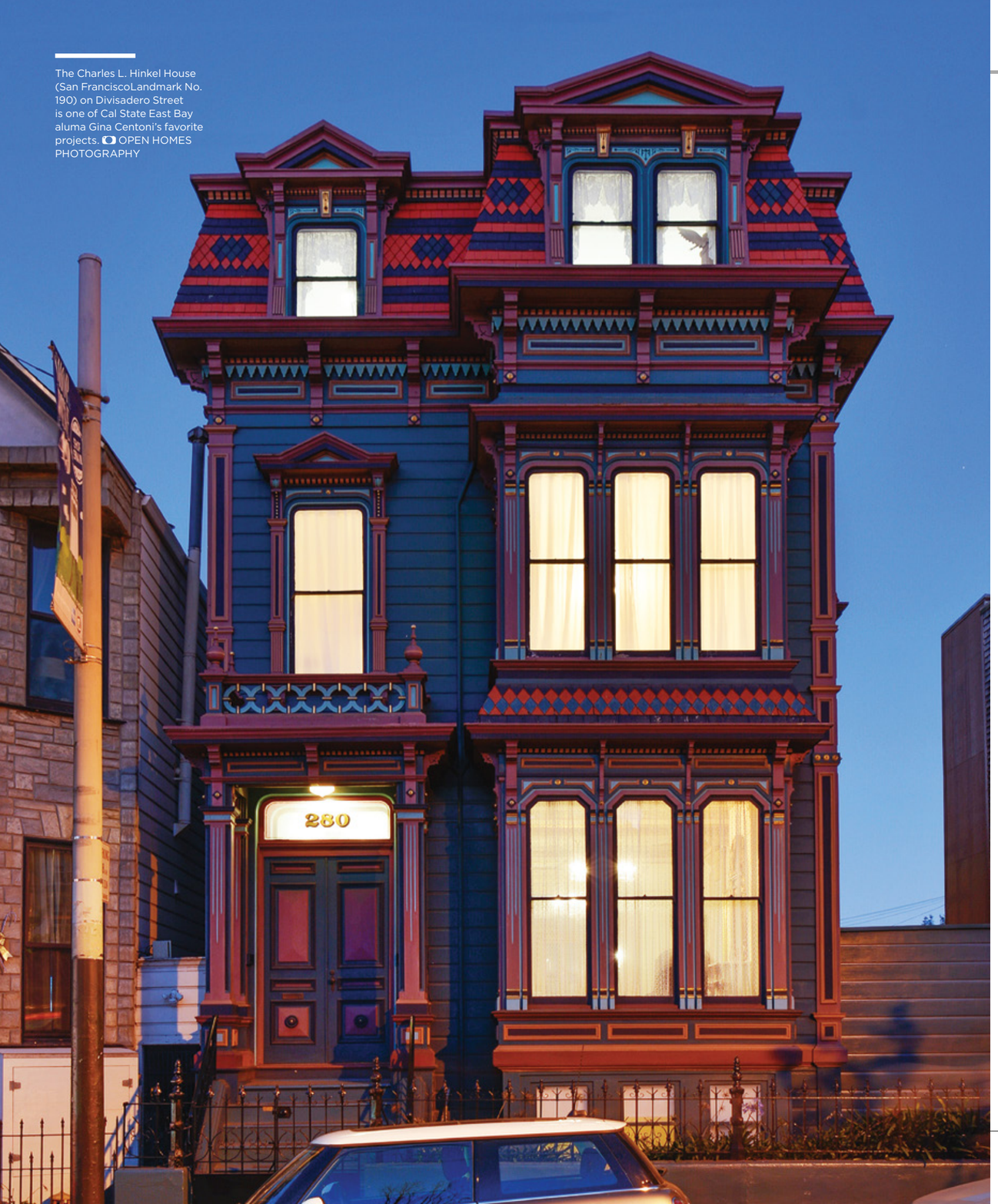
A French scientist named Christophe Tournassat will also work alongside Tinnacher, Pistorino and others this summer to help turn the data they've gathered into uranium sorption and transport models that can predict uranium mobility in bentonite barriers in the future. The models will be further supported by spectroscopic analysis of uranium surface species by Department of Earth and Environmental Sciences Professor Michael Massey. The molecular dynamics simulations of uranium solution species in the clay environment will be performed by Department of Chemistry and Biochemistry Professor Patrick Huang.

Next, collaborators at LBNL will test uranium mobility in these systems based on diffusion experiments. Caporuscio at Los Alamos National Lab will expose minerals to heat under controlled conditions to see if and how it affects the bentonite's ability to sorb uranium.

All in all, more than a dozen scientists — both students and professionals — will have worked on the project, exemplifying the collaboration Tinnacher believes will be the key to solving the question of where and how the U.S. will store its radioactive waste.

TRADING THE BOARDROOM FOR A HARD HAT

Cal State East Bay alumna owns, manages woman-run construction business



The Charles L. Hinkel House (San FranciscoLandmark No. 190) on Divisadero Street is one of Cal State East Bay aluma Gina Centoni's favorite projects. OPEN HOMES PHOTOGRAPHY

BY ILENE LELCHUK

GINA CENTONI'S MIDLIFE CAREER CHANGE STARTED WITH FIRE. The Silicon Valley executive had just returned from a business trip to Japan and despite her jet lag, was in the midst of presenting to the leadership team at Sun Microsystems.

"My phone just kept ringing and after the presentation, I had all these calls and messages saying my home was on fire," the Cal State East Bay alumna said.

Flames were consuming her 1906 house in San Francisco's Cole Valley, which Centoni had spent the previous year diligently renovating and restoring to its Arts and Crafts architectural glory.

When the flames died down, Centoni realized she now faced another year of construction. The thought of it might have driven anyone else mad, but she saw it as an opportunity.

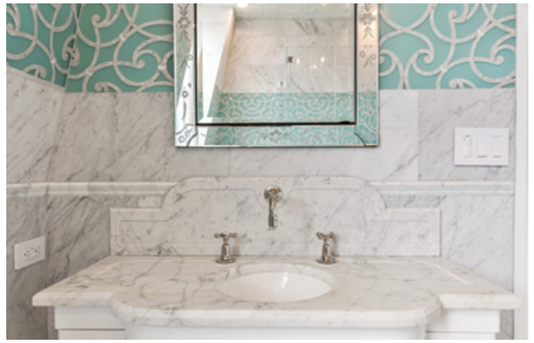
"I absolutely love the entire process of renovation," she said. "I've always been the kind of kid who loved construction. My dad used to keep me busy in the garage with him, making Barbie doll tables with cut off pieces of two-by-four and nails."

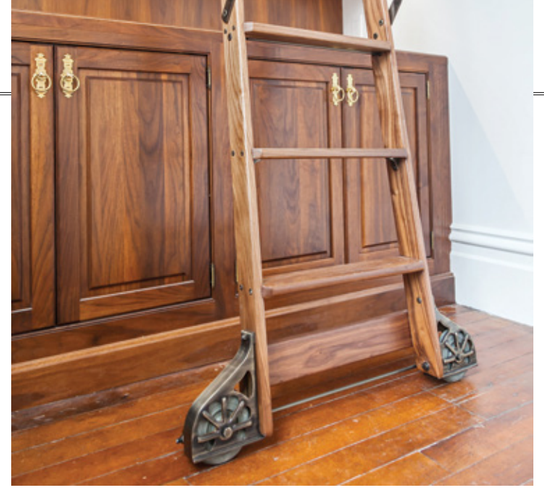
FROM BARBIES TO BUSINESS OWNER

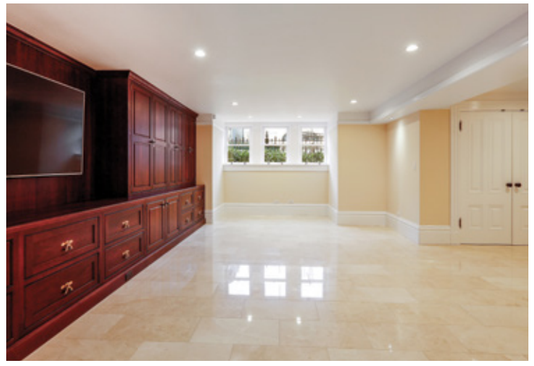
Today, Centoni, 53, is president and CEO of Centoni Restoration & Development, a licensed contractor specializing in historical restorations of all eras in San Francisco. She not only made a dramatic career change — trading in her boardroom seat for a hard hat — but also entered a male-dominated industry.

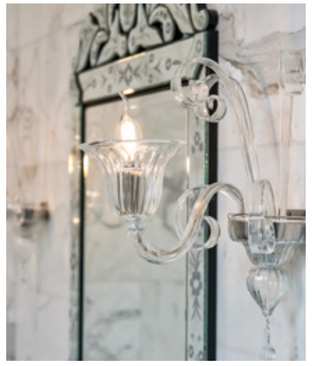
Her winding career path began with a bachelor's degree in business administration from then-Cal State Hayward in 1986, and she landed her first job for a winery within days of graduating.

"What I appreciate about the university is that it's a practical school," said the San Leandro native. "They are programming people to think about the real deal. ▶









One of Gina Centoni's specialties is intensely customized and detailed projects such as these features in a home on Divisadero Street in San Francisco. OPEN HOMES PHOTOGRAPHY

It's about people who want an education because they want to work."

Centoni migrated from the winery to Silicon Valley where she specialized in product development for companies, including Apple, Openwave and Macromedia.

"If you think about it, renovating an old house is just another kind of product development," she said.

To officially make the switch from tech to construction, Centoni returned to school and studied construction management and hands-on trade work to obtain her contractor's license. After graduating, she began buying, renovating and flipping houses. She eventually founded her own, now-flourishing residential design-build firm.

A WOMAN-RUN OPERATION

Centoni's presence as a woman in the male-dominated contractor business is rare.

Women make up just 9 percent of the country's construction industry and are largely represented in sales and office work, according to the U.S. Bureau of Labor Statistics.

"I don't think women are encouraged from a young age to pursue fields such as construction management," Centoni said.

And Centoni admits that while her office operations are run by women, her hard hat team is male. She said if she could find a skilled female carpenter to hire, she would.

Meg Vasey, director of Tradeswomen, Inc., an Oakland-based training and advocacy group, applauds women like Centoni.

"Women in the construction business have many barriers," Vasey said, adding that schools must work harder to attract female students to technical career education classes.

Cal State East Bay has joined in the outreach efforts, helping organize the first annual Women in Construction Workshop, held at the University of Central Florida in partnership with universities in China and Brazil in 2015.

Cal State East Bay assistant professor Reza Akhavian, from the university's construction management program, attended the workshop and said female students should be empowered with the knowledge that they have a place in this industry. Studies show that universities could do more, including providing female mentors and promoting their construction programs better to elementary, middle and high school girls.

The ongoing challenge, Akhavian said, is that construction continues to be perceived as man's work. "However, numerous studies indicate that women exhibit higher levels of persistence and perseverance than men," he said.

According to a 2009 survey published by the Construction Management Association of America, most construction managers believe their female peers are as qualified and capable their male counterparts. But, female construction managers report bias against them in the form of skepticism and indifference.

And it shows.

Nationwide, 47,842 women own residential building construction businesses compared to 585,183 men, according to the U.S. Census Bureau's 2012 Survey of Business Owners.

When Centoni had her own home renovated, not one woman was involved in the construction.

"As a woman-run operation, we are different from everybody else," she said of Centoni Restoration & Development. "We have a different ear, a different way of interacting. There is no such thing as a silly question from our clients."

Those clients often demand intensely customized and detailed projects.

Her current favorite is the Charles L. Hinkel House (San Francisco Landmark No. 190) on Divisadero Street. One of the city's Victorian "painted ladies," it was built in 1885 and is victoriously still standing despite earthquakes, fires and odd interior changes.

For the job, Centoni dug into the property's history, marveled at the structure's "good bones" despite the lack of building codes in the 1800s, replaced the original brick foundation with a modern one, and added 21st-century electrical upgrades.

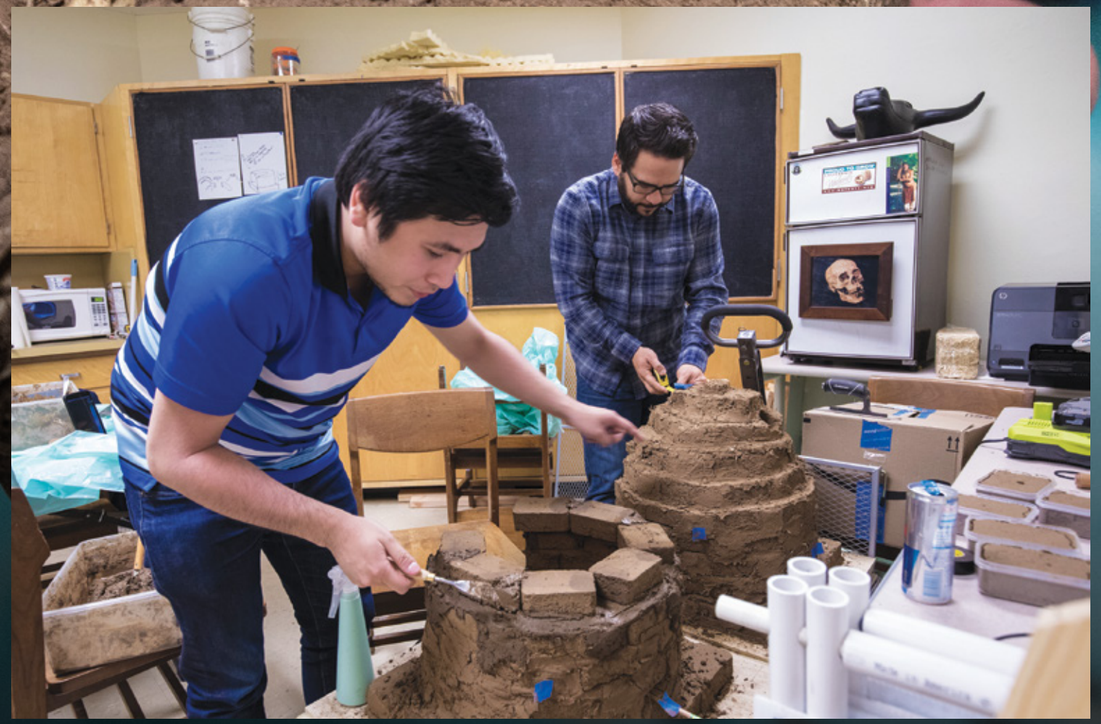
Next up: Renovating a national historical landmark built in 1860.

"Every job is completely different and I love that," Centoni said.

Gina Centoni recently volunteered as a panelist for "Women on the Rise," an alumni program recognizing successful Pioneer alumnae and providing opportunities for Pioneer women to share their inspirational career stories, discuss the unique benefits and challenges of being a woman in the workforce, and connect with each other for support and networking.

Pioneer alumni like Centoni give back by sharing their professional experiences and industry insight with the university community. Do you have insight to share to support the early career development of our students and recent graduates? Connect to the Forever Pioneer Network and support tomorrow's Pioneers, today. Visit csueastbay.edu/alumni for more information.

OF DIRT AND COMMUNITY



CAL STATE EAST BAY ARCHAEOLOGY STUDENTS BUILD, TEST ADOBE BRICK OVENS

BY NATALIE FEULNER PHOTOGRAPHY GARVIN TSO

Cal State East Bay Professor Albert Gonzalez has long-been fascinated by the community aspect of the "enjarrando" or "mudding" days in Taos, New Mexico, where he worked for several years. And now, he's bringing that tradition to the East Bay with a scientific twist.

Gonzalez and several of his archaeology undergraduates are currently studying the physical and chemical properties of adobe bricks in hopes of gleaning information that will allow archaeologists to differentiate between adobe used to build walls versus ovens. The distinction may seem obvious, but as Gonzalez points out, when digging for dirt, in dirt, it can all start to look the same.

"They end up buried like all the other artifacts, and we have to make them out from the dirt, around them, but the tricky part is they're made of dirt too," he said. "You run your trowel over adobe, and it feels like dirt so it takes specialists to know what to look for or you'll just dig through walls."

Once the research is concluded, the team will design and build a life-size adobe brick oven at Peralta Hacienda Historical Park in Oakland, which Gonzalez hopes will draw the community to a Taos-style enjarrando event.

In Taos, adobe bricks aren't a thing of the past. Rather, thousands of people still live, worship or work in brick adobe buildings and that means, they have to be maintained.

"It's not just museums and missions there, and rain and weather eat away at the exteriors, so they need to be tended to on a yearly basis," Gonzalez said.

Each year, communities gather — many times with archeologists like Gonzalez alongside them — to restore the buildings, repair bricks and add new layers of plaster over the top. In academia, that hands-on participation with the locals living near or in historic buildings is known as "community archaeology."

"Every brick unearthed is connected to so many people, so archaeology is directly connected to their ancestors," Gonzalez said. "It really put some meat to the bones of the artifacts and the bare adobes that I was working with because every brick I found is connected to so many people in some kind of way."

Grandparents would spend the day barbecuing and making enchiladas; there would be prayers, singing, and dancing. And of course, work. Broken bricks are repaired, and new mud is added to the existing walls creating a new, weatherproofed layer.

"You get to know the families [at] these enjarrando events ... that's often where we'd have the most fun."

TESTING THE BRICKS

In Taos, Gonzalez said, families often have a designated person who can find the type of dirt needed to build adobe, by feel. But at Cal State East Bay, there's more science (and students) involved.

On a recent day in the lab, undergraduate student Hai Vo was bent over a beehive-shaped structure built using bricks without straw. He carefully spread mortar between them, building up what would become an oven, layer by layer.

Pencils stuck into the walls of the oven will later be removed once the dirt dries, leaving behind holes that Gonzalez and Vo will use to insert thermometers and test the heat retention of the structure.

The idea is that the physical makeup of the bricks that retain more heat will likely be closer to those used hundreds of years ago to build ovens and allow archaeologists to differentiate them from walls.

Vo is a biology major and never planned on working in archaeology, but after taking a class with Gonzalez and starting to work on the bricks project, he decided to pursue a graduate degree in archaeology.

"I was just interested in this and wanted to learn more, and now I'm directing the construction of the second oven," Vo said.

Gonzalez says the two degrees should have a natural crossover and serve Vo well given the importance of soil science in archaeology.

PARTNERING WITH PERALTA

In addition to the work happening in the university's archaeology lab, Gonzalez has developed a flourishing partnership with Peralta. The park is only 6 acres of what's left of an original 44,800-acre 1820 land grant rancho spanning what would become eight cities stretching from Albany to San Leandro. And, at one point it was home to adobes.

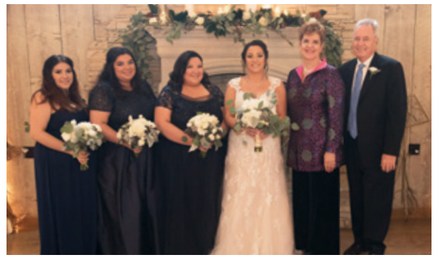
But in the 1890s, a group of Boy Scouts took down one of the remaining adobe structures, moved the bricks and used them to build a scout hut at nearby Dimond Park. All that remains of the hut is four walls — three made of wood and one of adobe.

Now, 122 years later, Peralta wants the wall back.

In the coming year, the historic park will be working with Gonzalez, his students and the public to move the wall from Dimond Park back to Peralta. Gonzalez's team will excavate the bricks, and the park will hold a competition for local artists to use them in a newly-designed installation.

Once the bricks are moved, and testing of the ovens at Cal State East Bay is complete, Gonzalez also hopes to build a full-size brick oven at the park with the goal of holding enjarrando-style yearly events celebrating the East Bay's rich and storied adobe history.

"They were initially concerned but then excited that real mud takes real maintenance ... but that's the best part; this is what draws the community together, you make it an event," he said. "It would be an echo on the scale of what happens in New Mexico ... but still, if we can accomplish a fifth of the community bonding that's accomplished similarly there, then we are much better off than we were before."



Jodi and Brian Servatius with their four children, at daughter Molly's wedding in January.

FROM 'JUST US' TO A

Party of 6

Jodi and Brian Servatius pledge legacy gift to Renaissance Scholars program in honor of their four adopted children

BY NATALIE FEULNER

Unbeknownst to them at the time, the answer to a seemingly simple question would forever change the lives of Cal State East Bay Professor Emerita Jodi Servatius and her husband, Brian.

The couple had long discussed the possibility of adopting children and finally, in 1988, after years of living a "jolly good life of going to Europe, and drinking wine," they were ready. It was a foggy May day when they met with a social worker at the Monterey County Child Protective Services and answered that key question.

"We sat down and they asked us 'Would you consider siblings?' to which we said 'Yes,' because at the time we were thinking siblings sounded like two," Servatius said.

But that's not quite what the social worker meant. Instead, she handed the couple a Polaroid photo of four girls ranging in age from 1 to 6 years old.

"I looked at Jodi and said, 'Are you serious?'" Brian said. "'We're going to go from zero to four kids?'"

She was serious.

"We used to have two people at our dining table and now our immediate family is 11 people," Servatius said, explaining the family now includes spouses and grandchildren.

Servatius is well-known around the campus community.

This meant, Brian, her spouse of 50 years, was also heavily involved with Cal State East Bay and its various programs and events. So, when they started their estate planning, a gift to the university's Renaissance Scholars program seemed like a good fit.

"In all the years I've seen Jodi up here, I've been attracted to Cal State East Bay because I believe it's a university that really makes a quality college education accessible," Brian said.

But it was also important to the couple that they find the right program to support.

"I've been touched thinking about what would've happened to our girls if they hadn't been adopted; they would've aged out of the system and then who would've helped them?" Servatius said.

Servatiusadded that she's happy the couple were able to find a way to not only support the university, but also a program that directly speaks to their core values.

"I would hope that other people would find similar intersections where their personal interests and the university's various programs intersect like a Venn diagram," she said. "That place where the two circles come together and they can say 'Our family really cares about this and the university is doing that, let's see if there's a way for us to make a gift.'"

CLASS NOTES

1970s

PATRICK GARDNER (B.A. '76, Music) was recently included in The New York Times' listing of "Best Concerts of 2017" for his performance of Lou Harrison's "La Koro Sutro." Gardner's concert was listed alongside the New York Philharmonic and the Metropolitan Opera. He first performed "La Koro Sutro" while studying at Cal State East Bay and later wrote his dissertation about the piece.

MICHAEL P. JENSEN (B.A. '78, English) has been working with Shakespeare performance scholars to study audio and radio productions as thoroughly as they study Shakespeare onstage and on-screen. Jensen has written extensively about this practice and was recently published in the book, "The Shakespearean World."

FOREVER PIONEER

The Forever Pioneer Network wants to hear from you. Share news about your career, accomplishments, fond memories and changes in your life with fellow Pioneers and the university community. Submit your class note online at **csueastbay.edu/alumni.**

CAL STATE EAST BAY
Rising in the East

SUSAN L. USTIN (B.S. '74, Biological Science; M.S. '77, Biological Science) is a professor of environmental and resource sciences at UC Davis where she studies remote-sensing data and has published close to 300 titles. This year, Ustin was named a fellow of the American Geophysical Union.

STEVE WILEY (B.A. '73, History) has spent the past 15 years helping students at San Lorenzo High School create a one-acre native plant garden. The school's Druids Environmental Club members serve as the gardens' docents, where visitors learn about the lives of native Californians. Wiley and the Druids installed a miniature version of the garden at the Hayward Area Historical Society in October 2017.

1980s

ANNE K. ROSS (B.A. '82, Liberal Studies; M.S. '85, Counseling) has retired after 32 years as a school psychologist in the San Francisco Bay Area. She is the author of "Blood Strangers: A Memoir" and has launched a photography business.

ROBERT M. CALONICO (M.A. '87, Music) is retiring after 28 years as director of the UC Berkeley marching band, commonly known as the Cal Band. Calonico's highlight of his 28-year tour was when half of the band, 110 members, played at the Great Wall of China in 2016.

DAVID CARTER (B.S. '83, Business Administration) has served as the chief financial officer for Java City, headquartered in Sacramento, since 2011. His previous positions include CFO and plan administrator for Ultimate Electronics in Colorado, CEO and CFO for Trader Vic's worldwide, CFO for Good Guys, and CFO/COO for Pasqua.

CLARE DURAND (M.S. '84, Geography) was honored with the Silva Service Award in 2015, which is given annually for outstanding service to the sport of orienteering in the United States. She served as president of Orienteering USA from 2007-2011 and continues to support the organization as chair of the national rules committee, recently representing the U.S. in summer 2017 in Lithuania at the World Trail Orienteering Championships.

DEBORAH P. EVANS LUCAS (B.S. '88, Business Administration and Organizational Communication/ Public Relations) has recently published a book, "God and the Self: Insights from Major Thinkers in the Western Philosophical Tradition," which was recently endorsed by Harvard University professor, Dr. Cornel West.

RICHARD OH (B.S. '86, Business Administration) is the co-owner of Affina Food and Wine, a restaurant in Carmel, which features wines from his two wineries, Otter Cove wines and Oh wines. In February 2017, Affina was selected to prepare a prestigious James Beard Foundation dinner in New York City. The resulting 10-course dinner, called "Carmel Chic," featured the bounty of the Monterey region, and reflected the Asian, French and California cuisine influences of the chef and owners.

KAREN M. REZENDES (B.S.. '86, Business Administration) is currently a managing partner of Lozano Smith Attorneys. Her areas of expertise include private and public sector employment law including effective employee recruitment, retention, employee contracts, evaluation, investigations, equal employment opportunity issues and discipline.

MARCY RUSTAD (B.S. '82, Business Administration) has run her own consulting company for 26 years, advising nonprofits, educational institutions and businesses on how to collect quality data in support of informed decision making. She has also helped launch nonprofits, sat on nonprofit boards and served as a school board member.

BEPSY STRASBURG (MBA '82) has joined the audit committee of Carson City and serves as a coach and adviser to Entrepreneurs Assembly, which advises startups on strategies and finance operations excellence. Strasburg's previous positions and affiliations have included Zuckerberg San Francisco General Hospital Foundation, ServiceWest and BDO Consulting, among others.

BARBARA J. TURNER (B.S. '81, Nursing) has worked as the director of nursing at West Oakland Health Council for 11 years, during which time she exhibited compassion and commitment, and developed trusting relationships with the Oakland community. Turner is currently precepting at Cal State East Bay, where she continues to foster relationships with students.

1990s

KHALID A. CHECKZAI (B.S. '98, Business Administration) was recently appointed CEO of Poppy Bank in Santa Rosa. Acheckzai joined the bank in March 2015 as a chief financial officer and chief operating officer. He has more than 20 years of combined banking experience both working in the banking industry and providing auditing and consulting services to financial institutions.

NELSON FIALHO (B.A. '91, Political Science; MPA '96) has been the city manager of Pleasanton, California since 2004. Fialho's major accomplishments in the position include steering Pleasanton through a recession and managing the completion of a $16.2 million, 16-acre community park.

LEE HENDERSON (B.S. '95, Business Administration) is an assurance partner and central region growth markets leader at Ernst & Young and also has significant experience working at the firm's London office. As part of his work, Henderson is responsible for leading numerous integration activities and managing the day-to-day operations of 1,900 employees.

DAYO O. ORIMOLOYE (B.A. '94, Economics; MBA; B.S. '97, Finance) is the chief risk officer of Sterling Bank. Orimoloye has more than 22 years of senior management experience with leading financial institutions in Africa, North America and Europe. His key areas of expertise include risk management, project finance, capital markets, treasury and business development.

KEITH TROUTMAN (B.S. '92, Business Administration, MBA '95) was recently included in the San Diego Business Times, "Book of 500 Influential Business Leaders." Troutman is also a partner in Squar Milner's tax department, leading the company's San Diego office.

ERIC SANCHEZ (B.S. '96, Criminal Justice Administration) was named chief product officer of the legal technology startup GrowPath, located in Durham, North Carolina. Before his new role, Sanchez was with the Law Offices of James Scott Farrin, where he most recently served as the firm's vice president.

2000s

MATTHEW EVANS (B.A. '95, Music; M.A. '06, Music) has worked at Cal State East Bay since 1984 and is currently the budget analyst for the College of Education and Allied Studies. Evans is also the program director for the Online M.S. in Educational Leadership. After 34-plus years of service, Evans is now planning to retire from Cal State East Bay at the end of 2018 to pursue other musical and entrepreneurial ventures.

JENNIFER GRIFFIN (M.S. '02, Counseling Psychology) recently published her second book, "Understanding Morning Sickness as a Gift: An Introspective Journey of Healing and Hope From a Hyperemesis Gravidarum Survivor." The book is a heartwarming memoir and essential healing guide filled with practical tips for overcoming any chronic condition. Griffin is also the author of "Understanding Your Child as a Spiritual Gift."

DENNIS LIM (B.A. '06, Mass Communication) has recently become a learning and development program manager at Google for the company's marketing team. Prior to Google, Lim worked for Cost Plus World Market in the company's e-commerce marketing division.

ADRIENNE MCGRAW (M.S. '08, Environmental Education) is the executive director of Chico State's Gateway Science Museum. McGraw was previously the director of the traveling nonprofit Exhibit Envoy and co-founded the Green Museums Initiative, a committee within the California Association of Museums that promotes environmental sustainability in operations and programming.

HEATHER C. SONTAG ('04, Teacher Credential) is an organizational expert, coach and speaker whose goal is to help people live fulfilled and organized lives. Sontag has released an action guide called "Taming your Inner Critic" and is a sought-after consultant and coach who has spoken for Genentech, ReBoot Accelerator and a host of business associations, women's groups, parenting organizations and schools.

2010s

SCOTT DEUTSCH (MBA '16) is currently leading the expansion of Elliptic's worldwide sales organization and business development. With his focus on sales, marketing and engineering in the international arena, Deutsch has built large-scale operations in Asia, Europe and the Americas, and has critical experience engineering corporate acquisitions.

JENNIFER ELEMAN (B.A. '05, History & Sociology; MPA '09, Public Policy Development) is an educational specialist in the Monterey County Office of Education where she provides professional learning opportunities for teachers and plans civic learning opportunities for educators and students. Before her recent appointment, Eleman was an AP government teacher at John F. Kennedy School in Fremont, which included working alongside other Cal State East Bay history department alumni.

JOSEPH HARRELL (MBA '16) is the co-founder of CageChain, a blockchain technology and cryptocurrency research firm.

Harrell has been involved with the financial industry since 2009 when he started as a registered securities adviser and trader.

CONOR FOSTER (B.A. '13, History) recently began teaching U.S. Government, Economics and AP Psychology at Heritage High School in Brentwood, California.

CHERYL F. GLEASON (M.S. '13, Education) recently had a solo art show called "Nature in Transition" at Gallery 625 in Woodland, California, which featured her paintings and sculpture. Gleason's "up-cycled" mixed media works are primarily made from discarded wood, then embellished with metal, glass and other found objects.

EMILY KISTNER (B.A. '17, Theater Arts) recently performed in "Cabaret" at Great Star Theater in San Francisco with Tribe Productions. Kistner played Fraulein Kost in the Cal State East Bay production of "Cabaret" in winter 2017.

ALEXANDRA LEONG (M.A. '16, History) has begun a Ph.D. in comparative literature at the University of Minnesota and is also leading a seminar called "Late Modern Political Thought" in the university's political science department.

KATIE SCHOENRANK (B.A. '12, History; M.A. '16, History) has recently begun a public history Ph.D. program at the University of California, Riverside.

MORIAH ULINSKA (M.A. '16, History) has begun a joint program in public history at the University of California, Santa Barbara and Sacramento State, where she is researching liberation movements and minority community organizing. She is also involved in the Association for Moving Image Archiving, as its diversity chair, and is an organizing member of the Community Archiving Workshop.

In Memoriam

CHRISTOPHER FLOYD BILLINGTON (B.S. '89, Business Administration) of Montara, California, died Jan. 17 surrounded by family after a two-year battle with brain cancer. Billington was remembered as a devoted husband and father and known for his smile and positive outlook on life. Born in San Francisco, California, Billington graduated from high school in Newark, California, before pursuing his business degree from then-CSU-Hayward.

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PARTING SHOT

Lawrence Livemore National Laboratory's National Ignition Facility targets, the size of pencil erasers, contain two forms of hydrogen, deuterium and tritium. When heated by the NIF's powerful laser beams to more than 3 million degrees Celsius, the target implodes, fusing the atoms inside. GARVIN TSO

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