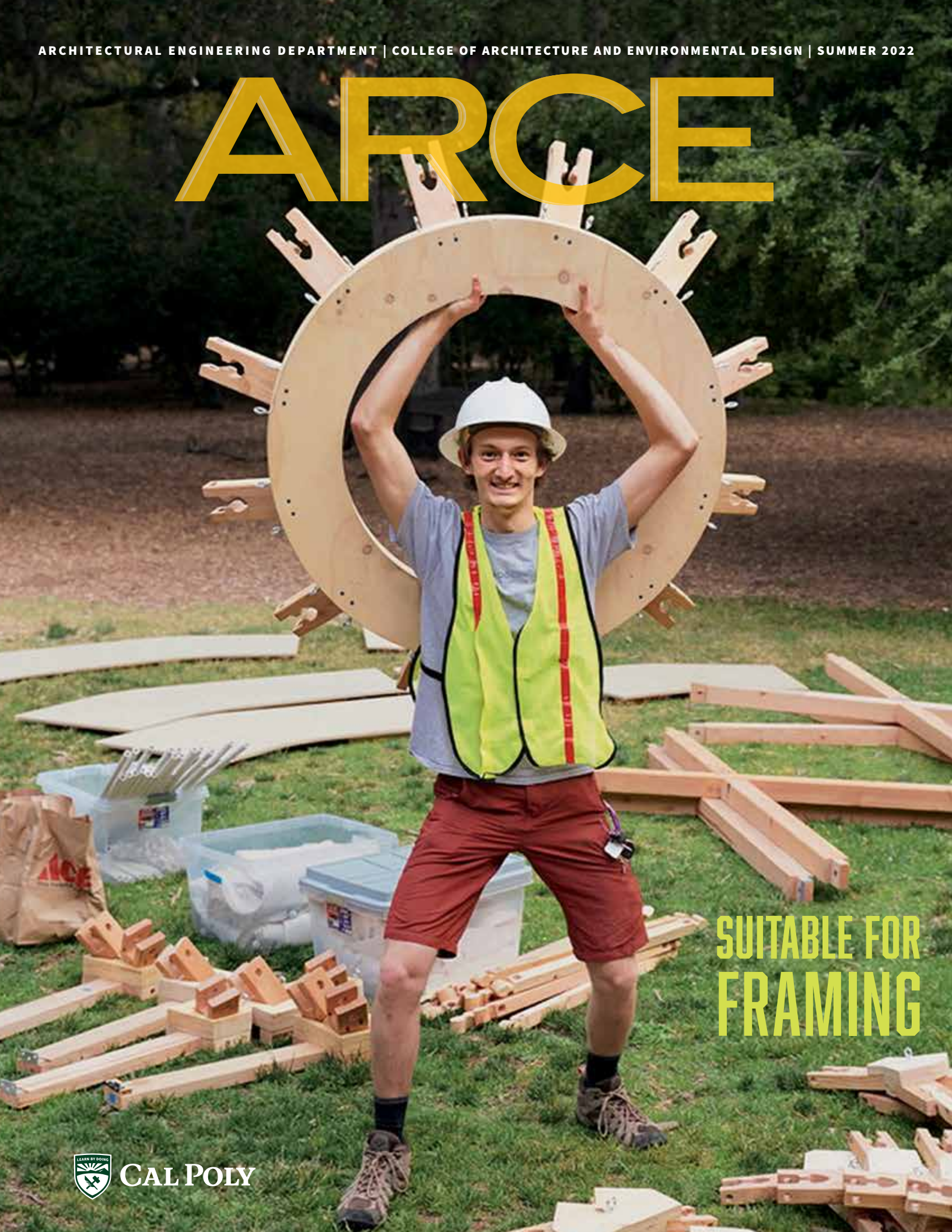
ARCHITECTURAL ENGINEERING DEPARTMENT | COLLEGE OF ARCHITECTURE AND ENVIRONMENTAL DESIGN | SUMMER 2022

ARCE



SUITABLE FOR FRAMING

CAL POLY

Department Head Al Estes gives a presentation to the staff and faculty at Vilnius Tech in Lithuania.

We're Back — and Energized

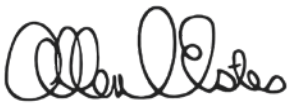
Recovering from a pandemic can be more difficult than the pandemic itself, as we witnessed this year when we returned to in-person classes, opened everything back up and resurrected activities that had been dormant for two years. As you will read in the following pages, we attended the SEAOC convention in San Diego, returned to Lithuania, conducted a scholarship luncheon and on-campus advisory board meetings, and resumed both the in-person graduation and the Order of the Engineer ceremony. I thank Labib Funk + Associates for sponsoring this post-pandemic edition of the ARCE magazine.

The students jumped back in with Structural Forum, SESH (Structural Engineering Students for Humanity) trips, seventh-week stretch barbecues, ARCE Prom, Senior Banquet, Thanksgiving lunch, end-of-quarter parties and lunchtime speakers. Nothing was easy, and if that was not enough, we are transitioning from quarters to semesters. The transition is set to take place in fall 2026.

With new lab equipment installed, generous lab support from Simpson Strong-Tie and the Structural Resilience Leaders Fund (thank you, Ashraf Habibullah), the faculty and students have taken on a multitude of very cool projects.

On a more personal note, I have announced that I will be retiring in January 2025. With a large number of the current faculty either retiring or on a reduced time base, I am committed to bringing some new faculty members into the department to allow a smooth transition in two-and-a-half years.

The pandemic has not yet allowed us to celebrate the 75th anniversary of this great department. I am pleased to announce that the grand celebration will take place on Nov. 4, 2023, at the Madonna Convention Center and is being sponsored by CSI. Save the date.



ALLEN C. ESTES | Ph.D. , PE (VIRGINIA) | DEPARTMENT HEAD

DEAN'S MESSAGE

ARCE Students, Faculty Share Their Knowledge and Passion Abroad

As I write this, Cal Poly's Structural Engineering Students for Humanity (SESH) and their faculty advisor, James Mwangi, are preparing to travel to Portoviejo, Ecuador, where they will join Miyamoto Relief to help create resilient bamboo structures that are sustainably sourced using innovative approaches to design and construction.

These types of multidimensional projects extend Learn by Doing beyond our campus and expand education into service. Students return to Cal Poly with new insights, eager to share their experiences and ready to take on global challenges.

Dean Christine Theodoropoulos

The inspired passion and impressive leadership of ARCE students are possible because of alumni, friends and dedicated faculty and staff who help us prepare the next generation of architectural engineers and provide them with opportunities that launch careers.

Thank you for all your support.

CHRISTINE THEODOROPOULOS | AIA, PE | DEAN
COLLEGE OF ARCHITECTURE AND ENVIRONMENTAL DESIGN

IN THIS ISSUE

ARCE MAGAZINE | SUMMER 2022
Your input and content contributions are welcome for this annual publication. Please contact Jamie O'Kane at 805-756-1314 or arce@calpoly.edu.

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▲ A dome project called the Center 4 Centering takes shape in the hands of a multidisciplinary team of students.

ON THE COVER
ARCE fourth-year student and Center 4 Centering team member Ryan Scharf stands amid structural elements for the dome prototype. Read about the project on Pages 20-21.

SAVE THE DATE

Department Schedules 75th Anniversary Bash

It is over a year away, but mark your calendar to attend the Architectural Engineering (ARCE) Department's 75th anniversary celebration on Nov. 4, 2023, at the Madonna Convention Center in San Luis Obispo.

Ashraf Habibullah, president and founder of CSI (Computers and Structures Inc.), has generously agreed to sponsor this historic event, which will include superb dining, fine wine, dancing to the Ashraf All-stars, tributes to the department's history, lavish surprises, Ashraf being Ashraf, and the world's best collection of students, faculty members, alumni, industry partners, and friends of the department.

"The pandemic may have delayed this celebration," said Department Head Al Estes, "but the wait will have been worth it. Thank you, Ashraf and CSI. I can't wait to celebrate. Save the date."

Goodbye, Quarters

CSU DIRECTS CAL POLY TO SWITCH TO SEMESTER SYSTEM BY 2026

Cal Poly, San Luis Obispo, the only remaining campus in the California State University on the quarter system, has been directed to convert to semesters by fall 2026.

While that might seem like a long way off, it leaves only a year and a half for individual programs to assess the current curriculum, develop a new one and finalize the plan. The remaining years will be used to rewrite course descriptions, publish a new catalog and create new articulation agreements.

"The Architectural Engineering (ARCE) Department used fall quarter 2021 to develop some guiding principles for this effort that align with our vision, mission, core values, program objectives and student outcomes," said ARCE Department Head Al Estes. "We solicited input from the faculty, students, college leadership and industry advisory board.

"During winter quarter, we formed five faculty teams and one student team to independently create a new curriculum," Estes continued. "At an end-of-quarter retreat, each faculty member offered two things they liked and two things they didn't like about each plan. We also assessed which guiding principles had been met with each and which were not well addressed."

The department aims to draft a consensus solution by the end of fall 2022. "So far, the preliminary results indicate that the new curriculum will be more evolutionary than revolutionary but will have some new and creative aspects," Estes said. ■

Annual Prom's Return

Wearing festive attire and broad smiles, dozens of students attended ARCE prom in May 2022. This prom was particularly special as many attendees had missed their high school prom due to the pandemic.

◀ **Joining the fun are (foreground from left): Hadiya Brown, Ian Phipps, Sasha Padilla and Isabella Jimenez-Melendrez. Background, from left: Ryan Scharf, Matthew Chung and Finn Burke.**

Structural Satisfaction

SECOND-YEAR STUDENTS POLISH THEIR TEAMWORK, DESIGN SKILLS

In an effort to celebrate the second-year students who spent their freshmen year at home, the department hosted a dinner in their honor in January. Students enjoyed an Italian dinner, had their freshmen photo taken, received T-shirts and conducted a centerpiece competition using K'nex pieces. The department thanks the Parents' Learn by Doing Fund for making this possible.

▲ **Celebrating their success (from left) are Ily Nelson, Lani Alo, Gianna Benedetti, Tristan Aranda, Roger Biddle, Elli Berger and Department Head Al Estes.**

▶ **Focused team members (from left) are Danny Shrestha, Brayden Martinez, Morgan Cuthbert, Gabriel Garfias and Peyton Hawley.**

Back With A Splash

Faculty, Students Welcome Return of In-Person SEAOC Conference

CAL POLY'S ARCHITECTURAL ENGINEERING (ARCE) Department sent a large, eager contingent to the Structural Engineering Association of California's (SEAOC) annual conference, held in September 2021 in Carlsbad, California.

Department Head Al Estes and Associate Professor Anahid Behrouzi accompanied five students and a former student to the annual conference, which attracts a large assembly of California's structural engineering community.

Behrouzi, master's student Faith Sharp and Claire Leader (Architectural Engineering, '21) presented a paper, "Considerations of Diversity, Equity and Inclusion in Advanced Structural Engineering Courses."

Jay Skaff, the 2021-22 president of Cal Poly's SEAOC student chapter, attended, along with Robert Hardwick, vice president; Tia Kelly, Structural Forum chair; and Sasha Padilla, outreach coordinator.

"Cal Poly's ARCE program is the only one to send students to the event year after year," Estes said. "As has become custom, our students assist with running the conference in exchange for free registration and access to all social events.

"The students attend technical sessions, network with potential employers, find guest speakers to invite to campus and get acquainted with the latest innovations from sponsoring vendors," Estes added.

The students are routinely recruited to participate in the event's President's Cup competition because of their "youthful exuberance and athletic ability," Estes said. This year's competition involved designing a boat using cardboard and duct tape and racing it across the swimming pool.

"Sadly, the boat built by Jay, Robert, Tia and Sasha sank," Estes explained. "However, Faith, who had interned with Buehler Structural Engineering and represented the central section, was on the winning team."

In another conference tradition, the ARCE Department hosted a reception for about 50 alumni and friends. Estes provided the group with department updates, including acquiring new

▲ **ARCE students Tia Kelly and Robert Hardwick's chances of winning the President's Cup competition sink with their boat.**

▶ **Top: Alumni, friends and students mingle at the ARCE-hosted reception.**

▶ **Left: Conference presenters (from left) include master's student Faith Sharp, Associate Professor Anahid Behrouzi and and ARCE alumna Claire Leader.**

▶ **Right: ARCE students (from left) Robert Hardwick, Sasha Padilla, Tia Kelly and Jay Skaff celebrate the Star Wars theme for SEAOC's dinner event.**

laboratory equipment, keeping labs open during the pandemic, the John Edmisten Global Travel Scholarship, and the department's upcoming 75th anniversary celebration.

The ARCE Department is grateful to Cal Poly's Instructionally Related Activities office, ARCE Parents' Learn by Doing Fund, ARCE Fund for Excellence, and the ARCE SEAOC Conference Support Fund that made the trip and these activities possible. ■


Ductility Is Damage

The 2022 Structural Forum's Focus:

'Fostering A Resilient Future'

ALTHOUGH ARCHITECTURAL ENGINEERING (ARCE) senior Tia Kelly faced unique challenges while planning this year's in-person Structural Forum, she is quick to credit its success to a team of student helpers.

"By no means did I do this alone," Kelly said. "I spearheaded a team of 35 amazing student volunteers who dedicated their evenings and weekends to assist in tasks such as designing the logo and making the table centerpieces. These students put in an enormous amount of effort; I owe the success of the event to their contributions."

As Structural Forum chair of the student chapter of the Structural Engineers Association of California (SEAOC), Kelly was tasked with organizing a large in-person event. "That was the most prevalent challenge when COVID-19 was still a concern," she said. "Luckily, SEAOC board members, advisor Peter Laursen and Department Head Al Estes helped guide decisions regarding COVID-19 and university safety protocols."

The theme "New Forms: Fostering a Resilient Future" was chosen to illustrate the variety of

▲ Guest speakers, flanked by SEAOC President Jay Skaff and Structural Forum Chair Tia Kelly, included aerospace engineer Emmanuel Grillos; Mar Structural Design founder David Mar; civil and structural engineer Janiele Maffei; and Estructure President Maryann Phipps.

◀ Guest speaker David Mar talked about Casa Adelante, an award-winning senior housing project in San Francisco.

professional opportunities available. "As structural engineers, it is our role to analyze our communities and proactively respond through new forms of strategy, collaboration and design," Kelly explained.

In selecting speakers for the event, Kelly found a unique group of diverse role models.

David Mar, founder of Mar Structural Design, presented on Casa Adelante, an award-winning affordable senior housing project in San Francisco. He spoke about designing for resiliency and his goal to achieve it without additional cost.

Civil and structural engineer Janiele Maffei presented on her role as California Earthquake Authority's chief mitigation officer and her experience with post-earthquake insurance.

Aerospace engineer Emmanuel Grillos, this year's "wild card" speaker, spoke on resiliency beyond structural engineering. Grillos, who served in the U.S. Air Force and at Boeing, is now at Blue Origin. He talked about his experience with flight vehicles and their sustainable aspects.

Estructure President Maryann Phipps, a leading structural engineer, delivered the evening's banquet keynote address, straying from the typical technical presentation. "She presented 'The Stories of Engineering and Life,' her touching personal story," Kelly said. "Her message was that life is full of opportunities, and what matters most is the relationships you make along the way."

Kelly was especially proud of the centerpieces that were created for the banquet by the Structural Forum Committee. "They were astonishing. They utilized the concept of tensegrity, which aims to create an impossible floating structure," she explained. "Kudos to the centerpiece team for their dedicated design and construction efforts!"

This year 54 industry sponsors attended the event, speaking to students about internships, career opportunities and the industry at large. "To my surprise, when registration opened in November, nearly 50 of these spots filled up with companies within the first 48 hours," Kelly said. "I didn't realize how sought after this event is to companies and how valued ARCE students are to the industry.

"It was a real highlight seeing the relationships between professionals — both old and new — in the room," Kelly continued. "It was nothing short of powerful and inspiring to our future generation. Over half of the company representatives that attended are Cal Poly graduates, exemplifying the one-of-a-kind ARCE bond that exists between the industry and Cal Poly." ■

▲ **The 54 dining table centerpieces, designed and made from scratch by this year's Structural Forum Committee, utilized fishing line so the tops appeared to be floating when seen in ambient dinner lighting. The students also incorporated the logo theme in the arms of the top and bottom pieces by using the shapes of the Burj Khalifa and Bank of China Tower.**

▲ The Structural Forum's career fair connects students and industry representatives.

◀ The 2022 team of student volunteers included (front row, from left): Dillon Schneider, Audrey Williams, Hayle Jones, Tia Kelly, Michelle Dennin, Elizabeth Claypool and Robert Rochel. Back row, from left: Jay Skaff, Evi Troulis, Cameron Grant, Kaylie Di Paola, Robert Hardwick and faculty advisor Peter Laursen.

THANK YOU, INDUSTRY SPONSORS

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2022-23 Scholarships

ARCE, COLLEGE OF ARCHITECTURE AND ENVIRONMENTAL DESIGN ANNOUNCE WINNERS

THE ARCHITECTURAL ENGINEERING (ARCE) Department awarded its top students a total of $69,000 in scholarships for the 2022-23 academic year. The scholarships were announced at ARCE's annual scholarship luncheon, held June 2 at the KTGY Gallery. Congratulations to Labib Funk + Associates for winning the coveted ARC'Y Award for the best congratulatory video.

"This year, as we resurrected and enjoyed and our annual scholarship luncheon, we recognized the hard work and accomplishments of our students, faculty and staff," said ARCE Department Head Al Estes. "We celebrated the end of the academic year and followed the ceremony with our annual Projects Day presentations."

The students listed here were awarded scholarships for the 2022-23 academic year.

ARCHITECTURAL ENGINEERING SCHOLARSHIPS

Carson Starkey Memorial Scholarship ($1,500) - Ana Atanassov

John W. Edmisten and Yvonne Y. Hsu Scholarship ($1,000) - Gracie Hoffman, Aidan Hughes, Jonathan Herrera, Jadyn Breien, Matthew Sloss

CYS Structural Engineering Eugene Cole Scholarship ($3,000) - Maria Boyle, Elizabeth Claypool

D'Abreau Family Foundation Scholarship ($3,000) - Kira Tolman, Evi Troulis

Emanuele Barelli Structural Engineering Scholarship ($1,050) - Calvin Vigeant

Forell/Elsesser Engineering Inc. Scholarship ($1,000) - Aaron Dewey

Hans Mager Scholarship ($1,200) - Tia Kelly

KNA Structural Engineers Senior Project Scholarship ($1,500) - Tebrez Khan

KPFF Consulting Engineers Scholarship ($1,500) - Kristofer Rickansrud

Labib Funk + Associates Scholarship ($1,500) - Maria Boyle

Riddle Scholarship ($1,500) - Albert Le

Paul F. Fratessa Memorial Scholarship ($1,000) - Kennedy Gomez

SGH Scholarship ($2,000) - Surina Marwaha

COLLEGE OF ARCHITECTURE AND ENVIRONMENTAL DESIGN SCHOLARSHIPS

Castagna Architectural Scholarship ($15,000) - Kennedy Gomez, Payton McGee

Robin L. Rossi Award ($1,000) - Gabriel Garfias, Zoe MacMillan, Loan My Nguyen

Herbert Collins Scholarship ($2,100) - Morgan Cuthbert, Gaspar Solorio, Lilla Vigh

Douglas James Martin Scholarship ($1,000) - Matthew Sloss

EXTERNAL SCHOLARSHIPS

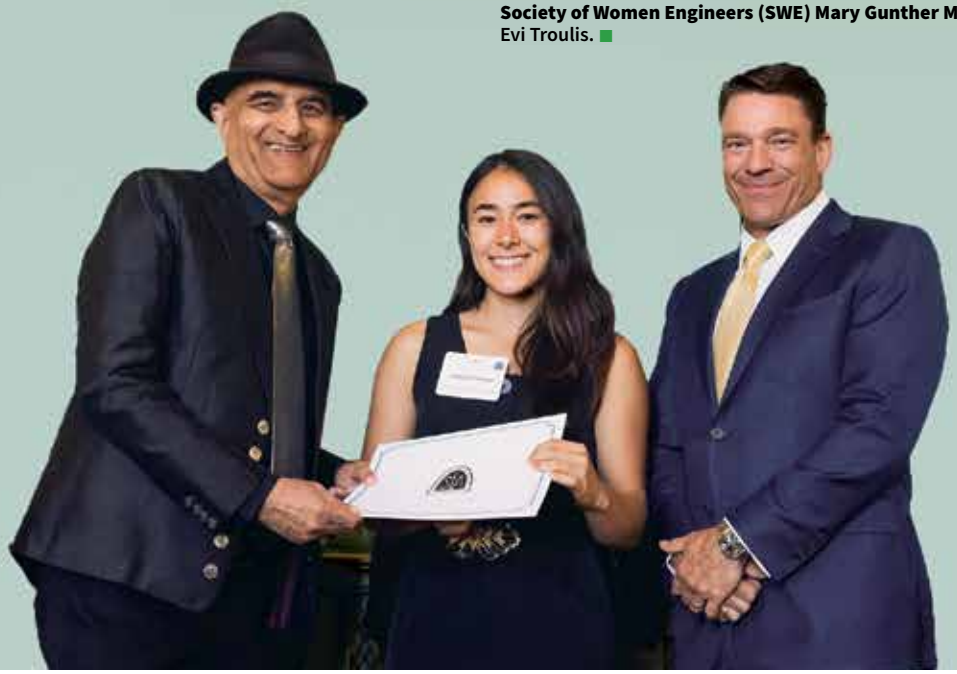
Structural Engineering Association of Southern California Scholarship (SEAOSC) ($2,000) - Maria Boyle

Forbes Scholarship ($1,000) – Alycia Darby

Concrete Reinforcing Steel (CRSI) Scholarship ($2,850) – Elizabeth Claypool

Structural Engineering Association of Northern California Scholarship (SEAONC) ($5,000) – Elizabeth Claypool

Society of Women Engineers (SWE) Mary Gunther Memorial Upperclass Scholarship ($7,000) – Evi Troulis. ■



◀ Elizabeth Claypool is awarded a $5,000 SEAONC Scholarship in San Francisco by Ashraf Habibullah (left), president and founder of Computers and Structures Inc., and SEAONC President Kevin Moore.

Woo-Hoo!

2022 Graduates Take Order of the Engineer Oath

AS A HOPEFUL SIGN that the post-pandemic recovery for this academic year is complete, the Architectural Engineering (ARCE) Department resumed its in-person Order of the Engineer ceremony prior to the university's June commencement.

The Order of the Engineer ceremony formally introduces the graduates to the structural engineering profession. It involves signing an oath, receiving a congratulatory certificate and placing a stainless steel ring on the pinkie finger of the graduates' working hand.

The ceremony, held in the Hasslein Courtyard, reminds the graduates of their professional responsibility to protect the public, serve society and preserve the planet. Department Head Al Estes addressed the graduates and assembled families, each student prepared a 280-character Tweet that was read as they crossed the stage, and ARCE Professor Ed Saliklis performed a heartfelt rendition of his songs "Goodbye Little Town SLO" and "Ordered Engineers."

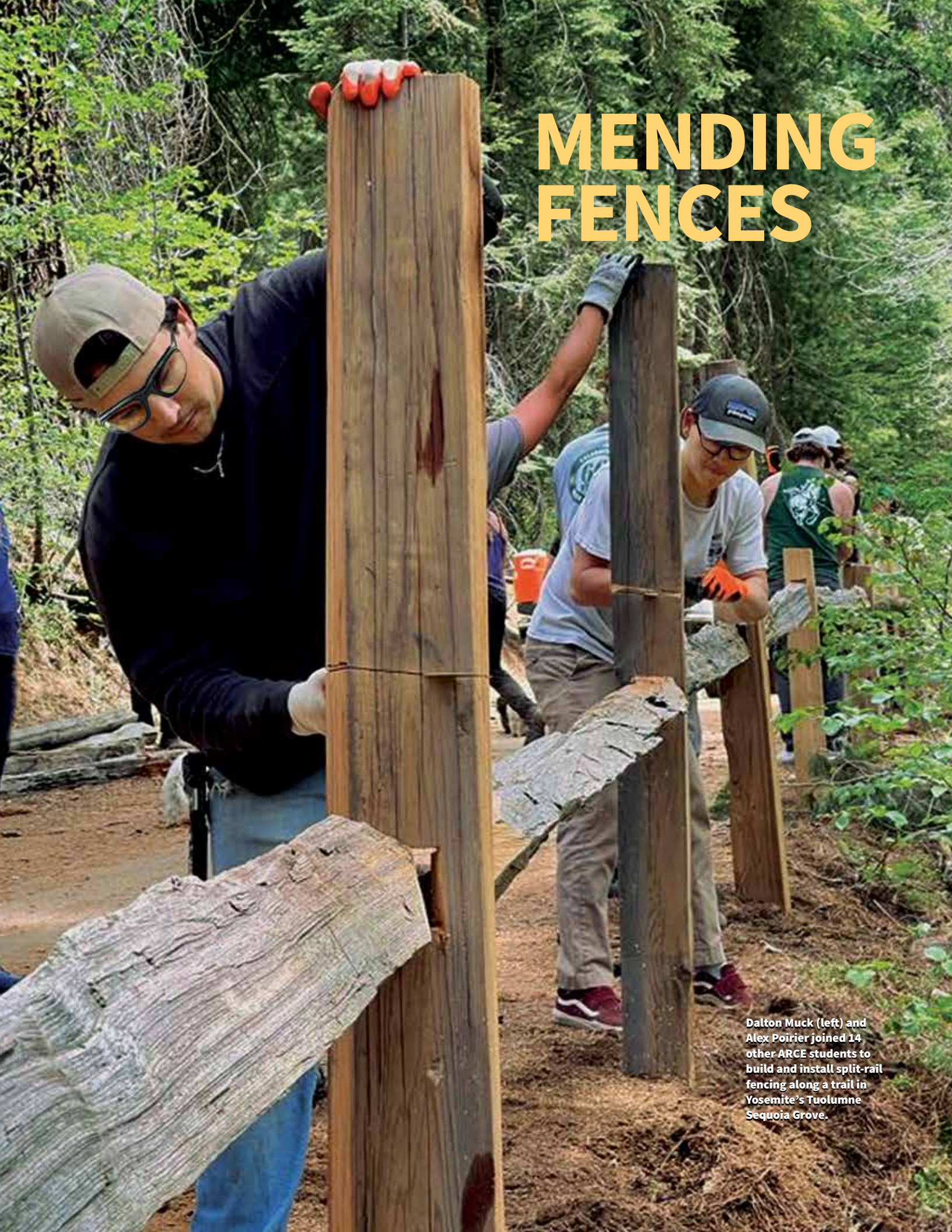
The department thanks Barrish-Pelham/Degenkolb for generously sponsoring this event. ■

▲ Left: With Professor Cole McDaniel looking on, ARCE Department Head Al Estes congratulates Blake Durham.

▲ Pinkie ring in place, Kaylee Hernandez takes the oath.

◀ Alexis Truong shares her excitement at the cermony.

MENDING FENCES



Dalton Muck (left) and Alex Poirier joined 14 other ARCE students to build and install split-rail fencing along a trail in Yosemite's Tuolumne Sequoia Grove.

ARCE Students Lend Hand With Yosemite Project

USING A COMBINATION of brute force and some engineering fundamentals, 16 architectural engineering (ARCE) students, led by senior Hayle Jones with Professor John Lawson, removed and replaced approximately 400 feet of damaged wood trail fencing in Yosemite National Park's Tuolumne Sequoia Grove.

The students, all members of the campus' Structural Engineers Association of California (SEAOC), built new cedar split-rail fencing using post-hole diggers, hand saws, reciprocating saws and sledgehammers. The opportunity was a part of the National Park Service's Volunteer-In-Parks program.

While working there, the students had a chance meeting with Raymond Neutra, whose famous architect father, Richard Neutra, pioneered International Style architecture. Raymond Neutra happened to be hiking past the work site and stopped to chat with the students about what it was like growing up and spending time in his dad's office during his most productive years.

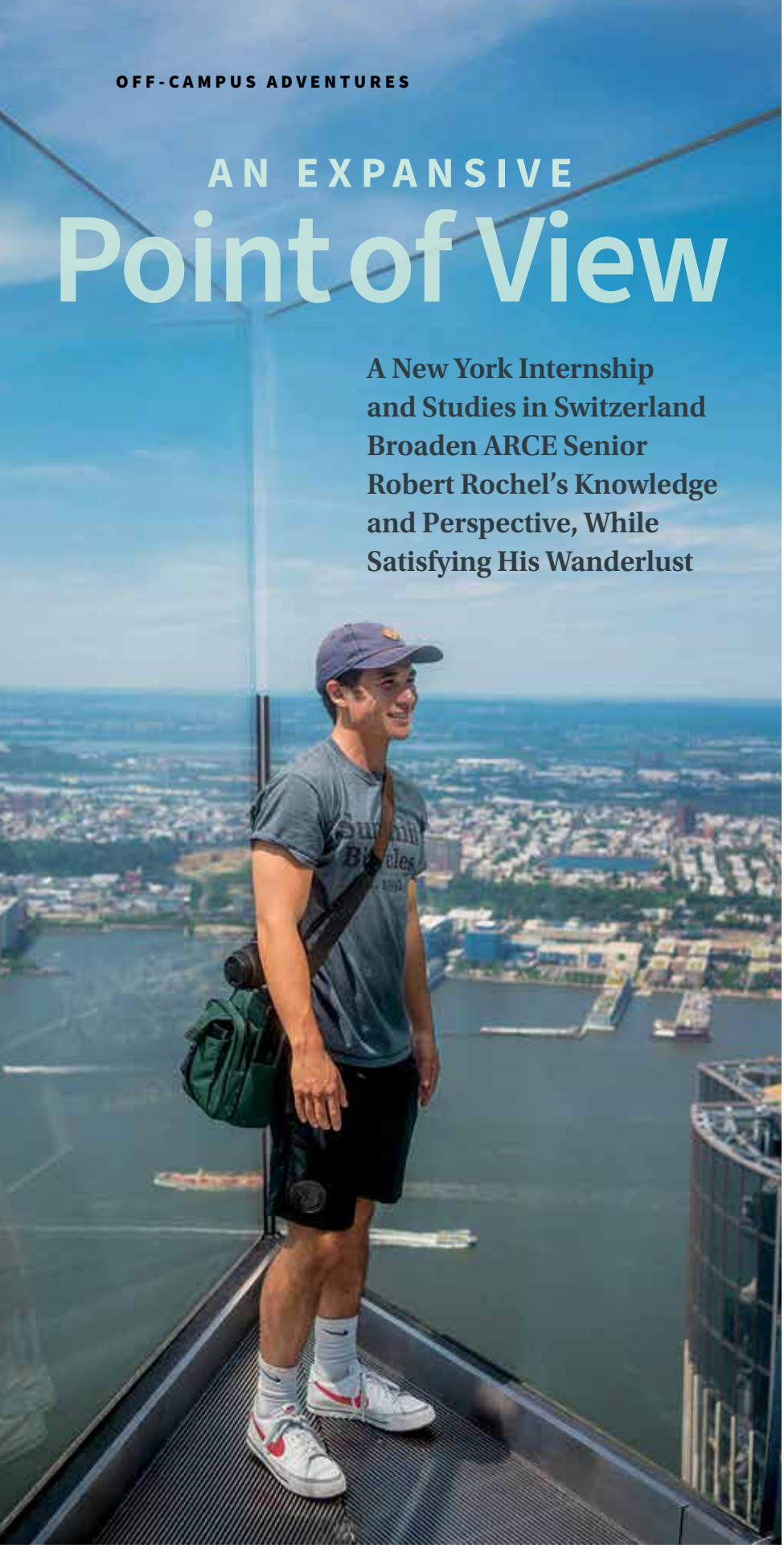
The students — some seasoned campers, some encountering their very first camping experience — worked hard and played hard during their four days of service. In addition to tent camping, they enjoyed strenuous hikes to summits and flowing waterfalls. ■

▲ **Top:** ARCE Professor John Lawson and the student volunteers pause to enjoy the national park's natural beauty.

▲ Raymond Neutra chats with students about his famous architect dad.

AN EXPANSIVE Point of View

A New York Internship and Studies in Switzerland Broaden ARCE Senior Robert Rochel's Knowledge and Perspective, While Satisfying His Wanderlust



THE ERA OF ONLINE LEARNING necessitated by the COVID-19 pandemic didn't stop architectural engineering (ARCE) senior Robert Rochel from seeking — and participating in — more immersive learning experiences, including an internship in New York and an exchange program in Switzerland.

Rochel served as a structural engineering intern at Gilsanz Murray Steficek LLP in New York City from June to August last year. While there, he produced design criteria, plans and calculations for new construction, as well as verified mechanical and structural steel designs and shop drawings. "I learned how to use different tools, especially industry-specific software," he said. "I also learned how to look at steel drawings and determine their correctness."

Rochel's internship was both enlightening and enjoyable. "It was a valuable experience," he said. "I realized that I still want to pursue structural engineering as a career, but I also want to explore other design projects, not just buildings. I learned how to collaborate with other engineers in an office setting and how to find effective solutions on my own."

Outside of work, Rochel enjoyed the New York experience, where he learned boxing at the pier, sailed on the Hudson and ate New York pizza.

"I always encourage ARCE students to move outside their comfort zones and take advantage of unique opportunities, especially when they are still young and unencumbered," said ARCE Department Head Al Estes. "Robert is a living example of this. Because he changed majors from physics into ARCE,

◀ **While interning in New York City, Robert Rochel enjoyed the nightlife and visited landmarks such as Edge, a skyscraper that boasts an 1,100-foot-high outdoor platform with glass walls.**

▲ **Top left: Attending Hochschule Luzern in Switzerland as an exchange student.**

▲ **Top right: Hanging out at Lake Zurich with new and old friends.**

▲ **Rochel also visited the historic landmark Salginatobel, a reinforced concrete arch bridge designed by Swiss civil engineer Robert Maillart.**

I was his faculty advisor. Despite the pandemic, he refused to give up on this adventure."

One month after completing his internship, Rochel embarked on an overseas program at Hochschule Luzern (Lucerne University of Applied Sciences and Arts) in Switzerland. He was joined by three other Cal Poly students, including his roommate, computer engineering senior Christian Rapp, and two mechanical engineering students.

"I had been seeking an experience abroad since I was a freshman," he said. "I wanted to go to become a better student — not just academically, but to better understand the world around me and to meet people from other cultures."

Mission accomplished. Rochel met and studied with architecture and engineering students from Chile, Denmark, Egypt, Germany, India, Mexico, Norway and Switzerland. "It was fun and interesting to interact with them," he said. "The experience exceeded my expectations because I didn't expect to meet so many people from other countries."

Rochel's classes were taught in English and German, a language Rochel is fluent in, thanks to his father's German roots. "The Swiss dialect was harder to understand than the high German I was taught. It was a fun challenge, though," he added.

While abroad, Rochel took full advantage of Switzerland's train system. "It was easy to travel to go skiing and hiking," he said. "The landscape is beautiful and rich with culture."

He also traveled to Austria, France and Italy and took an overnight train through Lichtenstein and Slovenia to Croatia. "The best part was being able to visit my grandparents in Leipzig, Germany, for my grandpa's birthday and Christmas. I used to spend my summers with them as a kid and have very fond memories of that time," he recalled.

Because of the pandemic, Rochel missed out on the ARCE Lithuania study abroad experience and was grateful for this opportunity.

"This experience has helped me to be more open-minded and thankful for what I have — and it has inspired me to travel even more," he said. "I encourage every student to jump at the chance to study abroad, no matter where it is. I would also like to thank ARCE Department Head Al Estes and the rest of the faculty for supporting me to make this experience possible." ■

Senior Anna Yamauchi Excels in the Classroom and On the Trails

CHAMPION MOUNTAIN BIKER and architectural engineering (ARCE) senior Anna Yamauchi doesn't run from challenges. Rather, she seems to seek them out.

The Truckee, California, native grew up riding bikes around her neighborhood; however, she didn't pick up the sport competitively until she broke her leg during her final year of competitive skiing.

"I grew up ski racing; it was my favorite sport," she said. "I shattered my femur skiing, and that ended my season early."

It also changed Yamauchi's life. "That year, I spent a lot of time on my bike as rehab, and I fell in love with the sport," she said. "When COVID-19 hit, the bike became an outlet for me again. My days consisted of Zoom class meetings and long rides. That first summer, my friend and I planned a bike-packing trip from Seattle to San Luis Obispo. We camped our way down the coast and rode around 100 miles every day for two weeks."

She placed third among professionals in her first mountain bike race, the 100-kilometer Tahoe Trail, in summer 2021. In the fall, she competed in the collegiate nationals, landing on the podium in every race she took part in.

"My team — two other Cal Poly students and me — won the relay race," Yamauchi said. "I also placed second in cross country, downhill and omnium races. In the dual slalom and short track, I came in third and fifth place, respectively."

Along with her victories, she has suffered her share of accidents and injuries.

"I've gotten two concussions," Yamauchi said. "They are a reminder that the sport is unforgiving. The challenging and dangerous nature of mountain biking is what makes the sport so special. Unfortunately, crashing is part of the sport and its progression. Overcoming those injuries and getting back on my bike helped me gain a newfound sense of confidence."

Even those humbling experiences had a silver lining. They've taught her the important role that mental attitude plays — not just in athletics but in life in general.

"Approaching difficult situations with the right optics is so important," Yamauchi said. "I've learned to shift my paradigm when races don't go well, crashes happen or things ultimately don't go my way. This has helped me with academics and challenges in life as well."

Yamauchi trains about 12 hours a week riding. She also lifts weights and practices yoga.

Student athletes must learn to manage their time well. "The rigorous course load of ARCE leaves students with very little free time, especially in upper-level design labs," she noted. "Ultimately,

▲ In April 2022, Anna Yamauchi participated in the U.S. Cup Cross-Country Olympics (XCO) in Fayetteville, Arizona, competing at C1 level for elites and juniors. U.S. Cup Series races are considered the highest level of professional cross-country mountain bike competition in the country.

school is my first priority; I have to be conscious of my schedule and stay motivated to meet deadlines. Training is a part-time job on top of school, but I enjoy the process and feel that time on my bike is a way to check out and escape for a bit."

Yamauchi said that getting enough sleep is her biggest obstacle. "When there's not enough time in the day to do everything, giving up some sleep is usually not a big deal," she said. "For athletes, sleep is when recovery and gains happen. I will shorten workouts and jam pack my day to make sure I get to bed on time."

Her strong initial results in competitions have left Yamauchi hungry for more. "I'm excited to push myself and train hard to reach the top step of the podium on the national level," she said. "I have the opportunity to compete against some of the best women in the world this upcoming season. I will be lining up on the start line with Olympians and world champions."

The sport is an outlet for Yamauchi. "It's where I feel most confident and comfortable," she said. "I feel truly myself and find the process of pushing myself addicting. It's meaningful to see my improvement and to challenge myself in such a pure and simple way." ■

▲ **Yamauchi hit the trails again in April 2022 for the Whiskey 50 Off-Road mountain bike race in Prescott, Arizona. Participants navigated dirt, gravel and paved roads, climbing as high as 6,600 feet.**

◀ **Wearing national champion jerseys and medals earned over three days of events, Yamauchi and another contestant celebrate their victories at the USA Cycling Collegiate Mountain Bike National championships, held in in Durango, Colorado, in October 2021.**

A Meditative, Artful Place

Not to Mention A Challenging One for the Designers and Builders

"I THOUGHT I WAS READY for a project like this. I've had a lot of experience leading teams to build something, but this project had a scale like no other."

So said fifth-year architectural engineering (ARCE) student Olek Piechaczek in describing his role leading a multidisciplinary team of students in designing and building the Center 4 Centering Dome Project, a 16-foot diameter prototype intended as a meditative space and an art installation.

In all, 16 architecture, mechanical engineering, construction management and ARCE students were involved in the project, inspired by students in architecture Professor Tom Fowler's and ARCE Professor Kevin Dong's ARCH 551: Interdisciplinary Building Design Studio course. The team collaborated closely with Center 4 Centering founder and artist Marcos Lutyens.

The vision was to develop an off-grid, sustainable retreat complex that combines spatial, audio and tactile qualities to create sensorial experiences that enhance self-awareness and healthy living while also embodying the best practices of conservation. The dome — when viewed from above — resembles a Dudleya flower.

▲ **Students from four departments teamed up to design and build the Center 4 Centering as a meditative space and art installation.**

◀ **While ARCE fifth-year student and team leader Olek Piechaczek found the project challenging, he declared it "the highlight of my time at Cal Poly."**

The project received the 2021-22 College of Architecture and Environmental Design Teacher and Student Scholar Award for $23,500 and was displayed at Descanso Gardens in Pasadena, California, to coincide with the Tonalism music event (https://www.dublab.com) in June.

From conception to installation, there was a flurry of behind-the-scenes activity. Piechaczek was joined by ARCE students Ryan Scharf and Lucas Brown, as well as architecture major Adam Albanese, in leading the other 12 students.

"On paper, the project seems simple: an outdoor meditation space," Piechaczek said. "However, the structure had to be semi-permanent, meaning the pieces have to be assembled and taken apart every time it's brought to a new location."

The team's main goals were to reduce complexity of the design, ensure structural

▲ **Architecture students Janice Wu and Adam Albanese, a team leader, adjust the connection joint for the dome.**

▶ **The team assembles the 16-foot diameter dome in a trial run on Dexter Lawn.**

integrity and improve ease of construction and deconstruction.

"In winter, we developed a design that met our parameters," he said. "We used Rhino for our 3D modeling needs. We reduced the total number of pieces from 308 to 84, and each of them were all the same length! By the end of the quarter, we had a scale model large enough to start looking at joint design."

For simplicity, the team — inspired by Japanese wood joinery — designed a joint that could be cut in one continuous motion, greatly reducing manufacturing time and improving the joints' quality.

In spring the team transitioned from Rhino to Fusion 360, software that no team member had experience with. "We taught ourselves how to use it in two weeks," Piechaczek said. "We managed to finish all our manufacturing designs by week five, then immediately started manufacturing at the CAED Support Shop. It was a grueling four-and-a-half weeks, with 14-plus hour days and entire weekends dedicated to finishing the project.

"We managed a trial assembly on Dexter Lawn during week 10," Piechaczek continued. "It was our first time putting all the pieces together, and we ran into many issues. It took us most of the day to finish; however, every problem we encountered, we solved before the final installation in Descanso Gardens."

That installation brought new concerns because it coincided with finals week.

"The install at Descanso Gardens was the Monday of finals week, but much of the preparation to install was accomplished the week and weekend before," Fowler said. "The timing was not great, but the students somehow balanced this intense project with getting ready for finals."

Fowler also credits students' ingenuity for making the unit easy to transport. "It's flat-packable, meaning that the total structure fits into a cargo van and takes about six people seven hours to install and about two hours to take down," he said.

Piechaczek spent 20 weeks working on the project, learning valuable lessons along the way.

"This project showed me my true limits, the importance of prototyping and the everlasting need for clear communication," he said. "Every step in this project was Learn by Doing. This is the highlight of my time at Cal Poly, and I loved every second." ■

THE CENTER 4 CENTERING TEAM

Faculty: Architectural engineering Professor Kevin Dong and Architecture Professor Thomas Fowler IV, FAIA (Fellow of the American Institute of Architects), DPACSA (Distinguished Professor, Association of Collegiate Schools of Architecture)

Team Leaders: Architectural engineering students Olek Piechaczek, Ryan Scharf, Lucas Brown; architecture student Adam Albanese.

Team Members: Architectural engineering students Edgar Pena, Surina Marwaha, Matthew Sloss; architecture students Naomi Brand, Anton Fender, Catherine Tumali, Janice Wu; construction management student Mason Canton; mechanical engineering students Berent Baysal, Michael Charronat, Jonathan Lam, Andrew Peterson.

FROM THE VAULT

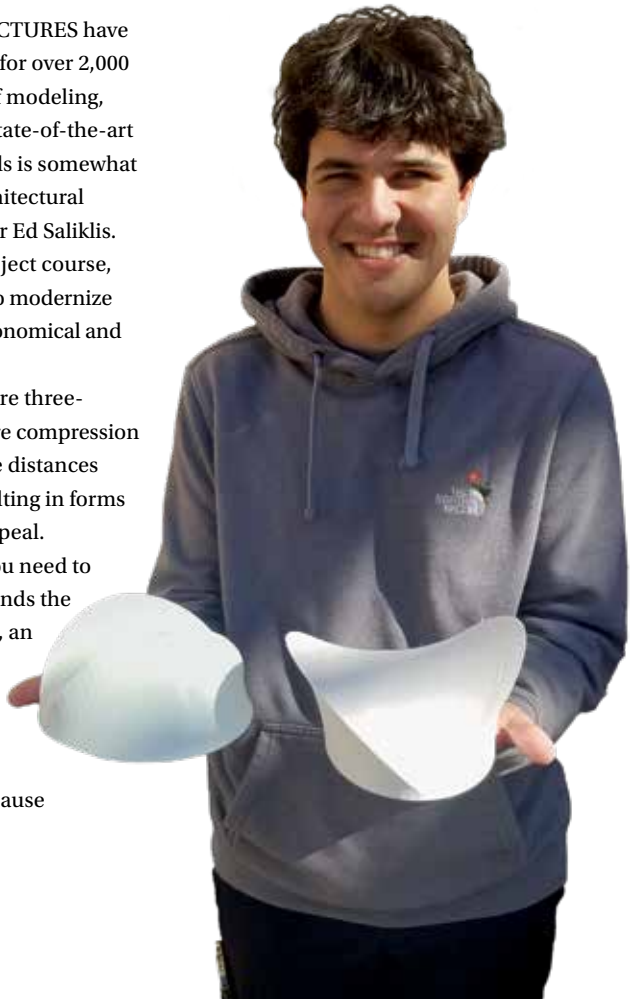
Centuries-Old Shell Structure Design Enjoys a Renaissance in Professor Ed Saliklis' Senior Project Class

VAULTED CONCRETE STRUCTURES have inspired designers and users for over 2,000 years. But the complexities of modeling, analyzing and constructing state-of-the-art thin reinforced concrete shells is somewhat of a lost art, according to architectural engineering (ARCE) Professor Ed Saliklis.

The ARCE 415 Senior Project course, led by Saliklis, is an attempt to modernize the realization of efficient, economical and elegant thin-shell structures.

Thin-shelled structures are three-dimensional, lightweight, pure compression structures that can span large distances using minimal material, resulting in forms with a graceful, sculptural appeal.

"To understand shells, you need to be an engineer who understands the mathematics of the load flow, an architect who understands the geometric challenges of designing a three-dimensional curvilinear shell, as well as a builder, because without building it, it's all just fantasy," Saliklis said. "In the ARCE Department, research on shells has been pedagogically driven for the past 10 years. We have sought to teach students about the three fundamental aspects of thin-shell design: form finding, form testing, form making."



FORM FINDING

Form finding is the creation of three-dimensional shapes, and it has recently garnered renewed interest, thanks to new technology. "Form finding of shells is experiencing a renaissance because of the popularity of the Grasshopper plugin within Rhino," Saliklis said. "An infinite

CONTINUED ON PAGE 24

▲ **ARCE 415 projects offer hands-on experience designing and building a thin-shell structure.**

◀ **ARCE senior Jay Skaff shares a couple of 3D-printed examples of form finding.**

▶ **Students assemble the new double-skin timber shell without nails, screws or glue.**


CAL POLY
TRI TEAM

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variety of curvilinear forms can be made fairly quickly. Even wildly irrational forms that have great aesthetic interest have found popularity in the YouTube world of form finding."

FORM TESTING

According to Saliklis, form testing has roots in the German tradition of the concrete roof.

"Today, such testing is typically a detailed finite element analysis, yet we always check our models via benchmarks of established theoretical membrane solutions for elementary shapes such as hemispheres and elliptical spheres," Saliklis explained. "These studies are of great importance to the students, and our undergraduates are exposed to these verifications in a guided and approachable manner."

Form testing also includes physical testing on experimental models.

"This is very challenging, and safety issues are paramount when large gravity loads are applied to experimental forms," Saliklis said. "Yet, obviously physical testing necessitates the creation of a real form, otherwise the experiment would remain digital."

◀ The forms undergo physical testing — an invaluable way to check their resilience.

▼ A computer graphic of gravity load flow lines overlaid on a photograph illustrates student analysis of the form.

FORM MAKING

"Form making is the most challenging aspect of thin-shell studies as it requires patience, skill and financial support," Saliklis continued. "Safety is again a primary concern when allowing students to actually build fairly large structures. The design and creation of efficient, economical and eco-friendly formwork is challenging. We have made great strides closing this entire loop."

Saliklis said that thin-shell structures are potentially resistant to seismic loads because they are very stiff and very light, factors that aid in creating a resilient structure.

"There are very few engineering programs that grapple with the typology of shell structures," Saliklis said. "For architectural engineering students to learn the role of analyst, designer and builder is a beautiful, empowering thing. Our polytechnic trained undergraduate students can indeed do this."

This project was supported through the Structural Resilience Leaders Fund created by Ashraf Habibullah and his company Computers and Structures Inc. ■

▲ **Top: Form making is the most challenging phase of thin-shell projects, according to Professor Saliklis, "as it requires patience, skill and financial support."**

▲ **Scan the QR code with your smartphone camera to donate to the Structural Resilience Leaders Fund.**

◀ **Grappling with shell constructability is an invaluable hands-on learning experience for the students.**

Making a Difference

DONATION ENSURES FUNDING FOR STRUCTURAL RESILIENCY PROJECTS

SEVERAL STRUCTURAL RESILIENCY projects are underway, thanks to Ashraf Habibullah, longtime friend of the Architectural Engineering (ARCE) Department and president and founder of Computers and Structures Inc., who last year signed a transformational $300,000 gift agreement with the College of Architecture and Environmental Design. Specifically, the CSI Structural Resiliency Leaders Fund supports faculty and student scholar efforts, including research, cocurricular activities, off-campus experiences, professional development and more. (See article: https://arce.calpoly.edu/arce-magazine.) Three promising research projects are featured here.

TIMBER BUCKLING RESTRAINED BRACE FRAME (TBRB)

ARCE graduate students Faith Sharp and Armando Castaneda are leading the charge on the TBRB project, which aims to produce a more cost-effective alternative to the buckling restrained brace frames (BRBFs) that were developed about 40 years ago.

"A traditional BRBF consists of a steel brace enclosed in a hollow steel tube filled with mortar," Sharp explained. "Steel is great in tension, but it buckles in compression. The steel tube filled with mortar helps restrain the core steel brace when it tries to buckle. This allows the brace to take on higher loads during earthquakes and perform significantly better than a typical steel brace."

Sharp and Castaneda, who are working with Professor Kevin Dong, are experimenting using timber — TBRB — instead of mortar and a hollow steel tube.

"Timber is inexpensive," Sharp said. "Existing BRBFs have a high price tag and can be overkill. In downtown San Luis Obispo, BRBFs were used to retrofit some two- and three-story masonry buildings. The capacity of these BRBFs were likely more than was needed — and so was the cost. We're hoping to introduce an appropriately scaled, economical alternative using renewable materials."

The TBRB project received $1,100 in grant money, which has been used to buy steel plates for the core brace and timber for beams, columns and braces. "This is enough material for eight full-scale tests — more if we reuse materials," she said. "We were able to keep costs down partially because we reused material from last year and used unclaimed material in the support shop. We're doing our best to reuse and repurpose where we believe it won't negatively impact the performance of the project."

▲ **With a helping hand from a shop assistant, ARCE graduate student Faith Sharp dado cuts one half of a timber sleeve to create a slot for the steel brace.**

As of press time, Sharp and Castaneda had completed all testing and found that the latest TBRB design behaved cyclically symmetric in tension and compression, meaning it has stable, reliable, and ductile behavior. The TBRB met ductility and drift requirements, based on codified BRB standards.

"The results are promising, and we are excited to share our findings with industry professionals at this year's SEAOC (Structural Engineering Association of California) Convention," Sharp said. "We are hoping that this is only the beginning for TBRB." ■

▶ Celebrating the finished brace are (clockwise, from left) Professor Kevin Dong, friends Gilbert Munoz and Jose Hernandez, and graduate student researcher Armando Castaneda.

▼ David Kempken, CAED Support Shop manager and structurally certified welder, attaches stiffener plates to the brace.

▲ Faith Sharp cuts steel plates that will serve as the brace to be sandwiched by the timber.

▶ The TBRB frame is erected and ready for clyclic testing.

BALLSY: AN AFFORDABLE ROLLING PENDULUM BASE ISOLATION SYSTEM WITH INCREASED SEISMIC PERFORMANCE

Fifth-year ARCE graduate students Andrew Hodge and Alexander Ameri are working on a base isolation system that they hope will offer better seismic performance of mid-rise buildings at a lower cost than the currently available proprietary systems.

"Oftentimes mid-rise buildings do not have the budget to incorporate base isolation because the specialized manufacturing process needed is expensive," Ameri said. "We hope to create a new, more affordable system to increase the structural resiliency of the built environment around us.

"Broadening access to base isolation by making it a common staple in many building projects is our goal," Ameri continued. "As structural engineers, familiarity with designing base isolation systems would become more common in both education and practice."

The students are grateful for the guidance that their advisor, Assistant Professor Michael Deigert, has provided. "He has helped us move forward with design, fabrication and analysis," Hodge said. "We're all incredibly invested in the project and enjoy working together. Professors Cole McDaniel and Peter Laursen have also assisted with the theory and calculations behind the scenes, as well as the instrumentation and testing procedure required for the shake table in the ARCE Seismic Lab."

The department's shake table allows the students to simulate seismic events, which tests the system in a realistic way. The students

▲ **Top (from left):** Andrew Hodge, project advisor Michael Deigert and Alexander Ameri show off the Ballsy prototype they designed and built.

▲ As a shop assistant stands by to help, Hodge (right) cuts plywood for the construction of concrete bearing bases.

▲ **Top left:** Hodge taps a hole in bottom steel plate to attach the high pressure hoses of the hydro-forming machine.

▲ **Top center:** Ameri forms the edges of hydro-formed pieces to embed in the concrete pedestals

▲ **Top right:** Hodge and Deigert place anchor bolts in wet concrete to provide an attachment connection.

▲ **Lower left:** Deigert tightens bolts of the student-built hydro-forming machine to bend spherical plates.

▲ **Lower right:** Ameri and Deigert construct forms for the concrete bases that support the steel spherical plates.

have accomplished their goal of constructing and testing a new prototype of the base isolation system.

"We spend up to 16 hours a week constructing specialized concrete formwork, transporting steel and other materials across campus to use special equipment in other departments, running the experimental hydroforming machine at high pressures to bend sheet metal to a specific curvature, mixing and pouring concrete, or testing our prototype on the shake table," Hodge said.

While hitting their quarterly goals, Hodge and Ameri have produced quality components for the project. "By the end of fall quarter, we had assembled and successfully utilized the machine necessary to produce the concave bearing surfaces of our pendulum base isolator," Ameri said. "By the end of winter quarter, we had manufactured our experimental rolling pendulum base isolation system and successfully conducted both scaled down tests with 3D-printed models and a full-scale initial test with the shake table."

According to Hodge, "The most rewarding part of the project is seeing the culmination of work produced by such a wide variety of resources. Our project would not be in its current state without the help of knowledgeable people and cutting-edge equipment. We've been able to cut steel with the water jet at the College of Engineering's Mustang 60 shop, develop innovative concepts designed by Ameri and me and the ARCE faculty, and pour concrete with the help of the Construction Management Department."

Hodge and Ameri have been awarded a $4,500 grant from the Structural Resiliency Council for their project, which is serving as their master's project in the ARCE blended program.

PROJECT UPDATE: TENSEGRITY PAVILION COMPLETED BY STUDENTS IN POLY CANYON

"Tensegrity is complete," architectural engineering senior William Adam said in reference to a team project first reported on in the 2021 ARCE magazine. (See https://arce.calpoly.edu/arce-magazine, Pages 16-17.)

The project — a pavilion in Poly Canyon — was conceived and built by Adam and fellow ARCE seniors Ivan Cruz, Jose Hernandez, Kasey Tatis and Truman Waller.

"After six months of lying dormant and stranded in the College of Agriculture and Environmental Design's (CAED) Support Shop yard, tensegrity is finally off the ground, literally," Adam said.

Adam credits the "tireless help" of shop staff members Dave Kempken, Tim Dieu and Vince Pauschek. "They voluntarily gave up their Saturday to help us complete the project, and they deserve special recognition for their expertise and kindness."

The students' efforts, which started in 2020, came to a fruitful end on Jan. 22, 2022. "Prior to the final installation day, the team had successfully placed concrete for footings and attached steel pyramid pillars that had been post-installed," explained Adam. "The pillars were to act as the final part of the load path down to the ground for this structure. Since all 18 tension rods needed to be installed at once for stability, a one-day installation was necessary."

To accomplish this, the students carefully planned the construction sequence, taking two days to prep materials and track down parts from the 2021 school year that needed to be redone, finished or fabricated.

"The structure's canopy was prefabricated upside down and had its upper shade system installed to increase rigidity and limit work that needed to be done during installation," Adam explained. "With a steel tab welded at its centroid, the canopy could be lifted onto the truck and transported to Poly Canyon. The 'gem' connections that made up the inverted pyramids of the structure were prefabricated with only one tube attached since sequencing would not allow for all of them to be prefabricated. With these parts completed and trucked to Poly Canyon, the canopy was lifted by a forklift and suspended in mid-air by straps and a steel tab welded at its centroid. This was carefully positioned until all of the tensile rods were able to be attached and welded into place. This planning and fabrication took a total of 16 hours, with the students finally leaving the canyon at 9:45 p.m. It was truly an exhausting yet rewarding day."

(Editor's Note: The department and students thank United Rentals for donating a flat-bed truck and forklift to aid in the installation of the pavilion.) ■

◀ After lowering the canopy to align with the steel pyramid pillars, the project team installed 18 tension rods, welding them in place.

◀ **Inset:** The tensegrity team's project specifications.

▶ The team connected the structure's intricate system of steel tension rods.

▼ The completed pavilion stands on campus in Poly Canyon.

▲ **Top:** Kasey Tatis uses an angle grinder to prep the surface of a pillar for welding.

▲ **Middle:** Jose Hernandez welds a tab in place.

▲ **Bottom:** Ivan Cruz places a post into its correct position.

PHOTOS BY MIN HO KIM

LEADING THE WAY

ARCE Alumni Hold Positions of Prominence in Industry Organizations

IF IT'S TRUE that one measure of the value of an academic program is how many of its graduates reach key leadership positions in the profession, Cal Poly's Architectural Engineering (ARCE) Department has earned some bragging rights. Currently several the of the university's ARCE alumni are occupying the highest ranks of noted structural engineering professional associations, including the National Council of Structural Engineers Associations (NCSEA) and the Structural Engineers Association of California (SEAOC). The ARCE Department is proud to profile four of these individuals in this issue of its magazine.

KENNETH D. O'DELL

Kenneth O'Dell ('89), principal at MHP Structural Engineers in Long Beach and current president of SEAOC, is one of those fortunate few who knew early on that he wanted to be a structural engineer. He landed at MHP after graduation and has been there ever since.

Starting as a project engineer, O'Dell progressed through engineering roles, including recruiting, overseeing human resources and now managing business development. "I've had an opportunity to learn about the profession and an opportunity to give back to the profession," he said.

Giving back includes membership on ARCE's Advisory Board and the College of Architecture and Environmental Design's Dean's Council, as well as his service as SEAOC president, which ends in September.

"SEAOC connects colleagues to share ideas and opportunities," O'Dell said. "I love my profession; I love what I do every day. Why wouldn't I want to share that passion with my colleagues throughout the state?"

O'Dell's involvement with SEAOC began in 1991, largely because one of MHP's principals was president of the Southern California region. "I started on a computer applications committee when we were going from shared desktop computers to large area networks," he recalled.

He has served on the Communications Committee at the regional and state levels and as chair of the statewide Communications Committee. "After my involvement with the Communications Committee, I was asked to join the board at the Southern California level," he said.

O'Dell serves the organization because engineers "don't operate in this industry" by themselves. "MHP cannot stand alone in negotiating the best outcome for a client," he said. "MHP brings collective experience of 40-plus employees; however, SEAOSC (Structural Engineers Association of Southern California) carries the voice of over 800 members.

"Taking clients a step further, I can say that SEAOC — the structural engineering profession and its voice of over 3, 000 members — provides the basis for validating an idea," O'Dell continued. "These organizations provide a huge value, but only if we're engaged. Being involved allows us to guide the conversation. I have been molded and impacted by learning from others. Hopefully my voice can help nurture the profession."

▲ **Top:** Ken O'Dell speaks at a SEAOC Conference in San Diego when he was installed as president.

▲ O'Dell and Michelle Kam-Biron (ARCE, '87) attend the ARCE-hosted reception in San Diego.

KRISTA LOOZA

SEAOC president-elect Krista Looza ('04), principal at Buehler Engineering Inc., has been involved in SEAOC since her undergraduate years at Cal Poly. She stays active in the organization, she said, because it offers continuous education and a sense of community, and it continues the profession.

"I learn from my SEAOC colleagues, and those experiences have impacted my career for the positive," Looza said. "We are a community, and it's great to share experiences and know that we are not alone in the struggles we face."

She became involved in SEAOC right after graduation. "A coworker who was president of SEAOCC (Structural Engineering Association of Central California) made sure that I got plugged in," Looza said. "That first year, I became chair of the Younger Member's Forum."

Looza has also previously served as SEAOC state director and SEAOCC president, and when her SEAOC president-elect term expires in October 2022, she will take over as state president.

As president-elect, she is working on defining the roles and responsibilities for SEAOC officers and directors and helping to develop SEAOC's vision for future SEAOC conventions.

Looza began her career as a project engineer, learning the different materials and working on a variety of project types. In 2015 Buehler decided to open a Los Angeles office with Looza at the helm.

"I had just completed one of the largest projects of my career at the Los Angeles International Airport and was ready for a new challenge," she said. "I took on opening the L.A. office, which entailed finding office space, negotiating leases, hiring and managing engineering staff, planning office events, handling business development and managing projects. It was a very busy time; I was stretched and stressed. But I began to hone my leadership and management skills."

Since returning to company headquarters in Sacramento, Looza finds her passion has shifted to "finding ways to improve our company to support our people. Buehler has always given me room to find my path and values my contributions," Looza said.

In January 2022, she was promoted to principal — Buehler's first female principal.

"I'm proud that I am Buehler's first female principal," she said. "I hope to help retain our diverse talent so that our company leadership will continue to diversify."

▲ **Top: Krista Looza, principal at Buehler Engineering, works with Bill Rader, S.E., senior principal (ARCE, '84).**

▲ **Looza (middle) joins other SEAOCC volunteers in Sacramento at a CREATE Mentor Trades Day for high school students.**

▲ Ed Quesenberry and his wife, Carla, attend the SEAOC conference in San Diego, in 2021.

▼ Under purple lights at a NCSEA conference in Anaheim are (from left): Kerry Volker ('86), Quesenberry, Bret Green ('90), Kevin DuMont ('89) and Carla Quesenberry.

ED QUESENBERRY

Quesenberry ('89) has served on the NCSEA board of directors in several capacities since 2017, including as director, treasurer and vice president and president. When his term as president ended in March 2022, he assumed the position of past president.

"My involvement in industry organizations has provided a deep sense of community in my professional life and afforded me the opportunity to give back to the profession that has given me so much," Quesenberry said. "I began my involvement with NCSEA as the delegate from the Structural Engineers Association of Oregon (SEAO) in 2011 and have been active since. I also served on the board of SEAO and was president of the Cal Poly student chapter of SEAOC in 1988. I might have a volunteering problem!"

Day to day, Quesenberry, principal/owner of Equilibrium Engineers LLC in Lake Oswego, Oregon, mentors staff and handles his firm's operations, business development and "… doing actual engineering. As my firm's name implies, I'm always trying to find a state of balance between my business responsibilities and my passion for structural design," he said. "I enjoy being able to see tangible evidence of my firm's work in the built environment around me. Not many professions have the level of tangibility that structural engineering does. I feel very lucky to have found such a fulfilling and fun career."

"Much like a structure, my career rests on a solid foundation that was formed at Cal Poly."

Quesenberry credits his success to "hard work plus counsel and encouragement from key mentors, advisors and most of all, my wife."

He also said that Cal Poly played a part. "The knowledge I gained at Cal Poly, specifically in ARCE, gave me a jump start by preparing me to be a productive design engineer on day one of work. Much like a structure, my career rests on a solid foundation that was formed at Cal Poly."

KELSEY PAROLINI

Parolini ('03), president of SEAOSC (Structural Engineers Association of Southern California) for 2021-22, was introduced to the organization while an undergraduate at Cal Poly.

"Although the club was smaller then, we had an active student chapter that promoted mentorship, networking and field trips," Parolini said. "Ultimately, this club gave me opportunities to step out of my comfort zone and lead as secretary and as Structural Forum chair — two positions I embraced and made my own."

After graduation, Parolini accepted a position at a local engineering firm and began the steps to become a California licensed structural engineer. "The transition into SEAOSC as an emerging professional wasn't automatic," she recalled. "Working in San Luis Obispo made regular participation in dinner meetings or committee work unrealistic. What led me back to SEAOSC was its technical expertise and educational opportunities. SEAOSC's technical expertise brought me in, but its community hooked me to become active.

"It has also given me opportunities to advocate for the profession, lead on a larger scale than my intimate office setting offers and speak at an array of forums," she continued. "SEAOSC has given me much more than I could ever give in return."

Parolini has served as a director on the boards of SEAOSC and SEAOC and as SEAOC board secretary.

"As association leaders, I believe it's our responsibility to assure the association remains relevant while fulfilling our vision and mission," Parolini said. "Each new event, public statement or publication must bring value to our members, the profession and/or the communities our structural engineers serve."

In 2011, Parolini helped establish SSG Structural Engineers in San Luis Obispo, California. She said that Learn by Doing — or trial by error — continues to serve her. "When I come across something that isn't working well, I set myself to making it better," she said.

Parolini has stayed connected to the ARCE Department as a part-time lecturer and most recently as a member of the ARCE Advisory Board.

She advises students, "Embrace your education, but be humble in the things you don't know. There will be many, and that is OK." ■

▲ **Left: Kelsey Parolini joins SEAOSC Treasurer Craig Chamberlain and President-Elect Patti Harburg-Petrich at a Women Working Together event.**

▲ **Parolini helped to establish SSG Structural Engineers in San Luis Obispo, where she works as a senior structural engineer.**

CATCHING UP WITH ALUMNI

CATCHING UP WITH ALUMNI features news submitted by alumni. Those listed earned B.S. degrees in architectural engineering, unless otherwise specified. They are listed chronologically by graduation year, then alphabetically.

1950s

Don Goldman ('59) is now retired after 50 years in the profession. He earned numerous design honor awards, a Sunset Magazine Award, and the Bob Mosher Lifetime Achievement Award. He was formerly licensed to practice in California and was a member of the National Council of Architectural Registration Boards.

1960s

Rafy Mamian ('65) writes that he is the proud parent of four children and 11 grandchildren.

Jeffery S. Wilson ('65) went to work in England, Italy and Germany after graduation. Upon returning to the States, he worked in San Francisco for a few years before moving to Alaska "during the crazy oil pipeline construction." After working a couple of years for an international company, Wilson earned his architecture license in 1973 in California, opening his own practice in 1977. He has since worked in four states. He is married with two grown children.

1980s

Bill Rader ('84) works in the Sacramento, California, office of Buehler Engineering Inc. Rader has been with Buehler for nearly 38 years. He is a senior principal with the firm and sits on its board of directors. He and his wife live in Folsom in a house they designed and built 16 years ago. They have two adult children and are still waiting for grandchildren. "Professionally it has been a great ride with many challenges and triumphs over the years and so many rewarding projects completed," he wrote. "There is nothing like seeing a project that you helped design finally completed. My studies at Cal Poly prepared me so well for my professional life. It was challenging and fun, and I got to meet some great people."

Henry T. Fairbairn ('86) writes: "After graduation I worked with fellow alumni Steve Schiller, Brett Nuttall and Carl Howe at Kevin Kelly and Associates, Santa Monica, California. I moved to Northern California in 1988 and worked at several firms in the Bay Area, including Tom Moore, Darrell Harris. In 1992, I started my own firm, Seismic Design Consultants, in Oakland. Today we are located in Alameda and have four employees working on retrofits, studies and new construction. I have professional memberships with SEAONC and ASCE."

▲ **Clockwise, from top left:**

Proud dad and granddad Rafy Mamian.

Henry Fairbairn launched his company, Seismic Design Consultants, in 1992.

Jeffrey Wilson got his architect's license in the 1970s and started his own practice.

Bill Rader has worked at Buehler Engineering for nearly four decades.

Leona Flores ('86) first went to work in the Laguna Beach/Laguna Niguel area as a licensed engineer, mostly on custom residential homes and light industrial projects. After 10 years, she switched directions, went back to school and earned a doctorate in biomedical sciences from UC San Diego. She went into scientific administration in cancer research as director of Research Development at UCSD and San Diego State University and now serves as executive director at the Salk Institute Cancer Center. She also did a six-year stint as a cancer journal associate editor. "All this time, I never lost my identity as a Cal Poly engineer, and while I'm not up to date on the latest codes (I have friends for that), I still know how structures should go together," she said.

Michelle Kam-Biron ('87) spent many years in structural engineering consulting before joining the WoodWorks team and then the American Wood Council. She authored and educated on wood construction in the U.S and internationally and represented the U.S. as an expert at conferences with Japan, Canada and the U.S. She led and implemented the first university student wood design and construction competition with Simpson Strong-Tie and the Binational Softwood Lumber Council in 2018 (https://youtu.be/09asPgEkESw). Cal Poly hosted — and won — the competition in 2019 (https://youtu.be/NKfvPC_OLYo). Kam-Biron recently joined Structurlam as a mass timber specialist to educate, promote and sell mass timber products.

▲ **Liz Mahlow and her partners recently celebrated the 10th anniversary of their company, Nous Engineering.**

She was the first woman president of the Structural Engineers Association of Southern California and the first SEAOSC woman in the Structural Engineers Association of California's College of Fellows in 2021. In 2022 she earned the Susan M. Frey National Council of Structural Engineers Association Educator Award. She has served on the ARCE Advisory Council and is on the College of Architecture and Environmental Design Dean's Leadership Council.

▲ **From top left:**

Leona Flores swapped engineering for cancer research and scientific administration work.

Michelle Kam-Biron shares her expertise in wood nationally and internationally.

Krista Looza was promoted to a principal position this year at Buehler Engineering.

2000s

Krista Looza ('04) was promoted this year to a principal position at Buehler Engineering Inc. — the firm's first female principal. She has worked at Buehler since graduating.

Liz Mahlow ('06) recently celebrated the 10-year anniversary of her company, Nous Engineering, with partners Matt Melnyk and Omar Garza. After working at BuroHappold, Mahlow is most proud of building a company that stands by its commitment to make a positive impact on the industry and the world. "Whether working on museums, schools, hospitals, offices or residences, Nous works hard to positively contribute to thriving and sustainable buildings and neighborhoods," she writes. The firm is based in downtown Los Angeles, with jobs as far away as Africa. She serves on the ARCE Advisory Council, LA Forum's Advisory Board and the Association for Women in Architecture and Design. Named a Los Angeles Business Journal's 2022 Woman of Influence, Mahlow recently welcomed her second child, Emma Lucia, into the world. "Needless to say, it has been a busy couple of years." she writes. ■

Professor Ed Saliklis' self protrait.

ED SALIKLIS RECEIVES NATIONAL ASCE GEORGE WINTER AWARD FOR HIS

Multifaceted Talent

THE AMERICAN SOCIETY of Civil Engineers has awarded architectural engineering (ARCE) Professor Ed Saliklis the national 2022 ASCE George Winter Award.

The honor recognizes "the achievements of an active structural engineering researcher, educator or practitioner who best typifies the late Dr. George Winter's humanistic approach to his profession: i.e., an equal concern for matters technical and social, for art as well as science, for soul as well as intellect."

ARCE Department Head Al Estes said, "This is great for Ed, great for ARCE, great for Cal Poly. The award was tailor made for Ed, who can teach an architecture studio in the morning and a graduate-level mechanics class in the afternoon. He sings, plays the ukulele, writes poetry and paints, while still finding time to author three engineering/architecture textbooks in the last five years."

The award will be formally presented to Saliklis at the 2023 ASCE Structures Congress in New Orleans in May. ■

ARCHITECTURAL ENGINEERING FACULTY AND STAFF trekked over Cuesta Grade last September for their annual retreat. Picutred in front of Atascadero's historic Administration Building are (from left): Kevin Dong, John Lawson, Brent Nuttall, Erika Clements (staff), Michael Deigert, Department Head Al Estes, Peter Laursen, Cole McDaniel, Radu Popescu, Anahid Behrouzi, Craig Baltimore, Jamie O'Kane (staff), Ed Saliklis and Dahlia Hafez.

A Return to Lithuania

▲ **Top: ARCE Department Head Al Estes with Professor Romualdas Kliukas, Vilnius Gediminas Technical University rector.**

▲ **ARCE faculty member Peter Laursen addresses the students at the Lithuania program's culminating banquet.**

ARCE FACULTY, STUDENTS PARTICIPATE IN SUMMER PROGRAM AT VILNIUS TECH

AFTER A TWO-YEAR COVID-19 hiatus, the six-week architectural engineering (ARCE) Lithuania summer program resumed at Vilnius Tech with 19 Cal Poly students plus three Lithuanian students and one Ukrainian student.

ARCE faculty members Peter Laursen and Brent Nuttall taught ARCE 302: Structural Analysis, ARCE 352: Structural Computing and ARCE 371: Structural Systems Laboratory, all of which boosts these students a quarter closer to graduation. Using funds from the Erasmus+ inter-institutional agreement for exchange of faculty, ARCE Department Head Al Estes spent a week in Vilnius teaching two classes to the students, making a presentation to the Vilnius Tech staff and faculty, and meeting with the university rector (president).

"This program, in its seventh iteration, has been a huge success, and we expect to expand it in 2024 with Professor Ed Saliklis teaching an interdisciplinary studio course to an additional cohort," Estes said. "The department continues to raise funds for the John Edmisten Global Travel Scholarship endowment that allows students with lesser financial means to participate in this great program." ■

▲ **ARCE faculty member Brent Nuttall visits the Hill of Witches during a three-day weekend excursion to the Baltic coast.**

JAMIE O'KANE RETURNS TO ARCE AFTER DAUGHTER'S BIRTH

THE ARCHITECTURAL ENGINEERING (ARCE) Department welcomed back administrative support assistant Jamie O'Kane in late February, following the birth of her second child, Penelope Mae O'Kane, on Oct. 20, 2021. O'Kane resumed working part time, mostly from home, where she lives with her husband, Jeremy, and 7-year-old son, John.

Although she "genuinely missed" her ARCE family, she is grateful to be able to work remotely. "I enjoy seeing my children experience something for the first time," she said. "I love watching them work through frustration and accomplish something. I love having the excuse to let loose, play and explore with them like I'm a kid again."

Department Head Al Estes has supported O'Kane's "tiered" return to work. "The ARCE Department's recognition of my ability to successfully work from home, as well as the shared ideal of a healthy work-life balance, has me feeling great about returning to work," she said. ■

ARCE loyalist Penelope Mae O'Kane.

Invaluable Advisors

ARCE ADVISORY BOARD MEMBERS STAND READY TO OFFER EXPERTISE

AFTER 18 MONTHS of virtual meetings, the Architectural Enginnering (ARCE) Department Advisory Board's semi-annual meetings resumed on campus in fall 2021 and spring 2022.

"The board provided great advice on everything from accreditation and inter-disciplinary collaboration to pandemic lessons learned and the quarter-to-semester transition," said Al Estes, ARCE department head. "The spring meeting included a joint advisory board session with the Construction Management Department's board, which was meeting at the same time."

Current ARCE Advisory Board members include Margaux Burkholder (past chair), Walter P. Moore; Steve Pelham, Barrish-Pelham; Matt Melcher, Lionakis; Randy Collins, FTF Engineering; Liz Mahlow, Nous Engineering; Abe Lynn, Degenkolb; David Cocke, Structural Focus; Damon Ho (chair), Simpson Strong-Tie; Sharon Gookin, LA Metro; Peter Sokoloff, Foster + Partners; Mehran Pourzanjani, Saiful Bouquet Structural Engineering; Janiele Maffei, California Earthquake Authority; Evan Reis, Reis Consulting; Amber Freund, RISA; Kelsey Parolini, Smith Structural Group; Krista Looza, Buehler Engineering; Dick Dreyer, Holmes Structural; and Thomas Robinson, Lever Architecture. ■

▲ **Top: In spring 2022, guest Ken O'Dell (left) joins 2021-22 ARCE Advisory Board members (from left) Damon Ho, Krista Looza, Kelsey Parolini, Amber Freund, Thomas Robinson, Margaux Burkholder, Steve Pelham, Dick Dreyer, Abe Lynn, Janiele Maffei, Randy Collins, Sharon Gookin, Matt Melcher, Peter Sokolov, Department Head Al Estes and Mehran Pourzanjani.**

▲ **ARCE senior Elizabeth Claypool describes the ongoing shear wall test with board members (from left) Steve Pelham, Margaux Burkholder, Peter Sokoloff and Sharon Gookin during their fall 2021 visit to the ARCE High-Bay Lab.**

AWARD-WINNING FIRM WELCOMES ARCE GRADUATES TO ITS WORKFORCE

▼ **The Orum Residence, a luxury home designed with three "blades" radiating from a single node, required custom-tapered steel beams to meet performance and depth requirements.**

PHOTO: MATTHEW MOMBERGER COURTESY SPF:A

AWARD-WINNING STRUCTURAL design firm Labib Funk & Associates (LFA) knows that its greatest asset is its people — including many Cal Poly architectural engineering (ARCE) graduates — and considers development of its team its most important endeavor.

Since its inception in 2003, LFA's growth has allowed it to continuously hone its engineers, new and seasoned, through experience on contemporary and diversified engineering projects.

The company, headquartered in El Segundo, California, offers vertically integrated structural, civil and shoring consulting services. LFA is a leader across all sectors: commercial, hospitality, multifamily, affordable housing and high-end single family homes.

The firm's key growth periods correlate to the expansion of the management and ownership team, which has a broad spectrum of industry experience, including larger ground-up development, institutional design, seismic retrofit and performance-based design. Its diverse clientele has made LFA highly resilient to market fluctuations, while its expertise has allowed it to build an extensive portfolio of projects, including West Edge Office Tower and Residential Complex, Sofi Stadium and Lakers' and Clippers' training facilities.

LFA, an avid supporter of ARCE's Structural Forum, shares the university's Learn by Doing philosophy. Perhaps that's why many graduates come for internships and stay for the long haul.

"Interns and grads recognize quickly that they are key team members and not just cogs in a wheel," said Associate Marya Nabhani, S.E. (Architectural Engineering, '08). "LFA provides an environment that offers engineers the coveted opportunity to evolve personally and professionally, own and manage projects, and meet structural challenges with solutions that are at the cusp of the industry."

Alumnus Mike Duby, P.E. (M.S., Architectural Engineering, '15), interned with LFA before returning full time. Seven years in, he's worked on several

▲ **From left: John Labib, S.E., along with ARCE alumni who have landed rewarding careers at LFA: Michael Ayers (’21); Mike Duby (M.S., ’15); Ross Klein (’11); Marya Nabhani (’08); Joe Thompson (’10); Kevin Towers (’11); and Julianne Vergne (’20).**
COURTESY LFA

▶ **Top: 8888 Washington is a sleek, steel-framed office building with a robotically operated parking garage.**
COURTESY ABRAMSON ARCHITECTS

▶ **Center: The UCLA Health Training Center serves as the Lakers’ headquarters and a state-of-the-art health and practice facility.**
© ROSSETTI JAMES STEINKAMP

▶ **Bottom: LFA rebuilt the Xavier Center at Loyola High School of Los Angeles, transforming it into the 26,188-square-foot Caruso Hall, which boasts operable walls that transform the Grand Hall into three separate rooms.**
KFA ARCHITECTURE AND ARCHLENZ PHOTOGRAPHY

challenging and rewarding projects, including 8888 Washington, a sleek, steel-framed office building with a robotically operated parking garage. He also worked on The Watermark at Westwood Village, retrofit of a non-ductile concrete high-rise building, and The District, an adaptive reuse project that turned the 100-year-old Douglas Aircraft Co. manufacturing plant into new headquarters for Beyond Meat and L’Oréal.

Duby feels his professional development at LFA mirrors his growth as a student. “Cal Poly’s Learn by Doing attitude remains a pivotal aspect of my experience at LFA,” he said. “Because of the diverse project types and collaboration, I am constantly sharpening my engineering skill sets and developing relationships with my fellow team members, designers, builders and clients.”

Similarly, Joe Thompson, P.E. (Architectural Engineering, ’10), began as a project engineer at LFA before growing into his role as director of single-family residences. Over the past 11 years, he’s worked on a wide range of projects, including small commercial seismic upgrades, tenant improvement projects, multifamily apartments and custom homes larger than 20,000 square feet. His favorite remains the award-winning Orum Residence, an extensive luxury home comprised of three “blades” radiating from a single node.

“Orum was a challenging hilltop project that required custom-tapered steel beams to meet depth and performance requirements, 45-foot-high excavations, a retaining wall and triangularly-oriented building wings with six axes of excitation for lateral forces,” Thompson said. “Despite the complexity, it was an extremely rewarding project.”

LFA creates a solid foundation for early professional development by exposing its engineers to vastly diverse experiences.

“These early years for graduates are critical, and LFA’s dynamic workplace and project portfolio encourage growth and resilience,” said John Labib, S.E. “Its collaborative environment and project management structure allow team members to work with several managers on different teams with various specializations to help them round out their experience.”

LFA knows that balancing work with play is equally important, offering employees flexible schedules, social events and educational opportunities.

As LFA continues to grow, it welcomes new ARCE graduates to its team. According to alumnus and Senior Project Engineer Ross Klein, P.E. (Architectural Engineering, ’11), “ARCE grads have become some of our most successful players due to their profound curiosity and dedication. They never fail to improve the world around them.” ■

PREVIOUSLY PROFILED COMPANIES, IN ORDER OF MOST RECENT:

SIMPSON STRONG-TIE
ZFA STRUCTURAL ENGINEERS
BUEHLER ENGINEERING INC.
HOLMES STRUCTURES
STRANDBERG ENGINEERING
COMPUTER AND STRUCTURES INC.
MHP INC. STRUCTURAL ENGINEERS
J. LOHR VINEYARDS AND WINES
NUCOR CORP.
FLUOR CORP.
KPFF CONSULTING ENGINEERS
DEGENKOLB ENGINEERS
BARRISH PELHAM & ASSOCIATES INC.
JOHN A. MARTIN & ASSOCIATES

CAL POLY
Architectural Engineering
COLLEGE OF ARCHITECTURE
& ENVIRONMENTAL DESIGN

California Polytechnic State University
1 Grand Avenue
San Luis Obispo, CA 93407-0281

Can Do!

CANSTRUCTION COMPETITION IS A WIN-WIN FOR STUDENTS, COMMUNITY FOOD BANKS

A TEAM OF CAL POLY ARCHITECTURAL ENGINEERING STUDENTS won the 2022 Architectural Engineering Institute's Student Chapter CanStruction Competition for their project, "The Bridge Khalifa — Bridging the Gap Between College Students and Their Community." The competition encourages student chapters to have fun and create donations for their local food banks. The students built the 9-foot-wide by 1.5-foot-tall structure — an arching bridge in front of the city skyline over a sea of canned tuna — with 405 cans, rubber bands, wire and packing tape. The winning team included fourth-year students Garrett Barker (pictured), Michelle Dennin (pictured), Cameron Grant, Alex Poirier, Dillon Schneider, Jay Skaff, and Audrey Williams; third-year student Hayle Jones; and second-year student Lilla Vigh.