

ARCE

LEARNING CURVE



CAL POLY

Staying Busy with Learn by Doing — and So Much More

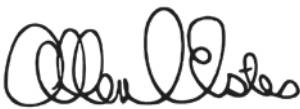
The pandemic is over, yet we continue to feel some of the lingering effects. But as my photo indicates, the world has completely opened back up. This edition of the magazine provides ample proof, as you will read about alumni receptions, an on-campus class reunion, conference attendances, student competitions, advisory board meetings, field trips and global travel.

This has been an eventful year, with the added thrills of transitioning from quarters to semesters, trying to replace faculty who have retired and planning a memorable and monumental 75th anniversary bash. We have started a faculty search for a new department head to succeed me when I retire in fall 2024.

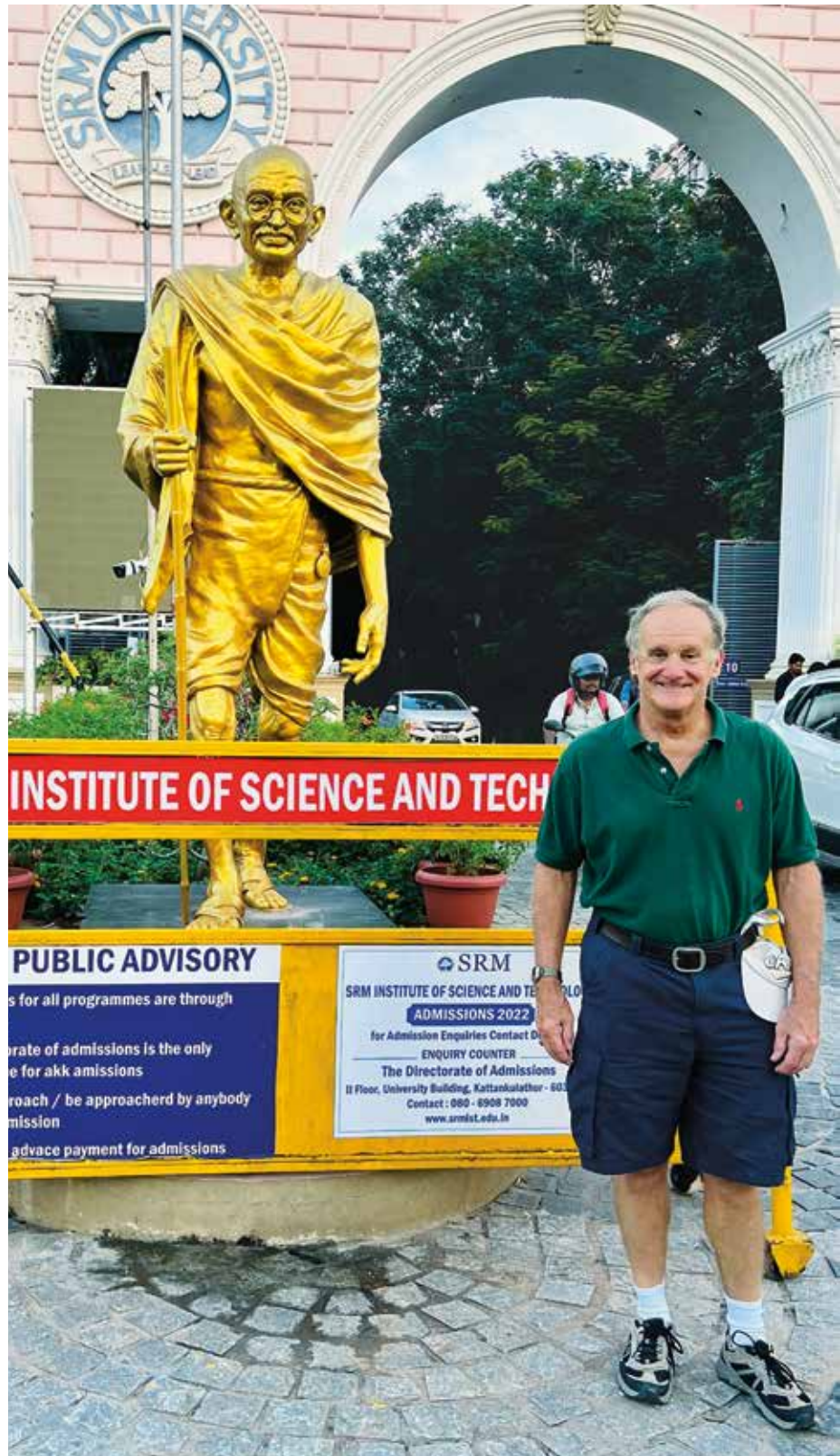
My thanks to MKM for hiring so many architectural engineering (ARCE) graduates and sponsoring this edition of the ARCE magazine. We remain grateful for the Structural Resiliency Leaders fund that has allowed both faculty and students to participate in research and promote creativity in the classroom. We also thank all those parents, alumni, industry partners and friends who have continued to give generously, renew lab sponsorships, provide scholarships and support specific activities. We could never have accomplished so much without you.

The low point of the year was the tragic loss of ARCE freshman Sean Hillman in a bicycle accident. A high point was ARCE Professor Ed Saliklis being presented with the George Winter Award at the ASCE (American Society of Civil Engineers) annual conference in New Orleans. And there was so much in between, so please read on.

I took a sabbatical during winter quarter and am grateful to Professor Brent Nuttall for serving so ably as the department head in my absence. I want to personally thank Christine Theodoropoulos, who retired as the College of Architecture and Environmental Design dean. She worked tirelessly and provided dedicated leadership to this college for over a decade, and we all wish her the very best in retirement.



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



Al Estes attended an engineering program accreditation visit to Chennai, India, in fall 2022.

Bidding Farewell with Fondness and Pride for the College, Students

As I reflect on where the College of Architecture and Environmental Design (CAED) stands today, I take pride in our shared commitment to students.

In shops, labs, Poly Canyon and beyond, it is inspiring to see students designing, building and testing structures, mentoring their peers and engaging with practitioners. They are eager to learn and excited to innovate as members of creative teams, as members of their communities and through humanitarian service. I am especially proud of architectural engineering (ARCE) student leaders for all they do to enrich our programs and promote a supportive learning community.

Everyday ARCE faculty create Learn by Doing experiences. ARCE's project-based labs embrace a pedagogy common to all CAED disciplines where students simulate the processes practitioners use to plan, design, engineer and manage projects. And through senior projects and research assistantships, faculty create opportunities for students to become scholars who ask and answer real-world questions.

Hands-on experimentation is a hallmark of CAED teaching. It leads students to discoveries that become those "ah ha" moments they will never forget. There is a special sound a class makes when the models they carefully designed and lovingly constructed are tested



Dean Emeritus Christine Theodoropoulos retired in August.

to failure — a mixture of oohs and aahs, laughter and groans that brings joy to students and makes a teacher's day.

I would like to thank the generations of ARCE students, faculty, staff, alumni, friends and partners who, for 75 years, have contributed to the impressive achievements that make the CAED a premier institution in California and the nation, preparing students for leadership roles in professions that shape the built environment.

The opportunity to serve as dean of the CAED has been a true privilege for which I am deeply grateful. I look forward to staying connected. Best wishes!

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

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ON THE COVER

Fourth-year ARCE student Avery Bunting shows off the in-progress radio telescope project that she collaborated on researching, designing and building with fourth-year ARCE student Kira Tolman and fourth-year electrical engineering senior Jack McGuigan. Read about the interdisciplinary team's work on pages 16-17.

ARCE MAGAZINE | SUMMER 2023

We welcome your content contributions for this annual publication. Please contact Jamie O'Kane at 805-756-1314 or arce@calpoly.edu.

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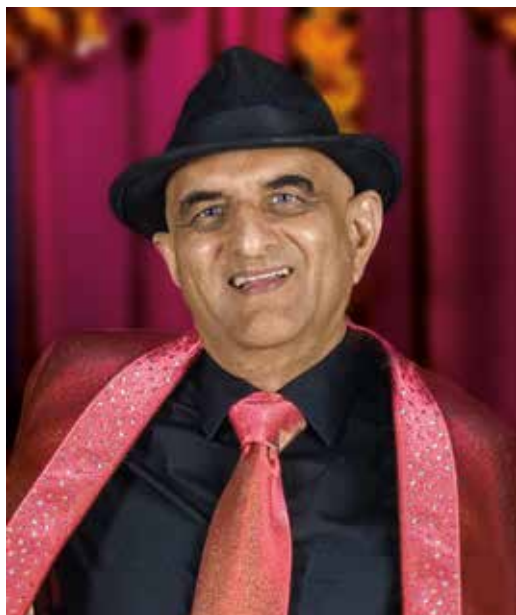
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Celebration Time — Come On!



CSI President and CEO Ashraf Habibullah, a longtime ARCE friend, is sponsoring the event.

Register Now for Department's Special 75th Anniversary Gala at the Madonna Inn

ARCHITECTURAL ENGINEERING (ARCE) Department Head Al Estes invites all alumni to ARCE's 75th anniversary gala at 5 p.m. Saturday, Nov. 4, 2023.

"Reunite and reminisce with classmates, friends and faculty as we look back on 75 extraordinary years at Cal Poly, catch up on current achievements and see what's ahead for our distinguished department," Estes said.

The extravagant reception will be generously sponsored by Computers and Structures Inc. (CSI) and will fill the Madonna Inn Expo Center in San Luis Obispo. A fun-filled evening of dancing, food, drinks and celebration is planned

▲ ARCE students are among the guests at a festive CSI event in the San Francisco Bay Area.

with ARCE's stellar students, honored alumni and esteemed faculty.

Purchase tickets at bit.ly/45eXewc or by scanning the QR code. Seating is limited, so get your tickets now. For details, email arce@calpoly.edu or call 805-756-1314.

Estes encourages everyone to forward news of the event to reach as many ARCE alumni, donors and friends as possible.

"We hope to see you at our landmark celebration," he said. ■



Finding A Better Way

The Efforts Behind Switching from Quarter to Semester System

IN FALL 2021, Cal Poly was given five years to complete the transition from the quarter system to semesters (Q2S). Because the initial plan was due in a scant 16 months, the Architectural Engineering (ARCE) Department dug right in.

“When we started, we reviewed the literature and asked people who had recently made the same transition for their methodology on how to make the transition, but none was available,” said ARCE Department Head Al Estes. “So we developed a methodology, published a paper on it and presented it in June at the 2023 American Society for Engineering

Education conference in Baltimore. It includes a systematic series and parallel, step-by-step process that other programs can use in the future.

“The serial steps started with the literature review and consultation with similar Q2S programs. Using our vision, mission, core values and program objectives, we sought input from faculty, students, the ARCE Advisory Board, college and university to develop guiding principles for this new curriculum,” Estes continued.

The department formed six teams — five faculty and one student — to develop six unique and independent solutions.

“After analyzing, assessing and comparing each solution, we consolidated the results into a single strawman solution,” Estes explained. “Through a formalized process of motions for change and considerable debate, a single solution evolved and was approved and submitted

by the faculty. The steps proceeding in parallel were consulting with other departments that provide support courses, implementing the evolving guidance coming from the university and joining those various higher-level committees that were making critical decisions. Finally, we evaluated our proposed curriculum using our guiding principles.

“Essentially we had little time to develop our new curriculum,” Estes added. “We started with a flow chart for 12 quarters and now have a flow chart for eight semesters. It’s all drudgery from here on out; the fun was in the first 16 months of creation. We are now preparing course proposals for every ARCE class, creating consultation memos on other program’s classes, going through the approval processes, creating a new course catalog and making articulation agreements with the community colleges.” ■

▼ Al Estes presented ARCE’s Quarter-to-Semester paper at the 2023 ASEE Conference in Baltimore in June 2023 and caught up with other attendees. From left: Jenny Retherford, University of Tennessee; Estes; Ashraf Habibullah, CSI; and Alexander Douglas, Missouri University of Science and Technology.



▼ Estes greets Cal Poly Pomona Civil Engineering Department Head Yasser Salem at the 2023 CE Department Heads conference in Ames, Iowa. Salem offered helpful advice from Cal Poly Pomona’s Q2S conversion in 2012.



A Lively Reconnect

FIRST POST-COVID ALUMNI EVENT ATTRACTS CROWD

ARCHITECTURAL ENGINEERING (ARCE) Department Head Al Estes came out of his sabbatical — temporarily — to socialize with Bay Area alumni in March 2023 at Schroeder's in San Francisco. Approximately 70 friends and alumni turned out for the in-person gathering, the first post-COVID-19 meeting of the annual event.

"It was so much fun to see this event resurrected and everyone returning after the pandemic," Estes said. "We had lots of year groups represented."

▲ ARCE alumni mingle with former classmates, professors and industry partners.

► **Middle:** Chatting over drinks are (from left) Anders Johnson (ARCE, B.S./M.S., '22), Lucas Brown ('22), Quinn Porter ('21) and Autumn Wagner ('21).

► **Left:** Jorge Lee ('72) and Fred Zerebinski ('70) catch up.

► **Right:** Jen Ton ('11) and ARCE Department Head Al Estes enjoy the gathering.



Welcoming the Opportunity

ARCE Students Participate in 2022 SEAOC Convention

THE ARCHITECTURAL ENGINEERING

Department once again had a strong presence at the annual Structural Engineers Association of California's (SEAOC) convention, with Department Head Al Estes and four SEAOC student officers — Sasha Padilla, Shaina Dickie, Morgan Cuthbert and Brayden Martinez — in attendance.

In addition, ARCE faculty members Anahid Behrouzi and John Lawson were joined by ARCE graduate students Armando Castenada Jr. and Faith Sharp in presenting technical papers at the conference, held in Indian Wells, California, Aug. 31 to Sept. 3, 2022.

Cal Poly continues to be the only university with a student presence at what is unquestionably the largest gathering of structural engineering professionals in the state.

Behrouzi presented a virtual outreach program designed to cultivate diversity in the next generation of structural engineers. The program was developed and co-authored by ARCE alumnae Nicole Buck (M.S., ARCE, '20) and Sarah Navias (B.S./M.S., ARCE, '22).

Lawson spoke on a parametric study of new wood diaphragm design force methods. His co-author was alumna Emily Taylor (ARCE, '21).

Castenada and Sharp presented their work on timber buckling restrained braced frames, which they conducted under advisement from ARCE faculty member Kevin Dong.

"Increasingly, the ARCE faculty have included students in their research," Estes said. "Students presenting at a professional conference have become the gold standard for a successful senior or master's level project."

As always, the ARCE Department hosted an alumni and friends reception, with approximately 80 attendees. "ARCE graduates and friends of this program play a huge role in the SEAOC conferences," Estes said. "This year, the SEAOC presidency was transferred from outgoing President Ken O'Dell (ARCE, '89) to incoming President Krista Looza (ARCE, '04).

"In addition, all five newly inducted SEAOC Fellows — Joyce Fuss (ARCE, '82), Jesse Karns (ARCE, '92), Steve Kerr (ARCE, '98), Simin Naaseh (ARCE



scholarship donor) and Mehran Pourzanjani (ARCE Advisory Board member) — have strong connections to the department," Estes continued. "It is a vivid demonstration that this program does much more than just prepare graduates for the job on day one."

Tragically, the fires in Maui eliminated the 2023 convention, Estes said, but the department will attend the 2024 convention in Portland, Oregon. ■

▲ **Top:** Faith Sharp and Armando Castenada Jr. presented their work on timber buckling restrained braced frames.

▲ **Outgoing SEAOC President Ken O'Dell welcomed incoming President Krista Looza.**

'CHALLENGING CONSTRAINTS'



▲ **Top:** Industry innovator Ron Klemencic, chairman and CEO of Magnusson Klemencic Associates, was keynote speaker at the event's banquet.

▲ This year's career fair attracted 54 industry partners eagerly looking for job candidates.

The 2023 Structural Forum

THE ARCHITECTURAL ENGINEERING (ARCE) Department's annual Structural Forum continues to attract an increasing number of students and industry professionals who attend as speakers and recruiters, and 2023 was no exception.

"Structural Forum is the crown jewel of both the student-run organization known as SEAOC (Structural Engineers Association of California) and one of the biggest ties between the ARCE Department and industry," said fourth-year student Shaina Dickie, chair of Structural Forum. "Students are able to network and have access to jobs, internships and other industry-specific opportunities through the job fair."

ARCE Department Head Al Estes added, "Forum keeps getting bigger and better every year. We had a long waitlist of companies trying to attend this year, which is a new challenge for us. Shaina, backed by an army of assisting ARCE students, did a fantastic job of leading this effort. The complexity of the event, the quality of the speakers and even the creativity of the table centerpieces are at a consistently high level, as each new student team learns from the lessons of those who have gone before."

This year marked the event's 33rd year, and Challenging Constraints was the theme. "I wanted to incorporate the idea that we all take part in changing our industry, whether that be the constraints that restrict us regarding opportunities, diversity and inclusion, or the codes that restrain how we design," Dickie said.

Approximately 230 people attended the morning speaker sessions, and around 340 came to the evening banquet and career fair, which was attended by representatives from 54 companies.



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Theme Ponders Changes to Industry

2023 STRUCTURAL FORUM SPEAKERS

Margaux Burkholder (ARCE, '09; M.S., '10), licensed structural engineer, Walter P Moore

Martin Cortez (ARCE, '09), project manager, Murphy Burr Curry Structural Engineers

Ron Klemencic (keynote speaker), chairman and CEO, Magnusson Klemencic Associates (MKA)

Claire Leader (ARCE, '21), structural designer, Martin/Martin.

Rafael Sabelli, senior principal and director of seismic design, Walter P Moore

Natalie Y. Tse, project manager, Tipping Structural Engineers

Mason Walters (ARCE, '78), senior principal, Forell/Elsesser



"I spent several months last summer carefully researching some of the most inspirational members of our industry who embody the theme," Dickie recalled. "We were especially lucky to have industry innovator Ron Klemencic, chairman and CEO of Magnusson Klemencic Associates (MKA), as the banquet's keynote speaker."

Organizing Structural Forum created additional work for Dickie, who already had a full schedule as a student with a job. "Time management was a big struggle," she said. "I want to be a project manager long term. This helped me confirm that." ■

▲ **Top:** Career fair attendees (from left) are third-year ARCE students Trevor Reichenberg, Ellen "Ellie" Untalan (left), Tara Reich and ARCE Department Head Al Estes.

▲ Serving as 2023 Structural Forum Chair confirmed Shaina Dickie's interest in working as a project manager.



A VISIT FROM THE ‘ZOOMSEs’

Structural Engineers Enrich Architectural Engineering and Architecture Students’ Design Studio Experience

ARCHITECTURE (ARCH) PROFESSOR Thomas Fowler infused fresh insight into ARCE 316: Structural Integration in Architecture, a unique course in which faculty from the Architectural Engineering (ARCE) Department and ARCH collaborate to integrate structural design into the third-year studio projects of architecture students.

Fowler collaborated with ARCE Professor Brent Nuttall and architecture Professor Jeff Ponitz to add working structural engineers (SEs) from around California to each of the nine design studios. The structural engineers provided students with

the latest in structural integration knowledge by showing sample case study projects and reviewing the emerging architecture students’ building design projects.

“We affectionately referred to these industry engineering practitioners as ZoomSEs because the iterations with the design studio were primarily via Zoom,” said ARCE Department Head Al Estes. “In a stroke of genius, Tom was able to bring five of the nine ZoomSEs to campus for an afternoon hands-on workshop with 150 students from nine sections of design studios. All third-year architecture faculty

▲ ARCE faculty member and local structural engineer Justin Wolfe offers project input to ARCH students enrolled in ARCE 316: Structural Integration in Architecture.



▲ ARCH students discuss their model with ARCE Professor Brent Nuttall.

◀ ARCE lecturer Andy Guyader reviews a student team's project.

and many of the ARCE faculty who teach ARCE 316 participated in this session.

"This was a massive structural system/building design critique in which structural engineers shared their knowledge and best practices," Estes continued.

The visiting SEs wrapped up the workshop by highlighting what was successful in a few of the students' projects from each of the design studios.

Funding for the course was provided from the 2022-23 College of Architecture and Environmental Design's Teacher and Student Scholar Support Program. ■

THE VALUE OF Teamwork

Jill Nelson's Interdisciplinary Capstone Course Emphasizes Collaboration

IN ARCHITECTURAL ENGINEERING (ARCE)

Associate Professor Jill Nelson's winter 2023 Interdisciplinary Capstone Project course, ARCE seniors worked alongside landscape architecture students on a real-world project to gain an understanding of the role a structural engineer plays on an interdisciplinary team.

The course, which often includes architecture students as well, aims to prepare students for the interdisciplinary challenges associated with integrating design and construction to complete a project.

Students are exposed to all aspects of a project, from design and schedule to quality and client expectations.

"We give students a concept, and they have to take that concept and make something of it," Nelson explained. "Students learn what will work and what won't. We give them a problem, and they have to figure out how to solve it. This is the best possible example of Learn by Doing."

In winter quarter, 10 ARCE students and 16 landscape architecture students enrolled in the

studio, which Nelson co-taught with Ellen Burke of the Landscape Architecture Department faculty. The landscape architecture students were charged with designing a public open space park on eight acres of waterfront property in Oakland that included the development of a landmark structure.

"The landmark structures varied from 30-foot-tall cranelike shade structures to green-roofed, boat-shaped tunnels to elevated walkways over marshes," Nelson explained. "The ARCE students were charged with the structural design of those landmark structures. The proposals must show creativity, relevance to the site, place, culture and environment, as well as an integrated approach to structural design."

Students are required to create a conceptual structural engineering design that includes structural materials and system selection, structural system configuration and preliminary structural member sizing. The course also emphasizes the development of graphic, written and verbal communication.

"In the design labs, we teach them how to design a structurally sound 'box,'" Nelson said, "This course

▼ Students and faculty review a design for the project, which includes eight acres of waterfront property in Oakland and a landmark structure. From left: Grace Dunn, Meghan West, unidentified student and Dawson Dewan.

► **Opposite, top:** Landscape architecture Professor Joe Ragsdale studies a student team's design proposal for the public open space and park project.





forces the students to utilize what they learned about that box in a totally new fashion. The students have to make ‘something that is crazy’ stand up. They are building a park on an estuary, so the designs are of bridges, shade structures with ‘green’ roofs, or a boardwalk on the water.”

Senior Gracie Hoffman took the course because it was an interdisciplinary studio experience with landscape architecture students. “I knew that if I did not take this course, I was going to regret it,” she said. “This class gave me firsthand experience and truly enhanced Learn by Doing.”

Landscape architects and structural engineers are an unlikely pairing, according to Nelson, who has decades of industry experience. “This class is really about how to work effectively with people who have a different approach to design,” she said. “Structural engineers are rarely the primary people on the job. We are usually hired or subcontracted by an architect or landscape architect. The students need to understand how to communicate with professionals in other disciplines.”

Nelson, who fully retired from teaching after winter quarter, has been co-teaching this class for several years. “It’s a lot of work for the professors and the students,” she said. “The architecture studios are open to students 24/7. The studio setting offers a different mindset of teaching; it fosters the creative aspects of design. Structural engineers are creative,



but we are bound by the laws of physics, so we start from a practical perspective.”

Nelson enjoys working with architects and landscape architects. “I like the way they think. It shakes up the ARCE students, and that makes them think.” ■

▲ ARCE major Sasha Padilla presents her team’s work at a mid-course critique.



HIGH-RISE LESSONS

Graduate Students Learn from Top Industry Pros at Skidmore, Owings & Merrill

LAST FALL, 21 Cal Poly architectural engineering (ARCE) and architecture graduate students were given a unique opportunity to learn about the complexities of high-rise design from the professionals at SOM (Skidmore, Owings & Merrill), an internationally acclaimed firm specializing in skyscrapers.

High-rise design is not covered in the ARCE or architecture curriculum, according to ARCE Professor Kevin Dong, who team teaches the course with architecture Professor Tom Fowler.

“The idea is for students to learn that the lines between architecture and engineering are blurred. You can’t do one without the other,” Dong said. “That’s a big departure from the narrative that is taught in the college and the profession — that the architects do their work, then give it to the engineers to design. A successful high-rise design proposal requires a balanced collaborative approach that integrates both architectural and structural design.”

Dong’s students were instructed to design a 40-story office building over a two-story exhibition space that stands 500-plus feet high and consists of close to a million square feet.

“The students need to work closely together to successfully develop a project design,” Dong said. “This large building type required student teams to establish a clear story for design conceptualization. It also required them to follow through with the design development and integration of advanced building systems, including high-rise structural systems and programmatic spatial configurations, wall assembly attachments to the structural frame, environmental systems and environmental controls.”

ARCE graduate student Robert Hardwick enjoyed the collaborative approach. “Collaborating with architecture students was rewarding because they bring so much design knowledge to the table,” he said. “Working with them to develop a high-rise design that was both architecturally interesting and structurally efficient was a great challenge that helped us all grow.

“This studio was effectively a microcosm of how a firm like SOM might approach the conceptual design of a high-rise structure,” Hardwick continued. “We learned how to do this from industry professionals and from our industry-experienced faculty. Then we actually developed our own high-rise designs. If that isn’t Learn by Doing, I’m not sure what is!”



During the quarter, students visited SOM’s San Francisco and Chicago offices to get feedback from the firm’s professionals.

“This studio required a more formalized presentation of our work than students are accustomed to, thanks to the presence of SOM industry partners Mark Sarkisian and Leo Chow,” ARCE graduate student Dillon Schneider said. “The course was very fast-paced, and the need to present clearly, concisely and professionally added a layer of attentiveness that is hugely beneficial as a young professional.

“The greatest lesson I learned was to understand what you need to let go of and where you need to take a project,” he continued. “Seeing how an endeavor will end before getting too far down the rabbit hole and knowing when to stop saves time, sanity and — in the real world — money.”

Prior to their Chicago trip, the students built small-scale models of high-rise structures and shipped them to SOM’s Chicago office, where they were put through a wind tunnel test. “The models all held up,” Dong joked, “but more importantly, SOM’s professionals offered invaluable suggestions on improving building performance based on wind engineering principles.”

Leo Chow, SOM architecture design partner, and Mark Sarkisian, SOM structural design partner, as well as several other SOM professionals, lent their time and expertise to review the students’ work, making their points in a nurturing and inquisitive way.

“Students don’t often get this type of feedback,” Dong said. “This was an invaluable learning experience; Tom and I are so grateful for the SOM team.” ■

▲ Skidmore, Owings & Merrill partners Leo Chow (left) and Mark Sarkisian offer feedback during a critique of student-designed skyscrapers.

◀ ARCE and ARCH students collaborated on designing and building small-scale models of 40-story office buildings.

INTERDISCIPLINARY SENIOR PROJECT TEAM BUILDS RADIO TELESCOPE TO

STUDY THE HEAVENS



WHILE ARCHITECTURAL ENGINEERING (ARCE) students Avery Bunting and Kira Tolman knew that communicating ideas across disciplines could be a challenge, they were still eager to collaborate on an interdisciplinary senior project.

The project, a radio telescope, was the brainchild of Jack McGuigan (Electrical Engineering, '23). He enlisted the help of Bunting and Tolman, who at the time were seniors in ARCE's blended B.S./M.S. program.

The instrument lets users view planets, comets, giant clouds of gas and dust, stars and galaxies by studying the radio waves originating from these sources. From this, astronomers can learn about the objects' composition, structure and motion.

The students' radio telescope specifically conducts hydrogen line astronomy, which "consists of collecting the photon emissions from hydrogen atoms when there is a spin flip of the 1s electron," according to the students. "This is a rare occurrence, but hydrogen is the most abundant element in the universe. Therefore, there are enough emissions to pick up a signal. These emissions — weak radio waves — are digitized and processed to form images."

Bunting said, "An important feature that differentiates this radio telescope from most is its unidirectional feed. The parabolic dish reflects the signal to a focal point — the feed. In most radio telescopes, the dish and feed can rotate together in all directions.

"In our project, the spin of the Earth is used for the east-west movement, and the

◀ Jack McGuigan, Avery Bunting and Kira Tolman's interest in astronomy inspired their scientific research to build a radio telescope that can view planets, stars, galaxies, gas clouds and other elements in the universe.



▲ Using a manual slip roller, Avery Bunting (left) and Kira Tolman bend bars to the proper radius for the telescope.

feed itself is on a track that moves north and south,” Bunting continued. “The feed scans ‘up and down’ as the rotation of the Earth moves sideways, scanning a long rectangular portion of the sky. This allows portions of the galaxy to be mapped in a session as short as a few hours or up to 24 hours.”

The biggest challenge the students encountered was translating the design into an actual structure. It was true Learn by Doing. “We learned about designing a structure that is constructable by having to deal with the choices we made in the design process,” Tolman said. “We ran into issues ordering materials and scheduling material delivery. Ideas we had about how we’d like to build it turned out not to be feasible or we found a better way to do it.”

Project advisor Craig Baltimore was more than willing to let the students make their own decisions. “This gave us some great experience in a low-stakes environment rather than in the workplace,” Tolman said. “Sometimes you learn more by doing and failing than by being told what to do and succeeding.”

“We are all grateful to The Alliance, a foundation for interdisciplinary learning, for sponsoring and funding this project,” said Department Head Al Estes. “The students presented their project to The



Alliance at its spring meeting and also shared their work with the ARCE Advisory Board. It was a great example of an interdisciplinary effort in which no one member of the team possessed all of the knowledge needed to complete the project.”

The radio telescope will be donated to the Cal Poly Radio Astronomy Club.

See more project details on Cal Poly’s Digital Commons: <https://digitalcommons.calpoly.edu/arcesp/196/>. ■

▲ Top: Jack McGuigan puts together the first arm and leg assembly to make sure it works before the team drills and threads holes in the other three.

▲ Project advisor Craig Baltimore observes as Bunting and McGuigan connect the telescope’s arms to each other using L brackets and to the legs using threaded rods cut to length.

LEARNING BY DOING WITH Bamboo

Student Humanitarian Group Builds Learning Center in Ecuador

ARCHITECTURAL ENGINEERING (ARCE) senior Hayle Jones led a group of 13 students to Ecuador last summer to work with residents to help build and bring running water and electricity to their town's learning center in Pedernales. The seismically active city was nearly leveled in 2016 by 7.8-magnitude earthquake.

Jones organized the trip to the coastal town of Pedernales as part of her role as student leader of Structural Engineering Students for Humanity (SESH), a group of ARCE students who join efforts to aid communities affected by natural disasters. The trip marked the return of students' humanitarian efforts to aid communities in need of help.

The destination, in the province of Manabí, was chosen by Miyamoto Global Disaster Relief, the organization that works alongside the students and sponsors their visit. The purpose of the trip was to "work with the locals, learn techniques with bamboo and help out the region," Jones said.



ARCE Professor James Mwangi, faculty advisor to SESH, accompanied the students, who were there from Aug. 21 to Sept. 2, 2022.

"These humanitarian efforts expose our students to not only the global context of the structural engineering profession, but also to the cultural diversity of the communities that the students work with on these community service-learning projects," Mwangi said. "The students were exposed to construction of a bamboo building structure, a material that they do not learn about in their ARCE curriculum. They had to learn about the material, including how to make joints, before they built the structure."

Indeed, the trip was a continuation of the students' hands-on education. They analyzed drawings for the construction of bamboo. They sized and cut the bamboo to fit the plan. They cleaned and treated the raw bamboo in a chemical bath. They learned how to hand-cut the connections on the ends of the bamboo. They mixed the mortar proportions, placed the concrete masonry units on the foundation and framed the major elements in the structure.

"We were able to provide running water and electricity to the learning center we helped build," Jones said. "The center will be a space where people of all ages can attend workshops designed for different courses. It will provide the community with extra resources and be a place for people who want to learn."

▲ Cal Poly ARCE students Jay Skaff (left) and Hayle Jones hand-cut a connection on the end of a section of bamboo.

► The SESH team partnered with locals to build a learning center that will offer workshops for town residents.

◀ With the help of a local volunteer, ARCE student Dalton Muck ties off the raw bamboo in preparation for a hand scrubbing before it's chemically treated.





ARCE STUDENT PARTICIPANTS

Noah Demer, Payton Filippin, Hayle Jones, Surina Marwaha, Dalton Muck, Emilie Phuong, Robert Rochel, Ryan Scharf, Tom Sesin, Jay Skaff, Nicholas Sowatzke, Audrey Williams and Anna Yamauchi.

SPONSORING ORGANIZATIONS

Computers and Structures Inc.
Harris & Sloan Management Inc.
SSG Structural Engineers LLP
Seneca Structural Engineering Inc.
Tipping Structural Engineers
ZFA Structural Engineers
4 S.T.E.L. Engineering Inc.
MacKenzie
Hibser Yamauchi Architects

SPONSORING INDIVIDUALS

Rory Lopez-Esce
Kevin K. O'Brien
Kimberly Boyd Yamauchi
Lisa Yamauchi

According to Mwangi, the students' biggest takeaway was finding that "their ARCE curriculum enabled them to work with a material that they knew nothing about, including its mechanical properties. They learned that their understanding of fundamental engineering principles gave them the freedom to communicate clearly on design and construction of a new material."

Jones concurs. "The biggest surprise for me was how similar wood construction is to bamboo construction," she said. "Both have similar properties and building techniques."

Mwangi has accompanied SESH students on several humanitarian overseas trips and has noticed sweeping transformations during the course of the visits. "On the onset of the projects, the students always seem aloof to the communities, which I think is due to lack of prior exposure," he said. "That changes very fast as the students realize that the other side of the table is the community that is aloof to them too. The two sides learn from each other, and by the end of the trip, there are always tears, as neither side wants the other to leave. It is magical watching this transformation." ■

TREKKING TO LITHUANIA

ARCE Students Participate In Summer Program to Study — and Play



AFTER A TWO-YEAR pause because of COVID-19 restrictions, Cal Poly architectural engineering (ARCE) students were once again able to travel to Vilnius, Lithuania, for an unparalleled six-week summer study abroad program that connects American and Lithuanian students in a collaborative work environment.

The Lithuania program, developed by Professor Ed Saliklis in 2012, is run in partnership with Vilnius Tech, the biggest technical university in Lithuania.

The Lithuania summer study program is a boon to ARCE students. Typically study abroad opportunities during the school year are difficult for ARCE students because the curriculum is extremely time intensive and rigorous. The summer quarter in Lithuania, however, actually allows rising third-year students to get ahead in their ARCE curriculum.

In summer 2022, professors Peter Laursen and Brent Nuttall accompanied 18 Cal Poly students on the trip. They were joined by three Lithuanian students and one from Ukraine.

“The Lithuanian students and the Ukrainian student were in similar majors to ARCE; however, it was very interesting to see the different ways that they had experienced their curriculum,” said third-year ARCE major Carsten Huber. “We all got along quite well; we studied with them outside of class, and they showed us their go-to places around town.”

Vilnius, a medium-sized city, has an extraordinarily rich heritage, including a historic Old Town, where the students took their classes. “It’s a very safe city where everything is in walking distance, and the price of everything is extremely low. It was a wonderful place to spend the summer,” Huber said.

Huber’s three classes — Structural Systems Laboratory, Structural Analysis and Structural Computing



▲ Students teaming up to tackle a project are (from left): Ily Nelson, Victoria Maestas, Samantha Maher, Trevor Reichenberg and Tara Reich.

◀ The Baltic Sea trip included a stop to see wood sculptures at the Hill of Witches, in the woods near the village of Juodkrantė. From left: Zyra Kingston, Anna Cooper, Samantha Maher, Carsten Huber, Jared Schieferle, Calvin Vigeant and Cruz Bouquet.

◀ ARCE major Trevor Reichenberg explores a Lithuanian village with classmates during a weekend trip to the Baltic Sea.

▲ **Top:** Enjoying a weekend dip are (from left): Gaspar Solorio, Calvin Vigeant, Tara Reich, Ily Nelson, Trevor Reichenberg and Jared Schieferle.

Analysis — were taught in English by Cal Poly professors. “This was very beneficial as it helped transform our foreign classrooms into a more familiar learning environment,” he said.

For Huber, the highlight of the trip was the people he met and the friends that he made. “Experiencing all these new things in Lithuania was incredibly fun, and all the people there made it so much better,” he said. “The classes were also great, and while there was a lot of work involved, I found all of it interesting and engaging.”

“The course load got a bit strenuous at times,” Huber continued, “but we never got homework on the weekends, which let us fully experience the beautiful place that we were living in.”

Department Head Al Estes added, “I am very glad to see the Lithuania trip restart after the pandemic. After eight successful iterations, we are trying to institutionalize this experience by fundraising to

defray the cost for students, starting the John Edmisten Global Travel Scholarship to allow students with lesser means to attend, adjusting the course schedule to maximize the benefit to those students who take advantage of this marvelous opportunity and discussing how this program continues in the conversion to semesters.”

Huber recommends the summer program to other ARCE students. “It was tons of fun, and getting ahead on those three classes is very beneficial going forward in the ARCE curriculum,” he said. “I wanted to have as much fun as possible without losing sight of my work. This helped me improve my organizational abilities, as I wanted to waste as little time as possible between going out and getting my classwork done. This fall quarter I realized that my time management abilities were noticeably better than previous quarters, and I believe that is due to my time in Lithuania.” ■



▲ Prior to a shaking test, students and faculty tour the nearly completed mass timber tower from bottom to top, scrutinizing its unique infrastructure.

▼ The group stands on the last mass timber shear panel to be installed near the top of the 10-story building — the tallest building ever tested on a shake table.

ALL SHOOK UP





Faculty, Students Visit the Country's Largest Shake Table

WHEN ARCHITECTURAL ENGINEERING (ARCE) Professor John Lawson got the opportunity to tour the “tallest building tested on a shake table,” he jumped at the chance and invited Assistant Professor Michael Deigert and “any ARCE student willing to sacrifice part of their Thanksgiving break.”

It was a quick trip. The group traveled to Mira Mesa Nov. 20 and returned the next evening. The shake table, owned and operated by UC San Diego, is located at an off-campus experimental facility in Mira Mesa, a small community in San Diego.

Shake tables are designed to replicate the ground motions a building might experience during an earthquake. Often the ground motions are from a past historic earthquake and can be scaled up or down in magnitude, according to Lawson.

Students in Cal Poly's ARCE program have access to a small shake table in the department's seismic laboratory that allows them and faculty researchers to attach small-scale structural models and instrumentation to evaluate the performance of a structure.

“The shake table operated by UCSD is huge by comparison, the largest in the U.S.,” Lawson said. “Because of its size and outdoor location, full-size buildings can be subjected to some of the largest ground motions ever recorded, making it a valuable tool for faculty and doctoral students conducting research to improve building performance.”

This visit was initiated by a colleague of Lawson's, Shiling Pei at the Colorado School

FIELD TRIP PARTICIPANTS

The students (listed alphabetically) include: Cameron Cunningham, Alycia Darby, Noah Demer, Shaina Dickie, Gracie Hoffman, Isabella Jimenez, Hayle Jones, Luke Jones, Matthew Sloss, Nicholas Sowatzke, Ben Stewart, Kira Tolman and Evi Troulis.

of Mines, principal investigator of a research project involving a 10-story mass-timber wood building. The experiment Pei is working on is the Natural Hazards Engineering Research Infrastructure (NHERI) Tall Wood Project, supported by the National Science Foundation. Pei invited Lawson and the students to tour the building and the shake table's mechanics prior to the actual shaking.

“One of this experiment's goals is to validate the use of wood construction in very tall buildings in regions subjected to large earthquakes,” Lawson said. “Currently, wood buildings in the U.S. are typically limited to five stories, but with the use of mass timber panels, engineers are hopeful that wood can challenge materials like steel and concrete in taller buildings with lower carbon footprints and heavy timber fire resistance.

“Construction of the 10-story mass timber building experiment was near completion when we toured the facility, and we jumped at the opportunity to inspect each level of

▲ A UC San Diego site engineer leads a tour of the mechanics under the shake table.

the building all the way to the top,” Lawson continued. “Experimental damper devices and resilient-rocking shear walls were exciting features to touch. This experiment will be the tallest building ever tested on a shake table.”

And not just any shake table.

“This shake table is unique in that it has six degrees of freedom, meaning that the table platform can translate in three directions: horizontally in two directions — say north-south and east-west — and up and down. And it can rotate around three axes causing roll, pitch and yaw,” Lawson explained.

During the trip, which received funding from the College of Architecture and Environmental Design's Structural Resiliency Leaders Fund, Lawson, Deigert and the students were also treated to an underground tour of the “huge hydraulics necessary to accurately duplicate large earthquake motions on large buildings.”

ARCE sophomore Luke Jones is glad he went. “The trip was very informative,” he said. “The scale of this project was so incredible to see. Site visits are always a great opportunity to see what we've learned applied and giving us a much greater understanding on the processes put into structural engineering.”

See Pei's shaking experiments online at: <https://youtu.be/8GUNWCE1Gds>. For details about the NHERI Tall Wood Project, go to: <http://nheritallwood.mines.edu>. ■



IN MEMORIAM

Sean Hillman

ARCE Freshman is Fondly Remembered by Friends, Faculty at Memorial During Design Village Competition

SEAN OGAWA HILLMAN, a first-year architectural engineering (ARCE) major from Vashon Island, Washington, died Monday, April 24, in San Luis Obispo. He was 20 years old.

Hillman was critically injured when he was struck by a pick-up truck while riding his bike to work. He died three days later, surrounded by family.

He was born in Seattle on March 7, 2003, to parents Mayumi Ogawa and Carl Hillman. In high school, he was on the golf team, worked as the head lifeguard at Vashon Pool and took part in the Vashon Island Fire Explorers program.

▲ Sean Hillman is described by those who knew him as fearless, brilliant and hardworking, with a positive attitude and inspirational energy.

Although relatively new to Cal Poly and the ARCE program, Hillman was well known and had made quite an impression on the faculty and his fellow classmates.

"I had the privilege of teaching Sean in ARCE 106: Introduction to Building Systems, which all incoming ARCE freshmen take," said Department Head Al Estes. "Sean told me early on that he really came from two cultures. He spent his elementary and junior high school years

living in Japan and was reintroduced to American culture in high school.

"Sean was fearless," Estes continued. "We put out a call for proposals for student structural resiliency project grants, and Sean submitted a proposal to test the strength of alternative aggregates in the production of concrete. He got the grant, if for no other reason than it was unheard of to have a new freshman apply for a research grant. Sean's death is absolutely tragic. He was a special student, and we will never know how far he would have gone."

The ARCE Department and the Structural Engineers Association of



ARCE senior Sasha Padilla (top, left) organized a memorial for fellow SEAOC member Hillman during the Design Village competition his friends said he was looking forward to participating in.

California (SEAOC) student club, of which Hillman was a member, organized a remembrance to honor Hillman on April 28, at the start of Design Village, a competition held in Poly Canyon during the university's Open House. Guests were asked to wear green as a special tribute to Hillman.

Hillman had been part of an interdisciplinary team of students who were competing in the annual Design Village competition. Architecture freshman Max Dennison met Hillman at the start of spring quarter, when they were grouped together on the same Design Village team. "There

is no other word to describe him except 'incredible,'" she said. "He was brilliant. He seriously was going to change the world one day. He was always going to greet you with a positive attitude, a smile and a high-five."

Team member Justin Ocampo added, "Sean was a bright, hardworking student and friend with a lively and inspirational energy that he brought to everything and everyone every day. His loss will be felt throughout the Cal Poly community and beyond."

Hillman had been looking forward to the start of the Design Village competition, during which students build a structure in

Poly Canyon and sleep in it overnight. His team members completed the project that Hillman had been involved in. "We couldn't have done it without him; he contributed immensely," Dennison said.

During Hillman's remembrance ceremony, Sasha Padilla, former president of SEAOC, spoke. "Design Village — this event specifically — Sean was very involved, always in the shop working on this project with his group," Padilla said. "We're here to honor him and celebrate what an amazing person he was. We're honored to gather and come together in green today." ■



LOGGING

HIS WAY TO THE STATE CAPITOL

Emmett Huggins Snags Honors for His Skills in Timbersports

WHEN ARCHITECTURAL ENGINEERING (ARCE) student Emmett Huggins joined the Cal Poly Loggers to compete in the rough-and-tumble field of timbersports, he never thought his feats of strength and agility would be honored by the California Assembly and Senate.

Yet on Jan. 30 this year, Huggins and 18 other high-achieving Cal Poly students were part of Cal Poly's 2023 Champions Tour and recognized by lawmakers in Sacramento. The students had distinguished themselves as either an individual or member of a team that has earned a national industry award or other high-profile honor.

Huggins, who joined the logging team his second year at Cal Poly and now serves as vice president, won the title of Bull of the Woods — best male competitor — at the 2022 Cal Conclave, hosted by Cal Poly. The annual event showcases skills in sawing, chopping, climbing and log rolling contests.

"The practice of timbersports can perhaps be described as 'lumberjack Olympics,'" Huggins explained. "Events include tree climbing, single and double buck with cross-cut saws, speed and hard-hit chopping with the log horizontally or vertically positioned, choker setting, spar-pole climbing and axe throwing. We use chainsaws, crosscut (bucking) saws, climbing spikes, specially built racing axes and more.

"My favorite event is the vertical chop, in which a log is placed vertically on a stand, and I use a racing axe to chop through it as fast as possible," Huggins continued. "My best event is the obstacle pole race. Competitors

◀ Emmett Huggins competes in the obstacle pole race, running with a chainsaw up a tilted log to cut the end off.

run with a chainsaw out on a log canted off the ground, cut the end off and run back down as fast as possible."

It's not all fun and games though. The team is well versed in forestry knowledge skills like dendrology, wood identification and orienteering.

Huggins enjoys the uniqueness of the sport and the camaraderie of the timbersport community. "There is no other sport like it or the community that surrounds it," he said. "It's very special."

As in any sport, success depends on physical and mental strength.

"Physically I practice a lot and make sure I'm relatively healthy come competition time," he said. "I also make sure that I can easily compete in all of the events I'm signed up for in the span of one day. Mentally it takes confidence. I've started to coach new members, and many are fearful of the dangerous events. When teaching new members the horizontal chop — in which someone stands on top of a horizontally positioned log and chops through it between their feet with a razor-sharp, extra heavy axe — I tell them that if they're even thinking about chopping their foot, do not step onto the block."

Winning also takes teamwork, Huggins said. "Cal Poly was victorious, and I may have won Bull of the Woods at Cal Conclave 2022, but it took immense planning and effort from everyone on the team."



▲ Wielding a crosscut (bucking) saw, Huggins exudes confidence, focus and strength.

Huggins said his time as a Cal Poly Logger "has been a pleasant escape from the pushing of pencils required to pass the classes of Kevin Dong."

He also considers it an honor and a privilege. "Four years ago I joined a club that let me split wood on Friday afternoons," Huggins said. "Now I'm the vice president and somehow in California's capitol because I got good at swinging the axe and scurrying up trees." ■

Rising to the Challenge

Seventeen Students Compete at Undergraduate Seismic Design Competition

SEVENTEEN CAL POLY students — 16 architectural engineering (ARCE) and one civil and environmental engineering — competed against students from nine countries, four continents and 12 states in the 20th annual EERI (Earthquake Engineering Research Institute) Seismic Design Competition.

The international competition, held April 11-14 in San Francisco, charges

undergraduate ARCE and civil engineering student teams with designing, analyzing, building and testing a 5-foot-tall balsa wood high-rise model. The teams are judged on their design proposal, poster, oral presentation and how accurately their predicted acceleration values match the ones obtained during shaking.

"This year's competition problem statement differed from prior years in

▼ EERI's Student Design Competition gave the Cal Poly interdisciplinary team of undergraduates an opportunity to design and construct a 5-foot-tall balsa wood model of a cost-effective high-rise frame building that resists seismic loading.



► ARCE Department faculty and student EERI board members welcomed ImageCat President and CEO Ronald Eguchi (fourth from right) who came to campus as part of EERI's Friedman Family Visiting Professional Program.

that students were tasked with designing two slender towers connected by a number of sky bridges," explained ARCE faculty member and team advisor Anahid Behrouzi. "Our team also took on the additional challenge of implementing dampers — something the Cal Poly team has not done in the seven years I have been advising it."

The Cal Poly team came in 11th place overall out of 34 top-ranking universities.

EERI's Student Design Competition, a longstanding tradition of the group's annual meetings and conferences, provides undergraduates with an opportunity to work on a hands-on earthquake engineering project to design and construct a cost-effective frame building to resist seismic loading.

As part of EERI's educational mission, it has implemented the Friedman Family Visiting Professional Program, which sends earthquake engineering professionals to speak to students at universities worldwide.

This year, Cal Poly's ARCE Department welcomed Ronald Eguchi from ImageCat. Eguchi's visit, on April 27-28, included dinner with faculty and student EERI board members; a tour of Design Village, the High Bay Lab, Seismic Lab, Digital Fabrication Lab, Wood Shop and Metal Shop; and meetings with ARCE Department Head Al Estes and graduate and undergraduate students.

While on campus, Eguchi gave a presentation, "Seismic Risk Evaluation of Water Supply Systems," which stressed the necessity for seismically resilient water lifeline systems to ensure effective post-event response and rapid community recovery after earthquakes.

"I sincerely thank those donors whose support allowed us to send so many students to the competition," Estes said. "The younger students will be next year's leaders, and that's how dynasties are made." ■



STUDENT COMPETITORS

ARCE majors Jadyn Breien, Avery Bunting, Tynan Castro, Alycia Darby, Andrew Duong, Jack Evans, Payton Filippin, Sophia Maglabe, Payton McGee, Dalton Muck, Molly Rojec, Sheyna Rongong, Ryan Scharf, Tom Sesin, Matthew Sloss and Kira Tolman, as well as civil and environmental engineering major Noah Marcus

FACULTY ADVISORS

Anahid Behrouzi, Peter Laursen and Cole McDaniel

CAL POLY-AFFILIATED DONORS

CSI (Computers and Structures Inc.) Structural Resiliency Leaders Fund and Cal Poly Instructionally Related Activities (IRA) Program

CORPORATE DONORS

Access Compliance Consultants, Avila Structural Engineering, EERI SoCal Regional Chapter, Filippin Engineering, MHP Structural Engineers, RGSE, Rinne & Peterson, SSG Structural Engineers LLP, Structural Focus, Summit Engineering, T&S Structural and Walter P Moore and Associates Inc.

INDIVIDUAL DONORS

Jill Hurd, Elyn Marton, Robin Pao, Kate Robinson, Lisa Stahr and Jenna Williams

TEAM ADVISORS AND RESOURCES

Jenna Williams, Tipping Structural Engineers; Ryan Thornton, Magnusson Klemencic Associates; Nathan Canney, Taylor Devices; Kate Robinson, MSD Professional Engineers; Matthew Kyler, Kyler Engineering; and Austin McGee and Sydney Gallion, Forell/Elssesser Engineers Inc.

They're Tops

Student Group Garners Best Chapter Award at AEI Annual Conference

ARCHITECTURAL ENGINEERING (ARCE) Department Head Al Estes and students Hadiya Brown, Jamie Zimmerman, Ryer Lauth, Luke Jones, Evi Troulis and Hayle Jones attended the Architectural Engineering Institute's (AEI) annual conference in Denver from April 12-14.

While there, Estes attended the annual meeting of the AEI Academic Council and participated in a joint meeting with the AEI Board of Governors.

The students attended the AEI Workshop for Student Chapter Leaders, which is a training session for emerging leaders in the nation's various chapters. While there, the Cal Poly AEI Chapter was presented with the 2023 Best AEI Student Chapter award based on their outstanding annual report.

Funding for travel was provided from an Instructionally Related Activities grant and the ARCE Parents Learn by Doing Fund.



Members of the Cal Poly AEI Student Chapter — voted the best in the nation in 2023 — include (from left) Jamie Zimmerman, Hayle Jones, Hadiya Brown, Evi Troulis, Ryer Lauth and Luke Jones.

Crackin' Crab

A Celebratory Feast for Work Well Done

ARCHITECTURAL ENGINEERING (ARCE) faculty member Dirk Bondy (ARCE, '88) takes his graduate-level prestressed concrete class out to the Cracked Crab restaurant each quarter to celebrate their successful completion of the course.

The 2023 attendees (from left to right around the table) are Ben Stewart, Aaron Dewey, Kira Tolman, Avery Bunting, Kristofer Rickansrud, Ian McConnell, Matthew Chung, Evi Troulis, Dirk Bondy, Maria Boyle, Sheyna Rongong, Shelby Holmquist, Jadyn Breien, Paulina Robles, Kennedy Gomez, Andrew Duong and Sophia Maglabe.



2023-24 Scholarships

AWARDS PRESENTED AT LUNCHEON INCLUDED NEW BUEHLER ENGINEERING SCHOLARSHIP

AT THIS YEAR'S Architectural Engineering (ARCE) Department Scholarship Luncheon, Department Head Al Estes was pleased to award the first Buehler Engineering Scholarship, in the amount of \$2,375, to Hagan Jackson, a third-year ARCE student. The new Buehler Scholarship is awarded to an ARCE undergraduate or graduate student with financial need and at least a 3.0 grade point average.

In addition, Estes handed out a total of 19 scholarships totaling \$33,300 from the ARCE Department, and Associate Dean James Mwangi presented 11 college-level scholarships totaling \$70,300, including one to ARCE first-year student Polina Slaboff, who was presented \$1,000 as an inaugural award of the College of Architecture and Environmental Design scholarship endowed by Dean Emeritus Christine Theodoropoulos and her husband, Mark Henry. "This is one of my favorite acts as department head," Estes said. "These students have shown remarkable intellect, strength and work ethic, and I truly thank the donors whose generosity allows us to celebrate and honor these students."

ARCHITECTURAL ENGINEERING SCHOLARSHIPS

D'Abreau Foundation Family Scholarship (\$1,500) - Lydia Chou, Zoe MacMillan, Haley Pilcher
Forell/Elssesser Engineers Incorporated Scholarship (\$1,000) - Sachi Goli
KPFF Consulting Engineers Scholarship (\$1,500) - Kira Tolman
John Labib & Associates Structural Engineers Scholarship (\$1,500) - Alejandra Bravo
Simpson Gumpertz & Heger Scholarship (\$2,000) - Ian Kelly
CYS Eugene E. Cole Senior Project Scholarship (\$3,000) - Aaron Dewey, Kennedy Gomez, Meileen Yee
KNA/RTM Senior Project Grant (\$1,500) - Avery Bunting, Jack McGuigan, Kira Tolman
Carson Starkey Memorial Scholarship (\$1,500) - Katherine Thies
Buehler Engineering Inc. Scholarship (\$2,375) - Hagan Jackson
Emanuele Barelli Structural Engineer Scholarship Endowment (\$1,200) - Drew Kawaguchi
Paul F. Fratessa Memorial Scholarship (\$1,000) - Christian Achkar
Hans Mager Scholarship (\$1,200) - Alycia Darby
John W. Edmisten and Yvonne Y. Hsu Scholarship (\$1,000) - Gabriel Garfias, Gracie Hoffman, Hayle Jones, Matthew Sloss, Gaspar Solorio
RRM (\$3,000) - Emily Byrd, Albert Le

COLLEGE OF ARCHITECTURE AND ENVIRONMENTAL DESIGN SCHOLARSHIPS

Robin L. Rossi Award (\$1,000) - Alejandra Bravo, Gracie Hoffman, Jared Martinez
Herbert Collins Scholarship (\$2,100) - Aaron Dewey, Loan Ngyuen, Lilla Vigh
Castagna Architectural Scholarship (\$15,000) - Ana Atanassov, Morgan Cuthbert, Kennedy Gomez, Payton McGee
CAED Scholarship (\$1,000) - Polina Slaboff

EXTERNAL SCHOLARSHIPS

Structural Engineering Association of Southern California (\$2,500) - Aaron Dewey, Kira Tolman
Community Initiative Scholarship from the Cal Poly Society of Women Engineers (\$500) - Alyssa Darby
Structural Engineering Association of California College of Fellows Scholarship (\$5,000) - Alejandra Bravo
Structural Engineering Association of California College of Fellows Scholarship (\$5,000) - Maria Boyle



ARCE Department Head Al Estes and faculty and staff members join 2023-24 scholarship recipients in celebrating their awards.



Smile!

ARCE Commencement Includes Order of the Engineer Ceremony

THE ARCHITECTURAL ENGINEERING (ARCE) Department conducted its Order of the Engineer graduation ceremony in the Hasslein Courtyard on June 18. The department honored 52 undergraduates and 14 master's students on their completion of the ARCE program.

Department Head Al Estes specifically honored ARCE students Hayle Jones, Shaina Dickie and Sasha Padilla during the ceremony for their service to the college, university and community.

ARCE student Aiden Wilker, who also participated in the ARCE graduation ceremony, was commissioned the day before as a second-lieutenant in the U.S. Army Corps of Engineers as part of the ROTC commissioning ceremony. Wilker will attend the Engineer Officer Basic Course at Fort Leonard Wood, Missouri, and the Army's Sapper School, respectively.

▲ **Top:** Department Head Al Estes honors ARCE students (from left) Hayle Jones, Shaina Dickie and Sasha Padilla.

▲ Tia Kelly, Jay Skaff and Audrey Williams proudly wear their master's degree hoods and Order of the Engineer rings after the ceremony.

► The day before graduating, Aiden Wilker is commissioned as a second-lieutenant by Major Dainese Roberts, a ROTC executive officer, at a ROTC commissioning ceremony.





▲ Sat Rihal and Jake Feldman shared fond memories with their former classmates.



▲ Class of '82 alumni turned out for a weekend of reunion activities, which included (from top) hiking Poly Canyon, dining at Café Roma and cruising in Morro Bay.

The 40th

ARCE Class of '82 Reunites for Weekend Celebration

THE ARCHITECTURAL ENGINEERING (ARCE) Class of '82 held a 40-year class reunion in San Luis Obispo on Oct. 7-9, 2022.

A Friday evening cocktail party at Hotel San Luis Obispo's rooftop High Bar kicked off the weekend. Alumni hiked up Poly Canyon on Saturday, followed by a cruise in Morro Bay and dinner at Café Roma. ARCE Department Head Al Estes presented a department update, and ARCE emeritus faculty members Jake Feldman and Sat Rihal shared fond memories and offered words of wisdom to their class.

The alumni met for Sunday brunch before saying farewell.

Class members Greg Taber, Karen Vogt-Wilcox and Glenn Loucks organized the event. Alumni who attended (in alphabetical order) included Jim Amundson, Terry Baldwin, Gina Benedetti-Petnic, Amor Camatcho, Phil Carey, Greg Dias, Robyn Dorius, Steve Earp, Joyce Fuss, W. Keith Herbert, Tony Jebian, Ed Jestes, Bill Larson, Damon Letz, Glenn Loucks, Brad Lowe, Joel Miroglio, Laima Reeder, Jim Rooney, Chuck Sinkey, Greg Taber, Joe Venuti, Karen Vogt-Wilcox, Greg Wayne, Terry Weatherby and Craig Wilcox.



George Winter Medal recipient Professor Ed Saliklis (left) shares in the camaraderie of winning prestigious accolades with Robert Driver, an engineering professor at the University of Alberta.



National Kudos

Ed Saliklis Picks Up George Winter Medal

ARCHITECTURAL ENGINEERING (ARCE)
Professor Ed Saliklis was presented with the 2022 American Society of Civil Engineers George Winter Award at the ASCE (American Society of Civil Engineers) Structures Congress in New Orleans in May.

Saliklis picked up the bronze medal award etched with the likeness of George Winter and an honorarium, which is determined from annual income generated from the award endowment.

The award recognizes the achievements of an active structural engineering researcher, educator or practitioner who best typifies Winter's humanistic approach to the profession, showing an equal concern for matters technical and social, for art as well as science, for soul as well as intellect.

Past winners of the award include Ashraf Habibullah, president and CEO of Computers and Structures Inc.; Cal Poly alumnus Tom Sabol (ARCE, '78); and Saliklis' personal mentor, David Billington, late Princeton University engineering professor emeritus who pioneered the discipline of structural art, evaluating artistic expression under the practical constraints of engineering. ■



High Praise from the Top

Estes, Behrouzi Honored for Excellence at Fall Conference

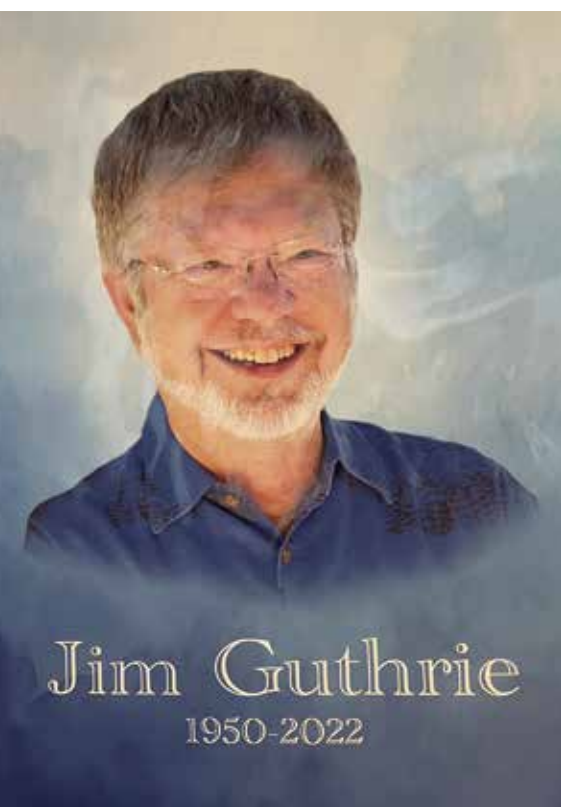
ARCHITECTURAL ENGINEERING DEPARTMENT Head Al Estes and Associate Professor Anahid Behrouzi were honored during the general session of Fall Conference 2022. Estes was recognized with the Provost's Leadership Award for Partnership in Philanthropy — an award he also won in 2012 — and Behrouzi won two awards: a 2021-22 Distinguished Teaching Award in recognition of excellence in teaching, contributions to student engagement and achievement, innovative instruction and commitment to student success; and the Outstanding Faculty Advisor of the Year Award.

Estes was credited with stewarding an outstanding fundraising program that has resulted in facility improvements, support of faculty initiatives and a huge enhancement of the ARCE student experience. He was praised for maintaining these efforts throughout the pandemic. "While others shut down, he saw this as an opportunity to contact donors, stay in touch, solicit gifts and steward donors in new ways," a nominator wrote. His initiatives include five-year sponsorships for eight labs, generating nearly \$1 million in gifts; completing the second iteration of the Parent's Learn by Doing Fund, which raised \$100,000 from parents and supporters of students in the ARCE program; and forming an ARCE Industrial Advisory Board, which last year sponsored the ARCE

▲ Cal Poly President Jeffrey D. Armstrong and Provost Cynthia Jackson-Elmoore honor Anahid Behrouzi and Al Estes at the 2022 Fall Convocation.
PHOTO BY JOE JOHNSTON

Student in Need fund and raised \$18,000. Estes is the only person to have won this award twice.

Behrouzi was praised for her efforts leading to students succeeding in their studies, following their passion and growing as future engineers. One former student, who took eight labs and lectures from Behrouzi, wrote, "Each one was a new adventure because Anahid had the habit of combining real-world examples into the topic for each class." Behrouzi strives to integrate diversity, equity and inclusion into her courses and engages students in these efforts. She also recruits, advises and travels with a student team to an annual international seismic design competition; participates in the student chapter of Structural Engineers Association of California; and encourages students to get involved with activities around campus. One nominator wrote, "I believe that the sense of concern Anahid has for her students is not only an attribute that makes her fit for this nomination but is the reason she began to teach in the first place." ■



IN MEMORIAM

Family, friends celebrate Jim Guthrie

A CELEBRATION OF LIFE for emeritus Architectural Engineering (ARCE) Department faculty member James Blacklock Guthrie was held Dec. 11, 2022, at the Culinary Artistas event space in San Francisco.

Guthrie, who passed away Nov. 9, 2022, was remembered by a host of family, friends and former colleagues from Forell/Elssesser Structural Engineers, where he had enjoyed a long and successful career prior to joining the faculty in the College of Architecture and Environmental Design.

Guthrie's daughter, Rose, and his son, Todd, opened the program with tributes to their father before opening the floor to others to offer their memories.

ARCE Department Head Al Estes was among the attendees. "I was honored to represent Cal Poly at the tribute and was

▲ Friends, family and colleagues gather for a celebration of Jim Guthrie's life.

◀ Jim Guthrie's smile beams from a memorial poster at the gathering.

very glad that I went," Estes said. "While it was widely recognized that Jim was an outstanding engineer, I was struck that the overarching theme throughout tributes was that Jim was a tremendously kind and caring person.

"I spoke of my recollections of Jim in the ARCE Department," Estes continued. "I got to spend some time with Jim's wife, Terry. I gave her copies of the ARCE magazines in which he was welcomed to the department (spring 2009), investigated earthquake damage in Napa (spring 2015) and retired from Cal Poly (spring 2016). ■



Bidding A Fond Farewell to Retirees

After winter quarter 2023, Architectural Engineering (ARCE) Department faculty members Jill Nelson and Pamalee Brady decided to end their participation in the Faculty Early Retirement Program (FERP) and fully retire. “Both insisted on a celebration that was intimate, no-frills and devoid of long-winded speeches,” said Department Head Al Estes. The department hosted cocktails and hors d’oeuvres on the the SLO Hotel rooftop to celebrate their journeys into retirement and thank them for their tenured service. “Pamalee joined the department in 1989 and was the longest-serving ARCE faculty member,” Estes said. “Jill joined in 2008 and served for 15 years.”

▲ **Left:** Jill Nelson (center) celebrates her retirement with Ed Saliklis’ wife, Ruta Saliklis, and Department Head Al Estes.

▲ **Right:** Pamalee Brady chats with ARCE colleague, Professor Craig Baltimore.



The ARCE Family Gathers

Architectural Engineering Department faculty and staff members (from left) are: Cole McDaniel, Radu Popescu, Craig Baltimore, Peter Laursen, Ed Saliklis, James Mwangi, Michael Deigert, Mario Esola, John Lawson, Erika Clements, Department Head Al Estes, Anahid Behrouzi, Jamie O’Kane, Melissa Hazlett and Brent Nuttall.

Families First

Department Staff Members Take Leave; Temp Helps

THE DEPARTMENT HAD to shift gears temporarily when two staff members, Erika Clements and Jamie O’Kane, went on maternity leave. The department, which normally relies on them to prepare part-time faculty contracts, plan department events, manage the building, make purchases, reimburse travel and handle voluminous other tasks, welcomed Sydney Anthoni to fill the gap when Clements left in November.

“The experience I had working in the ARCE Department was wonderful on so many levels,” Anthoni said. “I miss collaborating with the faculty, staff and students. I had very supportive resources who were very gracious in assisting me whenever I needed help.”

Anthoni has taken a temporary position in Cal Poly’s Facilities Management and Development office.

Administrative assistant O’Kane returned to full-time status in fall 2022.

Clements, administrative support coordinator, returned to work in April.

“I am very grateful for all the time I was able to take off to spend with my new baby and also to Department Head Al Estes for permitting a flexible schedule as I returned to work,” she said. “Having two small children at home is harder than herding cats sometimes, but I’m glad I was able to spend this important time with them when they were babies.”

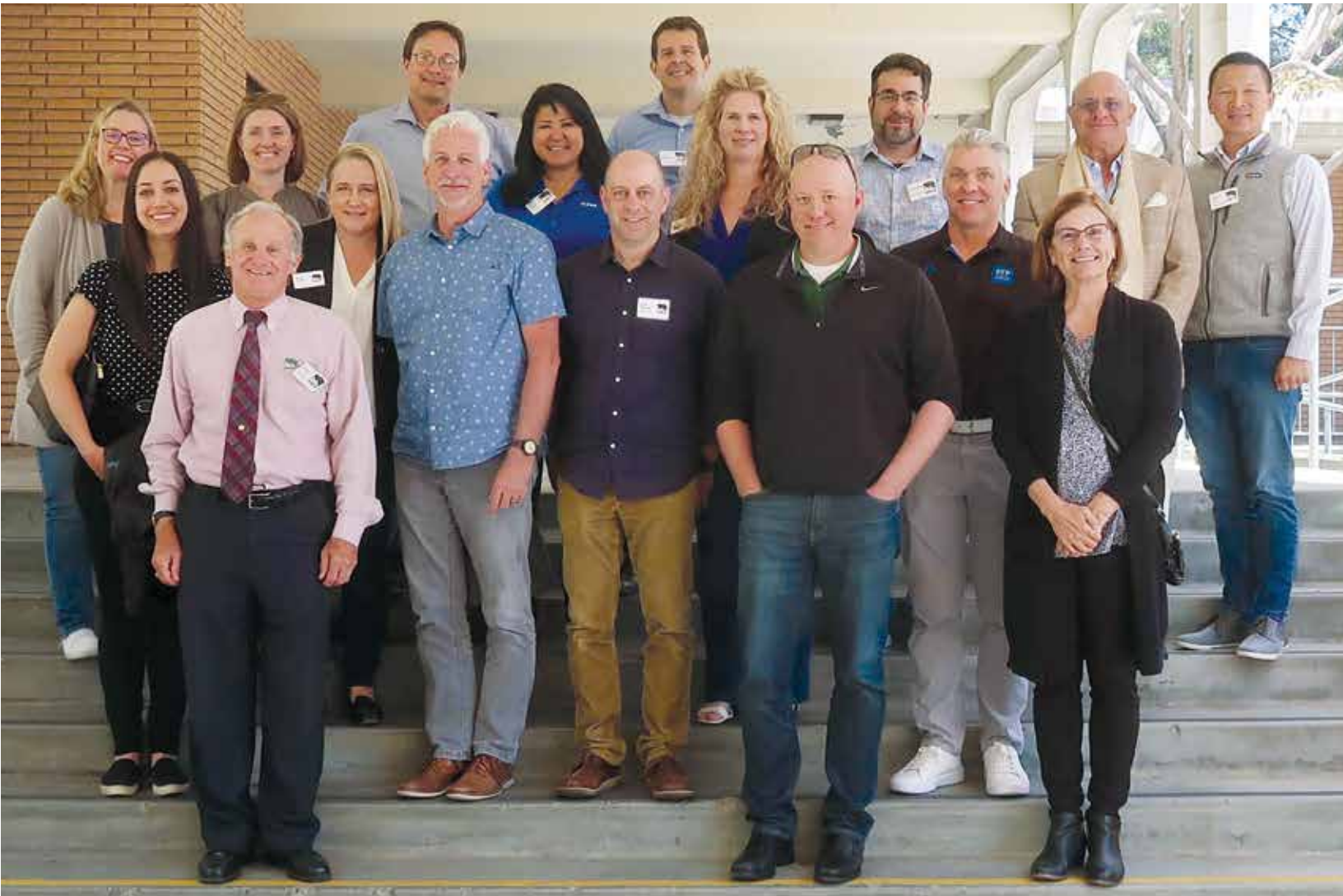
Estes is grateful to Anthoni for her assistance and happy that Clements and O’Kane are back.

“I could not be more grateful to Erika, Jamie and Sydney for getting us through this year without having to cancel any of our major events,” he said. “It was only possible by working together, dividing the load and accommodating the commitments that come with raising young families. Besides, it is very fun seeing these new little people crawling, waddling and running through the department.” ■



▲ The ARCE Department office has a nursery vibe when staff members’ children visit. Temporary staffer Sydney Anthoni enjoys a play break with Erika Clements’ baby, Adela, while Mom works.

◀ ARCE administrative assistant Jamie O’Kane with her children, Penelope and John, and their dog, Sal.



Outstanding — In More Ways Than One

ARCE Advisory Board Members' Connections to Industry Help Guide Department's Direction

MEMBERS OF THE ARCE Advisory Board meet in person on campus every spring and fall, generously volunteering their time and expertise to the Architectural Engineering (ARCE) Department. These industry professionals serve a three-year term, offering invaluable input on current issues such as the quarter-to-semester transition, interdisciplinary collaboration and accreditation. Their terms overlap as incoming and outgoing cohorts attend the spring meeting.

▲ ARCE Advisory Board members pictured in the back row (from left): Abe Lynn (Degenkolb and emeritus ARCE faculty member) and Josh Randall (RTM Engineers).

▲ Middle row (from left): Sharon Gookin (LA Metro), Kelsey Parolini (SSG Structural), Marcia Brown (Fluor), Krista Looza (Buehler Structural), Evan Reis (U.S. Resiliency Council), Mehran Pourzanjani (Saiful Bouquet Structural) and Damon Ho (Simpson Strong-Tie).

▲ Front row (from left): Emily Setoudeh (Overaa Construction), Al Estes (ARCE Department Head), Amber Freund (RISA), Ken O'Dell (MHP Structural), Peter Sokoloff (Foster + Partners), Luke Wilson (ZFA Structural), Randy Collins (FTF Engineering) and Janiele Maffei (California Earthquake Authority).

Not pictured: David Cocke (Structural Focus), Dick Dreyer (Holmes Structural) and Thomas Robinson (Lever Architecture).

INDUSTRY PARTNERS

Labib Funk + Associates Sponsors A Lab

THE ARCHITECTURAL ENGINEERING (ARCE) Department is thrilled to announce that the structural design firm Labib, Funk + Associates (LFA) has opted to sponsor what until now has been known as the A-Lab. LFA has hired a substantial number of ARCE graduates over the years and sponsored last year's edition of the ARCE newsletter.

"We look forward to dedicating this lab in the coming year," said Department Head Al Estes. "The pandemic was particularly tough on our sponsored labs program, as outside personnel were not allowed on campus. It became impossible to conduct dedication ceremonies or renovate the labs.

"This has turned into a joyful post-pandemic year, as Simpson Strong-Tie, Degenkolb and KPFF have all renewed their lab sponsorships for another five-year commitment," Estes continued.

In addition, the sponsorship of the SidePlate Lab has been assumed by its parent company and has become the Mitek



Lab as a renewal of that commitment. Several other sponsorships are expiring, and the department hopes to secure renewals for those.

A lab sponsorship represents a five-year commitment to provide \$10,000 per year during that period. "Those funds have been invaluable for maintaining the quality of the department lab facilities, and I expect many lab dedication ceremonies in the coming year," Estes said. ■

Thank You, Magazine Sponsors

The Architectural Engineering Department thanks MKM for sponsoring this edition of ARCE magazine and thanks and recognizes previous sponsors in order of the most recent:

Labib Funk & Associates
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

Clark Pacific Laboratory's New Look

The Clark Pacific Laboratory sports a bold new look, thanks to the artistic inspiration of Angela Jackson (left) and Kim Aubin. The marketing team traveled to Cal Poly to install the wall graphic in preparation for a lab dedication ceremony this fall.



Structural Resiliency Fund Awards Almost \$140,000 in Grants

AS THE ARCHITECTURAL ENGINEERING (ARCE) Department begins its third year of the CSI Structural Resiliency Leader's program, faculty and students were awarded \$139,415 in grants that support research, cocurricular activities, off-campus experiences, professional development and more. This recent round of grants, awarded in spring, will support most of the travel costs for members of SESH (Structural Engineering Students for Humanity) as they travel to Indonesia this summer.

In addition, students and faculty who completed projects this year will have their travel supported to present their work at the SEAOC (Structural Engineers Association of California) annual conference and the 18th World Conference on Earthquake Engineering in Milan, Italy, next June.

New projects receiving support include an investigation of infrastructure performance in the 2023 earthquake in Turkey, high-strength ductile plywood shear walls, integration of the material testing system and data acquisition, cardboard formwork for concrete columns, and improving building resiliency through structural health monitoring.

Grants were also awarded to continue ongoing projects, such as a rolling pendulum base isolation system, Gert Haunch seismic moment frame connection and recycling No. 5 plastic to make building materials.

"The department extends its continued thanks to Ashraf Habibullah of Computers and Structures Inc., whose generosity has made all of this possible," said ARCE Department Head Al Estes. ■

▲ Faculty member Cameron Richardson and ARCE student Haylie Tallon assemble the injection machine for No. 5 plastic. The project involves shredding and heating plastic that is currently not recyclable and injecting it into molds to make structural blocks for buildings.

► ARCE Professor Ed Saliklis and Cal Poly President Jeffrey D. Armstrong observe as liberal arts and engineering studies major Matthew Kilbride demonstrates the fire resistance of a shell structure.





INDUSTRY PARTNER KNOWS THE VALUE OF HIRING CAL POLY GRADS

MKM & ASSOCIATES was founded in 1983 with a vision to serve the community, and it has been doing that ever since, thanks in large part to its dedicated team of highly skilled, experienced and passionate technicians and engineers, including many Cal Poly architectural engineering (ARCE) graduates.

Early on, MKM established a tradition of hiring Cal Poly interns and graduates. During its first year in 1983, founding partners Larry Miyano and Bud Malmains hired Cal Poly ARCE graduate Eric Kreager, who became a partner in the firm in 1992 and remains there still.

The firm, headed by Kreager, John Cook, Mark Douglas and Josh Wallace, employs over 20 ARCE graduates, all of whom have helped the Sonoma County-based company continue its legacy of

creating unique solutions for a variety of structural engineering projects and attracting substantial repeat business.

“That is a testament to the continued trust we foster with our clients,” Kreager said. “Much of MKM’s passion for structural design is directly related to the engineers that have come to us from Cal Poly. The work that all Cal Poly students put in at school is directly related to their success after graduating and to their ability to immediately start working on structural designs.

“When new interns come to work, the enthusiasm for construction and design is revitalized, and the energy of new ideas and learning is brought forward again,” Kreager continued. “Our interns spend a lot of time in the field with our Construction Services

▲ **Top:** ARCE Department Head Al Estes (center) is welcomed by MKM & Associates staff, which currently includes more than 20 Cal Poly alumni.

▲ Kira Deguchi and Nicholas Horaney are among the ARCE alumni employed at MKM.

COURTESY MKM & ASSOCIATES



Department technicians, who have many years of construction experience.”

Cal Poly interns are also matched up with staff engineers, who participate in the review of their work.

“MKM offered everything I was looking for,” said Cal Poly ARCE alumnus Nicholas Horaney (’19), who works as a structural designer. “It was critical that I could be comfortable in my setting and feel challenged daily by unique conditions while applying the knowledge and skills that I learned at Cal Poly. As an undergraduate, I learned about the intricacy of architectural detail and programming and the critical yet often-overlooked impacts of other trades on structure, as well as gaining a deep understanding of fundamental engineering and code-related principles in structural engineering.

“Through the ARCE program, I was able to see how creativity drives unique solutions,” Horaney continued. “Through my work at MKM, I am able to see how many unique solutions there are for a single problem.”

MKM first hired ARCE alumna Kira Deguchi (’20) as an intern. She joined the firm as a full-time structural designer right after graduation. “A lot of other firms have only five to six people in each office, but at MKM, we have everyone in-house, so I have a lot of peers that I can ask questions and learn from,” Deguchi said. “I enjoy working under various managers who teach me different ways to approach the project. I also have been able to work on many different projects rather than just being the ‘wood expert’ or ‘footing expert’ like at some other firms.

“I was born and raised in Sonoma County, and having family nearby has made the transition from school to work easier,” she continued. “We have everything here in the North Bay: the redwoods, the beach, the mountains and the city are all within an hour’s drive.” ■



ARCE ALUMNI EMPLOYED AT MKM, listed alphabetically, earned B.S. degrees unless otherwise noted: Roger Blais (’81), Jennifer Briggs (M.S., ’17), David Corona (’21), Kira Deguchi (M.S., ’20), Spencer Dilley (’17), Erin Dupree (’21), Nick Gazdaks (’23), Nicholas Horaney (M.S., ’19), Eric Kreager (’84), Dennise Manalo (’17), Jamie Meachem (’83), Tony Nguyen (’20), Steve Pestell (’78), Dave Rogina (’86), Emile Schapp (’12), Josh Shockey (’21), Nick Stuart (’06) and James Whittall (’21).

2023 MKM INTERNS include fourth-year ARCE student Shaina Dickie and second-year ARCE student Luke Daniel Vollert.

FOR MORE ABOUT MKM & ASSOCIATES, VISIT:

www.mkmassociates.com

<https://www.instagram.com/mkmengineering/>

<https://www.linkedin.com/company/mkm-&-associates/>

▲ **Top left:** 888 Fourth Street, a mixed-use project in Santa Rosa, California.

▲ **Top right:** The Matheson, a commercial project in Healdsburg, California.

▲ The Roy Estate, a residential project in Healdsburg, California.
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Cheerleader with Style

ASHRAF HABIBULLAH, CEO of Computers and Structures Inc., is warmly welcomed by the Cal Poly team of students participating in the 20th annual EERI (Earthquake Engineering Research Institute) Seismic Design Competition. Habibullah, a dedicated supporter and generous sponsor, attended the international event to cheer the team on. Read more about the competition on Pages 28-29.