

# ARCE

ARCHITECTURAL ENGINEERING DEPARTMENT | COLLEGE OF ARCHITECTURE AND ENVIRONMENTAL DESIGN | SUMMER 2017

## LONDON REFLECTIONS

CAL POLY

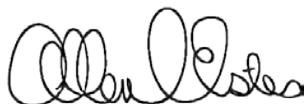


## SMILE-WORTHY MOMENTS, TO NAME A FEW

We just graduated the largest architectural engineering (ARCE) class in our 70-year history, and I am proud to offer my congratulations and seal of approval to them all. We hosted the second annual Order of the Engineer department-level graduation ceremony. This annual rite involves an oath and a stainless steel ring to remind each graduate of the trust and responsibility that society places upon them. I offer my continued thanks to Barrish Pelham Consulting Engineers, whose sponsorship makes this event possible.

As we complete another successful year, I want to thank Strandberg Engineering for sponsoring this edition of the ARCE magazine. David Strandberg has hired a substantial number of ARCE graduates over the past four years and is the 10th consecutive sponsor of this publication. We set a new record for Structural Forum with 52 companies attending this year. As part of the forum, we dedicated the Degenkolb Graduate Lab, which houses our master's degree students. We extend our gratitude to Stacy Bartoletti, CEO of Degenkolb, for attending the dedication ceremony and being our dinner speaker.

Thanks to the Parents Learn by Doing Fund and other generous sources, we sent students to Maui for the Structural Engineers Association of California (SEAOC) annual convention, to Portland to compete in the annual Earthquake Engineering Research Institute competition, and to Oklahoma City for a student leadership workshop. We had a record year for scholarships, supported senior projects and funded faculty initiatives for student interdisciplinary experiences. We welcomed Anahid Behrouzi to the faculty, bade farewell to Ray Ward and Larry Raio, who both retired, and promoted Pamalee Brady to full professor.



ALLEN C. ESTES | DEPARTMENT HEAD, ARCHITECTURAL ENGINEERING

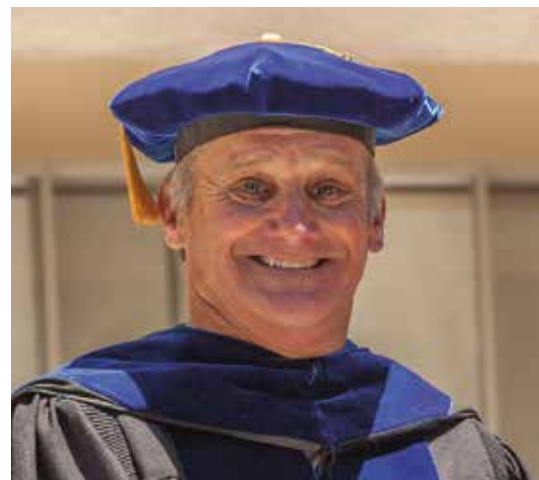
## PARTNERING TO MAKE OUR DREAM A REALITY

As I enter my fifth year as the dean of this college, I remain proud of our progress. This year, we developed a college strategic plan that will help guide the architectural engineering (ARCE) program as it also develops its own vision statement. We have created an exciting vision for new shop spaces and equipment that will advance Learn by Doing for several decades. I hope that many of you will help us translate this dream into reality. With its extensive use of experimental labs, ARCE will be a major beneficiary of these improvements.

I congratulate the department on its many successes this year, many of which are chronicled in this magazine. I salute the faculty, staff and students who have created wonderful learning opportunities, embraced interdisciplinary experiences and traveled around the globe to promote Cal Poly. My thanks to the many donors whose gifts have made these experiences possible. I am particularly optimistic about the newly named master's degree in architectural engineering and the opportunities it presents.



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



Department Head Al Estes

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### On the Cover

During spring break in London, Cal Poly architectural engineering students explored the structural marvels of London, including Tower Bridge. Kaylee Efstathiou captured this image showing herself (center), fellow students Avery Kwong (center, left) and Jami Hahn (top, left), and other visitors on the bridge's see-through floor, reflected in the mirrored ceiling. Read about the trip on Pages 12-13.



# Picture Yourself in Maui

## FACULTY AND STUDENTS DID ON THEIR TRIP TO 2016 SEAOC CONVENTION

Architectural Engineering Department Head Al Estes, Professor Cole McDaniel, lecturers Michael and Kelsey Parolini (both ARCE, '03), and five students flew to Maui in October 2016 to attend the annual Structural Engineers Association of California (SEAOC) Convention.

The students — all members of SEAOC's Cal Poly chapter — included Aaron Cook, president; Alex Remiticado, vice president; Kate Cuddington, Structural Forum chair; Sonny Moraga, treasurer; and Natalie Gibbons, former vice president. In return for assisting at the conference, held at the Hyatt Regency, the students were offered free registration.

Along with taking part in convention activities, the ARCE visitors explored Maui. Shown from left: Kate Cuddington, Natalie Gibbons, Sonny Moraga, Department Head Al Estes, Alex Remiticado and Aaron Cook.

McDaniel presented his paper, "Forced Vibration Testing of the Piedras Blancas Light Station Tower for Three-Dimensional Computational Model Validation." The lighthouse, a Central Coast historic landmark, began operating in 1875. Originally it stood 100 feet tall, but after a 1949 earthquake caused significant damage to it, the top 30 feet were removed.

"Shoreline Engineering in Morro Bay, California, is assessing rehabilitation options, including restoring the lighthouse to its original configuration," McDaniel said. "Shoreline invited Professor Peter Laursen and me to perform ultra-low forced vibration testing on the lighthouse to confirm the accuracy of their models."

Michael Parolini presented a paper he co-authored with Associate Professor John Lawson titled "The Making of a Rain-Induced Roof Collapse and the Lessons Learned for our Profession." Using a recent rain-induced roof collapse as a case study,

they demonstrated several vital points of interest in the collaboration between structural engineers and other design professionals. Citing problems with the building's design and code standards, the paper investigated the avoidable events that led to the costly roof failure.

As is tradition at this annual conference, the ARCE Department hosted the Cal Poly Architectural Engineering Alumni and Friends Reception at the Hyatt's Umalu Bar and Grill before the CSI dinner at the King Kamehameha golf clubhouse. The reception highlights the continued and exclusive participation of Cal Poly's ARCE program at SEAOC events. The department thanks the Structural Engineers Association of Northern California, the Parents Learn by Doing Fund, Jerry Lohr for his donation of J. Lohr wines, and Cal Poly for providing Instructionally Related Activity funds that allow the program to send students and host the annual event.





# We Attracted A CROWD

27TH ANNUAL STRUCTURAL FORUM  
SETS A RECORD FOR THE NUMBER  
OF COMPANIES THAT PARTICIPATED

The 27th annual Structural Forum, held Feb. 11, hit all the right notes: engaging speakers, more than 320 registered attendees, and a record 52 companies participating in the “no résumé” career fair. It was also a successful fundraising effort for the student chapter of the Structural Engineering Association of California (SEAO), which hosts the event with support from the Architectural Engineering (ARCE) Department.

This year’s theme, “Framing the Future,” encapsulated the role of the structural engineer, according to ARCE senior Kate Cuddington, Structural Forum chair. Cuddington organized the event with a committee of 18 students.

“I instituted an application process for people to join the Structural Forum Committee. I made a real effort to delegate because it is an important skill and their help was invaluable,” Cuddington said.

## 2017 PARTICIPATING COMPANIES — THANK YOU

Advanced Structural Design Inc.  
Ashley & Vance Engineering Inc.  
Barrish Pelham Consulting Engineers  
Brooks-Ransom Associates  
Buehler & Buehler Structural Engineers Inc.  
C. W. Howe & Partners

CYS Structural Engineers  
Daedalus Structural Engineering  
DCI Engineers  
Degenkolb Engineers  
Englekirk Structural Engineers  
Fluor Corp.

Forell/Elsesser Engineers  
4 S.T.E.L. Engineering Inc.  
FTF Engineering  
Gessner Engineering LLC  
Gregory P. Luth & Associates Inc.  
Harris & Sloan  
Holmes Structures

Hope Amundson Engineering  
JCE Structural Engineering Group Inc.  
John A. Martin & Associates  
John Labib + Associates  
KNA Consulting Engineers  
KPFF Consulting Engineers  
Lionakis





Stacy Bartoletti



Omar Garza



Eric McDonnell



Mark Sarkisian



Laura Whitehurst

The guest speakers (above) imparted industry-related words of wisdom.

Opposite page: Structural Forum chair Kate Cuddington (front, center) celebrates success with other student participants, many of whom helped her coordinate this year's event.



The job fair provides an informal meeting ground for students and industry representatives, such as student Emir Kuljancic (above, left) and Michael Aoki-Kramer, from RHD's Seattle office.

The morning speakers included Omar Garza of Nous Engineering, Laura Whitehurst of Walter P. Moore, Eric McDonnell with KPFF, and Mark Sarkisian, a senior engineer with Skidmore, Owings & Merrill.

"Sarkisian's talk was phenomenal," Cuddington said. "There literally was a swarm of students surrounding him after his talk, which focused on the creative aspects of the built environment professions. Most of the speakers talked about the future role of the structural engineer and the integration of the civil engineer, the architect, the construction manager and the structural engineer. Generally the focus was on how to improve our profession."

The career fair was also a hit. "I've been to lots of career fairs, and they are usually pretty stilted events. This has such a different vibe; it's much more casual. It's also a great networking opportunity."

Stacy J. Bartoletti, chairman and CEO of Degenkolb Engineers, gave the keynote talk at the evening banquet.

"I am amazed at the quality of forum speakers that the students are able to attract," said Department Head Al Estes. "I cannot imagine anyone more qualified to specifically address the future of the structural engineering profession than the CEO of Degenkolb."

The final three weeks of organizing Structural Forum is like a full-time job, Cuddington said, but she learned some valuable lessons. "It was helpful to have so many people invested in making it happen. I also learned how to fundraise. I'm definitely glad it's over!"

LPA Inc.  
Miyamoto International  
Magnusson Klemencic Associates (MKA)  
MKM & Associates  
MHP Inc. Structural Engineers  
MWA Inc.  
Nishkian Menninger

Nous Engineering  
Paradigm Structural Engineers  
Peoples Associates Structural Engineers  
RDH Design Group  
RedBuilt  
Rinne & Peterson  
Rutherford & Chekene

Sideplate Systems Inc.  
Simpson Strong-Tie  
STB Structural Engineers  
Strandberg Engineering  
Structural Engineers Inc.  
Summit Engineering  
Taylor & Syfan Consulting Engineers Inc.

Tuan and Robinson Structural Engineers Inc.  
Walter P Moore  
Watry Design Inc.  
Wiss Janney Elstner Associates Inc.  
ZFA Structural Engineers

# Celebrating Excellence

## ANNUAL LUNCHEON HONORS 2017-18 SCHOLARSHIP RECIPIENTS

The Architectural Engineering (ARCE) Department recognized its stellar students at its ARCE scholarship luncheon on June 8 in the KTGy Gallery on campus.

Three ARCE students were honored with College of Architecture and Environmental Design (CAED) recognition awards, and 27 scholarships valued at nearly \$80,000 were awarded to 24 students. The department thanks the many donors who generously contribute to these scholarships.

"It was wonderful having Russell Berkowitz (ARCE, '95) of Forell/Elssesser, Steve Hicks of ICC, Alan Hanson and Darwin Waite from Simpson Strong-Tie, and JeanLuc and Holly D'Abreau from the D'Abreau Family Foundation attend to present their firm's scholarships," said Department Head Al Estes.

Six firms sent videos in lieu of attending. Estes announced that the coveted ARC'Y Award for best video goes to Simpson Gumpertz & Heger Inc.

With Department Head Al Estes presiding (below, left), Emma Morley is presented the Forell/Elssesser Scholarship by Russell Berkowitz, a Forell/Elssesser senior associate and ARCE alumnus.



### CAED SCHOLARSHIPS

**Nicholas Dekker, Nathaniel Moore, Tony Nguyen**  
Robin L. Rossi Award — \$1,000 each

**Marin Govett, Leah Holleran**  
Herbert E. Collins Undergraduate Scholarship — \$1,200 each

**August Messano, Stephen Prendergast, Colin Ridgley**  
Castagna Scholarship — \$15,000 each

**Carla Simental** | Herbert E. Collins Graduate Scholarship — \$1,200

### CAED RECOGNITION AWARDS

**Kate Cuddington** | Outstanding Senior Award for Contributions to Objectives and Public Image of the College

**Amy Poehlitz** | CAED Recognition Award for Academic Excellence

**Hannah Rogers** | Collegiate Learning Assessment Plus Recognition Award

### ARCE SCHOLARSHIPS

**Sophia Abshire, Michael Blanchard, Brooke Lipsey**  
John Labib and Associates — \$1,500 each

**Enrico Alvaro**  
KNA Consulting Engineers Senior Project Scholarship — \$1,000

**Jeret Buerger**  
Emanuele Barelli Structural Engineering Scholarship — \$1,200

**David Corona-Perales, Lilliann Lai, Douglas McArthur, Nicholas Slavin**  
Carson Starkey Scholarship — \$2,500 each

**Christian Paul Curameng**  
CYS Eugene Cole S.E. Senior Project Award — \$1,800

**Tia De Harpport** | John A. Martin and Associates Scholarship — \$1,500

**Alex Esser** | KPFF Los Angeles / Pasadena Scholarship — \$1,500

**Sydney Gallion** | Degenkolb Engineers Scholarship and Internship — \$2,500

**Jiaming Liu** | Paul F. Fratessa Memorial Scholarship — \$1,000

**Emma Morley** | Forell/Elssesser Engineers Scholarship — \$1,000

**Olivia Pepe-Phelps** | Fluor Foundation Upper-Division Scholarship — \$1,250

**Stephen Prendergast**  
Simpson Gumpertz & Heger Inc. Scholarship — \$2,000

**Jessica Resta** | D'Abreau Family Foundation — \$1,000

**Neil Robertson** | Hans Mager Scholarship — \$1,200

**Kiana Underwood** | Fluor Foundation Lower-Division Scholarship — \$1,250

### OUTSIDE SCHOLARSHIPS

**Kate Cuddington** | ICC Fred H. Schott Scholarship — \$1,500

**Kate Cuddington** | Structural Engineers Association of Northern California — \$5,000

**Kate Cuddington** | SWE Outstanding Women in Engineering & Technology Award

**Anugrah Gupta** | CMACN Engineering Scholarship — \$750

**Jiaming Liu** | Trane Scholarship — \$2,000


**Olivia Pepe-Phelps**  
Simpson Strong-Tie Scholarship (2016) — \$2,000

**Olivia Pepe-Phelps**  
ICC Fred H. Schott Scholarship — \$1,500

**Amy Poehlitz** | Structural Engineers Association of Southern California David and Margaret Narver Memorial Scholarship — \$2,000

**Carla Simental** | Structural Engineers Association of Southern California — \$1,000





## ALUMNUS CREATES RESEARCH PROGRAM IN AUCKLAND TO ATTRACT ARCE GRADS

# New Zealand **Fellowship** Beckons

When Lucas Hogan (ARCE, '09) graduated from Cal Poly, he was certain about two things: He wanted to do his graduate work overseas, and he wanted to pursue structural engineering in a seismically active area. He planned to earn a master's degree in a year, then start his career.

Instead, he enrolled in the four-year doctoral program at the University of Auckland (UoA), where he remains eight years later as a research fellow in the Civil and Environmental Engineering Department.

Hogan now welcomes a few Cal Poly architectural engineering students every summer as part of the Cal Poly–University of Auckland Research Fellowship, which he and two colleagues created to attract potential doctoral candidates to the UoA. The fellowship aims to give students a view into the world of research and insight into how structures actually perform.

Shannon Abeling (ARCE, '15) was the first participant and is there now working on her doctorate. Kiersten Bakke, Katie Eberle and Ryan Lefebvre went in summer 2016, and Anugrah Gupta, Tia De Harpport and Sophie Moore are slated to go this summer.

"The fellowship serves as an opportunity to attract high-quality students for our graduate positions," Hogan said. "With several large earthquakes hitting New Zealand in the past seven years, a significant amount of research is funded. Because so much of our work is experimental, the skills that ARCE students bring — thinking critically about structural behavior, the ability to do hands-on work and practicality in construction — are valuable for this research."

The students work mainly on the doctoral project of their sponsoring professor. Projects have included field

ARCE alumni Lucas Hogan and Shannon Abeling work in the University of Auckland's Structural Testing Lab in Newmarket, "where we spend our time building and breaking large structures," Hogan explained.

testing of pile foundations, testing of unreinforced masonry walls, testing of concrete beams to determine factors that led to unexpected performance of frame buildings, and quantifying the damage and casualty rate of retrofitted buildings versus those that are not retrofitted.

"The research directly affects what is written in the building codes. Seeing that connection unveils the mystery behind those documents and encourages the students to not take codes as gospel, but to rather think about how those codes seek to encourage better performance of structures," Hogan said.

# A Festive Tradition

## BAY AREA ALUMNI CATCH UP AT ANNUAL RECEPTION



Approximately 40 people, mostly younger alumni living in the Bay Area, attended the Architectural Engineering Department's annual reception in San Francisco, held this year on March 24 at Schroeder's Restaurant.

Alumni in attendance included Stefanie Rae Arizabal, Michael Bauer, Alex Billings, Colin Blaney, Amy Burruss, Cristina Chilin, Edward Clements, Erika Clements, Kate Cuddington, Natalie Gibbons, Nate Hall, Larry Kaprielian, Kieran Kelly-Sneed, Gina Kope, Mary Kretschmar, former faculty member Abe Lynn, Mirian Martinez, Daniel Menno, Georgine Mooney, Meghan Navarro, Kion Nemati, Robert Norton, Jared Parker, Reece Relatores, Laura Rice, Emily Setoudeh, Emmett Seymour, Sarah Storelli, Jen Ton, Sean Westphal and Alec Zavala.



# All It Takes

## ... AND UTILIZING ONE'S KNOWLEDGE THAT'S ARCE ALUMNUS JESSE HOYE

Jesse Hoyer (ARCE, '13) credits his "deeply founded faith" for instilling in him a desire to help others, and since graduating, he's been doing just that.

As a structural engineering intern for Engineering Ministries International (EMI) in 2014, he worked in India, Nepal and Uganda, helping local villagers who had experienced loss regain hope. He admits that acclimating to vastly different cultures isn't always easy.

"My six months in India was a difficult experience," he said. "The culture is so different from ours. There were so many sights and sounds and smells; it was overwhelming. Slowly I fell in love with the Indian culture and people. Generally speaking, they're kind and fun with so much heritage that it drips from every storefront and street corner. At the same time, my heart would break seeing the





# akes Is Faith

OWLEDGE TO HELP OTHERS.  
SE HOYE'S RULE OF THUMB



poor. Almost daily, small children would beg for money."

While there, Hoye worked on a youth center in Manipur and a secondary school in Uttarakhand while also developing a program to help future volunteers design safe, code-compliant structures.

When Nepal's 7.8 magnitude earthquake hit in April 2015, Hoye felt the tremors in Delhi, India, some 500 miles away.

"A week and half later, I was on the ground in Kathmandu," he said. "We did repairs for an international school, assessed staff members' homes, and partnered with a leprosy hospital. The care and love that these people extended to those suffering from leprosy was amazing."

In Nepal, Hoye met people who had lost their homes, possessions, family, hope. "It's difficult walking into such brokenness,

but it's also amazing that our teams' expertise could offer some relief," he said.

Hoye will be leaving his current position with ZFA Engineers to become EMI's disaster response program manager, an unpaid full-time position.

"I'm raising support from people who want to use part of their funds to make this work possible. As manager, I'll put together and lead teams into areas affected by natural disasters and humanitarian crises. We get to go in with our expertise

Alumnus Jesse Hoye assesses the damage to a brick masonry home in Kathmandu (above) and a rural school in the foothills of the Himalayas (top, left). He also partnered with an international school in Kathmandu to assess damage on campus and to employees' houses, located on a map (top, right).

as architects and engineers and offer a level of peace and hope. There's no other way I'd rather be using my degree from Cal Poly! I feel I was made for this."



# Back to the Future

STUDENTS BENEFIT FROM COURSE IN CONCRETE SHELL STRUCTURES, WHICH

Students in the new ARCE 415/ARCH 453: Interdisciplinary Capstone Project course huddled in small groups in front of computer screens, quietly working on projects that harken back to an iconic architectural style popular in the 1950s and '60s: thin concrete shell structures.

Team taught by architectural engineering (ARCE) Professor Ed Saliklis, who developed this version of the course, and architecture lecturer Ansgar Killing, the new interdisciplinary class is the capstone senior project course for ARCE students. The class, which meets four hours, three times a week, has been offered since 2010, but this version is an entirely fresh approach.

"Normally architects design the structure, and engineers calculate the beams and columns — a scenario that doesn't require collaboration," Killing said.

The new course flips that concept, with architects and engineers working together from the first week. "The design is very much driven by the forces of

specialized mathematics and physics. The architects have to be briefed on the underlying structural rules of how to build a shell structure," Killing said.

Concrete shells are, according to Saliklis, "extremely efficient and very elegant. The disciplines of architecture and structural engineers are blended to create structures that have no beams, no columns — only a roof."

The students are creating 9-foot-long physical models and virtual designs for outdoor shelters in Los Angeles by Pershing Square; in Cuba, across the street from the American Embassy; and at a bend along the Danube River.

To create the concrete shells, students start with tutorials on geometric form-finding tools and then go into a model-based approach to ensure compression-only structures.

Students built physical models using chains and weights, and then they built cloth models wetted with plaster.

"It has to be the perfect shape," Saliklis said. "When they flip the cloth model, they should have a pure compression structure with no bending. This method of designing is mathematically complex, so we verify the math with simple physical models.

"The shell is impossibly thin — crazy thin," continued Saliklis, whose own research into form finding "spills into the class when I am teaching mathematical 3D compression-only form-finding. Only a couple hundred people in the world are doing pure compression 3D form-finding, and Cal Poly is the only university in the world to offer such an undergraduate class. Nobody at the undergrad level is doing anything like this."





## LOOK EERILY FAMILIAR

A concrete shell structure recently built by students of ARCE 415/ARCH 453 (bottom) is reminiscent of a thin-shell concrete "vault" built by ARCE students circa 1960 (below).



Among the new shell-structure builders (above, from left) are: architecture major Betsy Cerda; architectural engineering majors Alma Lopez, Kenneth DeCarlo and Alex Schall; and architecture major Justin Rapolas.

Architecture student Paris Allen said, "It is the only opportunity we have had to work alongside engineers and see how structures are integrated into architecture. The course gives us an opportunity to bounce back and forth the ways we can influence each other."

Department Head Al Estes added, "I love this version of our upper-division interdisciplinary studio. Rather than focusing exclusively on schematic design, the students are constructing formwork, placing concrete, and building the actual structure."

"It's expensive," Estes continued. "We have heavily supported this effort using our Parents Learn by Doing Fund. I have been searching for a model that might encourage the construction management students to rejoin this effort, and this has all of the elements."

Saliklis holds that there is value in reclaiming this trend. "It was a magnificent period in our two professions. An architect can't do it alone, and an engineer can't do it alone. It's important to reclaim that tradition."

Students agree. ARCE senior Keslyn Huntington said, "This class is our first opportunity to work with architecture students who have gone through four years of education. It's really inspiring and helps pave the way for my future working in industry with architects."





Professor John Lawson gets an overview from the London Eye.

A group of architectural engineering students with faculty leader John Lawson traveled over spring break to London, where they toured some of the world's most creative engineering firms, such as BuroHappold, Foster + Partners, AKT II, and Price & Myers.

Tim Lucas, partner of Price & Myers, provided the students access to Westminster Abbey's construction of a new masonry stair tower being built to allow public access to the elevated medieval Triforium — or gallery — for the first time in 700 years.

"Price & Myers' work is reported to be the most significant addition to the building since 1745," Lawson said. "The stone was quarried from the same locations as the original building's stone in the 13th and 16th centuries."

Students visited Arup's Millennium Bridge across the Thames River. A structural consultant working at Foster + Partners, the suspension bridge's structural engineer, discussed the unexpected bridge vibrations and the engineering solution. Students also visited Arup's 356-foot Orbit Tower, London's tallest sculpture, and rode the world's longest tunnel slide, built for the London 2012 Olympics.

Additional highlights included the students riding a private capsule around the giant 400-foot diameter London Eye, the world's largest Ferris wheel when it built in 1999; sipping champagne at sunset at the top of the Shard, a 95-story tapered, glass building and the fourth tallest building in Europe; and exploring the Sky Garden 500-feet in the air atop the infamous "Walkie-Talkie" Building, a skyscraper so nicknamed because of its distinctive shape.

The trip wasn't all about work, though. The students took jet boat tours on the Thames and walking tours around Big Ben, the House of Parliament, St. James Park and Buckingham Palace. Many visited the Tower Bridge, Tower of London, British Museum, the Royal Observatory and Camden Square. And what would a visit

# L O N



Students review plans for the addition of a stair tower at Westminster Abbey (above), a Price & Myers Consulting Engineers project.

to London be without catching a show in the theater district or enjoying a pint in an old pub?

"This was an incredible experience that allowed us to discover many of the differences in design between the U.S. and the U.K.," said Alex Remiticado, vice president of Cal Poly's student chapter of the Structural Engineers Association of California (SEAC), which sponsored the trip.



# D O N

## ARCE VISITORS EXPLORE THE CITY'S HISTORIC AND MODERN-DAY WONDERS



The group toured the 2012 London Olympic Aquatics Center (left), designed by Zaha Hadid Architects, and Arup's Orbit Tower, seen in the background.

Kaylee Efstathiou and Alex Remiticado (below, left) pose with the Shard building as their backdrop.

Visitors hang out in the Sky Garden (below).



Participating students were Sophia Abshire, Onessa Anastasio, Emma Barraza, Stella Bates, Jeret Buerger, Hunter Caldwell, Joseph Cervantes, Aaron Cook, Julia De Hart, Tia De Harpport, Rory de Sevilla, Kaylee Efstathiou, Jami Hahn, Avery Kwong, Michele Leung, Jiaming Liu, Adam MacLean, Dennise Manalo, Christopher Martinez, Alex Remiticado, Calvin Roth, Tommy Sidebottom, Max Snook and Sam Solow. In addition to John Lawson, ARCE Professor Pamalee Brady and her husband joined the tour of Foster + Partners.

# TAKING HOPE AND AID TO NEPAL



## STUDENTS HELP RETROFIT BUILDINGS IN EARTHQUAKE-RAVAGED KATHMANDU — AND MAKE SOME FRIENDS IN THE PROCESS

For two weeks in September 2016, architectural engineering (ARCE) Professor James Mwangi and 15 members of Structural Engineering Students for Humanity (SESH) were in Kathmandu, Nepal, to aid in rebuilding efforts made necessary after the April 2015 earthquake. SESH students have traveled three times to Haiti for a similar purpose.

Stefanie Rae Arizabal (ARCE, '11), an engineer at Strandberg Engineering, went to help the students evaluate and seismically retrofit two buildings: the Gaddi Baithak, a white neoclassical building, and the Shree Shanti Niketan School.

SESH set out to raise \$7,000 to help fund the seismic rehabilitation of the school and were thrilled when they raised nearly twice that amount — more than \$13,000.

To do the work, the students partnered with Miyamoto Global Disaster Relief. “We actually got to brainstorm with Kit Miyamoto,” CEO of the eponymous company, said senior Kate Cuddington, who planned and coordinated the trip. “It was awesome to talk to him and to lend our help.”

“It was the craziest trip I’ve even been on,” Cuddington continued. “I’ve been to two places where I have felt a true connection to the people and the culture: Costa Rica and Nepal. I say that even after spending two days in the hospital in Nepal (the result of drinking contaminated water). It’s still one of the most rewarding trips I’ve been on.”

During the students’ last four days, they embarked on a “village trip” to witness the effects of the earthquake damage





in the more rural areas of Nepal and to get a better sense of the Nepalese culture.

Seeing firsthand the damage caused by the earthquake was an incredible lesson.

"We spend so much time learning about building performance after earthquakes, but few people actually get to see the adverse effects of poor engineering on such a large scale. We talked to the Nepalese people about the impact the earthquake had on their lives. One man said it was sad to see so much damage and loss. 'But at the end of the day,' he said, 'we now get to build everything stronger and better.' We think of only the negative aspects, but to hear someone speaking about it in such a positive light gave me a new perspective on my role as an engineer," Cuddington said.

Opposite: Spirits are high after a soccer game between Cal Poly students (from left) Rebecca Winning, Jami Hahn and Ryan Llamas and the children who attend Shree Shanti Niketan School.

The group tours severely damaged areas in Kathmandu (top, left).

Students (top, right, from left) Rebecca Winning, Julian Reyes, Jami Hahn and Angelica Quach take measurements to complete preliminary framing plans for the school, as do Rory de Sevilla and Ryan Llamas (above).

2016 SESH members include Kimberly Bocanegra, Kevin Chiang, Kate Cuddington (administrative leader), Rory de Sevilla, Jami Hahn, Brianna Kufa, Ryan Llamas, Simon Ng, Amy Poehlitz, Angelica Quach, Julian Reyes, Kristy Sanchez (fundraising leader), Sheela Vedula and Rebecca Winning.



## Envisioning the Future

### ARCE DEPARTMENT MAKES PROGRESS IN DEVELOPING ITS VISION STATEMENT

Cal Poly alumna Ann Banning-Wright (Graphic Communication, '79), CEO of Bright Operations LLC, led the Architectural Engineering (ARCE) Department's yearlong effort to develop this vision statement: "Empower people through a balance of theory and practice to thrive professionally and to collaboratively engineer tomorrow's built environment."

During three retreats, department faculty and staff crafted the statement, which considers "what distinguishes us as ARCE, what is important to us, and what we want to become" said Department Head Al Estes. "Ann got us to unanimously approve the vision where every word was carefully chosen and debated. Now we need to build on it, define our core values, and re-evaluate our mission statement. From all of that, we will devise a strategic plan."

Faculty member Cole McDaniel and Cal Poly alumna Ann Banning-Wright brainstorm points at a retreat to dial in the department's vision statement (above).

Some of the core values defined include student-faculty interaction, balance of theory and practice, and interdisciplinary collaboration. After obtaining student and advisory board input, these will be refined at the fall retreat.

"They will make amazing strides by keeping the vision in the forefront of their minds as they go about their daily activities," Banning-Wright said.

Right: Marketing interns Lindsey Kuster (left) and Kate Cuddington.

### STUDENT MARKETING INTERNS LEAVE A LASTING IMPRINT

The department bid a fond farewell to recent graduates and Architectural Engineering (ARCE) Department student marketing interns Kate Cuddington and Lindsey Kuster (both ARCE, '17). While they are no longer roaming the halls of Cal Poly, their work is a reminder of their accomplishments as the department's first student marketing interns.

Cuddington, from Boulder, Colorado, and Kuster, from Denver, Colorado, were hired in 2015. Since then, they have spent countless hours updating the department's website and restructuring ARCE's social media presence on LinkedIn, Facebook, Instagram, Twitter and YouTube.

"I loved the job because I got to be creative and helpful to the faculty and the students in the department," Cuddington said. "Plus I learned new techniques and new software for the website, and I perfected my design skills."

Kuster also enjoyed her role and learned new skills. "Making videos and taking photos was a nice break from homework," she said. "I figured out who we're marketing to — mostly prospective students, current students, parents and alumni — and I learned to approach each group in a different way."







Lab technician Ray Ward assisted faculty and students for 28 years.

## ◀ LAB TECH RAY WARD RETIRES

After 28 years of service, Ray Ward, longtime Architectural Engineering Department laboratory technician, hung up his tools of the trade at the end of the 2016-17 academic year.

He was known for lending an invaluable hand to professors and students alike, fixing all things electronic and hydraulic, even helping students make aviation history in 1989 when their human-powered helicopter, dubbed DaVinci III, became the first ever to achieve liftoff.

"After eight years, the students had run out of ideas," Ward said. "I came up with an improved propeller with frictionless bearings that increased their speed by 60 percent."

He departs Cal Poly with the 2016-17 Outstanding Staff Award. "Ray is absolutely amazing," said Department Head Al Estes. "It will take three people to replace him. I have never seen anyone more inventive at solving problems; he always gives you more than you ask for."

Ward and his wife, Ann, have taken more than 100 foster children into their home over the years. They were honored in 2014 when they won an all-expense-paid trip and scholarship to attend the Foster Family-Based Treatment Association's annual conference on Treatment Foster Care.

Ward plans to fill his days traveling with Ann in their new motor home to all the U.S. national parks.

## LECTURER LARRY RAI0 RETIRES ▶

Longtime lecturer Larry Raio retired at the end of the 2016-17 academic year in June, closing chapters in two Cal Poly departments at once.

In addition to teaching the ARCE 421 lab in Soil Mechanics, Raio has also been teaching the lab section of the Introduction to Soil Science course in the Natural Resources Management and Environmental Sciences Department.

When he first came on board, Raio's teaching assignments were part time, so he also worked full time at a local soil engineering firm. Over the years, however, his Cal Poly responsibilities grew to full time, and he devoted all his energies to teaching.

"Larry gave 28 years of exemplary service to this department," said Department Head Al Estes. "Despite aging lab equipment, he believed in safety and pride of ownership. Everything was orderly and well maintained. We wish him all the best in retirement."

While he enjoyed teaching, especially the hands-on aspect, he looks forward to this next phase. "I'm looking forward to retiring," he said. "I love camping, traveling, photography, and I'm learning to play golf. Just being at home and having the time to garden and do home improvements will be nice."

Raio earned his B.S. degree in natural resources management and his master's in soil science, both from Cal Poly.



For 28 years, Larry Raio has shared his soils expertise with students.



Pamalee Brady

## PAMALEE BRADY IS PROMOTED TO PROFESSOR

ARCE faculty member Pamalee Brady will be promoted to the rank of professor, effective in the 2017-18 academic year.

Brady joined the architectural engineering faculty in March 1998 and has taught more than 22 different courses in the department. Her professional development has concentrated in the areas of K-12 education, forensic engineering and engineering education issues such as gender representation and disadvantaged student success.

Brady's collaboration with other Cal Poly departments helped lead to two grants, awarded in January 2015, totaling approximately \$2 million. The grants are aimed at improving STEM (science, technology, engineering, mathematics) performance in elementary and middle school students and developing K-12 teacher education.

Brady earned a bachelor's degree in architectural engineering from Cal Poly in 1979, a master's degree in civil engineering from UC Berkeley, and a doctorate in civil engineering from the University of Illinois. She is best known in the department for chairing the Scholarship Committee, participating in the EPIC summer program, and developing the Sandcastle competition.

## An Old Hand at Hands-On

### NEWEST FACULTY MEMBER, ANAHID BEHROUZI, IS NO NEWCOMER TO LEARN BY DOING

Cal Poly and Anahid Behrouzi, the Architectural Engineering Department's newest faculty member, are a natural fit. The assistant professor is not new to Learn by Doing; she was raised on it, thanks to her engineer father and educator mother who tended to answer their children's questions through experimentation.

"I'd ask a question, and my family got involved to investigate," Behrouzi said. "I learned fractions from baking. Mom would get these recipes to serve 200 people and tell me to scale it down to feed our family of four."

Behrouzi teaches Structural Analysis and Structural Dynamics, both part of a three-class sequence that are academically challenging and provide foundational knowledge for earthquake engineering — a subject that Behrouzi is currently researching with students.

"Our research is related to virtual earthquake reconnaissance, which involves assessing building damage using images posted online to formal or social media platforms," Behrouzi said. "With a team of computer scientists, we are developing a tool that automates the detection and categorization of structural damage."

Although fairly new to teaching, Behrouzi has developed quite a student following. Every eligible student in her fall Structural Analysis class signed up to take her Structural Dynamics class in winter.

She hopes to instill in her students a desire to experiment. "I want them to research the literature and be



Anahid Behrouzi

able to communicate their design solutions. I want them to have a sense of creativity and independence — to seek out resources, literature, colleagues and friends ... to be resourceful and ethical, and to bring their heart. I also hope they are inspired by the world around them."

Department Head Al Estes said, "Anahid is off to a wonderful start. I am amazed at her array of professional contacts. She has already presented a paper at the American Society for Engineering Education conference in New Orleans, obtained a research grant, and advised the ARCE student Earthquake Engineering Research Institute Seismic Design Team. She is full of energy, and we are lucky to have her."

Behrouzi earned a B.S. degree in civil engineering and a B.A. degree in Spanish language and literature from North Carolina State University. She earned master's and doctoral degrees in civil engineering from the University of Illinois at Urbana-Champaign.



## IN MEMORIAM

### WILLIAM PHILLIPS, FORMER DEPARTMENT HEAD, 93

William “Bill” Phillips, former head of the Architectural Engineering Department and one of a handful of Cal Poly faculty members credited with establishing the early roots of the College of Architecture and Environmental Design, passed away on Feb. 13, 2017, at the age of 93.

Phillips earned a bachelor’s degree from USC and a master’s degree from the University of Hawaii. He served in the

U.S. Army from 1942 until 1946. In 1957 he obtained his architectural license. He taught at Cal Poly from 1957 until 1973, serving as head of the ARCE Department from 1968 to 1978. Phillips was one of the original directors of the School of Architecture.

His work can be seen throughout San Luis Obispo County, where he designed many homes and more than 11 commercial buildings.



William ‘Bill’ Phillips



### Bayside Retreat

Faculty members and staff who met in Morro Bay included (from left): Dennis Bashaw, Mario Esola, John Lawson, Craig Baltimore, Jim Guthrie, Cole McDaniel, Anahid Behrouzi, Ed Saliklis, Adriana Sousa (staff), Graham Archer, Pamalee Brady, Dahlia Hafez, Radu Popescu, Jill Nelson, Department Head Al Estes, Peter Laursen, James Mwangi, Erika Clements (staff), Michael Salmon (staff), Kevin Dong, Ray Ward (staff), Brent Nuttall and Andy Guyader.





## ARCE ADVISORS EXTRAORDINARE

The Architectural Engineering Department is grateful to the ARCE Advisory Board for giving generously of its time and industry expertise. 2017-18 members are (back row, from left): Steve Abernethy (Square Trade); Donna Clandening (AC Martin); Sarah Storelli (IBM); Michael Parolini (Smith Structural); Jen Hiatt (MHP); Chris Haight (Hope Amundson); Bill Rader (Buehler & Buehler); Jim Pappas (Hensel Phelps); and Paul Kovach (WJE). Front row, from left: Shawna Peterson (Arup); Michelle Jones (RIM Architects); Department Head Al Estes; Michael Cochran (Thornton Thomasetti); and Bryan Seamer (LPA).

## CSI GALA-GOERS

ARCE students, faculty and staff donned their finest evening wear as guests of CSI President and CEO Ashraf Habibullah, in celebration of the company's 42nd anniversary. The theme of this year's gala, held at San Francisco City Hall, was "Back to the Future," with actors depicting Marty McFly and Doc Brown (below, foreground) from the movie of the same name.







# Space for Students to Succeed

## DEGENKOLB ENGINEERS SPONSORS ARCE LAB WITH \$50,000 DONATION

As part of the 2017 Structural Forum (see Pages 4-5), Degenkolb Engineers and the Architectural Engineering (ARCE) Department hosted a ceremony to dedicate the Degenkolb Graduate Lab, a space in which graduate students can study, work and learn.

At the ceremony, Degenkolb CEO Stacy Bartoletti presented ARCE Department Head Al Estes with the \$50,000 donation check. The funds support the lab in \$10,000 increments over five years. This marks the seventh ARCE laboratory to gain sponsorship.

"Degenkolb is very happy to partner with Cal Poly and support the recently dedicated Degenkolb lab," Bartoletti said. "It was a pleasure to be at the

dedication and to interact with the high-quality ARCE faculty, staff and students."

The gift has been used to paint the room and buy new furniture, including desks, chairs, computer stations, individual work stations, a teaching podium and conference table. One wall in the lab prominently displays a colorful custom-designed wall wrapping featuring the Degenkolb company's history and heritage and the alumni who work there.

"We are very grateful for Degenkolb's generosity and foresight in updating this space," Estes said. "Degenkolb has hired many of our graduate students over the past decade, so it is the ideal firm for this sponsorship. It's one of the nicest graduate student spaces I have seen."

The lab dedication included (from left) CAED Assistant Dean for Advancement Lorna Malcolm, Department Head Al Estes, Degenkolb CEO Stacy Bartoletti, Degenkolb employee Gordy Wray (ARCE, '02), Professor Cole McDaniel and Degenkolb employee Taka Tamiya (ARCE, '14).

Unlike undergraduates, whose classes are taught in different classrooms, graduate students can use this lab as a one-stop shop for lectures, to study between classes, and to complete projects.

Approximately 100 students, faculty, staff and industry partners attended the dedication ceremony, which included a ribbon-cutting, plaque unveiling, cake-cutting, group photos and campus-catered lunch.

# A Focus On Architecture

STRANDBERG ENGINEERING TAKES CREATIVE APPROACH TO DESIGN CHALLENGES

When contemplating what field to study in college, David Strandberg, owner and principal of Strandberg Engineering, seriously considered music composition and art as potential careers. As a pianist, he was drawn to the arts and wanted to compose music for films. But when a trusted advisor informed him that very few people actually made their living doing that, Strandberg took a more practical route, earning a bachelor's degree in mechanical engineering from Virginia Tech in 1993.

Still enticed by the creative aspects of design, Strandberg enrolled in the Master of Architecture degree program at Virginia Tech, where he earned dual degrees in architecture and structural engineering.

Then he headed to California. "I had always wanted to know what it would be like to live in a big city, and figured if I didn't do it right out of college, it probably wouldn't happen. I considered New York and Chicago, but ended up choosing San Francisco."

After a few years at Skidmore, Owings & Merrill, Strandberg and a partner, Peter Yu, opened Yu Strandberg Engineering in 2003. The partnership lasted about 10 years.

"I was working on pursuing a career in architecture," Strandberg explained. "I was putting together my architecture portfolio and doing side jobs. I was getting together with my architect friends and working in their studios doing structural engineering on their projects, and I was loving it."

"My career as an engineer kept growing and just took off," he continued. "At first it offered flexibility; I could pursue my other interests in the arts. But it quickly became a full-time gig, and I had to start hiring."

It was around 2013 when Strandberg separated from Yu Strandberg Engineering to form Strandberg Engineering. The company, headquartered in San Francisco's Mission



District, expects to have 20 employees — eight of them Cal Poly architectural engineering graduates — on board by this summer.

Strandberg Engineering is known for its focus on architecture. "We have a love for beautiful architecture, and I am interested in working with great architects," Strandberg said. "They force us to be creative in our solutions; they challenge us."

About 80 percent of the company's projects are single-family residential homes, but the company has also built schools, multi-family dwellings, wineries, office buildings and restaurants. "If someone in our office is interested in working on projects

The 3,500-square-foot Catepillar House (top) is LEED Platinum-certified, with fly ash in the concrete, FSC-certified lumber and 24-inch on-center stud framing. Its steel frame superstructure is infilled with rammed earth and wood stud walls. | PHOTO: JOE FLETCHER

The Hour Glass winery in Calistoga (above) has a sheltered outdoor space for fermentation tanks and a cave for aging wine and wine tastings. Its steel canopy cantilevers over the processing area, anchoring into a right-angle cut in the site's hillside. | PHOTO: RYAN HUGHES





David Strandberg (above, left)

The firm has attracted Cal Poly ARCE alumni (above, from left) Meghan Navarro, Jennifer Alviso, Reece Relatores, Stefanie Rae Arizabal, Jennifer Ton and Josh Batham.

The five-story Kyber Ridge residence in Whistler, B.C., (left) has a cantilevering roof anchored by four three-foot deep steel beams and a floor suspended by four inch-in-diameter stainless steel rods. The lateral system includes steel moment frames and both concrete and plywood shear walls.

in a particular sector, we'll make a push to develop work in that area," Strandberg said.

The company's growth has followed a somewhat organic path. "We've added staff as a natural progression," Strandberg said. "As the office picks up additional architectural clients and our engineers grow and mature, the better they are able to manage younger engineers.

"For some reason, people keep calling us," Strandberg continued. "It might be that we have an appreciation for the architect's goals on the project and push the structure to help achieve those goals. Sometimes contractors and architects appreciate our

flexibility and interest in pursuing multiple solutions to problems."

Strandberg Engineering is as concerned about taking good care of its employees as it is about taking good care of its clients. "We make what we do enjoyable," Strandberg said. "I've seen engineering firms lose good employees because of the work environment. It's essential to retain good people and to create an environment where they can thrive."

He likes Cal Poly's ARCE grads because of his own background in architecture and engineering. "Students go to Cal Poly to study architectural engineering because they have some level of interest in design.

That interest is fundamental to becoming a well-rounded structural engineer and appreciating the work that we do," Strandberg said.

Reece Relatores (ARCE, '10) was the first Cal Poly graduate to work there. According to Relatores, "A Cal Poly graduate with a bachelor's degree is almost comparable to someone from another university with a master's degree in structural engineering and a minor in architecture."

Since then, ARCE graduates Jennifer Ton ('11), Josh Batham ('12), Meghan Navarro ('13), Stefanie Rae Arizabal ('11), Onessa Anastasio ('17), Jennifer Alviso ('03 Civil), plus summer intern Alex Remiticado have also joined the firm.

Strandberg doesn't regret his decision long ago to study engineering instead of music composition. "I love what I do," he said. "I'd do it for free."

PREVIOUSLY PROFILED INDUSTRY PARTNERS (IN ORDER OF THE MOST RECENT): CSI | 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



## Board Meeting, Maui-Style

Architectural Engineering (ARCE) Department faculty members and students caught a few curls between activities at the annual Structural Engineers Association of California (SEAOC) Convention and Reception, held this summer in Maui. The surfers on safari (above, from left) include: Department Head Al Estes, Professor Cole McDaniel and students Aaron Cook, Alex Remiticado, Natalie Gibbons, Kate Cuddington and Sonny Moraga. Read more about the SEAOC convention on Page 3.