CULTIVATING WOMEN ENGINEERS IN THE JACOBS SCHOOL OF ENGINEERING

GIVING UPDATE

IMPACT REPORT 2023
YOUR ENDURING IMPACT
Our university seeks to foster a diverse, equitable, and inclusive community in which every student, academic, and staff is empowered to succeed.

As a university leader and as a woman in a historically gender-imbalanced discipline, I am committed to paving the way for greater parity for women in all fields, but most importantly, in those that have traditionally had less gender equity. UC San Diego continues to pursue our collective vision as a student-centered, research-focused, service-oriented public university by elevating experiential learning opportunities as a critical component of an excellent education. Ground-breaking discoveries often stem from novel approaches to shared problems, and we believe that valuing the myriad of student perspectives and improving the representation of different genders in academic endeavors are key to tackling some of today’s toughest challenges. We do this by opening more doors to higher education, taking an innovative approach to teaching and learning, and blazing new pathways to solutions that enrich our community and our world. With your philanthropic support, we are making waves for the greater good.

Sincerely,

Dr. Elizabeth H. Simmons
Executive Vice Chancellor
University of California San Diego
At the Jacobs School of Engineering, we continue to build an impactful student experience in partnership with our donors who generously contribute toward student success and support. Generosity and investments through scholarships and programmatic support recognize our exceptional students in their pursuit of a collegiate education. Through thoughtful commitment, we continue to make a significant impact on the lives of our women engineering students, allowing them to focus on their goals, succeed, and develop into creative, well-rounded engineers and computer scientists.

Over the last 20 years, the number of female engineering students has steadily increased. While we are proud of our gains so far, we know we need to continue to make more progress. In the following pages, I hope you enjoy reading about the many ways philanthropic support and programmatic access empower our engineering students to reach their full potential. The dedication to academic, personal and professional success is a testament to your understanding that if we inspire our ambitious learners today, they will become the innovative leaders of tomorrow.

We are deeply grateful for the philanthropic gifts and their enduring support of the Jacobs School of Engineering. On behalf of our past, present and future female engineering students, their families and all of the communities who benefit from their education, thank you.

Sincerely,

Albert “Al” P. Pisano, Dean
Irwin and Joan Jacobs School of Engineering
Walter J. Zable Distinguished Professor
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The Jacobs School has 1,569 women engineering undergraduate students and 836 graduate students enrolled this academic year. Women engineers make up 26.2% of our total undergraduate students plus an additional 24% of our graduate students. There are scholarships, clubs and faculty who support and cultivate women in engineering.
The Story Behind the Elizabeth Stupp Kohl Scholarship for Women Engineers

“My mother, Elizabeth Stupp Kohl, was born at a time when women’s career paths and roles in the workforce were severely limited. Engineering as a profession was highly valued by her family, yet only her brothers were allowed to pursue that career. As a young student at Washington University in St. Louis, she was not allowed to pursue her dream to study engineering and instead chose mathematics. After graduation, she married and devoted the rest of her life to being a wife and mother to four female children.

“When my mother died in 1984, I established the Elizabeth Stupp Kohl Scholarship for Female Engineers as a memorial to her. I attended UC San Diego for graduate school, earning my PhD ’75 Cosmochemistry, in part studying the first lunar samples, this prestigious institution was a natural location. I was personally supported at UC San Diego as a woman in a typically male field and have watched many other female students be supported in their turn. It has been one of my greatest pleasures to help in this endeavor and I hope these opportunities continue to expand and inspire many more women in the field my mother treasured. I know she would be pleased.”

–Candace P. Kohl, PhD

“Elizabeth Stupp Kohl was my aunt. When she started college in the early 1940s with a desire to study engineering, she was told that engineering was not an acceptable field for a woman. Because of this, I know how thrilled she would be that today women have the opportunity for a career in engineering made possible in part through the generous contributions to the Elizabeth Stupp Kohl Scholarship Fund at UC San Diego. This legacy is a wonderful opportunity for women to follow a path that was unavailable to her and it means a lot to me to be able to honor and remember her in this way.

–Leslie H. Stupp, PhD

The Elizabeth Stupp Kohl Scholarship for Female Engineers is awarded through the Chancellor’s Associates Scholarship Program (CASP) through Student to Fund Matching. Chancellor’s Scholars are awarded annually for four years and funding is consistent. This report profiles a few of those recipients along with other ways the Jacobs School of Engineering supports women engineers in all disciplines.
Scholarship Recipients

Anna Nguyen isn’t going to let being the only girl in her engineering classes deter her from a career in aerospace engineering.

“To me, it’s important to have female engineers for diversity. Everyone is capable of doing anything,” said Anna, 19, the Elizabeth Stupp Kohl scholar for the 2023-24 academic year. “A woman should not be held to the bounds that society has built for women. Women are able to do as much as a man can do.”

The 2021-22 recipient of the Elizabeth Stupp Kohl Scholarship for Female Engineers is a first-generation college student born and raised in Los Angeles by Vietnamese parents. Her cousin, a 2017 UC San Diego electrical engineering graduate, is the one who encouraged her to study at the Jacobs School of Engineering.

Anna grew up fascinated by aerospace – she took field trips to the California Science Center, listened to Ted Talks on the subject and even witnessed the Space Shuttle Endeavor landing in Los Angeles.

“I was in awe that something like that was able to go to space,” she said. “I want to one day be able to build something like that.”

With encouragement from her dad who works as an assembler of aerospace parts, Anna studied hard and was named valedictorian of her high school graduating class.

This year, she’s focusing on her math classes and looks forward to even more engineering classes next year.

“My first engineering class here, I was the only girl in class,” Anna remembers. “I felt a lot of pressure on me, I didn’t know what my other classmates were expecting of me. I feel like it’s a really demanding field. Sometimes, it does get a little too much.”

But she learned to overcome the barriers by connecting on a different level with her classmates.

“I really try to get to know them and talk to them and help them get over the fact that I’m a girl,” she said, “and make them realize I’m capable of whatever they’re doing.”

The scholarship empowered her to continue her studies and reduce her student loan burden while also bringing her one step closer to her dream of building rockets and satellites.

“It really helped me and it inspired me to do more and be more,” Anna said, adding giving back is a big part of who she is. “I’m very honored that people are providing me, a first-generation college student, with the opportunity to gain a higher education and use that education to do something better for our community and beyond.”
Vivian Chou ’22 is passionate about being a mechanical engineer.

Vivian is a first-generation college student and 2022 graduate of the Jacobs School of Engineering. She grew up in San Diego, the daughter of a Chinese mother and Vietnamese father. She would not have been able to attend the University of California San Diego without the help of the Elizabeth Stupp Kohl Scholarship for Women Engineers.

“The Elizabeth Stupp Kohl Scholarship covered a good amount of tuition for me, so my loans weren’t that much,” said Vivian, 22. “My parents and I really appreciated it.”

The Jacobs School of Engineering is highly ranked nationally among engineering schools and as a local resident, was a natural next step for Vivian. Her UC San Diego experience, she said, was fulfilling.

“I’m someone that if I don’t understand, I ask questions until I do understand,” Vivian said. “I really appreciated the professors sat down with me and explained it so I understood.”

Vivian was also included in a cohort of the Chancellor’s Scholar Alliance, a UC San Diego program for first-generation students. It not only awards annual scholarships, but hosts regular meetings to help students develop skills, participate in workshops for interviews, and interact with professionals in their field. Most importantly, the Alliance provided the guidance her parents could not in navigating the U.S. college experience.

During her junior and senior years, Vivian was recruited to intern at a local engineering company, Genasys Inc. The company’s main product, she said, is a long-range acoustic speaker used for emergencies such as notifying residents to evacuate an area during a wildfire. As an intern, Vivian supported the engineering team by updating drawings and sustaining work. Immediately after graduation, Vivian was hired.

“Now, as a full-time employee, I have the opportunity to design a product, see it through the prototype phase and see it go through production,” Vivian said, adding she’s now working on the mass notification system side in electronics packaging. “I’m learning a lot. The benefit of a midsize company is I get the opportunity to do different things, there are lots of things for me to learn.”

Not only did her scholarships cover most of her education which led to a full-time engineering career, they kept her total college loans under $8,000.

That lighter load lets her compete regularly in badminton tournaments at the Balboa Park Activity Center and even take time to do a little crocheting when she’s not being an engineer.
Stephanie Mountain ’21 bought her first UC San Diego sweatshirt in eighth grade and later graduated with a chemical engineering degree from the school of her dreams.

The 24-year-old is now a process development associate at a small biotech consulting firm designing vaccines.

Math and science have always been passions for Stephanie. She won math competitions, dove deep into physics and chemistry and loved to learn about different chemical reactions. As a first-generation college student, she knew she had to study hard to be above average. A straight-A student in high school, Stephanie was a valedictorian for her class. She went onto college, proving she belonged in engineering even if her male peers were not always welcoming.

“I didn’t want to have to say it, I would just show them women are just as smart,” Stephanie said. “There’s a lot of different lived experiences and different ideas that come from female engineers, especially if we’re making products for the world, you can’t leave out half of the perspective of people in the world.”

While attending UC San Diego, she participated in the Chancellor’s Scholar Alliance and shared experiences with peers with similar backgrounds, even joining the Quidditch Club. She’s most grateful for the Elizabeth Stupp Kohl Scholarship for Women Engineers.

“It’s really cool I got picked and it’s provided me with so many opportunities and allowed me to be where I’m at,” Mountain said.

“There’s a lot of different lived experiences and different ideas that come from female engineers, especially if we’re making products for the world, you can’t leave out half of the perspective of people in the world.”

– Stephanie Mountain ’21
Making A Difference

The Jacobs School of Engineering is not only empowering undergraduate women engineering students but supporting the groundbreaking research of its women PhD and postdoctoral students.

Madison Wilson is a PhD student at UC San Diego and the first author of a study showing that human brain organoids implanted in mice establish functional connectivity to the animals’ cortex and respond to external sensory stimuli. Madison is part of the team led by Duygu Kuzum, a faculty member in the University of California San Diego Department of Electrical and Computer Engineering. Details of her findings were published in the journal *Nature Communications*. Dr. Kuzum’s team also collaborated with researchers from Anna Devor’s lab at Boston University; Alysson R. Muotri’s lab at UC San Diego and Fred H. Gage’s lab at the Salk Institute.

Maria Zhivagui, a postdoctoral scholar in the lab of Ludmil Alexandrov, a professor of bioengineering, cellular and molecular medicine at UC San Diego, used to be a fan of gel manicures but now avoids them after studying the impact of the radiation in the nail drying technique. “I started using gel manicures periodically for several years. Once I saw the effect of radiation emitted by the gel polish drying device on cell death and that it actually mutates cells even after just one 20-minute session, I was surprised. I found this to be very alarming and decided to stop using it.” Maria contributed to the study published in *Nature Communications*.

Naba Rizvi, a PhD student in UC San Diego’s Computer Science and Engineering (CSE) department, was recognized recently by CSEdWeek and Vice President Kamala Harris as a Computer Science Hero. The Vice President honored Naba for her endeavors to make computer science accessible for all learners and noted the barriers and stereotypes Naba, and others from underrepresented groups, have faced in computing. Naba, a first-generation college student who was one of only two women in her undergraduate information technology program at the University of Toledo, is researching health equity at both UC San Diego and Google Health AI. She hopes to widen disability inclusion in artificial intelligence for those in the neurodiverse and autism communities.
Faculty Perspective on Women Engineers

UC San Diego Professors Christine Alvarado and Olivia Graeve overcame the barriers facing female engineers and look to mentor and support young women pursuing engineering as a discipline and career.

Both women joined UC San Diego in 2012. Professor Alvarado is now associate dean of the division of undergraduate education and the Paul R. Kube Endowed Chair of Computer Science, while Professor Graeve teaches mechanical and aerospace engineering and serves as director of the CaliBaja Center for Resilient Materials and Systems. They describe their disciplines as male-dominated and the climate often chilly toward women. They both have encountered many young female students suffering from imposter syndrome -- believing they are not good enough to be engineers. These two professors are mentoring these young women engineers one at a time, educating them on the psychological and cultural barriers they may face while helping them overcome those barriers in their journeys.

Challenges

“There are a lot of barriers for women going into engineering,” Professor Alvarado explained. “Some of them are cultural, where family pressures away from engineering because it's not a traditional field that women go into in a lot of cultures, and some of them are financial. I think that the more we can remove barriers for women, the greater the chances are that they'll be able to overcome the other barriers that stand in their way.”

Scholarships play a key role in helping some of these young women begin their journeys in engineering.

“We have to be conscious of the past, the lack of support, and the hostile environments that we had toward women in engineering in the past,” Professor Graeve said. “Scholarship support has an impact, because it tells girls, women who are interested in engineering, that they are valued, and that there are people that are interested in having them succeed. Removing barriers to education and making it a welcoming environment by starting with a strong scholarship shows that there are people interested in having them succeed and that's very important.”

Culture

Culture, they agree, does play a key role in either cultivating women engineers or discouraging them. As Professor Graeve noted, women are often minimized, their voices silenced in many parts of the world. Traditional roles of men and women in society are so ingrained, she said, it takes generations to completely change attitudes. However, in her work with Latin America, she has witnessed efforts to equalize opportunities for both genders, with many Latin American countries being more progressive and electing women presidents, which the United States has not.

“The political power of women, in certain countries, has also given women the opportunity to have power in other realms that were dominated by men, including science and engineering. It is my hope toward renewed and committed opportunities for women in engineering.”

Those commitments often must begin at an early age, explained Professor Alvarado, and must be reinforced throughout the academic experience.
“Once students are in middle school, there’s a lot of research that shows that early on, girls and boys are equally interested in math but then something kind of happens in the teenage years that math is not cool for girls anymore and some of these more mathematically focused fields somehow become less attractive,” Professor Alvarado said. “It is also just a chilly climate in the field itself towards women. It’s not that women aren’t interested in engineering. It’s really that they’re kind of pushed out or not encouraged to join. Because the culture, at least in my career length, engineering is traditionally rather cutthroat, a little bit high pressure and certainly not welcoming to women, for the most part.”

Professor Christine Alvarado (right) with three of her computer science students.

Professor Graeve also wants to see the support start early.

“The encouragement of young girls, starting from elementary school all the way through high school, is how our schools are slowly changing and providing the support necessary so that girls don’t get discouraged and don’t start thinking engineering and science are not for them,” Professor Graeve said.

**Mentoring**

That encouragement, she said, must continue when these women engineering students arrive at UC San Diego’s Jacobs School of Engineering.

“It is our responsibility to build a positive climate that does not result in them dropping out,” said Professor Graeve, who previously served as the Equity, Diversity and Inclusion director at the Student Center. She’s supported dozens of students, particularly women, who have come to her with feelings of imposter syndrome and equipped them with the tools to counteract it. The key is providing these students an opportunity to find and build a community.

When women engineering students are struggling, they often confide in their professors.

“I usually tell them that they are not alone,” she said. “I first acknowledge and validate their feelings and I tell them it is a more hostile place for women still. When women are in groups with mostly men, they tend to get pushed to the margins, their ideas tend not to get heard, they tend
to be relegated to nontechnical tasks. It’s not imagined, it's actually happening.”

Both professors tell students they need to seek out peers they trust, form connections with other women in the program and seek out women’s student engineering clubs on campus and organizations like the Society for Women Engineers which are highlighted in this report.

“It is about building this cocoon that protects you from the micro-aggressions of the world,” Professor Graeve said. “It is also about building a network that will allow you to feel like you’re welcome.”

Perspective
Maintaining the presence of women engineers in the industry is paramount in introducing a different perspective in the creation of new innovations.

“A female engineer’s perspective may be different, they may see things differently,” Professor Graeve said. “It has been proven that teams of engineers that have gender diversity, sexual orientation diversity and ethnic diversity, support a team that is more creative, thinks outside the box and is willing to take risks, versus an extremely homogeneous group of men that all think alike and precludes them to move beyond that box that they’re in.”

Professor Alvarado also sees the importance of introducing perspectives from all aspects of society, especially in engineering.

“Since women comprise half of the world’s population, it's incredibly important to have their perspective, because I think that women experience the world differently than men because of their physical differences, because of our cultural differences,” Professor Alvarado said.

“Engineering is all about solving the world's problems and creating things that will help society,” she said. “So if you are trying to do that without half of society represented, you're just not going to come up with solutions that best serve our society. It's as simple as that.”

She added when more women, particularly women of color get involved, there's an increased awareness of the ways that the systems that we've engineered don't serve society equally.
Parity
Both professors are seeing more women enter the human-centered fields of bioengineering where more than half of the discipline is represented by women. More women also are attracted to environmental engineering while there is less gender parity in civil structural engineering and electrical engineering.

They would also like to see complete gender parity in all fields of engineering in the next 10 to 20 years.

“Not achieving parity means that we still have systemic gender discrimination that we need to deal with,” Professor Graeve said, adding she does think parity is achievable.

Professor Alvarado estimates 20% of the student population is female in the computer science department in the Jacobs School of Engineering and she believes that number is too low. But she’s witnessed those numbers increasing gradually each year and is excited to see a growing number of women faculty hired in the engineering school.

“I’d love to see gender balance -- half the engineers in the world be women,” Professor Alvarado said. “But more than that, I’d like to see more diversity within the women in the field, too. You have to get women from all races, all backgrounds, all socio-economic statuses, all regions of the country, all over the world.”

In order to achieve that, she said, professors need to help all students understand some of the issues surrounding women engineers and help them change the student culture and climate while being more aware of how their actions affect others.

“As faculty and administrators, we also need to have a strong voice, to talk to our students about how to make [women who feel they are being shut out] stop happening,” she said. “We need to recognize and reward the kind of values and assets that diverse students, students from underrepresented groups or marginalized students bring to our program.”

Changing the culture of engineering where performance isn’t just linearly rewarded to recognizing there are other ways to embrace and recognize success, is important, she said, particularly in connecting with society and embracing women engineers.
Women Engineering Clubs

Beyond faculty support and mentoring of women engineering students, the Jacobs School of Engineering also offers women engineering students the opportunity to connect with their peers in different clubs and communities.

**SALLY RIDE SCIENCE**
Sally Ride, the first American woman in space, retired from NASA and began teaching physics at UC San Diego. To help narrow the gender gap in science and engineering, she founded Sally Ride Science to promote equity and inclusion for all students, especially girls, in STEM studies and careers. The nonprofit eventually found a home at UC San Diego under the direction of UC San Diego Division of Extended Studies. Today, as it celebrates its 20th anniversary, it continues to provide innovative programs encouraging diversity.

**WOMEN IN COMPUTING**
Women in Computing (WIC) is a group of coders and engineers of all genders who support women presence in computing. The organization hosts tech talks to socials and provides opportunities for female engineers to connect, support and succeed.

**SOCIETY OF WOMEN ENGINEERS**
Recognized as the world’s largest advocate for change for women in engineering and technology for over 70 years, the Society of Women Engineers has a chapter at the Jacobs School of Engineering providing scholarships and support among female engineers.

**WOMEN IN ELECTRICAL AND COMPUTER ENGINEERING**
Women in Electrical and Computer Engineering (WeCe) was founded in September 2022 to build a community among UC San Diego graduate women in electrical and computer engineering to enhance their career opportunities.
Thank you

In the Jacobs School of Engineering, we believe cultivating diversity, particularly with women engineers, is paramount to the future of the discipline and solving the world’s problems. Our faculty and student organizations are supporting these young women in challenging environments inside and outside of the classroom while teaching them how to navigate complex challenges as their visions evolve from idea to concept into realized form. Thank you for your support and future commitments to the growing success of women engineers in the Jacobs School of Engineering at UC San Diego.
At the University of California San Diego, visionary donors help us unleash a diverse community of doers: those who imagine unexpected answers that can transform humanity for the better. Together with your support of women engineers in the Jacobs School of Engineering, we foster bold scholars, researchers, healers, entrepreneurs and creators — because here, breaking new ground is the norm. Every scholar can become a changemaker. Every risk-taker can create a ripple effect. Every optimist can uncover a life-altering cure. Every person can change the world.

Because people are the point.