BUILDING TOMORROW

It began when a love letter fell from the pages of a notebook a decade ago. Now the Shiley-Marcos School of Engineering at the University of San Diego is celebrating its 10-year anniversary. Below, a philanthropist who established the school, the dean and an alumnus who is now a top executive at a local company write about the school's impressive record.

THE SCHOOL THAT BEARS OUR NAME CONTINUES TO MAKE A DIFFERENCE

BY DARLENE MARCOS SHILEY

As the steward of my late husband Donald's legacy, I'm always looking for signs that I'm doing right by him. Ten years ago, on a crisp, fall evening, I had a conversation with him — in my head and in my heart. I asked for a sign.

I assured him it didn't have to be a burning bush, but I also stipulated that it couldn't be so subtle that I'd miss it.

A few days later, while looking through Donald's notebooks from the 1960s when he was formulating his ideas for the artificial heart valve that made him a legend, a sign fell right into my lap. A piece of paper fluttered from the pages of his notebook.

I picked it up, unfolded it and read the draft of a love letter he'd written to me one Christmas. I figured if that wasn't a sign, then nothing was. At that moment, with the letter still in my hand and tears streaming down my cheeks, I made a decision.

In honor of Donald, and in honor of my own family, which instilled in me a deep dedication to education, I established the Shiley-Marcos School of Engineering at the University of San Diego. Today, as we celebrate the school's 10th anniversary, I know Donald would be proud.

The son of a farmer, Donald used the GI Bill to make his way through school at the University of Portland, where he honed his mechanical abilities, earned a degree in hydraulic engineering and graduated first in his class.

Donald worked at an Oregon laboratory, the first manufacturer of ball and cage artificial heart valves. In 1964, he started his own company, Shiley Laboratory, out of his garage. There he invented the Bjork-Shiley heart valve, which featured a tilting disc valve design that's now credited with saving tens of thousands of lives.

As I reflect on the last 10 years, it's amazing to see how far the Shiley-Marcos School of Engineering has come. The undergraduate student body has grown from 200 to 800 students. New majors like computer science and integrated engineering have been added, including an online master's degree program in applied artificial intelligence to keep the curriculum ahead of the curve in an ever-changing world. And the full-time faculty size has grown from 16 to more than 40 — with 40 percent of the faculty being women, embracing a more inclusive and diverse community in a male-dominated field.

One student who once walked through the school's halls went on to become a NASA astronaut, another became one of the first seven members of the Uber startup team.

But for me, the most rewarding experience of all has been connecting with current and former students who have benefited from an engineering education at the University of San Diego. Hearing about students' experiences and seeing where they are taking their degrees around the world is an opportunity that brings Donald's and my gift to life and highlights the domino effect that an education can have — shaping change, for the better, in our world.

When I helped create the Shiley-Marcos School of Engineering, I had confidence that the University of San Diego would use our gift as a force for good, based on its Catholic intellectual tradition, and educate future generations of engineers to sharpen use of the tools they gained through a dynamic, problem-solving educational experience and make a global impact.

> The school's undergraduate enrollment has grown from 200 to 800 students.

Today, in partnership with the University of San Diego, I celebrate Donald, who loved to tinker in the garage. I celebrate that he was what the University of San Diego calls a Changemaking engineer — an engineer who uses innovation to address humanity's most urgent challenges. I celebrate the space on campus known as Donald's Garage, where students now get to tinker on their own projects. And I celebrate the past, present and future Changemaking engineers who will forever be a part of his story, a part of my story, and a part of the story of so many who are positively impacted by their innovations.

I can't help but be full of gratitude and hope. Gratitude for those who, like my husband Donald, believe in making a difference and hope that more like him choose to do the same and support the people and programs in our communities in any way they can — either monetarily or by volunteering. When we support organizations that are making a difference in our communities, the ripple effect continues perpetually.

Ten years later, I'll say I read Donald's sign correctly — and did right by him.

Marcos Shiley established the Shiley-Marcos School of Engineering at the University of San Diego. She lives in San Diego County.

UNIVERSITY OF SAN DIEGO

Darlene Marcos Shiley, in the center of the second row, poses with students and staff at the 10th anniversary celebration of the Shiley-Marcos School of Engineering at the University of San Diego.

HOW WE ENGINEER FUTURE LEADERS

BY CHELL ROBERTS

I'll never forget my first introduction to engineering. It started as a kid with a flight simulator toy called the "Jimmy Jet." I loved how the Jimmy Jet made me feel like I was in a makeshift cockpit, flying a plane from my bedroom. I explored the inner workings and wanted to know how it functioned. Seeing my fascination, my mom suggested I should be an engineer one day. I didn't know anything about engineering back then, but after changing my major five times in college, I did, in fact, become an engineer like my mother had predicted.

Eventually my career path led me to become the founding dean of the Shiley-Marcos School of Engineering at the University of San Diego. As we celebrate the 10th anniversary of the school this year, I've had a chance to reflect on the last decade and what has changed. Most recently, I have become enthralled with ChatGPT, an open-source artificial intelligence program. Its recent emergence revealed to me that our entire world is going to change much faster than I had predicted. ChatGPT-like systems are going to change how engineers and computer scientists work, and how they learn. To explain, I want to start with big data.

I often have the privilege of sitting in on the pitch presentations of young entrepreneurs who are seeking funding to start their dream company. In most of the presentations, a significant part of the value of their new product or company is the data that will be collected and potentially used or sold. Companies like Google gather data on every internet interaction. Companies like Amazon gather data on every search and purchase. And smartphones capture everywhere we travel, how long we stay at a place and with whom we interact. Data helps in transportation, logistics, war and peace. The more data we have, the better we can predict and optimize what we do.

> Exciting new technologies require an appreciation of justice, ethics and humanity.

One area we're seeing interesting changes with big data is in the health industry. Many people have had their genome sequenced to discover their ancestry or learn information about their health. Doctors can use that data to diagnose and treat patients better. The data from patients' genomes can give them individualized treatment that is more likely to fit their needs. Some experts suggest we might actually be able to design our future children if we can map enough, extract the data and intelligently find the patterns.

That's where artificial intelligence comes in.

Think of AI as the engineering of intelligent devices, be it a computer, a robot or a phone. And by intelligent, I mean being able to do what humans can do but faster, a lot faster. We have been waiting for intelligent tools to help us use big data better, to sort through all the data and make informed decisions. And they're here.

ChatGPT can write papers and computer programs, analyze millions of records and provide summaries. And there are ChatGPT competitors here, with more coming. With this capability, the world of augmented reality will blossom. Robots will become more useful and perhaps become companions.

Oxford University's Future of Humanity Institute published the results of a survey it conducted in 2018 with hundreds of artificial intelligence researchers regarding what might happen with AI. AI could be translating languages by 2024, driving a truck by 2027, working in retail by 2031 and even working as a surgeon by 2053. The researchers also believe there's a 50 percent chance that AI will outperform all human tasks in less than 50 years.

When I used ChatGPT, I thought they were all wrong — I thought it's going to happen much faster!

As an educator, I have the important and daunting task of preparing the next generation of engineers for these possibilities. We can do this not only by training students on the building blocks of being an engineer and how to use these exciting tools, but also by helping them understand the justice, ethics and humanity involved in developing new technologies.

It's about developing the next best technology, and thinking about how this technology can make our lives better — while also looking at potential consequences. This type of thinking is crucial. I'm confident that with the right education, students will have the tools they need to become leaders in our communities if they put people front and center in their work, no matter what technology may arise.

Roberts is the dean of the Shiley-Marcos School of Engineering at the University of San Diego and lives in Downtown San Diego.

WHAT I LEARNED THE DAY MY MINIBIKE WOULDN'T START

BY RASHEED BEHROOZNIA

My career has been a whirlwind, from traveling to CIA headquarters, to visiting military bases, deploying systems that support millions of travelers and changing the landscape of technology on college campuses. The root of all these endeavors has been engineering.

This love started when I was 10 years old and I became fascinated with my neighbors' dirt bikes. I loved to watch them ride and maintain their bikes. I knew there was never a chance my parents would get me a dirt bike, but they did surprise me with a minibike. I would ride that minibike until the sun went down, and in my head, I had the biggest, baddest dirt bike around.

Then one Saturday morning, the bike would not start. I was devastated. I tried to get my father to help fix it, but he had errands to run and said we'd look at it together later. However, "later" just wouldn't do. So I decided to try and fix it myself, and I set straight to work disassembling everything.

A few hours later, I had everything that could be disassembled taken apart and neatly laid out on the driveway. I thought to myself, "Something here must be the problem, and I'm going to find it." Spoiler alert: I didn't fix the bike.

But that was the moment that I learned I wanted to know how things work and be able to solve problems. Throughout high school, I took computer programming classes and eventually concluded that I wanted to be a software engineer.

I got accepted to the University of San Diego in 2006 and decided to major in electrical engineering and pursue a minor in computer science. I figured it was focusing on the best of both — learning how things work and building software and hardware systems. During my college years, I took a campus job focused on fixing campus computers for different departments. It was great to be able to put smiles on people's faces as I solved their issues. For me, it was an interesting intersection of technology and customer service, where I had to work closely to understand the customers' problems and deliver a suitable result.

> Today's engineering students need an education that both provides technical knowledge and that promotes ethics, innovation and collaboration.

After a few internships, I got to work for the CIA.

It was a truly impactful moment for me as I stood in the headquarters building and looked proudly at the famous CIA seal embedded in the floor. Later, I worked for Lockheed Martin as a software engineer in the field. I would travel to military bases and installations to provide support for software solutions as they were tested during live exercises. I recall one time when an initial test flight recorded strange results. I was told that the next plane was going up soon and that a software fix was needed. I had less than an hour to troubleshoot the issue, write the fix and deploy the software. What a thrill!

I recall pulling from many places to troubleshoot and solve that problem, especially some of the skills I learned from the University of San Diego's engineering classes on how to tackle a problem, work with others to gain more insight and ultimately find a solution.

Today, I'm the senior vice president and general manager at Transact Campus, a company that provides innovative mobile credentials, including campus identification, and integrated tuition payment tools to higher education institutions. I help run the Campus ID business. Now more than ever, technology isn't the only aspect of bringing a solution to market. There's the user journey, the environment, ethics, data privacy, social factors and so much more to consider.

As the engineering industry evolves, I see an increasing need for engineers who have strong technical expertise as well as a broad range of skills. The world is complex and nuanced, and technical solutions must consider much more than purely the engineering that enables them. The next generation of engineers and leaders have a lot to consider as they strive to make the world a better place. My time at USD was incredibly influential, and I believe my story is a testament to the importance of developing engineering students with a depth of education that provides technical knowledge while delivering an education that promotes ethics, innovation and collaboration.

Behrooznia is the senior vice president and general manager of Campus ID Solutions at Transact Campus. He lives in Scripps Ranch.