

# ENGINEERING

## AT SAN JOSÉ STATE

CHARLES W. DAVIDSON  
COLLEGE OF ENGINEERING

*powering Silicon Valley*

# WOMEN IN ENGINEERING

Trailblazing the way through the sold-out 2018 Women In Engineering Conference



One Student's  
**PERSPECTIVE**

Keeping Sonoma's Flow  
**EVEN IN FIRE**

The SJSU  
**INVENTOR TO WATCH**

**SJSU** SAN JOSÉ STATE  
UNIVERSITY



“

**I'M EXCITED ABOUT  
THE STORIES YOU'LL FIND  
IN THESE PAGES.”**



**OUR SPRING COVER SHOWS ONE OF ANNUAL CONFERENCES THAT WE'VE JUST HOSTED,** largely run by students. This 4th Women in Engineering Conference connected hundreds of female (and some male) students with industry professionals, where Google, Agilent, and Intel provided powerful keynote speakers.

As I write this, I'm preparing to address a group of Admitted Spartans and their parents before they tour the College of Engineering and decide if this will be their home for the next few years to come. I'll explain to them that the College of Engineering is where 390 faculty and staff members, and more than 7,600 students come together to learn, work, and make things.

I'm excited about the stories you'll find in these pages. You'll read how Civil Engineering alumna Colleen Ferguson uses lessons she learned here in her daily work in the City of Sonoma. And how Mechanical Engineering Alumnus Karel Bachand is sidestepping the enormous costs of prototyping luxury watches, demonstrating Spartan resourcefulness. Finally, you'll hear from one of our students about how it felt to present a senior design project to a panel of alumni-judges at Lockheed-Martin.

In college news, we've been connecting our students to inspiring alumni and industry folks in a new series I'm calling Dean's Career Conversations; these are informal gatherings over pizza. With no more than twenty students attending, there is plenty of time for the speaker's career stories and many student questions. I've also had the first of likely many meetings with an engineering student advisory committee, composed of students from across the college, so we can understand better how to engage these busy, working commuters. And I've met with the Davidson Society, a loose federation of leaders from more than 25 of the student clubs, that one enterprising junior has gathered together. These students are sharing resources and best practices for increasing student engagement and it feels great to be a part of it.

Sincerely,

**Dean Sheryl Ehrman**

*Don Beall Dean,*

*Charles W. Davidson College of Engineering at San José State University*

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Photos (top to bottom, left to right): Mechanical Engineering alumnus Karel E. Bachand; Alumna and award-winning engineer Colleen Ferguson; Tan Ho, Mechanical Engineering '18; Local middle-school students at the Charles W. Davidson College of Engineering for Science Extravaganza.

Front Cover: Student engineers listen carefully at the Women in Engineering conference showcase. Photo by David Schmitz.





# The SJSU INVENTOR TO WATCH

*Bachand designs world-class timepieces with humble 3D printer*

## **MECHANICAL ENGINEERING ALUMNUS KAREL E. BACHAND**

designs luxury watches that turn time on its side. And that's not all; this San Ramon, California inventor has changed the game for luxury watch prototype fabrication, using the 3D printer as one of his most important tools.

His journey began with the inexpensive Quartz watch his aunt gave him as a present for getting accepted into San José State University. The gift sparked his curiosity enough that he began looking at watch-making videos on YouTube. Bachand had no interest in buying a top-of-the-line watch, which would have cost tens of thousands of dollars. Instead, he decided to build his own.

"I learned at SJSU about the importance of hobbies or passions outside the standard curriculum," he said. "Whether it be a personal project you work on in your free time or joining a club, a wealth of information can be gained while having a lot of fun throughout the process. A degree has

inherent value, but add to it something you are truly passionate about, and you will stand out from the sea of degrees."

Bachand received mentoring in Geneva with Urwerk founders Felix Baumgartner and Martin Frei. Urwerk is a Swiss company that makes some of the most sophisticated watches on the market. Soon, Bachand began his own work – the Barrelhand Project 1.

In a blog, Bachand explained, "I began looking around for places to machine these pieces, and was quickly met by the harsh reality that manufacturing such small and complex components would be extremely costly. It was certainly discouraging, but I had not given up, as I knew that with time I would find my solution. This is when I stumbled into the world of 3D printing."

Bachand said his project is being prototyped using the latest in UV-cured 3D-printing technology. "This allows me to quickly prototype precision components at nearly a tenth of the cost of traditional manufacturing."

*“A degree has inherent value, but add to it something you are truly passionate about, and you will stand out from the sea of degrees.”*



Photos courtesy of Karel Bachand

“I feel extremely privileged to grow up in the age of 3D printing,” he added. “Just a decade ago, none of this project may have been possible. As 3D printing technology has advanced, we have gained new materials and new levels of precision at a cost which allows everyone to bring their ideas to life. This new era of 3D printing gives enthusiasts with limited resources like myself an opportunity to create and explore the world of horology.”

“Don’t be afraid to start an ambitious project that may seem out of reach,” he concluded. “Whether you fail or succeed, the skills and first-hand experiences you will gain are worth their weight in gold.”

Bachand gives daily updates on his project at [www.barrelhand.com](http://www.barrelhand.com) for anyone interested in learning more. ☺

### **INSPIRATION**

*“I began by developing a new linear method of displaying minutes. My inspiration came from a vinyl record and how the needle follows a groove as it slowly makes its way towards the center of the album. Using this design, I calculated the curvature of a cam path (lower-left photo, highlighted in orange) which could glide a pin up and down to linearly display the minutes. This path is engraved into the cam plate and rotates around, creating a beautiful dance of motion which spans the whole dial of the timepiece.”*

### **DESIGN**

*“The crown itself takes design cues from Mars rover wheels and will be machined in aluminum before being anodized in a sunburnt orange to represent the afterburner of the thruster assembly.”*

### **DETAILS**

*“For the handmade custom strap, I chose American Bison leather both for its aesthetics and 40% greater strength than cowhide. The back of the strap is then lined with Alcantara, a suede-like material often found in exotic sports cars.”*



# Keeping Sonoma's Flow,

# EVEN

## Alumna and award-winning engineer explains her work

As Sonoma's new Public Works Director and City Engineer, **Colleen Ferguson**, '83, '85 Civil Engineering, is responsible for operating, maintaining, and upgrading the city's water and transportation systems, parks, and cemeteries. She brings more than 25 years of experience to the job. In Santa Rosa, where she last worked, she oversaw a staff of 55 and during her tenure the city reunited Old Courthouse Square, reimagining a divided property as a community hub.

"Sonoma is very different from Santa Rosa," said Ferguson. "It's a much smaller city, and a historic city, with a highly engaged community. Our entire staff of Public Works is twenty, including office staff. One of my passions is to connect our community better with its public infrastructure, and we're looking at social media as one way to connect. We all start our mornings using our water systems, and then we go out and use our transportation systems, then maybe parks and public spaces as we go about our day. We all use these systems, and we hardly ever think about it."

But during the great fires of October 2017, everyone in wine country became acutely aware of their water systems. The first firestorm began with intense winds on the Sunday night of a holiday weekend, and Ferguson was called in at 3 am by an emergency alert. She threw her sleeping bag into the car and drove from her home in East Santa Rosa to downtown Sonoma. She was stopped twice by fires moving in different directions across the road. When she finally arrived to the office,



she ended up staying there almost constantly, handling emergency operations, for two weeks.

Ferguson's water staff split into two 12-hour shifts for 24/7 operations. Staff members, including Ferguson, had to slip off periodically to evacuate their homes or check in on relatives and neighbors. Fortunately, they maintained enough staff to engage the critical water systems full-time.

Power was out, so the normal pumping station didn't work to keep the firefighters supplied with both water and pressure at the hydrants uphill from Sonoma. Backup generators were failing, possibly due to the high particulate matter in the smoky air. In the dark early morning hours, Ferguson's team engaged a large private generator to power the pump station. It worked! Water pressure was maintained and firefighters put out the fire above Sonoma.

"I like solving problems," said Ferguson, "of course, I'm an engineer. What we do is help people, we serve the community."

*“I like solving problems, of course, I’m an engineer. What we do is help people, we serve the community.”*

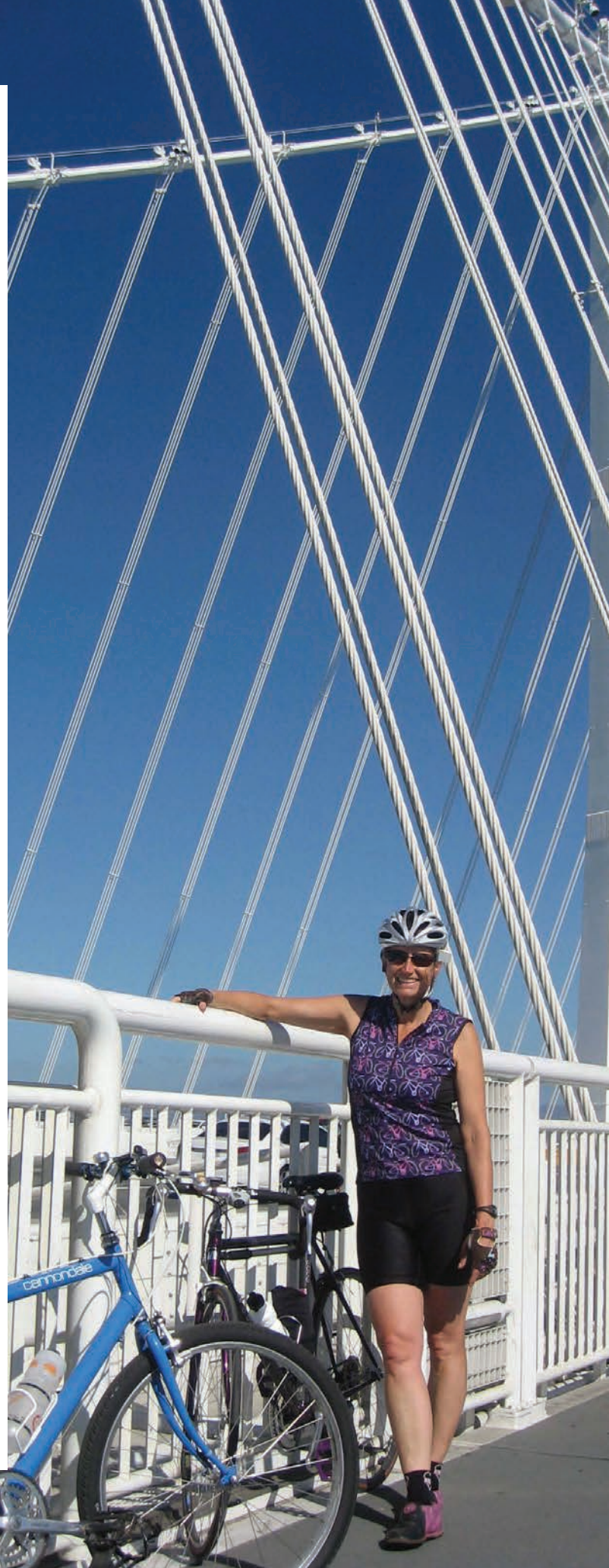
# IN FIRE

She was quite surprised to find that colleagues had nominated her for ASCE’s Outstanding Civil Engineer in the Public Sector, first in the Bay Area, and then in the State of California. The award noted that “Colleen Ferguson exemplifies the qualities that make the best civil engineers in our profession great: technical mastery, strong ethics, professional achievement, advocacy, and leadership.” Reading the letters of support from colleagues, said Colleen, was the best part.

Ferguson arrived at San José State after two years at Santa Rosa Junior College. As a junior engineering major she roomed in Hoover Hall with a freshman journalism major and they are best friends to this day. She also met her husband at SJSU.

Ferguson remembers Professor George Sicular, who taught Water Resources, as one of her most inspiring teachers. “He would throw these dinners for students in the faculty dining room,” she explained, “and bring in these top-notch speakers to discuss water issues.” In her daily work, Ferguson still uses the tools, and sometimes the very textbooks, that she got from SJSU. She advises young civil engineers, “It’s a lot of work to get through engineering school and to get registered, but just do it. Your whole career will be based on it, and it’s a very satisfying career.” She added, “Thank you SJSU, for a great engineering education, a best friend, and my husband!” 🍷

Photo by Genevieve Fire-Halverson







WOMEN IN ENGINEERING



## 2018 SILICON VALLEY WOMEN IN ENGINEERING

The 2018 Silicon Valley Women In Engineering conference drew a sold-out crowd of 450 community college and university students from throughout California to San José State University (SJSU) on March 17. They listened to inspirational speeches from trailblazing women in STEM (Science, Technology, Engineering, Math), and participated in panel discussions featuring life and career stories and advice from those who have already ascended to technical and senior leadership positions.

*Photos by David Schmitz.*

## DAVIDSON SOCIETY

A candid shot during the inaugural meeting between the Dean and the Davidson Society, a loose federation of leaders of more than 25 of the college's student clubs.





## SCIENCE EXTRAVAGANZA

Local middle-school students arrived at the Charles W. Davidson College of Engineering for Science Extravaganza earlier this spring. The event was hosted by SJSU's chapters of Society of Latino Engineers and MESA Engineering Program, organizations that dedicated much of their time and energy to create an inspiring, interactive day of learning for the next generation of engineers. In its nineteenth year, this event shows no signs of slowing in growth or popularity.

Photo by Blanca Sanchez-Cruz



## DEMO DAY

Computer Engineering student teams gathered in the College of Engineering's Showcase & Collaboration Lab for "Demo Day," showing off their semester-long VR/AR (augmented reality) projects. This included "CoolPets," a virtual pet application that enables users to tend to their very own virtual pet. The pixelated animal of one's choice is even voice-responsive and can be taught tricks.

Photo by Ashley Cabrera



## FLU STUDY GOES VIRAL

Sheryl Ehrman, Don Beall Dean of the College of Engineering, co-authored an eye-opening flu study that published in the Proceedings of the National Academy of Sciences in January, just as this year's historically aggressive flu season was worsening. The dean and her colleagues from other universities found that the viral disease can be spread more easily than once thought; their data shows that breathing alone, not just coughing or sneezing, is enough for the successful transmission of infection.

The study results quickly traveled around the globe through local and major news outlets and popular news websites.

**Dean Ehrman, who has a background in aerosol science, was directly quoted in more than thirty of these reports.**

"The findings suggest that keeping surfaces clean, washing our hands all the time, and avoiding people who are coughing does not provide complete protection from getting the flu," Dean Ehrman explained in an interview with the *New York Times*. "It's really important for people who are sick to stay home. If they are really sick they should go to the hospital. Please don't come to work. Please don't get on public transportation. Please don't go to the grocery store."

Ehrman and her fellow researchers hope that their work can help improve models and systems associated with airborne flu transmission, which could then effectively reduce the impact of the virus season after season. As for now, staying home and out of public spaces can make a world of difference. 🌐

# ONE STUDENT'S PERSPECTIVE

## Senior Design project at Lockheed Martin

Mechanical Engineering senior, Tan Ho ('18), attended the first-ever onsite SJSU Engineering Senior Design Review panel at Lockheed Martin in Sunnyvale. He bundled onto the shuttle with twenty-one other students in business casual attire. Nervously, they practiced their presentations.

At the company, all the students were deeply impressed by their welcome from Mark Pasquale, Vice President of Engineering (B.S. Mechanical Engineering '84). He said, "The engineers you are about to meet work in the areas of mission and sensor systems and missile defense to human spaceflight and deep-space missions. And if that has intimidated you, it's not a bad thing to be a little nervous before you present. But let me reassure you that we are excited to hear your fresh ideas."

Each team was given a total of fifteen minutes to present and answer questions from judges at Lockheed Martin. Here is Tan's report.

VP of Engineering and Technology, Mark A. Pasquale, introduces the event.



### IT WAS A GREAT EXPERIENCE.

In the beginning, on the shuttle on the way to Lockheed Martin I felt kind of nervous because of the presentation. However, everything went very well!

I presented for the Spartan Superway project, which has been in development at San José State since 2011, and represents a new paradigm of urban mobility. The focus of the project is to build a sustainable public transportation system that addresses some common issues associated with today's transportation systems, such as safety, environmental pollution, and traffic congestion. Essentially, we work on creating suspended driverless vehicles that use exclusive, grade-separated guideways with solar PV panels.

While I was there I learned how large Lockheed Martin is, and that it also makes satellites. I got great impressions about the company from the



Tan Ho, Mechanical Engineering '18



*“Be prepared and really learn your materials. You should know what your team can and cannot do and how you can get help from other people.”*

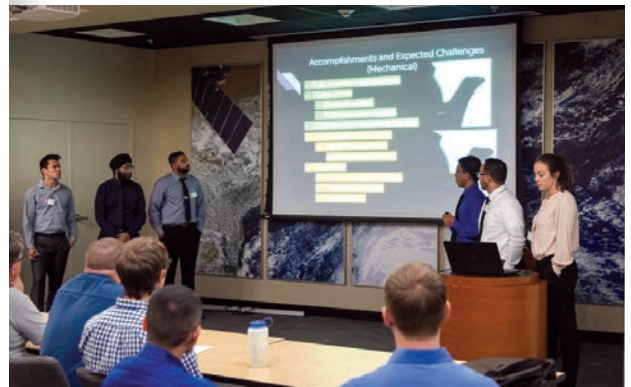
Photos by Jim Dowdell, courtesy of Lockheed Martin Corporation



engineers who work there. They were very friendly and willing to answer all the questions that I had. It was really helpful for me.

The judges were curious about Spartan Superway project and it was a new topic to them. They asked questions to learn more about Spartan Superway. I stayed for the alumni gathering and talked to Paul, a manager, who shared with me how he became a manager at Lockheed Martin. I learned that there are many ways to achieve my goal, and if I don't get accepted to my dream company that I should take my time to learn what I don't know and apply again.

If I could talk to a senior design student who is about to make the same visit, I'd say, be prepared and really learn your materials. You should know what your team can and cannot do and how you can get help from other people. Everyone in the team should present. I saw teams with more than ten members, but only two or three people on that team talked. And finally, go to the alumni social gathering, even if you are shy. Talk to people and ask if you can connect them on LinkedIn, but don't push your resume on them!



*Discussions are underway for another Senior Design Review in the fall.*

# ALUMNI NOTES

## **DAN “DOC” BALDWIN**

*BS Electrical Engineering, 1979*

Worked at Redstone Arsenal from 2003-2011 for Lockheed Martin in support of NASA as a hardware supervisor. He served in the armed forces during the Vietnam War, where he was wounded by sniper fire. For the past six years, he has served as president of Post 237's Legion Riders, a veterans organization in Huntsville, AL. We thank you for your service!

## **JOEL FRITSCH**

*BS Mechanical Engineering, 1970*

Retired as Executive Director of Mechanical Engineering, Walt Disney Imagineering. “I helped develop some of the greatest theme park rides. Now retired, I am even busier. How did I ever have time to work?”

## **MICHAEL GUIDRY**

*BS Electrical Engineering, 1995*

Currently the Director of Engineering at DENSO Products and Services Americas. He has garnered more than two decades of management and engineering experience in both the automotive and aviation industries.

## **BERNADETTE “BERNIE” VALENCIA**

*BS Aviation Engineering, 1993*

Recently promoted from general manager to Vice President of Matson, Inc. Prior to her work with Matson, she spent 14 years with Mobil Oil Guam & Micronesia, where she oversaw Mobil's bulk fuel terminal operations and engineering throughout the region.

## **CHRISTOPHER LAMANNA**

*MS Civil Engineering, 1997*

With more than 25 years of experience in planning, evaluation, design, construction administration, and water treatment, he works as an associate principal at Wendel Companies. He is an active member of the New York Water Environment Association and American Water Works Association.

## **LAWRENCE LIN**

*BS Electrical Engineering, 1997*

Currently serves as Taoglas' Vice President of Sales and is pursuing his EMBA from the Chinese University of Hong Kong. Over the years, he has also worked at Analog Devices, Atmel, and Laxcen.

## **DANIEL LAWLESS**

*BS Engineering, 1997*

Recently appointed as Vice President of Regulatory Affairs for Energous Corporation, the developer of WattUp® wire-free charging technology. He was previously at Broadcom, where he oversaw technical operations teams.

## **JOHN PRESLEIGH**

*MS Civil and Environmental Engineering, 1997*

After almost thirty years of service to the County of Santa Cruz, Presleigh announced his retirement this year. He joined the County as a senior civil engineer and has worked his way up to Director of the Department of Public Works, a title he held since 2009.

## **CHIP TAYLOR**

*BS Civil Engineering, 1995*

Recently hired as Sunnyvale's Public Works Director, marking the end of his 11-year run as Menlo Park's transportation manager. In this position, he helped oversee the traffic mitigation plans for different neighborhoods, the development of the city's greater downtown area, and the improvement of bicycle and pedestrian infrastructure.



## IN MEMORIAM

**GERALD L. TISUE***January 15, 1936 – November 7, 2017*

Jerry graduated from SJSU in 1974 with a degree in Electrical Engineering. He served in both the Air Force and Coast Guard. His hobbies included ham radios, golf, archery, sailing, astronomy, model trains, and his Harley Davidson. He is survived by his wife Connie, brother Gene, daughter Sheri, and granddog Bella.

**KENT GRANDON BOUMA***January 25, 1940 – September 21, 2017*

Kent attended Clark College in Washington before transferring to SJSU where he went on to earn a Master's degree in Electrical Engineering. He enlisted in the U.S. Navy, completed basic training and flight school in Florida, and retired from the Naval Reserves as Captain at Moffett Field, Mountain View, California. He also had a 32-year career at PG&E designing transmission towers.

**RICHARD KENNETH STEARNS***January 8, 1936 – January 12, 2018*

After honorably serving in the Air Force for 20 years, Richard received a Master's degree in Electrical Engineering from SJSU. He retired from the Air Force as a Captain and went on to work for Boeing as a software engineer. His experiences as an avid fly fisherman, world traveler, and RV'ing enthusiast are described in his memoirs "My River." He is survived by DeVonne, his wife of 31 years.

**HARVEY SHARFSTEIN, MECHANICAL ENGINEERING***1929 - 2018*

Harvey joined the Mechanical Engineering faculty at SJSU in 1964, remaining there until he retired in 1992. He served as Associate Dean of the School of Engineering for 11 years and as Chair of the Mechanical Engineering Department for 4 years. He was recognized for his expertise in design and stress analysis, serving as a consultant to the Navy, NASA, Lockheed, and several other companies. Harvey was much loved for both his teaching and mentoring activities. Upon his retirement from the Department Chair position, the department conferred upon him the "Ask Harvey Award" in appreciation for his service, willingness to answer any question, and his coffee-making abilities. After his official retirement in 1992, Harvey continued to assist with the experimental stress analysis laboratory that he developed and the senior design course for several years.

**ROBERT ROMIG, CHEMICAL ENGINEERING***1937 - 2018*

Robert Romig was one of the primary members involved in developing the Chemical Engineering Program at SJSU. He helped structure the program to prepare students for professional work, taught undergraduate and graduate courses, was a student counselor and assisted new faculty on development of their programs. He also served with Jay Pinson in the administration of the College of Engineering and was a significant contributor to the development of the new Engineering College in 1988, managing the college programs and coordinating with the rest of the University. Students were particularly impressed by Dr. Romig, and most indicated he was one of their more significant professors. This appreciation was recognized when students established a scholarship program in his name. In addition to critical academic contributions, Dr. Romig also participated in the faculty lunchtime basketball program. Other participants were impressed by his determination and ability to hit a jump shot. After Dr. Romig's retirement, there were quite a few gaps in the program that took years to refill. [By Michael Jennings]

# UPCOMING EVENTS

## Silicon Valley Leaders Symposium

Thursdays at noon | ENG 189

The Symposium hosts industry and technology leaders to talk about business and technology trends. It also features prominent leaders who discuss broader societal and political issues that shape our life and society.

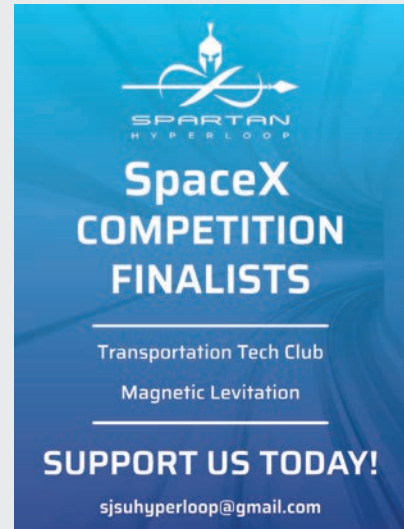
## GreenTalk Speaker Series

Wednesdays at noon | ENG 189

Practicing engineers, scientists, and technical experts deliver up-to-date briefings on how engineers deal with environmental issues.

## Spring Graduation Ceremony

Thursday, May 24 | Avaya Stadium | 5pm - 8pm



# SHARE YOUR STORY

Share your updates with Engineering at San José State!

Fill out the form below, snap a picture and email to: [engineering-comm@sjsu.edu](mailto:engineering-comm@sjsu.edu)

<b>NAME:</b> _____	<b>MY UPDATE IS:</b> _____
<b>MAJOR:</b> _____	_____
<b>GRADUATION YEAR:</b> _____	_____
<b>EMPLOYER:</b> _____	_____
<b>JOB TITLE:</b> _____	_____
<b>CITY/STATE:</b> _____	_____
<b>EMAIL:</b> _____	_____



# SCHOLAR PROFILES

Your Assistance Makes a World of Difference

## VIKAS NAVEEN

Computer Engineering Class of 2019  
**Harry Wong Scholar**



"I hope to change the world through the use of technology, which can open many doors in making life easier and more convenient. After getting my degree in engineering at San José State University I aim to make technology more easily accessible for people around the world. One area where I would like to contribute is in the field of robotics."

## ALYSSA WALKER

Industrial and Systems Engineering,  
Class of 2018  
**Ching Family Scholar**



"I hope that I can change the world by influencing children to aspire to achieve an education despite the setbacks they may encounter. I think that educating children in all aspects of life, whether in school or just life lessons, will make a huge difference in the world."

## PEEYUSHA BOORADA

Mechanical Engineering, Class of 2019  
**National Science Foundation  
Engineering Leadership Pathway Scholar**



"I found out about the Global Technology Initiative, a travel-abroad program in Taiwan, through this scholarship. A lot of scholars kept telling me to sign up and I'm glad I did. The experience was truly life changing. The people, the food, the culture and everything were so interesting and in the end I did not want to come back home. I'm truly thankful that the scholarship has given me the chance to work and travel at the same time, something I now want to do in my future."

## LUIS AREVALO

Software Engineering, Class of 2018  
**National Science Foundation  
Engineering Leadership Pathway Scholar**



"This scholarship has allowed me to visit companies I would never been able to visit, but also gave me connections inside the company to help my professional development. Also, it has allowed me to live in San José without causing a burden on my father so I can focus directly on my studies without worrying about how to pay for housing and school expenses."

## ELISA PARENT

Electrical Engineering, Class of 2020  
**Jane Evans Endowment Scholar**



"My dream job would be to be a researcher at a company that is trying to make people's lives easier using technology. I would like to work on that because research is pretty interesting to me and researching pushes the boundaries of human knowledge. And by making sure that I am helping people with my degree, I am using my talents to the best of my abilities."



**SJSU ranked #8**  
in social mobility by  
the *New York Times*.

THE TOP 10 AVIATION COLLEGES  
FOR 2018



SJSU Aviation Program is **Ranked 1st on the US West Coast and 4th in the nation**



SJSU won the **2018 Silicon Valley Water Conservation Award** for Best Organization



College Choice ranked SJSU **#15 nationally** in "Best Master's in Biomedical Engineering Degrees," highest in California schools.



## Do you know an outstanding Spartan Engineer?

### Why not nominate her/him for our Distinguished Alumni Award?

This alumnus or alumna has achieved superior professional accomplishments and/or has demonstrated outstanding citizenship through significant community or professional service.

The Distinguished Alumni winner receives:

- ✓ **Complimentary seats (2)** at the dean's VIP table at the awards banquet
- ✓ **Plaque** displayed in the college and one to keep
- ✓ **Website recognition**

Self-nominations are accepted. Go to: [bit.ly/SJSUengrDA](http://bit.ly/SJSUengrDA). Our form is open through February 2019.