

engineering FOR SILICON VALLEY AND A BETTER WORLD

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Prof. Shahab Ardalan with graduate student Shweta Panwalkar in the lab at the newly opened Center for Analog and Mixed Signal.

Shahab Ardalan

Dancing with digital design in an analog world

In the real world, says Shahab Ardalan, as he scribbles a diagram on a piece of paper, “nothing is digital.” Everything we encounter in the natural world is analog, meaning it creates a continuous-but-variable signal, not the familiar series of zeroes and ones comprising digital information.

But digital signals are extremely useful, Ardalan says. They use less power than analog, are fast, compressible and cheap to make while producing less “noise”—random, unwanted variation—which explains the exploding popularity of digital circuitry over the past 50 years.

A digital audio compact disc containing 70 minutes of music can store 700 minutes worth of compressed mp3 digital files, he points out. “Compression could only happen in digital,” he says. “But when you play it back, the player has to do this conversion back to analog.”



KARL NIELSEN

dean's message

I've been thinking a lot lately about the word *connect*. In its simplest sense, it means to unite or join together, which is why I view it as the principle behind much of what we do here at the Davidson College of Engineering.

In a world where technical knowledge is increasingly specialized and fragmented, we teach our students to connect the pieces so they can see the whole—and communicate that vision to others. Likewise, we want to connect our students, many of whom come from working-class and middle-class families, with the rich career opportunities that lie close at hand here in Silicon Valley.

We also aim to connect past and future, by reaching out to our alumni and creating opportunities from them to interact with students and faculty. All of which helps explain why you're reading our newly re-launched newsletter, *Engineering for Silicon Valley and*

a Better World. It is a forum for sharing new developments in the college, highlighting the achievements of our alumni and celebrating the accomplishments of our faculty and students.

In this issue, you'll read about Shahab Ardalan and the new Center for Analog and Mixed Signal. This program will provide a pipeline connecting our students with industries at the forefront of new microelectronic technology. You'll learn about our new graduate and undergraduate degree programs in biomedical engineering, which became a reality thanks to the vision and passion of Guna Selvaduray. Students will learn to connect insights from such diverse fields as mechanical and materials engineering, biology and ethics to achieve a powerful synthesis.

Two stories focusing on our alumni underscore the value of the education we provide. In his work on the Bay Bridge project, civil engineer Steven Hulsebus has combined impressive technical skills with an understanding of the need to keep members of his team connected and communicating. Lockheed Martin executive Julie Sattler has built on her technical education to lead the work of thousands of talented people working on complex projects.

You will see how our Engineering Student Success Center connects students with the campus resources they need to excel. Meanwhile, engineering senior Daniel Wanner, recognized as an up-and-coming talent by the American Society of Civil Engineers, wants to connect his interests in design, construction management and all-around problem solving as he prepares for post-graduate life.

Finally, President Barack Obama has assured me and other engineering deans that he stands solidly behind our commitment to graduate 10,000 more engineering majors each year as part of a major collaboration with the high-tech industry. Working together—staying connected—we can achieve this important goal.

Ultimately, to connect means we share a commitment to building a vibrant intellectual community. This is my vision for the college and for the future. Please join me on this journey—and remember to stay in touch!

A handwritten signature in blue ink that reads "Belle W. Wei".

Belle Wei, the Don Beall Dean of Engineering
Davidson College of Engineering
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Where body meets mind

Davidson College introduces new biomedical engineering degree programs

Mention “biomedical engineering,” and most people conjure up high-tech images of magnetic resonance scanners, drug-eluting cardiac stents and subcutaneous neural stimulators.

While accurate as far as it goes, “Biomedical engineering is broader than implants, instrumentation and imaging,” explains Guna Selvaduray, professor of chemical and materials engineering in the Davidson College of Engineering. “The Band-Aid is a biomedical device.”

Selvaduray has a knack for looking at the big picture, an outlook embodied in San José State University’s new biomedical engineering degrees, approved last October by the California State University chancellor’s office. The new B.S. and M.S. programs in biomedical engineering replace earlier subject-area concentrations.

The program is long overdue, Selvaduray says. The Bay Area is home to the nation’s largest concentration of medical device businesses in the nation—at least 400 biomedical companies are based in Silicon Valley alone, he says. Of an estimated 88,000 local biotechnology jobs, 31,000 are in biomedical devices, he adds.

Selvaduray, whose diverse background includes expertise in metallurgy, nuclear fuels and chemistry, has been involved in biomedical consulting since the 1990s, when he helped solve metallurgical problems involving stents, the tiny mesh tubes now widely used to prop open blocked arteries.

In 1998 he began teaching a class on biomedical devices and biomaterials, and in 2004, Davidson College Dean Belle Wei asked him to develop a biomedical curriculum.

“We took it step by step,” Selvaduray says. “My thinking was to show demand, show stability and then go for a degree program later.” He first decided to create a graduate-level concentration in biomedical devices, relying on input from industry experts on the kinds of skill sets students would need to cultivate.

“It was really helpful,” he says of the collaboration. “It’s making the program relevant to surrounding industries.” Soon, biomedical engineering was offered as a concentration for undergraduates, he says. About 70 students who had made biomedical engineering their concentration can now convert it into their major, he says. “They were all informed right from the beginning, ‘This is coming—we can’t promise you anything,’” Selvaduray says. “We got it done a year early.”

Along the way, students organized a campus chapter of The Biomedical Engineering Society and have helped put together the annual Bay Area Biomedical Device Conference.



Guna Selvaduray

Dean Wei says the new major creates unique opportunities for engineering students. “We want our students’ skills to be relevant for industries that are making rapid technical advances,” she says. “The biomedical engineering curriculum is a perfect example of how we are helping to meet these industry needs.”

Selvaduray, who grew up in Malaysia, earned his undergraduate degree in mechanical engineering at the Tokyo Institute of Technology. He later got a master’s degree in materials science and engineering and a Ph.D. in metallurgy from Stanford University.

Since coming to San José State in 1984, he has taught courses in biomaterials, engineering ceramics, microelectronic packaging, the thermodynamics of solids, experimental methods in materials engineering, materials processing methods, corrosion and design for the environment. He has even found time to work in earthquake hazard mitigation.

“If you’re a thinking individual, you’re constantly crossing boundaries,” says Selvaduray, adding that too often engineering education focuses on mastery of specific domains at the expense of seeing the big picture.

At 65 he still plays racquetball (he even climbed Mt. Kilimanjaro for his 60th birthday), but he well understands the need for new and improved biomedical devices for older people.

“The need has always existed,” he says, “but what is different is that people have higher expectations than they did. That awareness and consciousness of a higher quality of life has become pervasive, and I think that’s a good thing.” 🌟

So while the digital revolution has brought many benefits, it has not eliminated the need for analog circuitry, says Ardalan, an assistant professor of electrical engineering who heads the new Center for Analog and Mixed Signal at the Charles W. Davidson College of Engineering. “They are actively tied to each other,” he says, hence the term “mixed signals.”

Ardalan arrived on campus in January from the University of Waterloo in Ontario, Canada, where he wrote his Ph.D. dissertation on integrated circuits. He was drawn to San José State University by the “good weather,” he says, not to mention its proximity to Silicon Valley, which is home to hundreds of semiconductor companies.

Texas Instruments, Maxim Integrated Products and Davidson College alumnus Gust Perlegos endowed Ardalan’s chair as director of the center, which was dedicated last Nov. 30. The new lab is outfitted with six stations that run computer-aided design (CAD) tools to create analog and mixed signal integrated circuits. The lab also includes 10 mixed signal test stations.

Ardalan says the center is meant to give students a hands-on chance to design new integrated circuits while building partnerships with the Silicon Valley semiconductor industry and creating new opportunities for graduating students.

Davidson College Dean Belle Wei says the new center exemplifies the benefits arising from partnerships between the university and the pri-

every seven years. Ardalan’s team wants to improve the speed and performance of data communication integrated circuits while reducing their power dissipation. The main focus on this project is to use digital circuits along with power reduction techniques in analog blocks to achieve a low power solution while maintaining the required performance.

Designing a robust crypto processor. Digital security is among the most important considerations in designing integrated circuits in both digital and analog domains. In the digital era, “more money is stolen online than in bank robberies,” Ardalan says. “Security is very important.” High-performance integrated circuits must use little power while staying secure from so-called “side channel attacks” (SCA), which rely on techniques such as simple power analysis, differential power analysis and timing analysis. The team is designing and building robust crypto processors that block these attacks. “Our effort is to increase the immunity by elaborating some of analog and digital noise reduction techniques,” Ardalan says. “The dean asked me one time what the students were doing and I said, ‘They’re trying to hack.’”

Noise modeling and mitigation on a switch capacitor circuit. All digital cameras use a charge coupled device (CCD) or a complementary metal oxide semiconductor (CMOS) image sensor to capture analog information. Despite the low cost and low power advantages, the CMOS image sensor suffers from more device noise. Previous mathematical attempts

Some experts calculate that this backbone’s bandwidth requirement increases

by a factor of 50 to 100 every seven years.

Ardalan’s team wants to improve the speed and performance

of data communication integrated circuits while reducing their power dissipation.

vate sector. “With the benefit of Prof. Ardalan’s expertise and mentoring, his students are likely to find a very receptive audience when they enter the job market,” she says.

Ardalan’s students—all enrolled in a master’s degree program—are working on four major design projects. They include:

A low-power analog-to-digital converter (ADC) for an implantable biomedical device. Implantable devices lack external power sources and can’t dissipate much heat, so their chips use “succession approximation register” (SAR) architecture that connects with large wireless sensor networks while using very little power. This project aims to design an SAR converter with low power and low voltage, which would be ideal for a biomedical engineering application. Ardalan’s team is working with an implantable chip in transgenic mice that can monitor blood pressure and heart volume—wireless biomedical telemetry.

An integrated circuit for low power, high-speed wireline communication. The volume of data transmitted over the Internet has been increasing exponentially and the load on the global Internet backbone will soon increase to tens of terabits per second. Some experts calculate that this backbone’s bandwidth requirement increases by a factor of 50 to 100

to calculate and mitigate the noise in readout circuitry have not worked well. This project aims to solve the problem.

Digital circuits are generally designed using CAD software, Ardalan says. “It’s like programming. But when it comes to analog circuitry, “it’s not just 0,1. We can’t use a scripting language to design an analog chip.”

Ardalan says that he hopes to evolve his graduate program into one that grants Ph.D.s, because analog chip development process is somewhat time-consuming. “Doing a real solid project in two semesters is very difficult,” he says.

In digital chip design “you get your feedback immediately,” but with an analog chip, “to get the real measurement, we have to build it,” he says. That generally means sending the design off to Taiwan, where 90 percent of integrated circuits are built. “If we do it in the U.S., the turnaround takes a long time.”

The four-to-six-month delay in getting a finished chip back would work better with a Ph.D. student’s extended time commitment, he says.

Meanwhile, as digital design takes the world by storm, “We sometimes hear, ‘This is the end of analog—everything is going digital,’” Ardalan says. “I don’t believe it.” 🌟

From campus to the classroom

Project Lead the Way prepares teens for college engineering curriculum

Last fall, 20 Bay Area high school students entering the Davidson College of Engineering as freshmen brought with them an unusually rich set of skills—the result of having participated in a groundbreaking program that prepares young students for a technical education.

Project Lead the Way (PLTW) is a national provider of curricula in science, technology, engineering and mathematics for middle- and high-school students, says Rendee Doré, outreach coordinator for the program's Bay Area Regional Center, located on the San José State University campus.

The center promotes PLTW adoption in local schools, hosts summer training for teachers and offers a summer bridge program for incoming freshmen. "It's building an engineering community from middle school all the way through a four-year college degree," she says.

Doré has also built partnerships with industry that allow businesses to communicate their engineering needs to educators while increasing the number, preparedness and diversity of engineering graduates.

Project Lead the Way began in 1986 in New York State. The not-for-profit now serves more than 4,200 schools in all 50 states and the District of Columbia. Four years ago, PLTW approached the California State University system about facilitating training for high school teachers, Doré says.

At San José State, PLTW dovetails nicely with the Davidson College's existing Engineering Pathways to Success initiative, which receives support from such Silicon Valley powerhouses as Intel, Xilinx, Agilent Technologies, KLA-Tencor and Chevron, Doré says.

The regional center provides support for PLTW teachers in 37 middle schools and high schools spread throughout the 11-county greater San Francisco Bay area, she says. "We serve about 3,000 students," she says. The school districts each must sign contracts with PLTW committing to teaching the curriculum. "It's driven by a contract of the district and the district board, rather than the teacher," she says.

The Bay Area center's student mix is about 42 percent Latino and 27 percent female, Doré says. Meanwhile, among professional engineers, just 4.6 percent are Latino and 10.3 percent are female.

High school students can take a four-year engineering program that covers eight topics—the principles of engineering, digital electronics, introduction to engineering design, computer integrated manufacturing, civil engineering and architecture, engineering design and development, aerospace engineering and biotechnical engineering.



COURTESY OF PATHWAYS TO SUCCESS

In middle school, students can participate in six 10-week Gateway to Technology classes that introduce them to the scope and discipline of an engineering career. The hands-on courses cover design and modeling, electricity, the science of technology, automation and robotics, flight and space, and energy and the environment.

"They're all hands-on applications, so they're very lab-oriented," Doré says. "The real thrust of this curriculum is helping the students understand that it has a lot to do with real-world experience."

Meanwhile, incoming freshmen, like the 20 who graduated last spring from the PLTW program, will already have had four years of math and engineering training, Doré says.

"We're really looking for more prepared students for college," she says. When students lack a basic foundation in math, for example, "It is difficult for them to catch up."

The program also recruits engineering ambassadors from the Davidson College. They can get service learning credits for spending three to five hours a week mentoring students at a Project Lead the Way school, Doré says.

High school teachers—usually from the math or physics department—who want to implement the PLTW curriculum must take intensive summer professional development programs at San José State, San Diego State University or California State Polytechnic University at Pomona.

"It's a two-week boot camp," Doré says. "All of the curriculum from one year is covered in two weeks." Teachers typically start their classes at 8 a.m. and continue with homework until midnight, she says. The training is led by PLTW-certified master teachers, she adds. The curriculum, which is revamped every three years in consultation with industry, is web-based, Doré says, "so it's very movable." 📱



Bridge to the future

[Alumnus Steven Hulsebus oversees Bay Bridge construction](#)



When Steven Hulsebus approached Davidson College Dean Belle Wei last semester offering to arrange a tour of the San Francisco-Oakland Bay Bridge project, she jumped at the chance. After all, it's not every day that an engineer gets to peek behind the scenes of a \$6.2 billion construction project.

On a sunny September day, Wei, former San José State University provost Gerry Selter and several Davidson College of Engineering faculty members met at a staging area in Oakland, where they donned hard hats and life vests and hopped aboard a boat for a cruise out to the bridge's East Span.

They marveled at the sheer size of the project, which features a 1.2-mile seismically reinforced Skyway leading to the Oakland toll booths, and a span connecting it to Yerba Buena Island with a dramatic 525-foot tower,

making this the world's largest self-anchored suspension bridge.

Hulsebus, a 1983 College of Engineering graduate, serves as design principal for the Caltrans Bay Area toll bridge program. As he told Wei, Selter and professors Laura Sullivan-Green, Jae-Ho Pyeon, Juneseok Lee and Thalia Anagnos, designing a project of this size calls for precise communication.

The project, which has drawn on a wide range of engineering specialties, may well be the largest in Caltrans history. The span ele-



ments were produced in the U.S., Europe and Asia in pieces, then shipped to the Bay Area for assembly. The mile-long suspension cables are 2.6 feet in diameter, woven from thick strands of steel wire.

The 1989 Loma Prieta earthquake damaged a portion of the East Span, triggering a two-decade effort to build in stronger seismic safeguards. While the San Francisco portion (West Span) received structural reinforcements, planners decided to replace the entire East Span—all while accommodating about 280,000 drivers each day.

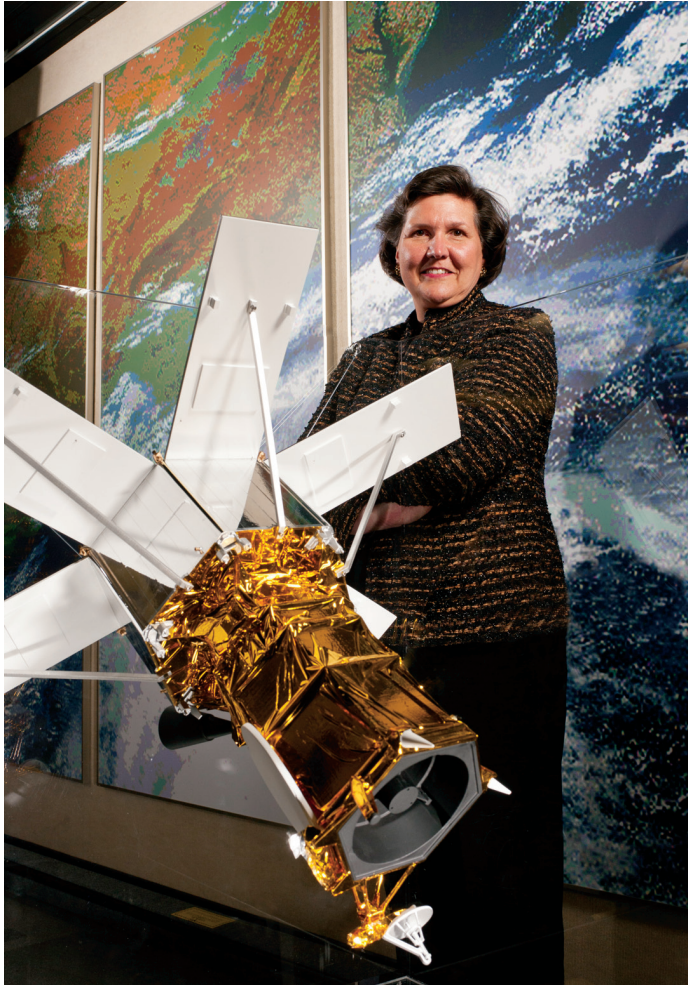
The new design, which uses new technology to absorb seismic energy, should be able to withstand rare, extreme earthquakes, defined as events that might occur once every 1,500 years. Fortunately, Bay Area motorists won't have to wait that long to use the bridge. Caltrans expects it to open in 2013. 🌟



BAY BRIDGE PHOTOS: KARL NIELSEN

Sky's the limit

Davidson College alumna receives Women in Aerospace Award



Julie Sattler became obsessed with the idea of getting her pilot's license at the tender age of 13, so with her parents' support, she enrolled in ground school at the small airport near her home in Ukiah, Calif.

"I was the youngest one in the class in a smoke-filled room," recalls Sattler, vice president and general manager for special programs for Lockheed Martin Space Systems Company. "I got my pilot's license at 15, before I got my driver's license."

Sattler later enrolled in the aeronautical engineering program at San José State University—and went on to become the first female maintainability engineer at Lockheed Martin. Twenty-eight years later, she has a long list of such "firsts," such as becoming the first woman to run an

engineering organization of 8,500 people and becoming the first female program manager to launch a satellite.

Last November, the Women in Aerospace organization recognized her accomplishments with the 2011 Lifetime Achievement Award, which she received in a ceremony in Washington, D.C.

Sattler, who is a member of the Engineering Industry Advisory Council for the Davidson College of Engineering, says that when she first learned of the award she wondered, "Really? Me?" While she appreciates the acknowledgment, she says, "It's not all about Julie. It's about the mentors who mentored you."

Sattler feels her San José State education gave her a strong preparation for her career. "The bar was set high and it presented challenges in competition," she says. "To perform meant doing well and it took dedication and hard work—which aligned with what they expected at Lockheed Martin."

Sattler worked at a local Safeway store to pay her way through college. For her computer science minor, she had to schedule time in the computer center to run her punch cards. Her roommate, who worked for a local startup called Apple, had a better idea. "She would say, 'Come on down. We can run it on the new computer we're building—it's called Lisa,'" Sattler recalls.

At Lockheed Martin she started out analyzing the reliability of missile and satellite systems. Later, she worked on the Hubble Space Telescope, the international space station and with space-based lasers. She also helped design a command center at the Pentagon. "It takes data from all over and processes it for dissemination in the action room," she says.

Later, she worked on Milstar, a system of high-tech communications satellites for the military, an assignment that later morphed into her becoming program manager for the Advanced Extremely High Frequency Program, which is currently being deployed.

She also ran a large engineering organization for the space systems company (one of four primary divisions within Lockheed Martin) and now heads the special programs line of business, overseeing 4,400 employees. Her clients include the defense department and U.S. intelligence agencies.

Sattler, whose husband is a stay-at-home dad for their 9-year-old daughter, spends much of her time traveling between her home base in Sunnyvale and Lockheed Martin offices in Denver and Washington, D.C. "I do a lot of work at 40,000 feet on a laptop," she says. Still, she manages to find time to visit her daughter's school to talk to kids about space.

"Family is very important," she says. "You can find the balance between the two, but it takes creativity and it takes effort." 🌟

A word of advice

Engineering student success center helps majors stay on track



Freshmen in the Davidson College of Engineering often find that making the transition from high school to higher education can be intimidating. With no class bells to answer (and no nagging parents), students must learn to structure their time and keep up with their homework. Sometimes they flounder.

Fortunately, there is a one-stop resource for when it all gets to be overwhelming. With its brightly painted blue, red and yellow décor, the Engineering Student Success Center (ESSC) offers students a safe, inviting place to ask for help and get their questions answered.

“If they don’t know where to go about finding something, this is a great first step,” says Jared Tuberty, the center’s executive director. “If a student doesn’t know what they don’t know, how do you figure that out?”

The center, which opened in 2009 and serves some 2,600 undergraduates, offers advising in a number of areas, tutoring, career coaching and professional development. It also participates in a 10-day summer residential experience for incoming students while supporting student organizations and living-and-learning communities.

Assistant director Francisco Castillo says that as students learn personal responsibility and time management, “academic performance is definitely the main issue.”

Students are expected to maintain a minimum 2.0 GPA in their major. If they fall below, they are placed on major probation. That entails attending a probation workshop offered by ESSC, discussing their academic issues with a staff advisor, meeting with a peer advisor and working out a study plan with their faculty advisor.

Students may also wind up on probation because their basic math and English skills aren’t up to snuff, Tuberty says. In a placement test given at the start of each school year, about 25 percent of 600 entering students fall into the remedial category.

About 40 percent of incoming students are transferring from community colleges, Tuberty says, and many are the first in their families to attend college. The ESSC staff also conducts workshops to help students develop their communication skills.

“Engineering is about working with people,” he says. “You can have the most brilliant idea out there, but if you can’t communicate that, someone else will get the credit.”

Castillo says ESSC staff are also trained to identify students with emotional issues that might require more in-depth assistance. “There is a team of professionals on campus that have a group for emergency type referrals,” he says. “There’s been really good communication with us.”

In the end, Tuberty says, it’s about finding the right mix of services to help at-risk students succeed. “If we can keep people going, they do really well,” he says. “Overall, we’re all members of the same team who want to help people graduate from San José State with bachelor’s degrees.” 🏆

Concrete thinker

Student recognized as one of 10 new faces in civil engineering

As a kid growing up in Stockton, Calif., Daniel Wanner liked playing with Legos, endlessly arranging the colorful interlocking plastic bricks into the prototypes for buildings he could see in his mind's eye.

Now a senior in civil engineering in the Davidson College of Engineering, Wanner is a lot closer to making his childhood visions a reality. Next fall he hopes to start a master's degree program in construction management and work toward his professional engineer's license.

Wanner's lifelong commitment to his craft recently was acknowledged in a big way when he was named one of the 2012 New Faces in Civil Engineering—College Edition by the American Society of Civil Engineers. The 10 winners include students at Cornell University, the University of Wyoming, University of Iowa and The Cooper Union. Wanner was the only winner from the state of California.

"I was excited to hear I was selected and that ASCE thought I was one of the top students," says Wanner, 23, who submitted his application for the award last September. The ASCE's New Faces awards previously had focused on working engineers under the age of 30. "This is the first year that they opened it up for a college edition," he says.

Apart from maintaining an impressive 3.9 GPA, Wanner has been deeply involved in student life in the Davidson College. He has been vice president of the ASCE student chapter, a vice president of the Associated General Contractors, a member of the American Concrete Institute and of Chi Epsilon, the civil engineering honor society.

While finding time for mountain biking



and running, he also served as a research assistant for an earthquake engineering simulation project. He has been working on recommendations for structural engineers who might want to model structures supported by piles in soft soil.

Perhaps the most fun has been his ongoing involvement with San José State's concrete canoe team, which every year builds a 20-foot vessel for entry in ASCE's National Concrete Canoe Competition.

The concrete used in the four-person canoes must be 30 percent (by mass) Portland

cement, with an aggregate making up 25 percent (by volume) of the mix. Up to half of the hull's thickness can be a reinforcement mesh.

The construction process calls for plenty of creativity. "We have to make our own design mix," Wanner says. "And it has to float." Various aggregates have been used, including Styrofoam and tiny glass spheres.

The 15-member team finished third in their conference the first two years that Wanner participated. Last year they made it to the nationals, finishing eighth out of 22 finalists.

Wanner says his concrete design class has been his favorite. "It was different," he says. "It was not just the normal calculations." The project called for students to design a three-story building on an actual location in San José, which meant they had to take into account zoning, permitting and environmental mitigation concerns.

Looking forward, Wanner says, "I'd like to get my hands into construction," which likely means spending some time doing project management—but that one day might lead back to his first love.

"I've heard that it's a good idea to get practice out in the field and possibly later go into design," he says. 🏗️

Hail to the Chief

[President Obama backs plan to graduate 10,000 additional engineers](#)



“This incredible diversity of talent is out there, just waiting to be tapped. But we are not living in a culture that constantly affirms the importance of math, science, technology and engineering.”

—President Barack Obama

A group of 40 college engineering deans gathered at the White House in February to talk about ways to increase the number of U.S. students graduating from their programs, received a surprise visit from President Barack Obama, who dropped by to offer his strong support for their work.

“Our founding fathers were a bunch of tinkerers and doers who believed in the capacity of people to constantly improve themselves through inquiry and asking questions,” he told them. “For every Steve Jobs we need 10,000 engineers who are maybe working a little more quietly but nevertheless are able to create the goods and services that improve people’s lives.”

Fresh from visiting with high school science fair students who had done things like start a rocket club and figure out how to fire a marshmal-

low from an air cannon, Obama said he was inspired by their ingenuity and persistence.

“This incredible diversity of talent is out there, just waiting to be tapped,” he said. “But we are not living in a culture that constantly affirms the importance of math, science, technology and engineering.”

Belle Wei, dean of the Davidson College of Engineering and a member of the deans’ council of the American Society for Engineering Education, was among those at the gathering, which also included Energy Secretary Steven Chu and Education Secretary Arne Duncan.

She says the president’s remarks underscored his support for an ambitious plan to increase the number of graduates from the nation’s 350 engineering schools. Annual bachelors graduation numbers are around 78,000, yet the percentage of engineering bachelor’s graduates is growing much slower than the total number of college graduates which has grown by 33 percent over the past decade, Wei says.

Although 27 percent of U.S. freshmen are majoring in science, technology, engineering or mathematics curricula, about 60 percent of them drop out or switch majors before graduation.

The new plan, hatched at a listening session held last August in Portland, Ore., by the President’s Council on Jobs and Competitiveness, is to add 10,000 engineering graduates per year. “The Holy Grail is how to accomplish this,” Wei says.

One component is the national “Stay With It” campaign, a new partnership with industry that encourages students by accentuating the prestige and impact of their chosen field while providing needed financial support.

Intel CEO Paul Otellini, who is leading the 10,000 Engineers push, said the private sector this year has committed \$20 million toward hiring 7,000 first- and second-year engineering undergraduates as summer interns.

At the Davidson College, students can see the impact of engineering first-hand. “We see the wealth being created by Silicon Valley,” Wei says. “But more important for me is the wealth that engineers create for society.”

As she and her peers work to encourage and retain promising engineering majors, she is particularly heartened by the support coming from the Obama administration.


“They want us to do more of the good things—that’s President Obama’s language,” Wei says. “As president, he’s using his bully pulpit to advocate for the importance of engineering education.” 

Image of President Obama from the iPhone video recorded and provided by Dr. Daryll J. Pines, Farvardin Professor and Dean, A. James Clark School of Engineering, University of Maryland



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This 2.6-foot diameter steel cable helps suspend the new Bay Bridge—
read more page 6.

Stay connected

Davidson College of Engineering students benefit immeasurably from the generosity of engaged alumni like you. We thank you for your continuing support.

<http://campaign.sjsu.edu/give-now.html>

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