

ENGINEERING AT SAN JOSÉ STATE

CHARLES W. DAVIDSON COLLEGE OF ENGINEERING

powering Silicon Valley



Martin A. Kropelnicki
President and CEO
California Water Service

Juneseok Lee
Cal Water Chair and Associate Professor of Civil Engineering
San José State University

**A New Model for
University-Industry Partnerships**

SJSU SAN JOSÉ STATE
UNIVERSITY



Greetings,

Winter in Silicon Valley may not bring the traditional scenes of the season to mind, but as we end the semester and begin a new year ahead, our students, faculty and staff have much to celebrate and look forward to in 2015. Our unique location against the sunny back-drop of innovation and entrepreneurship plays a big part of that, and is creating a brighter future for our college and our students.

As you know, last year we developed our five-year strategic plan for the Davidson College of Engineering and outlined three key priorities. One of these priorities was to strengthen industry partnerships. While the college had established solid relationships in the past, we saw tremendous opportunity to amplify these efforts and create new and exciting learning experiences for our students. We've now made this a core part of our vision and strategy, and I am thrilled to highlight the progress we're making here in our Winter 2014 edition magazine.

Together we are truly creating a new model for university and industry partnerships. We're tapping into our extensive alumni network more effectively, developing deeper partnerships with leading local companies, and providing more opportunities for students to participate in industry-related research and development projects.

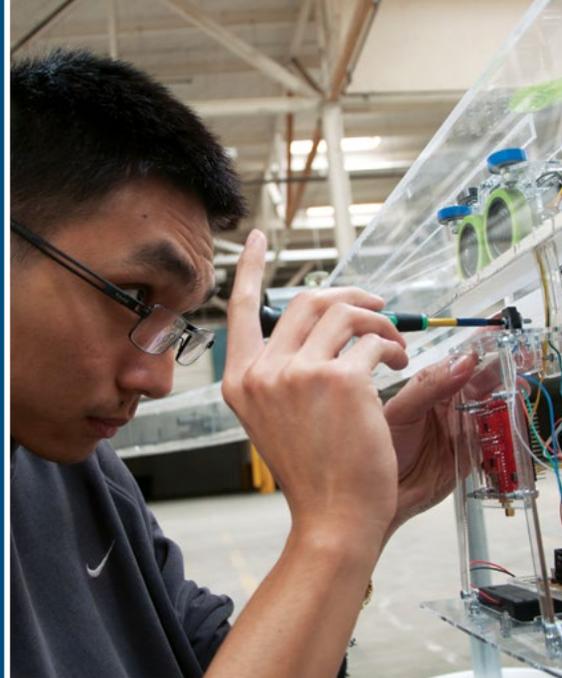
Our students are looking ahead at the challenges facing the 21st century economy and thinking about creative ways to solve them. Our cover story on our new partnership with Cal Water is evidence of that. SJSU students, led by Associate Professor of Civil & Environmental Engineering Dr. Juneseok Lee, are working together with Cal Water technical staff to develop sustainable solutions for a wide range of challenges confronting the water industry. Read more about how their work stands to impact two million California water customers on page 6.

When I look back at the fall semester, the hands-on learning abounds, and it's through these industry partnerships that make this possible. In the Intel Galileo Project (page 3), we saw engineering students team with fine art students to build a wide range of prototypes using Arduino-certified development boards. Aerospace Engineering students surpassed a national rocket altitude record in Project Hyperion (page 8). Grants from the National Science foundation are also funding innovative student research projects that could revolutionize the field of biotechnology (page 12).

At SJSU, we learn by doing. With ongoing collaboration between academia and industry, we're creating immersive learning opportunities to prepare our students for career success more than ever before. Expect to see even more in 2015 (see our round up of CoE industry-partnerships on page 16). What an exciting time to be a student at the College of Engineering!

Warmly,

Dr. Andrew Hsu
The Don Beall Dean, Charles W. Davidson College of Engineering
at San José State University



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Fueling A New Renaissance

ENGINEERING AND ART STUDENTS BUILD STEAM FOR THE 'NEXT BIG THING'

In Silicon Valley, as in few other places, innovation is fueling a new Renaissance. Here you can almost sense it in the air, and according to some industry analysts, the synergy of future discovery seems to lie at the intersection of art and science, or what is called STEAM. Think STEM—Science, Technology, Engineering and Mathematics—meets Art.

Last September, 50 SJSU Engineering, Arts and Humanities students and eight of their professors met for the first time in an engineering lab to get the ground rules for a bold new experiment: a competition that pairs teams of digital artists with engineers to design prototypes that currently exist only in the mind, but could one day disrupt life as we know it.

The main idea behind the semester-long contest, dubbed the Rapid Prototyping Competition, is to “be creative and have fun” says Carlos Montesinos, Intel Labs Robotics Engineer, who leads the competition from the industry side. But the high tech company hopes in addition to offering students a valuable hands-on learning experience, it too will be re-inspired by students’ scholarly innovations.

“Intel really believes the next big thing will come from college students,” Montesinos said.

This is the first time Intel has conducted this competition outside its own labs. After testing the program internally for more than three years, the company picked SJSU to pilot test it in an academic setting. If all goes well, the company could open up the prototype challenge to other universities.

The objective seems simple enough: build a cloud connected prototype product using Intel’s Galileo Gen 2 Rapid Prototyping platform. For this competition, the company supplies the circuitry kits to each student team. What students build is only limited by their ingenuity and imagination; however, there are some ground rules:

Each team is comprised of three to five registered SJSU students with at least one member from engineering and one from arts and humanities. This multidisciplinary project is designed to test students’ ability to work in teams with a cast of left and right brain thinkers.

The project also mandates teams communicate with end users. It’s not enough that the team thinks their prototype is a work of art; unless it adds value for the end user, it’s likely to be nothing more than another unrealized dream. Students design and build their prototypes with a clear understanding that it’s how users relate to the product that’s vitally important to the innovative process.

To accomplish this task, student teams need to first understand the users’ specific needs. Then they test their prototypes with multiple end users outside their own creative group at two milestone



events. Based on user feedback, it’s inevitable that some teams will need to fine-tune multiple versions of their prototypes before the final judging event.

Surprisingly, Intel isn’t looking for finished products here. Students are only required to present a functioning prototype – engineers called it a “minimally viable product.” Once the competition crowns the three winning teams in early 2015, students’ prototypes could be pushed to the next level, where venture capitalists will ultimately determine if each project is marketable.

With \$12,000 in cash on the line—to be applied to the winners’ tuition and fees— one might imagine a made-for-Hollywood spectacle where the art of competition is the only true master. However, in this open development environment, competition is welcoming and productive. Students from contending teams pose questions and suggestions intended to make their competitors’ products stronger, leaner, and more intuitive.

Teaming engineers with artists isn’t a new concept, especially in the heart of Silicon Valley, but seldom do college students have the opportunity to participate within the context of real world application.

“Many people don’t expect engineers and artists to work together. While the tools of the trade are certainly different for the two fields, they actually share many things in common, such as problem solving, creativity, innovation, and a keen eye for details,” said Gary Craig Hobbs, SJSU arts and humanities professor.

Melding engineering with aesthetics requires a different kind of thinking, says Hobbs, who helped organize the event with Shahab Ardalan, assistant professor of electrical engineering. Hobbs adds, allowing students to hone this skill will give them a leg up in their careers.

Montesinos agrees. “This experience could turn out to be one of the most valuable they get as students. Learning to communicate within a team environment with people outside your field is inevitable as a professional. It gives students a whole new perspective, and that’s key to innovation and productivity.”

3

NEW PROFESSORS

BIOMEDICAL, CHEMICAL AND MATERIALS ENGINEERING**ALESSANDRO BELLOFIORE
ASSISTANT PROFESSOR**

With more than 28 journal and conference papers to his credit, not to mention multiple awards, Alessandro Bellofiore is characteristic of the exceptional faculty that consistently makes SJSU an engineering powerhouse.

At SJSU, Professor Bellofiore is continuing his research into engineering tools that will modernize clinical medicine, making diagnoses and treatments more personalized and less invasive. Specifically, his work on mechanical devices that measures the motion and equilibrium of blood flow when subjected to external forces, such as physical exercise, shows promise in giving clinicians a better mechanical understanding of how blood circulates under a variety of conditions. This knowledge shows promise in greatly improving clinical monitoring and management of cardiovascular diseases.

Professor Bellofiore earned his MS and Ph.D. in Chemical Engineering at University Federico II in Naples, Italy. He conducted post-doctoral research at the National University of Ireland before landing at the University of Wisconsin-Madison Medical Center as a research associate. Here he discovered his passion for biomedical engineering while working on an NIH-funded project collecting and analyzing data from patients with pulmonary hypertension while performing physical exercise. Another area of focused research involves complications stemming from prosthetic heart valves believed to be associated with unnatural blood flow patterns in cardiac patients.

INDUSTRIAL AND SYSTEMS ENGINEERING**S. AYÇA ERDOGAN
ASSISTANT PROFESSOR**

What do hospital surgical rooms in Cleveland, cable TV installers in Orlando, and public commuter rail service in San Jose have in common? At first glance it may not seem like much, but these disparate services all run on complex systems with uncertainty, while trying to balance competing criteria of customer satisfaction and provider efficiency.

Optimizing complex systems to achieve the best possible human and capital outcomes is Assistant Professor Ayça Erdogan's specialty. She crunches

big data sets and turns numbers into complex simulations and mathematical optimization models to solve a variety of industry challenges. Her research interests lie in decision making under uncertainty with an emphasis on problems related to health care, including delivery operations and medical decisions on the individual and population level.

Prior to joining SJSU's Industrial and Systems Engineering Department, Professor Erdogan was a Postdoctoral Research Fellow at Stanford University School of Medicine and a visiting assistant professor at University of Southern California. She holds Bachelor's and Master's of Industrial Engineering degrees from Istanbul Technical University, Turkey, and a Ph.D. in Operations Research from North Carolina State University. She has 14 publications and working papers, nine presentations to her credit. For her postdoctoral research, Dr. Erdogan worked on a multi-university collaborative project funded by the National Cancer Institute. She conducted simulation modeling of lung cancer progression and screening scenarios to find the best policies for early detection. The findings—to initiate screening for heavy smokers—were recommended as national health policy by the U.S. Preventative Services Task Force. Dr. Erdogan's models showed screening would benefit older long-term smokers while lowering lung cancer deaths and costs associated with the disease.

INDUSTRIAL & SYSTEMS ENGINEERING**DAN NATHAN-ROBERTS
ASSISTANT PROFESSOR**

Professor Nathan-Roberts is researching how processes, systems or single devices can improve the lives of the people who use them. He's an Industrial Systems Engineer specializing in Human Factors and Ergonomics research and a co-investigator of vizHOME, a cutting-edge, 5-year project, funded by a \$2.5 million grant from the Agency for Healthcare Research & Quality and housed at the University of Wisconsin-Madison. The project's goal is to better understand how the design of a home affects healthcare delivery within that home. As people increasingly opt for home healthcare, he says it's increasingly vital to understand how the home's interior space and everyday household objects influences patients' medical care and schedules. Do certain objects aid or impede people as they manage their health?

Professor Nathan-Roberts' research interest—and passion—lies at the intersection of human factors, design, sociotechnical work systems, and non-hospital health care. To him, the research isn't about building a better mousetrap, but rather creating complete systems of intersecting factors that work in harmony with the user to create better outcomes. To study this, 360-degree images of the homes of people living with diabetes are collected and translated into 3-D models that can be navigated within a virtual reality. The team uses the virtual space to look for trends in the home that enhance or inhibit daily routines, such as checking blood sugar levels, taking medications or other healthcare practices.

Professor Nathan-Roberts, a native of the Bay Area, completed his Ph.D. in Industrial and Operations Engineering at the University of Michigan under the guidance of Dr. Yili Liu. His dissertation focused on quantifying the aesthetic and physical ergonomic

considerations involved in design of hand-held medical devices and mobile phones using Interactive Genetic Algorithms. Upon completing his Mechanical Engineering bachelors degree at the University of Rochester, he was awarded a fellowship in cognitive science, and later worked as physical ergonomics research engineer at the University of California Ergonomics Lab under Dr. David Rempel. Professor Nathan-Roberts currently serves as a member of American Society of Mechanical Engineers and as a member of the Human Factors and Engineering Committee of the Association for the Advancement of Medical Instrumentation (AAMI). Previously, he twice served as a CDC panelist on human factors, was a summer fellow in home healthcare at the FDA, worked for Intel on telemedicine system design, and wrote a book chapter on innovation with University of Michigan Ross School of Business professor Dr. Jeff DeGraff.

“ I care about people. That's the reason I wanted to teach, not just do research. I wanted to leave a positive footprint in students' lives. Instructing future leaders who will one day be on leading edge of technology and research and developing new tools is awe-inspiring. I've been blown away at the quality of students at SJSU. This is the best place I could be. ”

*Biomedical, Chemical and Materials Engineering
Alessandro Bellofiore
Assistant Professor*

“ Knowing that I was part of a project which is making a real contribution to health policy and saving lives is really rewarding. For years it was believed there was no benefit to screening for lung cancer, but advances in technology and engineering have now made that possible. I feel like we have made a really big step. ”

*Industrial and Systems Engineering
S. Ayça Erdogan
Assistant Professor*

“ I'm thrilled to be at SJSU and teaching in the Davidson College, which is widely recognized internationally as having a premier Human Factors and Ergonomics program. I'm energized by the students and the positive impact they are having on society. It's motivating and inspiring. ”

*Industrial & Systems Engineering
Dan Nathan-Roberts
Assistant Professor*



Engineering Sustainable 21st Century Water Solutions

A NEW MODEL OF UNIVERSITY-INDUSTRY PARTNERSHIPS FINDS ANSWERS THROUGH INNOVATION, RESEARCH AND COLLABORATION



Left, Robert R. Guzzetta, center -Dean Andrew Hsu, and R- Martin Kropelnicki discuss their industry-university partnership at Cal Water's San Jose headquarters.

Cal Water engineers to address the increasingly serious problems of water supply, water use efficiency, and affordability.

“Water is such an undervalued part of our daily lives – it’s simply taken for granted. But if we don’t step up and solve supply and infrastructure-related issues, we’re going to be in real trouble,” said Martin A. Kropelnicki, Cal Water CEO, President and Director of Cal Water Service Group and SJSU alumnus (BS ’89, MS ’95, Economics). “California’s population is growing and the state is prone to droughts like the one we are experiencing now. We’ve got to take action if we want to enjoy the reliable water supply that is the lifeblood of every community.”

“Water is such an undervalued part of our daily lives – it’s simply taken for granted. But if we don’t step up and solve supply and infrastructure-related issues, we’re going to be in real trouble.”

*Martin A. Kropelnicki,
Cal Water CEO, President and
Director of Cal Water Service
Group and SJSU alumnus*

These days water is on everyone’s minds as California faces one of the worst droughts on record. The state’s reservoirs are barely one-third full; forests are tinder dry, lawns are turning brown and fish are dying en masse along the banks of the drying Guadalupe River. Things have gotten so bad state water officials have publically acknowledged the drought’s impact has reached “devastating” levels, and have urged every resident to significantly curb his or her water usage.

Civil and Environmental Engineering Associate Professor Juneseok Lee understands the immediacy and complexity of solving the state’s most pressing public issue. Thanks to a five-year \$450,000 gift commitment from the California Water Service Company (Cal Water), Professor Lee, recently named the Cal Water Chair, and scores of young, innovative SJSU engineering students are conducting hands-on research with

The collaboration between Cal Water and the Davidson College of Engineering is part of a new model for University-Industry Partnerships that aims to use cutting edge technology and innovative thinking in solving critical technological challenges within a social context. The partnership's goal is to improve efficiency and service for Cal Water's two million water users, and is but one of many examples of how the Davidson College is cogently tackling real world complications.

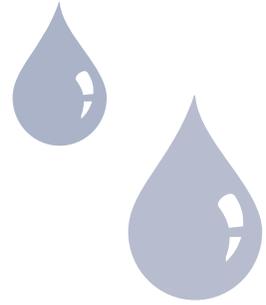
"Allowing students to work on meaningful, real-life problems is the ultimate laboratory," says Robert R. Guzzetta, Cal Water's former vice president of engineering and water quality and a SJSU alumnus (BS '77, MS '84, Civil Engineering.) "The partnership allows the university and industry to jointly present information, and that adds a lot of value to the research."

For this project, engineering colleagues and students created a list of 50 potential projects, and are working with Cal Water to implement the top six or seven. Each project is carefully designed for applied research at the undergraduate and graduate student level.

Guzzetta says one of the big issues facing the water industry going forward is affordability. Many of the projects identified as part of this partnership focus on how to optimize water system operations with practical, cost-saving solutions.

"This is a powerful combination of theoretical ideas and practical knowledge," Guzzetta said. "Having Cal Water's technical staff work side-by-side with professors and students will offer two perspectives to develop the best solutions."

Kropelnicki agrees. "We expect that the partnership will enable us to get a new perspective on water infrastructure challenges in our service areas and at the state level. From this partnership we get smart people with fresh perspectives and students get meaningful experience that can have a huge impact on our quality of life in California. Any business can benefit from tapping the brainpower of SJSU."



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*Robert R. Guzzetta,
Cal Water’s former vice
president of engineering
and water quality*



SJSU Engineering in the news

"The 20 Schools with the most grads at Apple – And Harvard and Yale didn't make the list. Business Insider. October 24, 2014." Writer Drake Baer points out where you go to school matters. SJSU alumni are the top recruits for computer giant, Apple.

"LinkedIn University Rankings: Best Schools for Software Developers." October 2, 2014. The career website places SJSU College of Engineering in the top 25 schools to launch your career.

"Intel goes Gadget Crazy." Bloomberg Businessweek. October 2, 2014. Writer Ian King profiles SJSU Alumnus Brian Krzanich, Intel CEO and his search for the "next big thing."

"Shining the Light on Advance Transit." Podcar-News. (Podcar.org) July 18, 2014. Article describes the ongoing partnership between SJSU College of Engineering, City of San Jose and the Advanced Transit Association in the development of an Automated Transit Network and features Davidson College Mechanical Engineering Professor Burford Furman and SJSU students.

"The Schools Where Apple, Google and Facebook Gets their recruits." Wired. May 22, 2014. Writer Joanna Pearlstein writes about the top schools where high tech giants get their recruits. SJSU is featured among the top "feeder" schools.

THE EXCITING CULMINATION OF MORE THAN A YEAR OF RIGOROUS WORK ON THEIR SENIOR DESIGN PROJECT BY THREE AEROSPACE ENGINEERING STUDENTS HAS BROUGHT NEW DISTINCTION TO SAN JOSÉ STATE UNIVERSITY.

THREE AEROSPACE ENGINEERING STUDENTS EXCEED THE ROCKETRY ALTITUDE RECORD WITH INNOVATIVE DESIGN

The Project Hyperion team, comprised of Jay Westerwelle, Benjamin Jacobo and Ted Lebantino—now BSAE grads (May 2014)—aimed high to build a single stage N-class rocket and surpass the existing altitude record. Their rocket, Big Papa, affectionately named to honor Professor Periklis Papadopoulos, crushed the 2013 N-class motor record of 51,238 feet in under a minute, establishing a new altitude of 55,373 feet in the annals of the Tripoli Rocketry Association (TRA), the national certification organization.

In September, amid 91-degree heat and 10-15 mph winds, Big Papa leaped off the launch pad, and into the record books at the world-renowned Black Rock Desert, in northern Nevada, where members of the Association of Experimental Rocketry of the Pacific (AERO-PAC) – a prefecture of TRA— holds three high-power rocketry launches each year.

Weighing in at 49 pounds, Big Papa measured 8.3 feet in length with a diameter of 3.9 inches. It's powered by a 32-pound Cessaroni N5800 solid grain motor powered rocket, which is also notorious for causing almost all previously attempted flights to shred after blast off.

Yet Big Papa soared high and just eight minutes after ignition, the sleek rocket landed safely approximately 3.5 miles northeast of the AERO-PAC launch site encampment, and was successfully retrieved. A TRA official was present to witness the rocket's launch and return, confirming it remained in flyable condition. A GPS receiver in the rocket transmitted altitude data, which was saved on a flash drive as proof of the results.

Tom Rouse, a rocket enthusiast and local homebuilder, was one of two team mentors. Rouse, who has mentored many college students over the years, attests to the team's prowess. "The three students had a wild success with their rocket," he said. "We've seen dozens of rocketeers try to launch this rocket motor over the last three

years with only one person succeeding. They succeeded where many have failed."

"Rockets have always interested me and the skills required are valuable," explained Westerwelle, project manager. "When Dr. Papadopoulos suggested options for our senior design project, I knew that building a rocket capable of breaking records would be a difficult and time-consuming challenge. Not only does this type of high-powered rocket require a Level 3 Certification, we had to first acquire Levels 1 and 2, and each level required a separate launch."

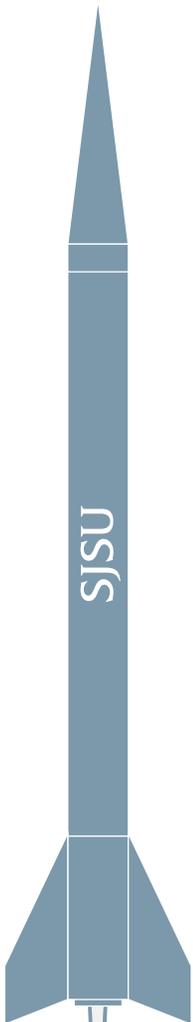
Added Jacobo, "The process was definitely not easy, but all our hard work paid off. It feels good to know we accomplished something that only a few others have."

"Since we initially knew very little about high-power rockets, it's truly amazing that we successfully launched a rocket on a motor that many experienced rocketeers have failed to launch," said Lebantino. "The project has also provided skills I can carry on to industry and my future career."

Besides surpassing altitude records, the Project Hyperion team had identified a second worthy goal for their project – to create a foundation for rocketry at SJSU.

"We shared what we learned with other students and began to generate interest in establishing a Rocket Club," enthused Westerwelle. "Consequently, many students who were juniors last year are now designing and developing rockets."

"Jay, Ben and Ted are an outstanding example for all students of how hard work, commitment and determination will help them achieve success," said Nikos Mourtos, AE department director and the team's advisor. "They have initiated a legacy for other students who will also benefit from learning about rocketry. We wish them continued success as they pursue their careers."





FIVE-YEAR STRATEGIC PLAN





Located in the heart of Silicon Valley — uniquely positioned at the center of one of the most influential and innovative regions in the world.



ENGINEERING

Local technology firms employ more engineering graduates from the Charles W. Davidson School of Engineering than from any other college.



AMONG THE
50 BEST
ENGINEERING SCHOOLS
IN THE WORLD

— *Business Insider*, 2012



SILICON VALLEY'S
FIRST CHOICE
FOR NEW
ENGINEERING HIRES

— *Silicon Valley Business Journal*, 2013

The Charles W. Davidson
College of Engineering

RANKS
3RD
NATIONALLY

among public engineering
programs offering bachelor's
and master's degrees,
excluding service academies.

In 2014–15 our key areas of focus and action include:

- ▶ PROVIDING **SUPPORTIVE FUNDING** TO CREATE SEVERAL SHOWCASE LABORATORIES AND EXPLORING OFFSITE LABORATORY ENVIRONMENTS
- ▶ PILOTING A COHORT PROGRAM OF INCOMING FRESHMEN TO **ENGAGE OUR STUDENTS** FROM ENTRY THROUGH GRADUATION
- ▶ **REFRESHING OUR COLLEGE WEBSITE** TO MAKE IT MORE APPEALING FOR ALL STAKEHOLDERS
- ▶ CREATING GREATER **LEARNING AND DEVELOPMENT** OPPORTUNITIES FOR FACULTY AND STAFF
- ▶ DEVELOPING **MORE FLIPPED COURSES** FOR GREATER LEARNING FLEXIBILITY
- ▶ WORKING WITH **INDUSTRY PARTNERS** TO PROVIDE STUDENTS WITH PROFESSIONAL WORK EXPERIENCE
- ▶ CREATING NEW **CORPORATE TRAINING AND DEVELOPMENT** WITH INDUSTRY PARTNERS
- ▶ PRODUCING NEW COLLEGE OF ENGINEERING **MARKETING MATERIALS**
- ▶ DEVELOPING A FORMAL DAVIDSON COLLEGE OF ENGINEERING **ALUMNI RELATIONS PROGRAM**
- ▶ PROVIDING **INCENTIVES AND REWARDS** FOR RESEARCH, SCHOLARLY ACTIVITY AND PROFESSIONAL PRACTICE INCLUDING **FUNDING INVESTMENT** IN FACULTY

12 ENGINEERING
DISCIPLINES

6000+
UNDERGRADUATE
AND GRADUATE
STUDENTS

260 FACULTY
AND STAFF



Partnering on Biotechnology Entrepreneurship

WHILE PURSUING DEGREES IN BIOMEDICAL OR MATERIALS ENGINEERING, FOUR ENTERPRISING STUDENTS ARE ALSO IMMERSSED IN INNOVATIVE RESEARCH PROJECTS, FUNDED BY THE NATIONAL SCIENCE FOUNDATION, WHICH COULD REVOLUTIONIZE THE FIELD OF BIOTECHNOLOGY.

Last fall, three BME seniors, Alina Lim, Kyle Soder and A'Lester Allen, and second-year grad student Aneshkumar Tilwani, entered the California State University Innovation Corps (I-Corps) Fall 2014 Challenge, sponsored by the CSU Program for Education and Research in Biotechnology, and were awarded prestigious micro grants. From developing disease detection and prevention tools to a mobile visualization clinic device for near infrared biomedical imaging, these dedicated and determined researchers have spent countless hours on and off campus meeting the rigorous requirements of these coveted grants.

“The I-Corps grants provide a unique opportunity for recipients to expand their thinking beyond engineering to developing a commercial product,” said Assistant Professor Folarin Erogbogbo, adviser for all four students. “Working with a team of up to four members, these students are working outside the lab interacting with industry mentors and potential customers. They are gaining valuable real world experience and learning what it takes to advance a biotechnology product concept.”

Prostate cancer is the most common cancer type in men and the second leading cause of male cancer deaths. For Allen, the decision to develop a cancer diagnostic tool became personal when someone close to him was diagnosed, and he witnessed firsthand the trauma caused by the disease.

Allen’s tool will identify the material secreted directly from cancer cells into the urine, which is a more accurate and less invasive way to detect early prostate cancer while lowering procedure costs. The tool combines a Raman spectroscopy and hollow fiber technology to analyze prostate cancer biomarkers, which gives more accurate and definitive results than the current FDA-approved technology for testing prostate cancer, a PSA test combined with a digital rectal exam.

“There is a large demand for this technology, which could revolutionize early detection,” said Allen, “and if developed into a physical product, it would be marketed to institutions such as the National Cancer Institute, medical schools and cancer centers. Our broader vision is an over-the-counter version similar to a pregnancy test.

“As more information about exosomes is discovered, this technology also has the potential for extended use as a diagnostic tool for other types of cancers,” enthused Allen.

This month, I-Corps Challenge teams will participate in the 27th Annual CSU Biotechnology Symposium in San Jose, where they will present their product concepts and lessons learned to panels of talented life science professionals and entrepreneurs, and compete for funding awards.

SJSU BMES NAMED OUTSTANDING STUDENT CHAPTER

2013-2014

The SJSU chapter of Biomedical Engineering Society (BMES) was awarded the 2013-2014 Outstanding Student Chapter Award at the professional

society's 2014 Annual Meeting in San Antonio, Texas. The honor recognizes the top student chapter across the nation.

Twenty-three people – six graduate and 17 undergraduate students, and their faculty advisor, Dr. Guna Selvaduray– represented the best of San José State University at the Annual Meeting. There, students mingled with professional biomedical engineers and listened to captivating presentations on topics ranging from microfabrication to cellular and molecular bioengineering. SJSU's student leadership was also invited to lead a discussion panel and to do a presentation.



This is the second time San José State University BMES was named Outstanding Student Chapter. It also took home the honor for the 2011-2012 academic year.

Alumni News



John Bergman

BS Mechanical Engineering, '08, Engineering Contractor

John is currently contracting with medical device companies to design and develop the Next-Gen of capital and disposable equipment and will be graduating from Santa Clara University in 2015 with his Masters in Mechanical Engineering, Mechanical Design.



Anna Montenegro Dal Pino

BS Civil Engineering, '87, Self-employed artist

Anna let engineering go a couple of decades back and has been playing with gravity in dance and paint ever since (shown here in her San Francisco Mission District studio).



Robert Bigler

BSME '87, CBO, Equalia LLC

Robert is a Designer-Engineer-Entrepreneur that's creating a "Hover Board" for release in spring 2015. Follow at www.hoverboard.com.



Caroline Pineda

BS Civil Engineering '91, MS Civil Engineering '95, Caltrans, Office of Design

Caroline is the South Oversight Project Engineer for the Hwy 85, 101, and 237 Express Lane Projects, East Campbell Avenue Portals, Hwy 880 HOV lanes, and Hwy 101 Aux lanes.



Thomas Hessler

Industrial & Systems Engineering - Construction Option, '62

After working over 40 years in the construction/engineering industry, Thomas published a historical novel based on the engineering and building of the Roman aqueduct containing the famous Pont-du-Gard in Southern France. "The Aedifex: Building the Pont-du-Gard" available on Amazon and Kindle.



Joy A. Franco

BS Mechanical Engineering, '14, Graduate Student and NSF GRFP Fellow, Department of Mechanical Engineering, Stanford University

As a full-time grad student and research fellow at Stanford, Joy studies traditional mechanical engineering topics such as mechanics of materials, but pairs this with research in mechanobiology to elucidate how mechanical cues influence cell behavior.



Paul Logue

BS Aerospace Engineering, '92 VP of Corporate Strategy at HP

Paul is happy to proudly return to his SJSU roots this year, having been recently nominated to the Advisory Board for the Lucas School of Business. "I must say I'm really enjoying all of the positive energy and change on campus ... such amazing progress from my graduating year!"



Priyanka Upendra

BS General Engineering '14, Clinical Technology Analyst— Cyber Security, Stanford Medicine

Priyanka is proud to say she bought her first car and it's a Mercedes Benz! "Thanks to SJSU for providing a strong foundation!"



Vishnu Pendyala

Computer Engineering '00, Cisco Systems

Vishnu presented on Humanitarian, Machine Learning, and mHealth related topics at IEEE GHTC, OCon San Francisco, and ICCCT in October, November, and December 2014 respectively.



Dina Verdin

B.S. Industrial & Systems Engineering '13 Current PhD student in Engineering Education at Purdue University

Dina says the Midwest is extremely different from California. "I can honestly say I left my heart in San Jose."

**Nhat Q. Nguyen**

Aerospace Engineering '13, Hardware Engineer Associate, Lockheed Martin, Space Systems Company
Nhat has this advice to E students: Don't just sit there while you're in college, be active and apply for internships because you'll never know where your next destinations will be. (As an airlines intern, you're allowed to fly around the world for free.)

**Kelly Blythe**

Civil Engineering, '93, CS Marine Constructors, Inc.
Kelly has 19 years in the construction industry and working for a heavy marine contractor in the San Francisco Bay area.

**Michael Grace**

Mechanical Engineering '13 Lockheed Martin Space Systems Co.
Michael is in his first year of the Engineering Leadership Development Program at Lockheed Martin Space Systems working as a mechanical systems engineer, and pursuing a Masters in Mechanical Engineering with an emphasis in Controls and Dynamics at Santa Clara University.

**Zack Pirkil**

BS Aerospace Engineering, 2011, MS Aerospace Engineering, 2014, Space Systems/Loral
Zack successfully launched one of the world's largest communication satellites from South America.

**Yoon Soo HA**

Materials Science '73, Korea Power Engineering Company, Inc. (1984-1996)
Yoon Soo has two daughters. His first daughter is a statistician at Samsung Data Systems and was married on November 9, 2014. The youngest is a Senior majoring in Western History at Seoul National University.

**Pelagio Payumo**

BS Mechanical Engineering '99 MS Human Factors Engineering '10, Apple, Inc.
From working with US Army vehicles like the Bradley Fighting Vehicles (BFV) at BAE Systems, to working with some of the most recognized electronics in the world at Apple Inc., Pelagio continues to enjoy engineering.

**Kyle Schmidt**

Mechanical Engineering '14, Manufacturing Engineer, Loring Smart Roast
After graduating from SJSU Kyle worked for Play-Well TEKology teaching children engineering by using LEGOs. He recently started working for Loring Smart Roast where he designs and build industrial coffee roasters.

**Kanav Gandhi**

MS Software Engineering '10, Citrix Systems
Kanav is working on Enterprise Mobility Management (EMM) software for Android devices.

**Monish Basha**

MS Computer Engineering '08, Lead Software Engineer, SAP
"SJSU gave me a VIP pass to Silicon Valley and I have worked at various companies from startup to corporates in the Valley since graduation," says Monish.

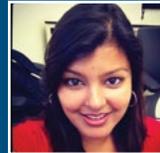
**Rebecca Mantecon**

BS Industrial & Systems Engineering, '13 SJSU ISE Dept.

Rebecca is working as a Teaching Associate in the Davidson College lecturing, mentoring and advising students for their Senior Projects and concurrently getting her Master's degree in ISE.

**Felix A. Schupp**

B.Sc., Computer Engineering '00, Partner and Managing Director at Reply, Munich, Germany
Felix lives in Munich, Germany with wife Rebeca and 2-year-old son Emiliano and is finishing his MBA with concentration on Strategy and Entrepreneurship at the Booth School of Business at the University of Chicago.

**Aashna Sinha**

Electrical Engineer '12, Texas Instruments
Aashna took a different approach to her career goals. She wanted to be a sales engineer in the tech field, therefore in order to be successful she got her degree in electrical engineering so she can better relate with engineers in developing new projects.

**Jorge Edison Lascano**

MS Software Engineering '09, Assistant Professor at Universidad de Las Fuerzas Armadas-BSPE, Quito, Ecuador

Jorge lives in Logan, UT where he is pursuing a PhD degree in Computer Science (2016) at Utah State University. "Wherever I go I am proud to say I am a Spartan from San José State in the heart of Silicon Valley, where I had the best of my college life experiences."

**Robin Kansara**

MS Software Engineering-Computer Networks '10 Co-Founder and COO at PaniPuri Soft, Jodhpur, India

Robin started an iPhone development studio, PaniPuri Soft, with brothers Naveen and Praveen shortly after graduation. For the last 2 years they've been working on an Apple interface game, Catch the Aliens, which released in August 2014. See the game's trailer at youtube.com or download free at <http://bit.ly/ctaApple>

**Sahil Gulati**

Civil & Environmental Engineering '09 Consultant, Water Sector, The World Bank

Sahil is a consultant for The World Bank, and manages agriculture and water research projects in India for George Washington University's Economics Dept.

**Courtney Vella**

Chemical Engineering '14, Associate Engineer, (PTAA-Q) PRO Unlimited, Genentech, Inc.

Courtney is striving for excellence in providing business and tech support in R&D engineering capital projects. "I am so proud to be a Spartan. Thank you San José State University for a fabulous foundation that will help me leap to new heights in my career as an chemical, quality engineer."

**George A. Metcalf**

BS Aerospace Engineering '96, Boeing
George is selling airplanes for the world's leading aerospace company.

Engineering Students to Watch

Sophomore Aishwarya Borkar wanted to do something big and positive to boost the number of women entering the Science, Technology, Engineering and Math (STEM) fields so the software engineering major organized a new all-female student organization and SJSU's first-ever International Women's Hackathon to encourage more women to become future innovators of technology.

The idea behind STEM Network of Women (STEM NOW), she says, is to bring together women to share common interests, to network, and collaborate.

"It's no secret that the number of women in STEM fields are dismally low, so it's nice to develop spaces we can call our own. Where women can look around the room and for once not feel outnumbered," she said.

The International Women's Hackathon Aishwarya is organizing is a crowd sourcing on-campus event in partnership with AT&T, to give females the opportunity to find self-expression and creativity through technology. The event could help usher SJSU women into the world of collegiate hacking and put SJSU in league with the University of Pennsylvania, University of Michigan, and MIT who now host some of the largest hackathons on university campuses.

But Aishwarya isn't stopping there. Her STEM NOW organization, is inspiring local high school girls to become software engineers through the Girls Who Code program, a national nonprofit working to close the gender gap in the technology and engineering sectors. Her message to high school girls is quite simply, "Programming takes you places."

"I tell them that it's a field that's never boring because the technology industry continues to evolve, producing a dizzying array of programming languages, wearable devices, and apps every year," she says.

Like Aishwarya, Silicon Valley tech companies too, want to reverse the low numbers of women in STEM fields. So it's no surprise her campus leadership skills and advocacy in this area landed her at the "hottest ticket in town," the Grace Hopper Celebration—the largest female technology conference, organized by the Anita Borg Institute—to rub elbows with top industry leaders.

Aishwarya was selected to attend Grace Hopper 2014 in October as a scholarship recipient funded by the cloud storage provider, Dropbox. She is also a National Center for Women & IT (NCWIT) Aspirations in Computing Award recipient who enjoys working on apps in her spare time.

Senior Joshua Cruz has a palpable passion for innovation and leadership. The computer engineering major says he wants to use technology to empower the lives of those around him. So far, he's achieving that dream.

Joshua is working on the next big thing in music innovation because, he says, "music is something that brings people together."

While euphonies have always been an integral part of his life—he was raised in a melodic family and is minoring in music at SJSU where he is in the Spartan band—it wasn't until as a shy sophomore in his high school band that he discovered just how powerful ordered tones are to the soul. "Music changed my life," he said. His passion for engineering however, came about more organically.

He acknowledges people chose engineering for different reasons, but says his combined passion for music, technology and creative social justice has helped him find his own identity.

"I really don't have an engineering role model to emulate, and I don't know what the future holds for me exactly, but I know I'm in the right place. As an engineer I'll see what doors open and where life takes me, and what I can create to make people's lives better along the way."

Joshua's engineering feats don't end with music. These days he's also working on a roleplaying gaming project based on the four Greek words for love—Agápe, Éros, Philia and Storge—that allow players to interact and react within an electronic space through prompts.

Outside class Joshua serves as a role model for first-year engineering students as a student instructional assistant in the Davidson College of Engineering, a member of the Engineering Ambassador Program, and vice president of the National Residence Hall Honorary. Additionally, he's in his third year as a resident adviser and an orientation leader. In September 2014, Joshua earned the prestigious Engineering Dean's Scholarship.

"It's thrilling to work with first year students through their college transition. I believe the first year sets the tone for their whole college career so it's rewarding to help guide others in the same way I was as a freshman," he said. "It's taught me that you've got to be a follower before you can become a leader."

Jose Roberto Montenegro is changing lives.

This chemical engineering junior not only carries a full load of coursework, he's actively involved in multiple campus and professional organizations where he serves as a leader, works full time to financially support his mom and younger sister, tutors and mentors high school STEM students part-time, commutes by bus two hours one-way to campus for a 7 a.m. class, and still finds the energy to excel in everything he does.

When asked how often he gets to sleep, he smiles genuinely and says, "Well, that's the question."

In September, Jose was honored as one of the SJSU achievers and innovators who power their classrooms, communities and the world as a 2014-2015 College of Engineering Dean's Alumni Association Scholarship winner, but it's far from being the only award or honor he's won. The list is long. Jose truly defines the Spartan Spirit. You might even say he's a Dreamer: figuratively, and quite literally.

He attends SJSU by way of the California DREAM Act. As such, he is no stranger to facing tough challenges head on, and says he's even learned along the way to enjoy the process. Despite the rather arduous road he's traveled, Jose admits finding his passion since

(continued on page 17)



Hands-On Student Learning



“Team Spark”: Left, Vivek Dixit, Nisha Sharma, Ankita Negi demonstrate the troubleshooting IP solution at the Juniper Networks Student Innovation event.

A partnership between **Juniper Networks and the Davidson College** launched the first-ever Juniper-SJSU Student Innovation Contest, a challenge for undergraduate and graduate students to solve real-world software engineering and performance metric problems while collaborating with Juniper engineers. More than 80 students representing 22 teams competed November 14 on the company’s Sunnyvale campus. Professional engineers judged the student solutions using the same criteria Juniper engineers use to judge their peer solutions. Winners of the competition are eligible to interview for summer internships at Juniper and other exciting prizes.

The Silicon Valley Innovation Jam (SVIJ), an all-day event hosted by Cisco Systems on its campus welcomes SJSU students to expand their thought process and generate new innovative ideas.

Groups of aerospace engineering students began an internship program in January 2014 with **Skybox Imaging** (currently being acquired by Google). Skybox designs, manufactures and operates the world’s first coordinated constellation of high-resolution microsatellites. Interns perform monitoring and command functions for Skybox’s revolutionary image satellites.

CHAIR PROFESSORSHIPS

- Cal Water
- Lam Research

ACADEMIC PROGRAMS

- Cisco, Computer Engineering – Cybersecurity
- IBM, MS Software Engineering
- KLA Tencor, MS Degree
- Lam Research, MS in Software Engineering
- Lockheed Martin, MS Computer Engineering
- NetApp, MS Degree

PARTNERSHIP R&D PROJECTS

- AsteelFlash
- Cavium
- Cisco
- Department of Veteran Affairs
- ebay - StubHub
- Ericsson
- Gallo Glass
- Intuit
- Lam Research
- NetApp
- Netgear
- Tilt-Up Concrete Association

Engineering students show judges their bright ideas to solve real world problems at the Juniper Student Innovation challenge.



RETHINKING PERSONALIZED URBAN TRANSPORTATION

FORMER US SECRETARY OF TRANSPORTATION, NORMAN MINETA, WEIGHS IN ON STUDENTS' ATN PROJECT

As current modes of transportation, especially internal combustion engine automobiles, become increasingly unsustainable, will enticing alternatives emerge to replace crowded freeways, long commute times and its negative environmental impacts?

In an unassuming San Jose warehouse, a group of innovative engineering students are building what they believe might be the answer. It's a next step in well-integrated, more personalized mass transit systems. Think part taxi, part bus: Automated Transit Networks (ATNs) are small, fully-automated driverless vehicles that run on dedicated guideways—or tracks—carrying passengers directly to and from their desired destinations. The vehicles would require no roads or fossil fuels, and could move virtually silently while blending seamlessly into their environment.

This multi-year project is nearing completion of an important milestone along its development roadmap. By the end of Spring 2015 semester, students say they will have a fully functioning one-twelfth-scale model and a solar-powered full-scale model.

The four student teams debuted their vision to former U.S. Secretary of Transportation Norman Mineta in October, under the guidance of SJSU mechanical engineering professor Burford "Buff" Furman, and Ron Swenson, International Institute of Sustainable Transportation co-founder and president, and Encitra CEO.



Student team leads (left) Christopher Rose, Jack Irwin, Jordan Carter, Norman Mineta, Andrew Chen, Professor Burford Furman and student Pavel Smrz

ATNs are distinctive from today's mass transit in that stations are off-line and vehicles travel from origin to destination without needed stops, transfers or a fixed schedule, yet travelers commute inside comfortable, fuel-saving "pods".

Mr. Mineta, founder of the Mineta Transportation Institute, praised the ATN's cost-saving design and innovation. "There's no innovation coming from major car companies so I think it's terrific that you students are solving challenges and advancing transportation needs," he said.

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coming to San Jose State as a transfer student has made all the difference - and he hasn't looked back.

Not so long ago, there was a time when Jose believed attending college would never be possible for him. Through sheer determination, hard work and refusing to give up against all odds, he found his way into City College of San Francisco.

As a role model for other young Dreamers, Jose is changing lives as a volunteer in the SJSU chapter of Student Advocates for Higher Education, an organization who fights for the rights of undocumented students.

He admits these days the future is looking bright. He's looking into getting a summer internship, graduating in 2016, and "ultimately making the world a better place to live," he says. His undeniable passions are finding solutions to air pollution and creating renewable energy sources.

"So many great things have happened to me since coming to SJSU. I love this field so much I get goose bumps reading my engineering textbooks," he says. "I just love the material and I'm so inspired by my professors. Like I tell everyone, 'engineering will change your life.'"

SILICON VALLEY LEADERS SYMPOSIUM

WE'RE GETTING READY FOR ANOTHER EXCITING SEASON.

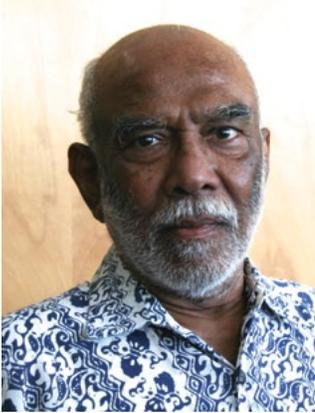
The Symposium hosts prominent leaders to talk about business and technology trends, and broader societal and political issues that shape our lives.

Silicon Valley Leaders Symposium
Thursdays, from noon to 1 p.m.
Engineering building auditorium 189
For the most-up-to-date schedule:
engineering.sjsu.edu/news-and-events/svls

Did you miss the Fall 2014 Symposium? Catch it online at engineering.sjsu.edu/our-college/events/silicon-valley-leaders-symposium



Faculty Accomplishments



Guna Selvaduray

Awards

Dr. **Guna Selvaduray**, Biomedical Engineering Director and Materials Engineering professor, has been named the recipient of the 2015 Andreoli Faculty Service Award, the highest honor the California State University Program for Education and Research in Biotechnology (CSUPERB) bestows.

The Andreoli Award honors a faculty member who has made outstanding contributions to the development of biotechnology programs in the CSU system.

Dr. Selvaduray, whose SJSU career spans 30 years, was chosen as a recipient for leadership in the development of new multi-discipline bioengineering degree programs at San José State University and his outstanding dedication to student training and high-impact educational practices. Under his direction the SJSU student chapter of the Biomedical Engineering Society (BMES) has won national honors and he was instrumental in organizing an industry-university conference around medical device product development.

Dean Andrew Hsu presented the award to Dr. Selvaduray during the annual CSU Biotechnology Symposium in Santa Clara, California, January 8-10, 2015.

The annual award is made in honor of its first recipient, Dr. Anthony Andreoli (CSU Los Angeles), to a tenured or tenure-track CSU faculty employed in the system for a minimum of 5 years, and whom a CSU faculty colleague nominates.



Thalia Anagnos

Publications

Sayali Deshpande, **Youngee Park**, Mark Stamp, "Eigenvalue Analysis for Metamorphic Detection" in Journal of Computer Virology and Hacking Techniques, Feb. 2014.

Burford Furman, Ph.D., Lawrence Fabian, Sam Ellis, Peter Muller, and Ron Swenson "Automated Transit Networks: A Review of the State of the Industry and Prospects for the Future." MTI Report-12-31. Sept. 2014. Available for free download online. transweb.sjsu.edu/project/1227.html

"An Intuitive Design Pattern for Sequentially Estimating Parameters of A 2k Factorial Experiment with Active Confounding Avoidance and Least Treatment Combinations," **Jacob Tsao**, and N. Patel, Computers and Industrial Engineering, Vol. 66, pp. 601-613, 2013.

"Efficient Space Dedication to Bus Rapid Transit or Light Rail Systems," **Jacob Tsao** and A. Pratama, Journal of Public Transportation, Vol. 16, No. 3, pp. 79-94, 2013.

Nader Mir, "Computer and Communication Networks" 2nd Edition, January 2015, Pearson Prentice-Hall, 816 pages. ISBN 033814742.

Grants

Professor **Thalia Anagnos**, Department of General Engineering, was awarded a second five-year grant from the National Science Foundation to fund the Engineering Leadership Pathway Scholars Program. ELPS2, building on the success of the original ELPS, will provide approximately 86 annual scholarships to academically talented undergraduate engineering students in financial need.

Retirement

Dr. **Jeanne Linsdell**, director of technical communication, retired on August 20, 2014 after 35 years at SJSU. During her tenure she won many prestigious awards, including SJSU's Outstanding Lecturer Award (2007-08), one of four major faculty awards given annually by the university, and in 2010, the Charles W. Davidson College of Engineering Outstanding Lecturer Award, and the SJSU Provost's Outstanding Scholarship of Teaching and Learning Award. Among many other noteworthy accomplishments, Dr. Linsdell was appointed to the U.S. Department of Justice, Federal Bureau of Investigation Citizen's Academy at the Silicon Valley Regional Computer Forensics Laboratory and developed the college's GreenTalks Speaker Series. As an educator and consultant in American Samoa for more than 20 years, she consulted with the U.S. Department of the Interior and opened a U.S. National Park.

Among her many accomplishments, Dr. Linsdell is particularly proud to have mentored 13 doctoral candidates and 26 graduate students throughout her career.



Jeanne Linsdell



SCAN TO WATCH ROCKET
LAUNCH IN ACTION



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SJSU's **computer engineering program** ranked 1st in the nation among public engineering programs offering bachelors and masters degrees in U.S. News & World Report 2015 Best Colleges, and ranked 2nd nationally among all public and private colleges who do not offer doctorate degrees. Overall, the Davidson College tied for 3rd nationally among public engineering programs offering bachelors and masters degrees, excluding service academies.



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