engineering news
School of Engineering
SPRING 17
SANTA CLARA UNIVERSITY

DEAN'S MESSAGE

One of the most successful public marketing slogans of all time, "A mind is a terrible thing to waste," introduced by the United Negro College Fund to encourage African-American youth to consider attending college, shifted the narrative from "at risk youth" to "minds to be developed." In today's competitive workforce, where tech leaders clamor for "innovators, not technicians," I contend that while a mind is a terrible thing to waste, a mindset is an essential thing to gain. In fact, three mindsets are better than one.

A *growth mindset* is the foundation for student success. In her book *Mindset*, Stanford University's Carol Dweck contrasts the fixed mindset with the growth mindset, illustrating how the latter improves learning outcomes and student performance. This message is so important that as dean I give a copy of this book to the entire incoming class of first-year engineers to ensure their undergraduate studies are oriented in the right direction.

With a growth mindset and a technical skillset, students learn to cultivate an *entrepreneurial mindset*, a set of approaches to problem solving—how to select problems, define and frame them, ideate creatively, and iterate solutions—that enables them to be agents of change, empowered to solve some of society's most challenging problems.

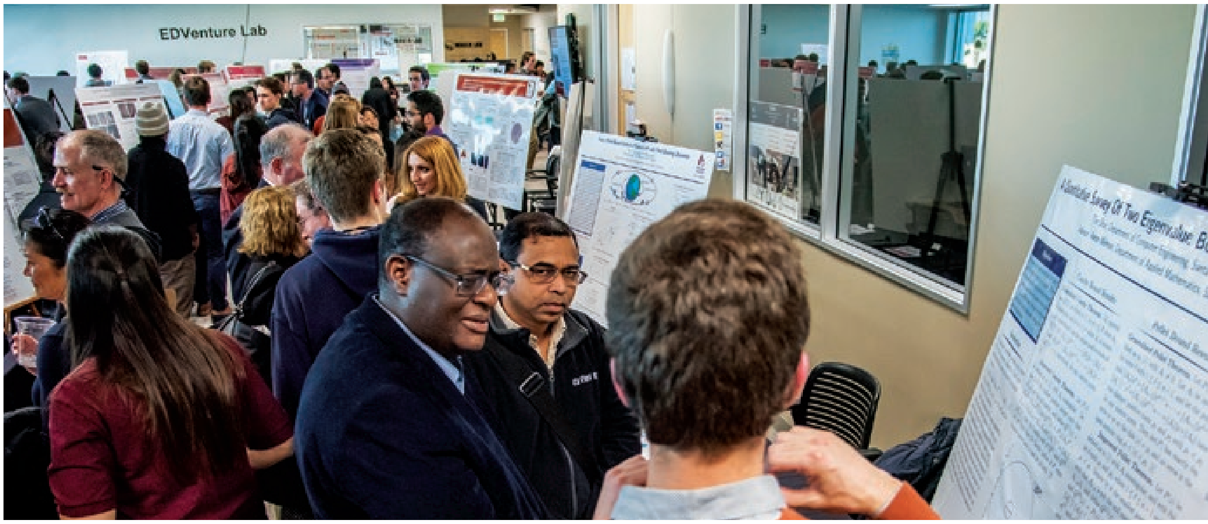
But to operate in the reality, complexity, and diversity of today's world, students need to adopt what I call a *stretch mindset*. They must be able to think logically and comprehensively, interpret facts, reason with clarity, address ambiguity, respect other viewpoints, and draw conclusions without emotion. A liberal arts education is central to this.

When it comes to mindsets, three are better than one. A growth mindset promotes a willingness to tackle challenges, an entrepreneurial mindset produces more innovative solutions, and a stretch mindset is key to the health, peace, and prosperity of our shared future.

Godfrey Mungal
Dean
School of Engineering

Hey, Kids—Let's Put on a Show!

Photo: Joanne Lee, SCU Photographer



Hundreds turned out for the inaugural Engineering Research Showcase.

It started, as so many great things do, with a simple question—okay, it was really two questions: What are our Ph.D. students researching, and how can they share what they've been working on with the engineering faculty and staff? That inquiry led to a series of conversations, and what began as a glimmer of an idea about a small, informal event to highlight Ph.D. students morphed into the first-ever Engineering Research Showcase, held last February.

An estimated 400 guests—engineering faculty and staff, to be sure, but also colleagues from across campus, industry research partners, advisory board members, parents, and friends of the School of Engineering—flocked to a poster session featuring faculty, post-doctorate, Ph.D. candidate, master and bachelor student research. Bioengineering, computer science and engineering, electrical engineering, mathematics, mechanical engineering, and web design and engineering were all on display, with faculty and students on hand explaining their work and answering visitors' questions. Nearly 40 posters were presented, and 35 percent of the researchers were women.

Prizes were awarded for best presentation posters in Ph.D., master's, and undergraduate categories. The competition for best undergraduate poster ended in a tie between Tim Shur, a computer engineering and mathematics double major, for "A Quantitative Survey of Improvements to Bounds on Eigenvalues," and electrical engineering's Zachary Baron and Richard Senegor for their "investigation of the viability of using carbon nanotubes grown on graphene as a functional alternative to copper and tungsten in integrated circuits." Robert McDonald, mechanical engineering master's student, won with his "preliminary research into practical applications of adaptive navigation of multirobot clusters, using a state machine architecture." Taking the prize for "Compact Microstrip Yagi-Uda Antenna Arrays for Microwave Hyperthermia at 5.8 GHz," electrical engineering's Ph.D. candidate Nivedita Parthasarathy said "My work with Prof. Ramesh Abhari on Microwave Hyperthermia is profoundly interesting to me not just because of the engineering challenge, but also because working on biomedical applications is uniquely rewarding in its potential to change human lives. Receiving the poster award is an honor and serves as motivation to continue applying the engineering skills I learned at SCU toward more efficient cancer treatment!"

Building a Passion

Photo: Mark Tyfield

Makena Wong (left) and Olivia Carreon celebrate a good day's work in Nepal.

In April 2015, the world was shaken by images of a devastating earthquake in Nepal. Two years later, the community of Takure still struggles to rebuild. Families live in makeshift lodgings cobbled together from ruined buildings and a patchwork of tarps. Of the structures that survived, many had been constructed using an inexpensive, seismically sound method: earthbag building. Superman-strong polypropylene bags are filled with ordinary local soil, then stacked in an offset manner like bricks. Barbed wire, buttresses, vertical rebar, and bond beams add stability and seismic reinforcement.

Seizing an opportunity to put their civil engineering knowledge to the very best use for Takure, three seniors chose as their capstone project the challenge of not only designing and building a single-family earthbag home that collected rainwater, but also producing a manual of their research and designs so local masons could replicate their work. Splitting the effort, Nabila Farah Franco became the structural lead, performing calculations and drawings for walls and roof; Olivia Carreon led the geotechnical effort, designing the foundation and determining load; and Makena Wong headed the water resources portion, designing a rooftop rainwater catchment system and storage tank to stand up to four months of monsoon rains and see the family through eight months of extremely dry weather. The team coordinated its efforts with a nonprofit working in the area, Conscious Impact. "We're the designers and engineers on the project; we do the design calculations and make sure it's safe, but it's cool that so many people from all over the world are involved. It's a very international team; we were Skyping from four different time zones over Christmas break," Nabila said.

Following months of research and design work, during finals week and spring break Olivia and Makena headed off to Takure with their advisor, senior lecturer Tonya Nilsson, and jumped right in helping with construction. Nabila, who is on SCU's women's tennis team, couldn't get away, but will travel to Takure at the end of May with folks from Conscious Impact.

Vitally important to Nabila, Olivia, and Makena was having a senior design project that helps others. And while these three thoroughly embody Santa Clara's ideal of *"Engineering with a Mission,"* surprisingly none of them started off as SCU engineering students. Nabila, who originates from Bolivia, transferred from William and Mary, which didn't offer an engineering major. "All the core courses here help you grow, not only as an engineer, but as a person. It sounds cheesy, but it's so true," she said. Similarly, Olivia transferred from the Bible Institute of Los Angeles where she had been majoring in physics engineering. "I was so lucky to get in here," she said. "Santa Clara is a great place to do engineering—especially in Silicon Valley—but the professors are the main reason I've succeeded; they are so willing to help you." Makena began at SCU as an economics major but found a passion for sustainability and civil engineering in her sophomore year. "Coming to SCU is an incredible privilege," she said, "and having this project as a way to give back is very powerful. SCU has taught me to take the initiative and pursue my passion to make a tangible impact somewhere that it's really needed. Here, I've learned how to find connections and make things work. Opportunities have lined up. Professors have been a tremendous support, and I've had a lot of freedom to pursue my passion. It's been amazing."

Read the team's blog: **earthbagnepal.wordpress.com**

Fish Gotta Swim, Engineers Gotta Build

Conor Rounds provides the pedal power as (from left) Sydney Lindeman, Joe McKenna, and Kyle Schumann adjust stability.

Designing, prototyping, and testing a human-powered watercraft using hydrofoils to reduce drag and send a craft speeding across a lake is no mean feat. It's complicated, with seemingly endless interlocking details to consider and decisions to be made. This year, mechanical engineering seniors Sydney Lindeman, Joe McKenna, Conor Rounds, and Kyle Schumann took on the job of what their advisor, mechanical engineering chair and associate professor Drazen Fabris, says is "a very challenging project, in that they have limited power for the hydrofoil and need to be very efficient in their engineering. They are also required to engineer/design both stability and power, transmission, propulsion, lift, drag, buoyancy, and dynamics. So, as a project they need to do it all." What would drive them to take on such a staggering task? Kyle has a simple answer: "We got into engineering because we wanted to build things. We wanted to make something we could actually ride, use, and enjoy."

To build their craft, they mounted a portion of an upright bike frame on two pontoons made of polyurethane foam the team manufactured themselves, strengthening it with carbon fiber and fiberglass to prevent cracks or breakage. Two bike chains were joined together to give them enough length to twist 90 degrees. Conor explains: "The chain comes directly down from the first set of gears off the pedals, twists 90 degrees, and is hooked up to a sprocket connected to a driveshaft which turns the propeller."

With a 4-foot-wide base and pontoons that are about 8 feet long, the watercraft would be stable in water, but the addition of two hydrofoils keeps it steady at a quicker clip. "In the back we're using a dihedral hydrofoil with three wings to provide extra lift and stability in the roll direction, and one in front with a flat wing to provide stability back and forth and a little more lift and steering capability," said Joe. Sydney notes that they had the hydrofoils cut "using an exact NACA profile, and we will coat them with carbon fiber, too."

Initially splitting up into subsystem teams, they soon opted to do all the work together. "We found that all the systems are dependent upon one another," Joe said. "You have to know how much power you're going to be outputting to pick the right propeller. To do that, you have to know how fast you might be able to move. Until you draw that out, you can't even design your hydrofoil, but you also have to factor in the weight of the boat and drag on the entire system, which affects how fast you can move. So this circular design process has been a little tricky."

Through it all, they are learning a ton, having some fun, and in the end they will have something they "can actually ride, use, and enjoy."

Guarding a Precious Commodity

For their capstone work, bioengineering seniors Nina Morrison, Samantha O'Connor, and Callie Weber wanted to tackle a brand-new project, from the ground up. "We knew it would entail a lot more effort, researching and understanding the field before even starting on the engineering, but also knew we'd rather spend more time if it is something we're passionate about," said Callie. Passionate, they are; and more work, they got!

Advised by Unyoung (Ashley) Kim, assistant professor and expert in integrated microfluidic systems for biotechnologies, the team has designed a low-cost paper-based sensor to detect the presence of *E. coli* in human breast milk donated to breast milk banks. Their aim is to ensure post-pasteurization safety in developing countries, where traditional lab culturing methods are unavailable. Nina explains that a podcast about breast milk donation opened their eyes to the need for this product: "A mother who was unable to breastfeed but had an infant who was allergic to formula told a desperate story of looking on the black market and Craigslist for milk for her baby. That inspired us to see how we could improve technology and milk banking."

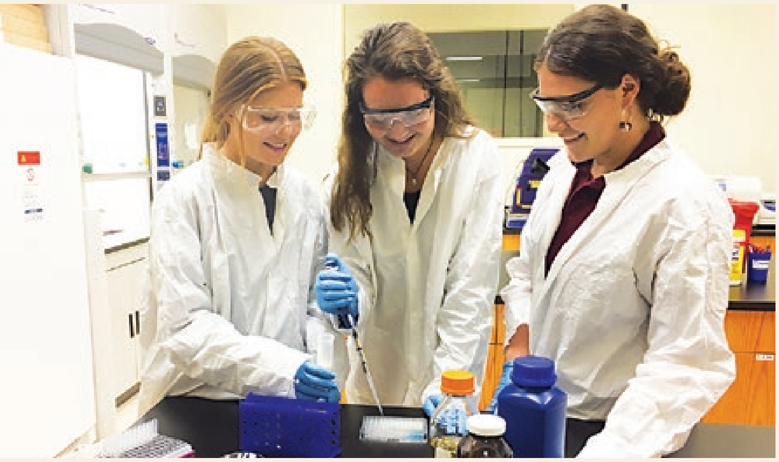


Photo: Heidi Williams

(From left) Samantha O'Connor, Callie Weber, and Nina Morrison at work on Milk Guard, a low-cost breast milk contaminant sensor.

Putting their inspiration into action, the trio sought the help of public health students Karen Mac and Maya Tromburg, and the advice of Michele Parker, adjunct lecturer for biology and public health science and advisor of SCU's Engineering World Health student organization, to get a fuller picture of how their device could best benefit mothers in need. "In the fall quarter we met each week to share information and develop a solid understanding of the breast milk field. We've also been advised by Mothers' Milk Bank in San Jose, and had an exploratory call with PATH, a nonprofit in Seattle that promotes milk banking globally, to learn about the needs of milk banks, mothers, and society as a whole," said Callie.

Once they had a clearer picture of the field, they got to work designing what they now call Milk Guard. "We wanted it to be low-cost and frugal to implement. Using paper as our platform instead of PDMS substrate microfluidics, as would normally be used in this type of project, keeps cost down," said Samantha. Basically, the test works like this: the paper on top of which lie biomolecules encased in silica gel (to retain stabilization) is dipped into a pre-treated sample of human breast milk; if *E. coli* is present, the paper will turn blue. Nina reports that making the gels and moving the detection method onto a paper platform has kept the trio busy over the past two quarters.

It's been time well spent. The team was selected to present their Social Enterprise Pitch at the Global Health Conference at Yale University in April, sharing their sensor with—and gaining insight from—a panel of experts in a room full of maternal health authorities. In June, Callie and Karen will travel to Mumbai, India, to share their device with LTMGH (Lokmanya Tilak Municipal General Hospital), locally known as Sion Hospital. For now, they are working to validate their results locally with Mothers' Milk Bank, which currently spends $4,000 per month outsourcing the bacteria culturing process.

Though they've come so far with their project this year, there's much to be done. "We wanted to start a project from scratch," Samantha said, "and we've grown so much through doing the research, making connections, and developing a prototype. This experience will be so helpful to us as we start our careers, but we really want future senior design teams to take it even further." Nina agrees: "We hope that this is just the very starting point, that other groups will lower the limit of detection and add testing for other contaminants to make the sensor more robust. But this year, this has been our baby, and it's given us a lot of confidence in ourselves."

More on the project: **breastmilksensor.org**

Interfacing Expertly

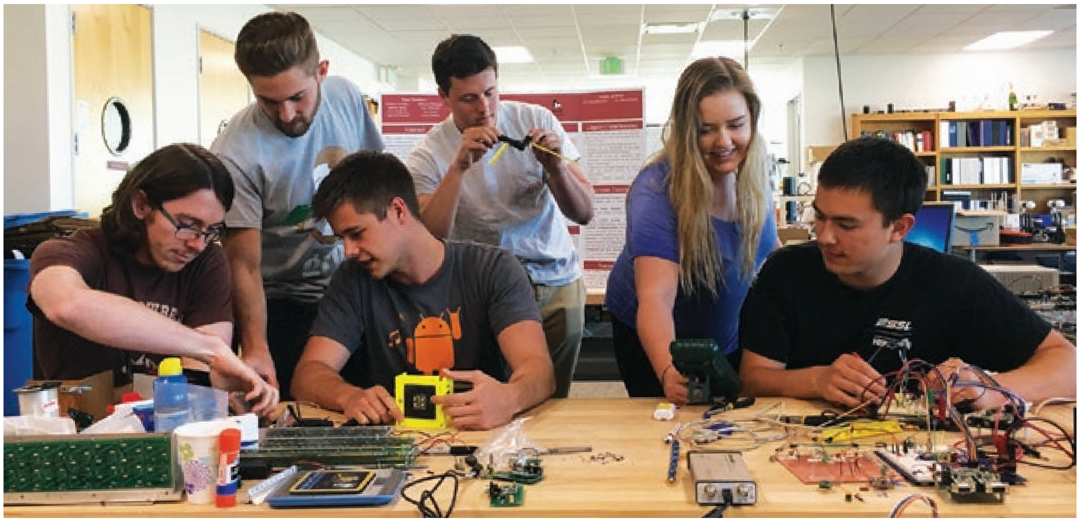


Photo: Heidi Williams

(From left) Matthew Condino, Andrew Drape, Brayton McKnight, Isaac McQuillen, Laura Tschudy, and Cooper McDonnell at work in the Robotics Systems Laboratory.

It's fitting that a team of engineers working on a communications satellite would be good communicators, themselves. Yet in talking with members of an interdisciplinary senior design team (six mechanical and two computer science and engineering students) who are working on advancing small satellite technologies to enhance amateur radio disaster communications, you'd almost think you were meeting with a seasoned NASA crew.

Advisors Christopher Kitts, associate professor of mechanical engineering and director of SCU's Robotics Systems Laboratory, and Michael Taylor, mechanical engineering assistant professor, are impressed with the team's work across mechanical, electrical, and computing disciplines. "As a team," Taylor said, "they are already operating with a level of professionalism very close to that which would be expected of them in industry as young engineers. They've internalized not only the technical aspects of our curriculum, but the organizational and system engineering aspects as well." So can their satellite and its interlocking components communicate as well as they do?

Satellite Structure and Power System

In natural disasters, senior Matt Condino explains, people can't rely on cell communications or traditional landlines that might go down. But a CubeSat satellite can use an amateur radio communications system to keep information about relief efforts flowing. "It's easy to set up ad hoc networks and different nodes on the ground during emergency situations," he says, "and our satellite will be able to send messages down to people and receive data messages from the afflicted area. That's our mission and we have a lot of engineering that goes into achieving it."

The entire narrow, foot-long structure is being machined in-house in the SCU Machine Shop, notes Isaac McQuillen: "It's basically a little box that has two end plates, four side walls, and four rails that connect to the sidewalls. The rails have some tight specifications in regard to surface finish and size because they actually interface with the deployer. On the inside, we are using a few 3D-printed brackets to hold the circuit boards. In the future, 3D printing will probably play a much bigger role in these kinds of projects."

"When a satellite is in space, the only way to generate any power is with solar panels," said Andrew Drape. "All of the subsystems on the CubeSat run on 5 volt or 12 volt power. Previous senior projects designed a solar panel and circuitry to transfer power from the panel to regulated 5 and 12 volt lines. We're taking both those subsystems and getting them to work together. We've also added circuitry to guarantee at least a one-hour wait time before any of the subsystems turn on after launch, per industry regulations, and we have a backup battery on board that can charge immediately and that will be used when the satellite is in eclipse from the sun."

Gravity Gradient Boom and Attitude Control

The main radio antenna must face Earth; to achieve that without a lot of extra power or extra engineering, the team used what's called the gravity gradient effect. "What that means," said Brayton McKnight, "is that if an object is spread out in a certain direction, it tends to orient itself lengthwise toward Earth as it orbits the planet. So we have a piece of tape measure coiled in the top of the satellite that we will deploy once we're in orbit, extending and elongating the distribution of mass of the satellite to keep the antenna at one end pointed toward Earth."

Cooper McDonnell explained further: "When the gravity gradient boom is deployed, it will either point in the right direction or be 180 degrees off. So we've put an Earth sensor on each end of the satellite. These sensors, or thermopiles, absorb Earth's infrared radiation and determine if the satellite is in the right orientation. One end has the main data antenna which we will use to communicate with from our Mission Ops room here on campus. The thermopile tells us if we're in position or not."

Systems Engineering

"One of the main experiences we've gotten from a project of this scale," said Laura Tschudy, "is a lot of practice with systems engineering—learning to coordinate what each team member is doing and what steps we should take, in what order. Some of that has been managed through the mechanical engineering department—we have our senior design class assignments to keep us on track—but we also lay out a lot of timelines and a lot of budgeting spreadsheets; not only for cost as you would normally expect, but we also have to budget for how much mass is going to be on the satellite, and how much power each component is going to be using. We've set up a lot of those types of documents to manage information along the way."

Summing up the team's experience, Isaac drew knowing laughter from his teammates when he said, "One of the biggest challenges of this project has been controlling the interfaces between all the different subsystems on the satellite—the power system, computer boards.... Anything that goes in the satellite is subject to a lot of change—we've seen that throughout the project! Keeping track of how a change in one area affects everything else in the satellite was a challenge for us to wrap our heads around a couple of times."

Watching the Invisible to Save Babies' Lives

The mention of Sudden Infant Death Syndrome, or SIDS, is enough to send a chill through any parent's heart. In the U.S. each year, 2,000 babies under the age of 12 months die unexpectedly in their sleep. Research shows that many of these deaths could be prevented through practicing safe sleep practices—having the baby sleep on her back alone in a crib with no toys, pillows, or blankets to cause accidental suffocation. Since the "Back to Sleep" public health campaign went into effect in 1992, SIDS cases have fallen 50 percent. Still, unexpected and unexplained infant mortality persists, and parents worry each time they put their babies down to sleep.

To help alleviate that concern, electrical engineering seniors Jackson (Xiaoting) Liu and Kyle Takeuchi are prototyping an IoT baby monitor that converts a video signal of a sleeping baby's movements to a pulse per minute (PPM) signal and notifies parents in real-time if the PPM falls below an acceptable range. The pair is using code developed at MIT to magnify images captured on video by about 30x. Basically, what is nearly invisible to the naked eye is captured in minute color changes in the pixels of video. By magnifying those alterations, the baby's chest rise and fall can be documented and pulse rate can be determined. "It's crazy code with about 100 lines of code for each function, and within that function there is another function," said Liu, laughing and shaking his head. "But it cannot stream video. We are adding that application."

Advised by electrical engineering professor Tokunbo Ogunfunmi (who is also director of SCU's Signal Processing Research Lab) and industry advisor and SCU adjunct lecturer Shivakumar Mathapathi, the pair researched and discarded a number of approaches, including converting the code to C language. Ultimately they opted to run live video from a baby monitor through a PC where the images are magnified, PPM is calculated and assessed, and notification is automatically sent if needed. "Shivakumar gave us an Artik board—a smart IoT platform—that we're using to communicate with a camera and the baby monitor," said Takeuchi, "and he tells us what other tools we can use to get the board working. When we get stuck, our advisors help us find new ways to try."

"Using MIT's technique for an IoT-based system to see invisible motion and noninvasively monitor a newborn's breathing is exciting," said Ogunfunmi. The team agrees. "Right now," said Liu, "a monitor can tell you if a baby is crying, but with SIDS there is no noise and parents don't know there is a problem. While this application can't prevent SIDS, it can shorten response time and hopefully minimize some of the parents' fear."

Photo: Nicole Morales

Professor Tokunbo Ogunfunmi checks in with advisees Xiaoting (Jackson) Liu and Kyle Takeuchi (right).

Grad Students Aren't Horsing Around

Photo: Heidi Williams

Elizabeth Sweeny in the Tack Room at B.O.K. Ranch, for which she and fellow grad students are creating a web system to ease daily operations.

It's no walk in the park to operate a therapeutic horse riding nonprofit that each week serves 150 riders dealing with 30 different disabilities, while keeping track—on paper!—of which riders like which horses, what tack goes with each horse, how many hours 12 horses have been worked, the schedules of more than 100 volunteers, and on and on. As a volunteer at B.O.K. Ranch in Woodside, computer engineering master's student (and former program director for SCU's Frugal Innovation Hub) Elizabeth Sweeny knew there was a better way. So, for their year-long graduate software engineering capstone project, she and teammates Ryan Lowe, Neha Soma, and Jeffrey Wick took the reins on designing a "full-on web system—an entire front and back end web portal to help coordinate their daily operations," said Sweeny.

The design makes it easy for instructors and staff to schedule therapy sessions by selecting riders, horses, volunteers, and tack using drag and drop functions. If Idgie has reached her weekly limit of hours, she's not found on the list of available horses; if a rider needs rubber bands to secure feet in stirrups, that information populates automatically, as does the proper saddle, bridle, and other gear associated with the selected horse. Volunteers can quickly view and make changes to their schedules, request and schedule a substitute, and access policy manuals. Parents will be well served by an online intake system and be able to view periodic notifications confirming that all the information is still accurate.

"We're also making it easier for B.O.K. to collect data for their Professional Association of Therapeutic Horsemanship certification," Sweeny said. "Now, they collect data manually in a number of different categories, including the age of riders, types of activities for each student, volunteer and horse hours. There is a lack of consistency in how the information is gathered and maintained. This website will automatically track everything."

Making all the decisions for the full technology stack hasn't been so easy. "It took us about five weeks to make all the technology decisions," Sweeny said, explaining: "Our professor, Zoltan Kurczveil, was really good at guiding us through that process; he has significant industry experience that really aids in determining what technologies to use. The back end uses Python in a Flask framework; the front end will be in HTML5 and JavaScript, utilizing bootstrap to help with the scaling of the user interface." Now that they've designed and mapped the system from front to back end, the team is coding and building it from scratch.

"This project has been really fun," Sweeny said. "Overwhelming at times, but we stay motivated because we know how much our work will change B.O.K.'s day-to-day operations. Plus, two of the four of us on the team had never seen a horse before, so exposing them to a whole new world was a bonus!"

2017 Distinguished Engineering Alumni Awards

For more than 100 years, the School of Engineering at Santa Clara University has been educating the leaders and innovators of the future to make a difference in their communities and in the world. For such achievements, in 2017 the School recognized Richard DeBlasio, Bill Holt, and Scott Santarosa, S.J., with the Distinguished Engineering Alumni Award—the highest honor bestowed by the School of Engineering to graduates whose accomplishments in their professions, communities, and University service have set them apart.

Richard (Dick) DeBlasio '72 BS Electrical Engineering was recognized for his contribution to the field of electrical engineering and the advancement and adoption of renewable energy research.

DeBlasio is a research fellow emeritus at the U.S. Department of Energy's National Renewable Energy Laboratory (NREL). In his more than 35 years there, he furthered NREL's renewable energy successes both nationally and internationally. His work has contributed immeasurably to the efficiency, reliability, affordability, and adoption of renewable energy systems. Industry and government standards that enable the use of renewables in conjunction with central power systems were achieved through his leadership and foundational research, and he led the effort that has become the standard for Smart Grid modernization.

Scores of scholarly publications attest to DeBlasio's influence in his field, as do numerous industry awards—the ANSI Finegan Standards Medal for extraordinary leadership in the actual development and application of consensus standards, the IEEE Charles Proteus Steinmetz Medal for contributions to the standardization and global impact of distributed electric power system technology, an IEEE Lifetime Achievement Award, and recognition by *Fierce Energy Magazine* as one of 13 nationally influential experts on energy, to name just a few.

Bill Holt '79 MS Mechanical Engineering was selected for the Distinguished Engineering Alumni Award for his impact on the semiconductor chip industry and the advancement of computing.

In Silicon Valley, the semiconductor industry exploded, in part, based on what's known as Moore's Law—the maxim that the computing power of integrated circuits would double about every two years. For more than 40 years, Bill Holt, retired executive vice president and general manager for Intel's Technology and Manufacturing Group (TMG), led the teams that delivered the efficiency, innovation, and cost reductions that drove the industry and proved Moore's Law to be true. During his time at Intel, processors became 3,500 times more powerful and 90,000 times more energy efficient.

Beginning his career in DRAM development as a development engineer, Holt assumed a number of management roles before being elected corporate vice president in 2003 and taking on the management of TMG in 2005. Under his guidance, Intel consistently led the industry in revolutionizing transistor technologies. A consummate innovator and leader, he had a marked influence not only on his company, but on his industry, and on the nation's economy. In 2015 Holt received the Semiconductor Industry Association's highest honor, the Robert N. Noyce Award for Longstanding Accomplishments on Behalf of Industry.

Scott Santarosa, S.J., '88 BS Civil Engineering, provincial of the Oregon Province of the Society of Jesus, was chosen for this award not for his engineering prowess but for the contributions he has made to enriching the lives and furthering the prospects for the poorest of society, and for his leadership within the Society of Jesus.

During his time as a student at SCU, the seeds for Santarosa's future were planted on a brief trip to Mexico. There, he witnessed abject poverty but was moved by how people experienced God's love. After receiving his bachelor's degree in civil engineering, he joined the Jesuit Volunteer Corps, running an after-school program for low-income families in New Jersey, and soon decided to begin the formation process to become a Jesuit. He spent his fourth year of theology studies in Mexico City.

As a Jesuit, Fr. Santarosa spent five years at Verbum Dei High School in Watts, Los Angeles. When he arrived in 2000, the inner-city school was on the verge of closing. Just six years later he had transformed it into a well-respected Catholic preparatory school for low-income students, with 100 percent of the graduating students accepted to college. For the next eight years he lovingly pastored Dolores Mission Church in Los Angeles, a parish dedicated to social justice through serving the poor and the immigrant. In 2014 he took on the role of provincial of the Oregon Province of the Society of Jesus; as the Jesuits merge the California and Oregon provinces he will head the resulting region, which includes Alaska, Washington, Idaho, Montana, Nevada, Utah, Arizona, and Hawaii.

Congratulations to these shining examples of excellence who light the way for future Bronco engineers.

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The Jesuit University in Silicon Valley

Photo: Joshua Umesh

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Mungal Honored for Championing Jesuit Mission

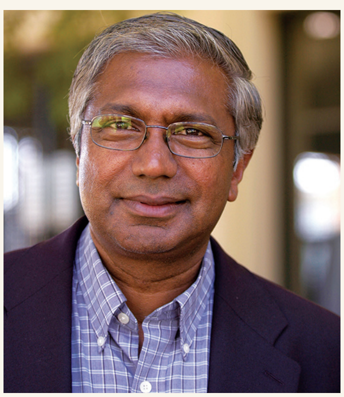

Photo: Charles Barry

Godfrey Mungal

In an unprecedented gesture, Santa Clara University's faculty have awarded School of Engineering Dean Godfrey Mungal a Special Faculty Senate Council Award in recognition of his "outstanding contribution to the mission of the University." The nomination—brought forward by faculty from the College of Arts and Sciences, Leavey School of Business, School of Education and Counseling Psychology, and School of Engineering—cited Mungal's multi-layered approach to advancing SCU's Jesuit, Catholic mission through (among other things) his support of student and faculty immersion trips to developing countries, greatly expanded collaboration with Jesuit universities around the world in the form of student and faculty exchange programs and tuition support for Jesuit Ph.D. candidates, and encouragement of faculty and staff spiritual development. "It is rare to see a Dean who has so wholeheartedly embraced Jesuit ideals, and has helped put them into practice," read the nomination. "By doing so, he set a standard for all administrators to follow."

Jesuits from the United States, Argentina, India, Africa, and Uruguay also offered testimonials in support of the award. Fr. Rob Scholla said, "'Engineering with a Mission' is no mere slogan at Santa Clara University. Dean Mungal's steady and confident leadership is animated by a deep interior life—a life of faith and personal reflection, and his heart and commitment to mission are not limited to the School of Engineering, our campus, or the Silicon Valley, but are expansive and global." Fr. Constant Bossou hailed Mungal's generosity and compassionate heart, and his "passion for innovation to solve the world's pressing engineering problems." Repeatedly, the words "simplicity," "generosity," and "commitment" attested to Mungal's drive to support, inspire, and propel a band of global Jesuits—a group that Kolkata's Fr. Maria Joseph Israel termed "leaders in blending religion and science/technology ... torch bearers of Ignatian values and traditions regionally and globally ... SCU-trained Jesuits who are enthusiastic about sharing the charism of St. Ignatius of Loyola with others."

With characteristic humility, Mungal said, "I am deeply honored to receive this award. Mission matters for us in the School of Engineering, and it manifests itself as deeds, not words. I sincerely thank the faculty, staff, and students for their commitment to making Jesuit mission a reality, and the Faculty Senate for this special recognition."

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