# UNM Engineering

*Rising to the Top*

# Message from the Dean

## Welcome to the 2016

issue of *UNM Engineering!* This is a bittersweet edition for me, as I will be concluding my second term as dean at the end of the spring 2017 semester, with a total of 12 years of service. So it is fitting that for my last issue, we highlight some of our greatest accomplishments during the past several years as we celebrate 110 years of the School of Engineering.

*In just the last decade, faculty and students in the School have been actively involved in issuing 220 patents and creating 44 startups*

One of the most significant developments over the past year has been the naming of the dean position in the School through a new endowment. Combining a generous gift of $500,000 from long-time friends of the School and UNM, Jim and Ellen King, with matching funds from the state of New Mexico, UNM has established a $1 million endowment that creates the Jim and Ellen King Dean of Engineering and Computing. Funds from the endowment will be used to support STEM education and research, along with economic development. Engineering is the first college or school at UNM to have an endowed deanship, and I am deeply honored that the provost has appointed me the inaugural Jim and Ellen King Dean of Engineering and Computing. I am also very grateful to Jim and Ellen for their visionary gift, as well as to the New Mexico Legislature and the governor for establishing the higher education endowment fund that provided the match for the Kings' gift. UNM's School of Engineering will join many other top-ranked engineering schools around the country that have endowed dean positions.

Another point of pride is the innovative research that our faculty continue to produce, year after year. Especially impressive are the efforts of our youngest faculty. One measure of excellence for those new to academia is the National Science Foundation CAREER Award. In the School of Engineering, we have more than a dozen CAREER awardees, and a handful just within the last year. Read about the work of Lydia Tapia, Trilce Estrada, and Sang Eon Han on Pages 4–5. In addition, Gregory Rowangould, associate professor in civil engineering, recently received a comparable honor for his research from the Environmental Protection Agency. Read more about that on Page 17.

Of course, research and discovery is what we are all about, but what makes that research extra meaningful is for it to make the jump out of the lab and into the marketplace. For many years, the research from the School of Engineering has been spinning off into intellectual property, patents and companies via STC.UNM. In just the last decade, faculty and students in the School have been actively involved in issuing 220 patents and creating 44 startups. One shining example of this innovation to industry is Sanjay Krishna, founder of SK Infrared, which is close to bringing its technology to the marketplace. Read more about its success starting on Page 6.

Another vital part of our School is alumni. Dana Wood was a special alumnus of the School, putting his incredible talents to work as an entrepreneur, and his spirit will now live on for generations to come through a scholarship that honors his life (Page 13). Also, I'm proud to have been able to bring back the Distinguished Alumni Awards, honoring some of the stars of our School of Engineering family (Page 16).

Enjoy this issue of *UNM Engineering,* and thanks for all you do to support the School of Engineering.

**Joseph L. Cecchi**

*Jim and Ellen King Dean of Engineering and Computing*

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**On the cover**
Pictured are three of our NSF CAREER Award winners—Lydia Tapia, Trilce Estrada, and Sang Eon Han

# Rising to the Top

## Endowed deanship, strategic partnerships among the points of pride at the School of Engineering's 110th birthday

The University of New Mexico School of Engineering has been educating students since 1906, and during that time, the School has undergone significant changes, transitioning from a focus on teaching students to work in technical fields to educating them for higher academic study and meeting today's challenges of ever-changing technology and globalization.

Since 1906, the School has seen ups and downs in demands of disciplines, but in recent years, the mission has turned into a much more strategic and collaborative one, focused on growing research projects and dollars, increasing partnerships, and growing enrollment by giving greater opportunities to students.

The School now boasts around 100 tenure- and tenure-track faculty, in addition to annual research expenditures of $32.9 million (up from $29.8 million in 2015).

### Endowed Deanship

In spring 2016, the School of Engineering became the first school or college in the University to hold an endowed dean's position. Jim and Ellen King's gift of $500,000 has created the Jim and Ellen King Dean of Engineering and Computing. The Kings' gift, combined with matching funds from the state, will provide the $1 million funding needed to create the endowed deanship.

"This crucial investment will help UNM attract and support the best leadership for the School of Engineering for many years to come and will help ensure that our School continues to be viewed as a well-respected institution," said Joseph L. Cecchi, Jim and Ellen King Dean of Engineering and Computing. "In today's academic environment, endowed positions are an important way for universities to have a competitive advantage to attract and retain world-class faculty and academic leaders through increased prestige and additional resources."

UNM's School of Engineering joins many other top-ranked engineering schools around the country that have endowed dean positions, including Stanford University, Purdue University, University of Michigan, Duke University, Cornell University, and University of Tennessee.

Jim and Ellen King

50+

Since its start in 1995, STC.UNM has launched more than 50 startup companies and helped entrepreneurs secure more than 240 patents that were generated from inventors in the School of Engineering.

## Strategic Partnership

In July 2015, Sandia National Laboratories and The University of New Mexico signed a memorandum of understanding (MOU) for a strategic alliance. The MOU aims to explore strategies enabling the future of engineering for national security; seek innovative facility partnerships that enable collaborative research; and jointly recruit and hire nationally prominent researchers for UNM faculty and Sandia technical staff.

Collaborative research is focused on quantum computing and information science, nanoscience and microsystems engineering, nuclear engineering, high-energy density science, energy, water, cybersecurity and bioscience for national security.
The MOU has deepened the relationship between the institutions to strengthen both organizations by exchanging personnel, developing innovative joint research programs and educating the next generation of national security leaders.

Sandia and UNM also work together through an Inter-Institutional Visitor Agreement, which allows direct collaborations without formal agreements or the need for UNM to use a project-specific research contract to have Sandia staff run experiments at the Labs.

Joint faculty appointments include Fernando Garzon, a recognized expert in materials science and engineering and the first professor recruited together by Sandia and UNM. Sandia researchers Jeff Brinker and Rick Kemp also work for UNM as professors through joint appointments. The MOU calls for more such joint hires in the future.

UNM and Sandia share the Advanced Materials Laboratory in UNM's Science and Technology Park, which supports collaboration among Sandia, UNM and industry in materials research, development and transfer to private companies for commercialization. The 45,000-square-foot facility south of UNM's main campus houses about 90 staff from the university, Sandia and private companies in a single, integrated research laboratory. Since it was established in 1992, research at the lab has produced 10 R&D 100 awards, the so-called "Oscars of Invention."

10

There are 10 major research areas in the School of Engineering:

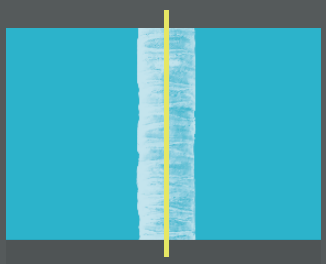
1. Aerospace Science and Engineering
2. Biomedical Engineering, Bioinformatics, Biocomputing
3. Energy, Environment, Water
4. High Energy Density Physics and High Power Microwaves
5. Integrated/Additive Manufacturing and Robotics
6. Nanoscience, Nanotechnology, Microsystems
7. Nuclear Non-proliferation and Safeguards
8. Photonics and Optics
9. Scalable Computing and Cyber Security
10. Sustainable and Resilient Infrastructure

The Advanced Materials Laboratory

6

The School of Engineering has six centers of research excellence that serve as catalysts for collaboration with partners in the public and private sectors:

1. Center for Biomedical Engineering
2. Center for Emerging Energy Technologies
3. COSMIAC
4. Manufacturing Training and Technology Center
5. Institute for Space and Nuclear Power Studies
6. Center for Water and the Environment



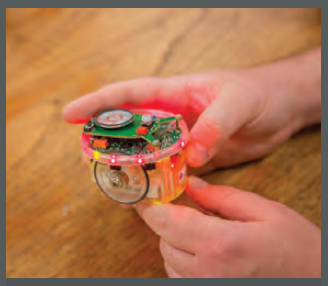
Ultra-thin displays as thin as 5 to 10 microns are a fraction of the width of a human hair

Our faculty continue to earn prestigious grants and awards, such as the National Science Foundation's CAREER Award, which is geared toward helping early-career faculty get strong starts on their academic careers. The award is NSF's most prestigious award in support of junior faculty who exemplify the role of teacher-scholars through outstanding research, excellent education, and the integration of education and research within the community.

Fifteen of our current School of Engineering faculty have received this honor. In 2015–16, four faculty from the School received the CAREER Award. In addition to **Daniel Feezell** (previously announced) from Electrical and Computer Engineering, recipients were:

**Sang Eon Han,** an assistant professor in the Department of Chemical and Biological Engineering, received the award from his project titled "Symmetry Control in Photonic Nanostructures for Enhanced Optical Properties." The goal of the project is to research the effect of symmetry on the optical properties of photonic materials and explore the full implications of the symmetry effect on energy applications. Control of symmetry in metallic nanostructures can increase light absorption in optoelectronic devices, including thin-film solar cells. The research could lead to advances in products designed to enhance energy efficiency in solar panels and heat-management materials, such as are used in the construction of buildings. The research in thin films could also aid in the development of ultra-thin displays for various devices, possibly to a width as thin as 5 to 10 microns, which is a fraction of the width of a human hair.

**Trilce Estrada,** assistant professor in the Department of Computer Science, received her CAREER Award in 2015 for "Enabling Distributed and In-Situ Analysis for Multidimensional Structured Data." Scientific advances produce massive amounts of data, and when many of these datasets are at multiple locations, instead of all in one place, it becomes difficult and costly for researchers to extract meaningful information from them. The central question behind Estrada's project is "How do we learn from these datasets if they cannot be shared or placed in a central location?" The project focuses



(Far Left) Computer Science senior Valuable Sheffey performs research on autonomous navigation systems. (Left) Lydia Tapia discusses with students about navigation in crowded, changing, and uncertain environments. (Above) A robot is used to demonstrate the principles of molecular aggregation to children.

on building mathematical models from each of the "local" data banks at each distributed site, and these models will capture data patterns rather than specific data points. This will help speed up research in a variety of areas, such as health informatics, astronomy, high-energy physics, climate simulations and drug design.

**Lydia Tapia,** assistant professor in the Department of Computer Science, received a CAREER Award in 2016 for "Modeling and Analyzing High-Dimensional Molecular Assembly: Quantifying the Impact of Allergen Structure." The project will integrate research and education dedicated to computational simulation and analysis of the interaction of molecules. Interactions occur when one or more molecules bind together, thus forming larger aggregate structures that are capable of performing a function. For example, antibodies bind to antigens to begin a signaling cascade that induces an allergic reaction. The method, inspired by high-dimensional robotic motion search, will incorporate and integrate hybrid and multi-resolution models of molecular structure, motion planning simulation for identifying both pathways and timescales for aggregation formation, and understanding of the impact of structure on the aggregate. Through collaborations with the UNM School of Medicine and the Sanford Burnham Prebys Medical Discovery Institute, experiments of aggregates involving allergens will be used to compare to the computational simulations. The project will also provide robotic demonstrations of aggregation to the community through school and museum demos.

10

The School's ten distinguished professors comprise more than 8 percent of the total faculty, compared to less than 3 percent university-wide: Plamen Atanassov, Jeffrey Brinker, Steven Brueck (Emeritus), Vince Calhoun, Christos Christodoulou, Abhaya K. Datye, Stephanie Forrest, Deepak Kapur, Edl Schamiloglu, and David Whitten.

# A Rainforest Grows in the Desert

School of Engineering research forms backbone of effort's success

*By Megan Fleming*

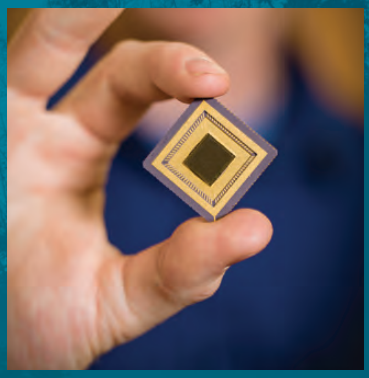
Picture a rainforest sprouting from New Mexico's dry land. But rather than an expanse of towering trees, lush undergrowth, and thick vines, this is a rainforest made of flourishing businesses, dynamic universities, new organizations, and entrepreneurs collaborating to create a unique ecosystem that fuels New Mexico's innovation economy.

## IT'S TAKING ROOT RIGHT NOW.

The "rainforest theory" is a concept developed by Victor Hwang and Greg Horowitt, venture capitalists, entrepreneurs, and authors of *The Rainforest: The Secret to Building the Next Silicon Valley.* Horowitt and Hwang say that successful innovation ecosystems, including Silicon Valley, are like rainforests because they provide the ideal environment for companies and innovation organizations to grow in unpredictable but effective ways. The result is a thriving economy that generates companies, jobs, and economic success for the region.

One of the most important "nutrients" in New Mexico's growing rainforest is **STC.UNM,** the university's technology-transfer and economic-development organization. STC works with UNM-based inventors (many of whom are connected with the School of Engineering) to evaluate their technology from a patentability standpoint, then links them with the people, resources, and organizations that can help get the technology off the ground.

For the community, what's really important is how the university can contribute to regional economic development.



SK Infrared's technology is based on a high-performance III-V semiconductor.

Technology transfer and commercialization are central to the success of the university and the community, says STC.UNM CEO **Lisa Kuuttila.**

"For the community, what's really important is how the university can contribute to regional economic development," she said. "The best way we can do that is through startup companies that form here, grow here, and create jobs here."

In the last decade, STC.UNM has launched more than 44 startup companies and helped entrepreneurs secure more than 220 patents generated from investors in the School of Engineering.

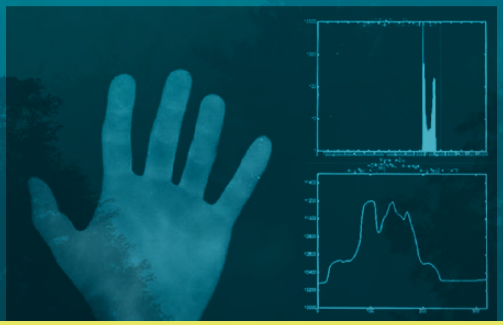
**Joseph L. Cecchi,** Jim and Ellen King Dean of Engineering and Computing, says that it's no accident that faculty have been so actively engaged in turning innovations into commercial applications. He said the School has actively encouraged faculty to both collaborate and to become involved in entrepreneurial activities, and has set forth the foundation to make that happen.

"Thanks to our focus in strategic and in-demand areas such as biomedical engineering, nanotechnology, high-energy density physics, and photonics and optics, our faculty have been able to form strong and relevant research alliances with partners such as Sandia National Laboratories, private industry, and other academic institutions worldwide," Cecchi said. "These partnerships have expanded our scope and have strengthened the quality of our research. They have also set the important groundwork that has allowed us to make pioneering advances that are also economically viable."

Kuuttila says STC.UNM's structure is key to its success.

"As a 501(c)(3), we have a really good model that gives us the flexibility to be entrepreneurial in how we develop our programs and support the university."

One company flourishing in New Mexico's rainforest with help from STC.UNM is **SK Infrared.** The company is developing next-generation infrared detectors for use in a variety of industries, including manufacturing, defense, health, and automation.



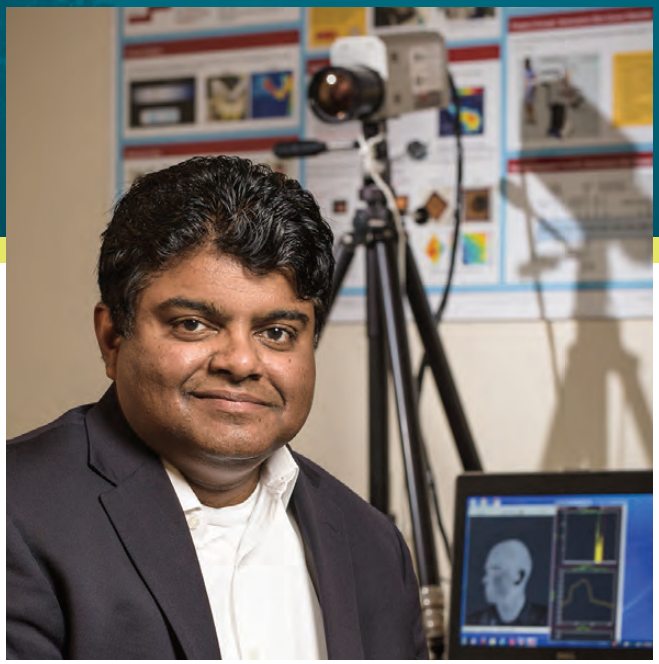
SK Infrared CEO and CTO **Sanjay Krishna,** a UNM professor of electrical and computer engineering, and his wife **Sanchita Krishna,** COO and UNM cancer biologist, co-founded the company in 2010. They received a grant from STC.UNM and were a virtual tenant before moving in to an office with lab space in the STC building.

"STC and UNM have been very supportive of us. The university has been very progressive about letting faculty pursue their entrepreneurial aspirations," said Sanjay Krishna. "Distance is a big barrier, so having proximity to the south campus and the Center for High Technology Materials (CHTM) where we have a lot of infrastructure and facilities has been extremely helpful."

The SK Infrared team is developing two types of sensors. Their single-element point sensor can detect infrared signals and has applications in the military and medical fields. SK Infrared engineers also use nanostructure superlattice semiconductors to create an array of infrared detectors that can peer through the atmosphere, smoke, and provide thermal images.

What differentiates SK Infrared's technology is that it is based on a high-performance III-V semiconductor technology that leverages an existing manufacturing base of foundries and facilities. SK Infrared is working on novel solutions to encode spectral information to produce color images so users have a better visual representation of what's being detected. For instance, SK Infrared's imaging detectors could be used to evaluate car exhaust in real time. Instead of a standard black-and-white image, the detector could differentiate types of emissions through color.

The company's detectors are also engineered to operate at higher temperatures than other detectors, which must be cooled. That reduces the size, power consumption, and weight of the detectors making them much more versatile and marketable.



SK Infrared CEO and CTO Sanjay Krishna is a UNM professor of electrical and computer engineering

"The ability to operate at higher temperatures will substantially reduce the cost of implementation and enhance the economic benefit for people who are able to deploy these technologies," says Earl Fuller, a CHTM strategic support manager with significant commercial business experience, who is helping SK Infrared with its commercialization efforts.

Within a year SK Infrared expects to produce its first commercial product. Ultimately, Sanjay and Sanchita Krishna hope to achieve their long-term goal of creating an infrared detector for skin cancer detection, a project they've been working on steadily as they grow their business in other areas. "Skin cancer detection is our 'baby' project," says Sanchita Krishna. "It's something we believe in and it has societal impact. But it's for the long haul ... it's a few steps away. "

Earlier this year, SK Infrared received first round funding from the governor's Technology Research Collaborative to help bring its ideas and products to the marketplace.

"They have complementary skills and have developed a strong reputation in the small business community based on their ability to deliver on their customer's expectations," says Fuller. "SK Infrared has the ability to leverage that into commercial product deployment and stronger growth and make SK Infrared a company that will attract strong investors for the company's growth."

# UNM TEAM

## MAKES A SPLASH IN SOLAR CONTEST

***The University of New Mexico's Solar Splash team competed for the first time in 2016 in the national solar boat competition, and they were pleased with their performance.***

The team placed fourth overall, second place in slalom, and were recognized as the highest-scoring rookie team. They also received a special sportsmanship award for their willingness to help out other teams. Fifteen teams entered the competition this year, and 13 had boats ready in time for the event.

**The contest was held June 15-19 in Dayton, Ohio.**

**Peter Vorobieff,** professor of mechanical engineering and faculty advisor to the team, said the team's performance was due largely to one thing.

**"We kept it simple," he said. "Fewer things on the boat mean fewer things that can go wrong."**

Vorobieff noted that the team had no major mechanical malfunctions, despite the fact the UNM boat was built for considerably less than the other competing teams' boats. He said they were outspent around 10:1, with the UNM boat costing less than $10,000 to build.

"We had to accept some compromises because of that," he said. "It's not very fast, but it's very nimble because of the flat bottom."

Vorobieff said the team was helped greatly by being able to start the project within the framework of the senior design class developed by Professor **John Wood** in the Department of Mechanical Engineering. The senior design class taught the students to consider multiple design alternatives, to evaluate their options using iSuccess criteria accepted in industry, along with learning how to market the design, figuring out the cost of materials, and many other aspects.


The *Jolly Roger* set for launch in Dayton, Ohio

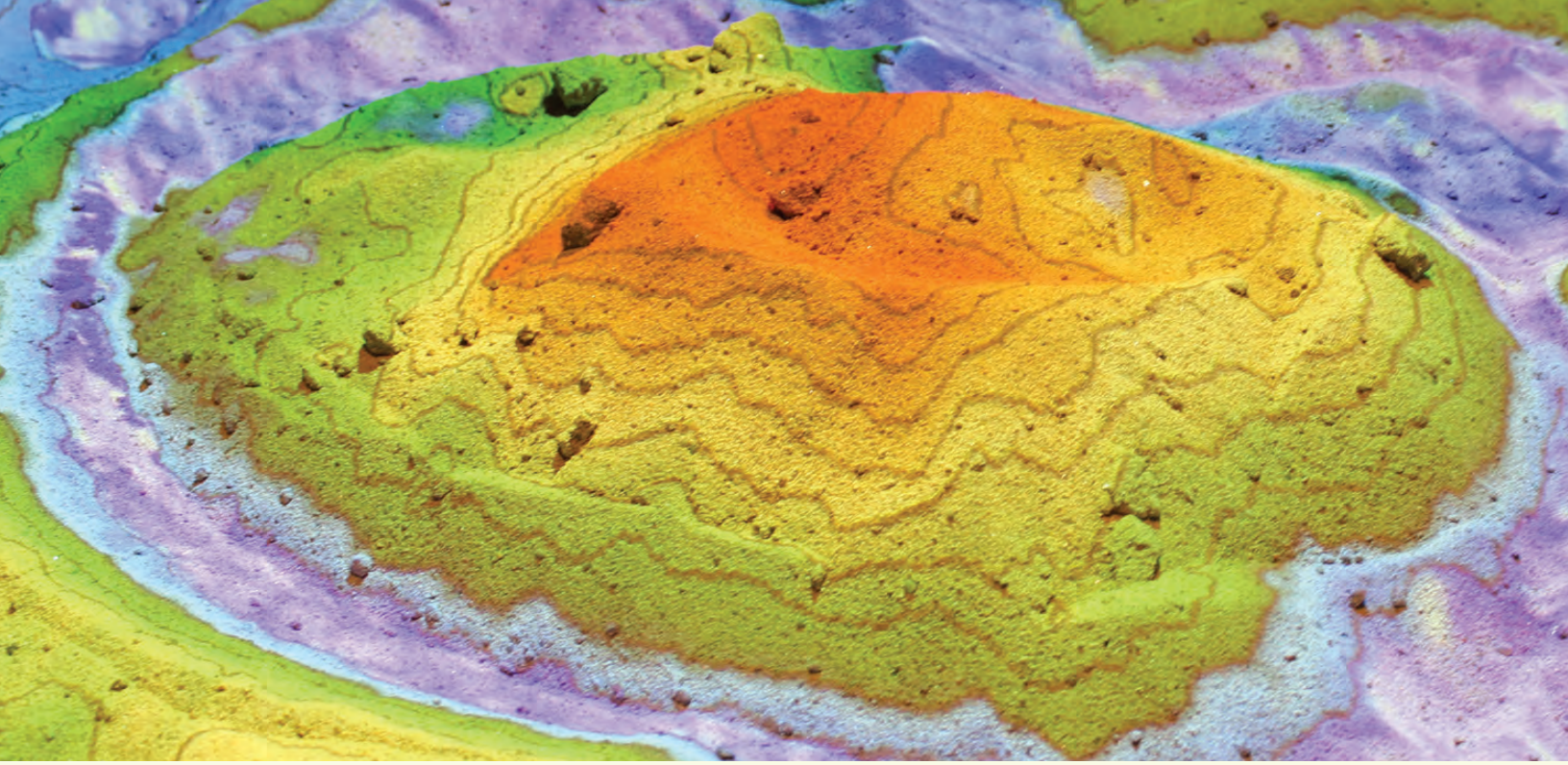
The team also felt it was an advantage to build their own solar array instead of using manufactured cells, with the team having to solder individual cells together. The Solar Splash rules allow student-built arrays more surface area and power than premade ones.

The team of eight students (seven mechanical engineers and one electrical engineer) has been working on the project since last fall, said **Lucca Henrion,** team lead who recently received his bachelor's degree in mechanical engineering.

The team has a variety of sponsors, including Sandia National Laboratories, UNM, ASME, IEEE and Sunpower by Positive Energy Solar. The team secured build space for the semester at the Mesa del Sol facility south of campus. The space was donated by Steve Chavez, CEO of SC3 International.

The boat is named *Jolly Roger,* for Roger Koerner, who donated to the project. Koerner received a bachelor's degree in mechanical engineering from UNM in 1968 and is retired from ExxonMobil.

***To make a donation to the UNM Solar Splash team, contact Betty Karlsson, senior director of development for the School of Engineering, at (505) 277-0230 or betty.karlsson@unmfund.org.***



# Just Add Water

## CREST PROGRAM INSPIRES A NEW GENERATION OF ENGINEERS

**Can a pile of sand or a jar of murky water inspire someone to become an engineer? A team at the School of Engineering's Center for Water and the Environment (CWE) says "yes."**

The CWE has created several portable, hands-on, water-related experiments designed to inspire middle and high school students to consider careers in STEM fields.

"The goal is to show people what water is all about and how exciting and fun it is," explains **Kerry Howe,** professor of civil engineering and director of the Center of Water and the Environment.

The demonstrations are part of a five-year grant from the Centers for Research Excellence in Science and Technology (CREST) program at the National Science Foundation. CREST establishes and supports research centers while encouraging underrepresented minorities to consider careers in STEM fields. Under the grant, a dozen graduate students working on advanced degrees in water-related topics receive tuition and a stipend so they can focus on their research. The students also help with outreach.

While the program is only in its second year, the outreach team has already taken hands-on activities to dozens of schools and events. With mason jars of dirty water, chemicals, and sand filters, the students demonstrate surface water treatment. Using a wood and plexiglass frame resembling a giant ant farm, they explain how contamination moves through an aquifer.

The crown jewel of the outreach program is the augmented-reality sandbox. Suspended above an elevated tray of gleaming white sand, is a carefully calibrated projector connected to a computer running powerful 3D visualization software. The projector beams a colorful topographic map representing land elevations and bodies of water onto the sand. As people move the sand, the computer redraws the map in real time to show how changes in the topography of the sand affect the bodies of water. The result is a dynamic, engaging, and educational tool demonstrating geology and hydrology concepts. When the team took the sandbox to the New Mexico State

Girls interact with the augmented-reality sandbox at the New Mexico State Capitol during the 2016 legislative session.

Capitol for a demonstration during the 2016 legislative session, people of all ages swarmed the sandbox to try it out.

Now the team is adding experiments and expanding the outreach program. Howe says the CREST grant is succeeding by building a pipeline of new students interested in STEM — and they still have three more years to grow.

"The School of Engineering as a whole is 20 percent female, but our program is 65 percent female," explains Howe. "Overall, more than 90 percent of the students funded on the CREST grant are Hispanic, Native American, or female. So we're really talking the talk and walking the walk."

## IT STARTED WITH STOPLIGHTS

**Lauren Breitner** (MSCE '17), a second-year graduate student, was fascinated with them, which is one reason she pursued civil engineering at UNM. "I like civil engineering because it's so broad and there's so much you can do with it," she says. "Everything you do impacts society."

But after taking a sustainability class from Kerry Howe, professor of civil engineering, and having a job during her undergraduate career working on water resources with the U.S. Geological Survey, Breitner switched from stoplights to water. Now she's finishing her thesis on using reverse osmosis for advanced water treatment.

Breitner is part of the CREST grant and is the lead designer and manager of the outreach program. She designed and built all the outreach experiments, including the augmented-reality sandbox. Faced with the challenge of creating the sandbox from scratch, she taught herself how to use power tools and how to adapt open-source software.

"The hardest thing was figuring out how to run the software since I'd never done anything with computers beyond writing something in Word," she says.

"That's just the type of thing engineers do," says Howe. "They have an end product and need to figure out how to design it and build it. Lauren is going to be a great engineer!"

Breitner is also an ideal spokesperson for pursuing engineering. Before joining the program she didn't know where her community's water came from and didn't plan to pursue a graduate degree. She shares that perspective with the students she meets.

"It's cool to teach people about what happens with our water," she says. "To many students, going to college sounds overwhelming. I tell them I'm a normal person and what I did to go to college. Talking to students about my experience and how I got through engineering is fun."



"The class is unique because students learn computational skills in the context of real scientific modeling questions."

MELANIE MOSES

# CS for All

*brings computational problem-solving to New Mexico's students and teachers*

**A professor at The University of New Mexico is leading a National Science Foundation-funded project designed to teach both high school teachers and their students the value of computer science and how to use it to solve problems.**

New Mexico Computer Science for All trains students and teachers to code and write programs, and they also learn computational thinking, which is a methodology for problem-solving applicable to any science, said **Melanie Moses,** associate professor of computer science.

"The modern economy is built on computer science. Computational skills are increasingly necessary for success in science and technology, but computer science is simply not taught in our high schools," Moses said. "The class is unique because students learn computational skills in the context of real scientific modeling questions."

The potential impact of New Mexico CS for All dramatically increased. In early 2016, President Obama announced a national $4 billion CS for All initiative to accelerate computer science education in K-12 by training teachers, expanding access to high-quality instructional materials, and building effective partnerships.

New Mexico CS for All was the first such computer science program in the country, and with collaborations with educators across the state, New Mexico can leverage federal funds to accelerate computer science education for students.

Nearly all computer science graduates from UNM are employed, with an average starting salary of $70,000. And there is a big gap in the state between available jobs for computer scientists and those qualified to fill those positions, so those with computer science-related skills have an advantage in seeking employment after graduation.

High school teachers first take the CS for All professional development course at UNM, then the next semester, they teach the almost-identical material to their students in their own high school classrooms. So far, about 50 New Mexico teachers have been trained. They, in turn, have taught more than 800 students, about 500 of those receiving both high school and UNM credit.

Moses said the emphasis on scientific modeling is unique. The course content was developed by **Irene Lee** (now at the MIT Media Lab) to build on research conducted at the Santa Fe Institute. The course teaches modeling as a laboratory science, similar to biology or physics, where students design computer programs to answer a specific question.

***"We face complex challenges such as climate change, poverty, and the spread of epidemics in our increasingly interconnected world," Moses said. "Today's students need the tools to solve problems in complex and dynamic social, economic, and environmental systems."***

As the program grows, Moses would like to develop collaborative relationships to advance computer science education research at UNM with the College of Education and the Organization, Information and Learning Sciences (OILS) program, both of which train and support teachers. She is also working to integrate CS for All with other science, technology, engineering and math (STEM) outreach organizations on campus, including the STEAM-H program at the UNM Health Sciences Center, the STEM Collaborative Center and the STEM Gateway.

Starting in fall 2016, all UNM students have the opportunity to experience CS for All, which is offered as UNM course Computer Science 108L.

# ALUMNUS' GIFT

## WILL CREATE SCHOLARSHIPS FOR SCHOOL OF ENGINEERING STUDENTS


Students in The University of New Mexico's School of Engineering will benefit for decades to come, thanks to the generosity of one of its alumni.

The estate of **Dana C. Wood** has provided a $150,000 endowed gift that will fund student scholarships in perpetuity. Wood, a native of Gallup, New Mexico, received a bachelor's degree in 1977 and a master's degree in 1990, both in civil engineering from UNM.

Wood fought a long battle with cancer, succumbing to the disease in 2013.

"Dana Wood was a creative, passionate engineer and entrepreneur, and we are honored that this gift will benefit the School of Engineering"

JOSEPH L. CECCHI

The Dana C. Wood Endowment for Engineering Awards will be given to the three senior engineering students with the first, second, and third highest grade-point averages for that year, with one-half, one-third, and one-sixth of the total annual amount available going to each, respectively.

Wood is described by his family as having had a passion for the UNM School of Engineering and students' access to engineering education.

"Dana was a Lobo fan, so he wanted to support UNM and felt strongly about giving deserving students who might not ordinarily get that chance an opportunity to pursue engineering," said Doug Wood, brother of Dana and a 1977 UNM civil engineering alumnus. "This scholarship is the perfect opportunity for Dana to leave a lasting legacy that demonstrates his passion for the School of Engineering and all that it provided him."

Dana's sister, Dolly (Charlene) Delaunay, remembers an intelligent, talented engineer, but also a person who made others feel good about themselves and who exemplified a positive spirit and determination.

"Whenever Dana was in a room, you could be sure there would be laughter. It wasn't that he brought attention to himself. In fact, he was a master at engaging others," she said. "So many successful people let their lives get out of balance with work taking up the lion's share of time. Not Dana. He truly understood that life was meant to be enjoyed and shared with others."

After graduating from UNM, Dana Wood worked for Bohannan Huston Inc., but his fascination with computers came to the forefront when Bohannan Huston created its spinoff company, Diginetics. He eventually led Diginetics and, after leaving that position, he started Leadertech, a software firm in Albuquerque and Los Angeles.

"Dana Wood was a creative, passionate engineer and entrepreneur, and we are honored that this gift will benefit the School of Engineering," said Joseph L. Cecchi, Jim and Ellen King Dean of Engineering and Computing. "Dana's enthusiasm for engineering, education, and the School will live on through this scholarship, which will help undergraduate engineering students achieve their dreams for years to come."

Dana Wood is survived by his three siblings, Doug Wood, of Albuquerque; Charlene (Dolly) Delaunay, a retired teacher in Wyoming; and John Wood, a professor in the UNM Department of Mechanical Engineering.

# Transitions

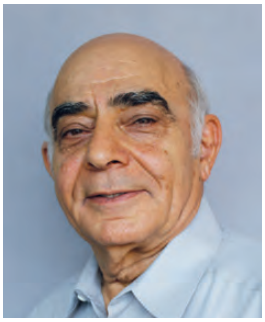
*Keeping up with the people in the School of Engineering*


Michael Devetsikiotis


Darko Stefanovic


Yu-Lin Shen


Arup Maji


Arsalan Razani

## New leadership

**Michael Devetsikiotis** has been selected as professor and chair of the Department of Electrical and Computer Engineering. Devetsikiotis was formerly professor of electrical and computer engineering at North Carolina State University. He is a native of Thessaloniki, Greece. He received a diplom-ingenieur in electrical engineering from Aristotle University of Thessaloniki in 1988, and master of science and Ph.D. degrees in electrical engineering from North Carolina State University, in 1990 and 1993, respectively. Devetsikiotis has research interests in efficient simulation and rare-event modeling techniques and in analyzing complex systems.

**Darko Stefanovic,** professor of computer science, has been selected as permanent chair of the department. He served as interim chair in 2015-16.

**Yu-Lin Shen,** professor of mechanical engineering, has been selected for a 2-year term to serve as interim chair for the department.

## New faculty

**Osman Anderoglu** has joined the Department of Nuclear Engineering as an assistant professor. Anderoglu holds a Ph.D. in materials science and engineering from Texas A&M, a master's in mechanical engineering from Texas A&M, and a bachelor's degree in mechanical engineering from Bogazici University in Turkey. Anderoglu was formerly a technical staff member at Los Alamos.

**Nichlaus Carroll** has joined the Department of Chemical and Biological Engineering as an assistant professor. He received his Ph.D. and bachelor's degrees from UNM in chemical engineering. He formerly was a postdoctoral researcher at Harvard University in applied physics and an assistant research professor at Duke University.

**Sang Lee** has joined the Department of Mechanical Engineering as an assistant professor. Lee received a Ph.D. in aerospace engineering from University of Illinois at Urbana-Champaign, a master's in mechanical engineering from Stanford University, and a bachelor's degree in mechanical engineering at Yonsei University in Korea. He was formerly a member of the technical staff/research engineer at the National Renewable Energy Laboratory in Golden, Colo.

**Youho Lee** has joined the Department of Nuclear Engineering as an assistant professor. He received his Ph.D. and master's degrees in nuclear engineering from MIT and a bachelor's degree in nuclear and quantum engineering from Korea Advanced Institute of Science and Technology. He was formerly a postdoctoral researcher at Korea Advanced Institute of Science and Technology.

## Retiring Faculty

**Arup Maji,** professor of civil engineering, and **Arsalan Razani,** professor of mechanical engineering.

# Achievements

*Giving kudos to our faculty and students*


Anil Prinja


Gabriel P. Lopez


Gregory Rowangould


Meeko Oishi


Julian Vigil

## Faculty

**Anil Prinja,** professor and chair in the Department of Nuclear Engineering, is serving on the Battelle Energy Alliance Board of Managers as the Nuclear University Consortium (NUC) representative. The goal of the NUC is to engage in collaborative research that strengthens the portfolios of the INL and the universities and further the nation's strategic nuclear energy objectives. UNM holds the chair for the consortium for the next two years (it rotates among the other partners of MIT, Oregon State, Ohio State, and North Carolina State universities). Prinja is also serving on the board's science and technology committee.

**Gabriel P. Lopez,** UNM vice president for research and a professor in the Department of Chemical and Biological Engineering, received the 2016 STC.UNM Innovation Fellow Award in recognition of his achievements as one of UNM's leading innovators. In addition, Lopez received an Innovation Award for two issued patents.

**Gregory Rowangould,** assistant professor of civil engineering, received an Early Career Award from the Environmental Protection Agency. With the three-year grant, he will look at how different combinations of land-use and transportation strategies affect exposure to toxic vehicle emissions.

**Meeko Oishi,** associate professor of electrical and computer engineering, was selected to become a UNM Regents' Lecturer. She will retain the title of Regents' Lecturer throughout her career at UNM.

## Students

Two design teams from the Department of Nuclear Engineering received best presentation awards in their technical tracks at the American Nuclear Society annual student conference at the University of Wisconsin-Madison from March 30–April 2. **Arnika Chidambaram, Joey Elmblad, James Pike,** and **Ryan Sharp** developed a low-enriched, high-flux nuclear reactor for the production a molybdenum-99 medical isotope. **Zackary Dodson, Cole Mueller,** and **Brittany Umbrag**e developed an 241Am2O3 coated particle, 100 We RTG for long-life planetary and space missions. Dodson and Umbrage also received an invitation to present their team design at the Innovations in Nuclear Space Conference to be held February 2017 in Orlando, Florida.

**Julian Vigil,** a senior in chemical and biological engineering, received the prestigious Goldwater Scholarship. The scholarship was founded in recognition of U.S. Senator Barry M. Goldwater and recognizes distinguished students in the fields of mathematics, science, and engineering. Vigil plans to pursue a Ph.D. in chemical engineering.

A student team won first place at the Intel Environmental Innovation Award for their wastewater treatment project in the 26th Annual International Environmental Design Contest held in April 2016 in Las Cruces. Students on the winning team were **Hannah Height, Aiden Anderson, Eric Sivonxay, Alina Martinez,** and **James Chavez.**


The 2015 winners of the Distinguished Alumni Award stand with Dean Joseph L. Cecchi (from left): Carol Adkins, James McNally, Jeff Van Dyke, Michael Dexter, Cecchi, L. Wayne Brassure, Antonio Jaramillo, Charles Jennett.

## School of Engineering reintroduces the Distinguished Alumni Awards

**After a several-year hiatus, the School of Engineering reintroduced the Distinguished Alumni Awards, which are given to honor the outstanding achievements of our alumni.**

**The 2015 ceremony was held October 15, 2015, at the Embassy Suites in Albuquerque. The following alumni were honored:**

**Carol L. Adkins,** *a graduate of the Department of Chemical and Biological Engineering.* She received her bachelor of science degree in chemical engineering from UNM in 1981.

**L. Wayne Brasure,** *a graduate of the Department of Nuclear Engineering.* Brasure earned a Ph.D. in nuclear engineering from the University of New Mexico in 1991.

**Michael E. Dexter,** *a graduate of the Department of Mechanical Engineering.* Dexter earned his bachelor's and master's degrees in mechanical engineering from UNM in 1975 and 1976, respectively, and his MBA from UNM in 2011.

**J. Charles Jennett,** *a graduate of the Department of Civil Engineering.* Jennett received his Ph.D. in 1969 from the Department of Civil Engineering, specializing in environmental and water resources.

**James J. McNally,** *a graduate of the Department of Electrical and Computer Engineering.* McNally received a Ph.D. in electrical engineering from UNM in 1986.

**Jeff P. Van Dyke,** *a graduate of the Department of Computer Science.* Van Dyke earned bachelor's and master's degrees from the UNM Department of Computer Science in 1991 and 1993, respectively.

The Young Alumni Award was presented to **Antonio E. Jaramillo,** a *graduate of the Department of Civil Engineering.* Jaramillo, of Albuquerque, received a bachelor of science in civil engineering in 2000.

**The 2016 awards ceremony, also held at the Embassy Suites, honored the following alumni of the School on September 22, 2016:**

**Douglas M. Smith,** *a graduate of the Department of Chemical and Biological Engineering.* Smith received a Ph.D. in chemical engineering from UNM in 1983.

**Rick L. Marquardt,** *a graduate of the Department of Civil Engineering.* Marquardt earned his bachelor's degree in civil engineering from UNM in 1984.

**Rick D. Russell,** *a graduate of the Department of Computer Science.* Russell received a bachelor's degree in computer science from UNM in 1987.

**Michael A. Rodriguez,** *a graduate of the Department of Electrical and Computer Engineering.* Rodriguez earned his Ph.D. in electrical engineering from UNM in 1981.

**Roger J. Koerner,** *a graduate of the Department of Mechanical Engineering.* Koerner received a bachelor's degree in mechanical engineering from UNM in 1968.

**Jennifer L. Troup,** *a graduate of the Department of Nuclear Engineering.* Troup received her bachelor's, master's, and Ph.D. degrees in nuclear engineering from UNM in 1992, 1994, and 2000, respectively.

The Young Alumni Award was presented to **Jason W. Harrington,** *a graduate of the Department of Civil Engineering.* Harrington received a bachelor's degree in construction management from UNM in 1998.

# FIVE FOR Greg Rowangould

***Gregory Rowangould is an assistant professor of civil engineering, but instead of studying highways and traffic flow for motor vehicles, his work takes a different focus: "While some of my colleagues think about building stuff, I think about what the impacts are on ways to mitigate or reduce emissions."***

## What are the goals of the research of your Early Career Award from the EPA?

We'll be looking at things like if you build your city more densely to constrain sprawl, that might reduce greenhouse gas emissions because everything's closer, more people use transit, more will walk and bike, but on the other hand, people will still drive cars. They may not drive them as far, but now it's concentrated in a small area. We're trying to figure out how to have healthy growth that contains sprawl, so we're doing some innovative modeling strategies on how you can piece together different policies and plans so you reduce greenhouse gas emissions but reduce exposure to toxic emissions.

## What impact do you hope your research will have?

My goal is to create tools, do research, and collect data that allows people to make more informed decisions, whether that's individuals or policymakers.

## What got you into the kind of work you do?

I grew up in Boston, and my family would go up to northern New England on vacation. And every year there was more sprawl and development, and the wilderness was disappearing. That's really what motivated me to go to college, to study forest science. Then I switched into chemical engineering to study the chemical processes. I realized we had a lot of good technology for reducing greenhouse gases, but I wanted to understand why people didn't do this stuff.

## What is the most pressing civil engineering issue we face today?

If you want to buy a big SUV, that's not my place to tell you that's a bad idea, but I think it's important that people understand the impact that has so they can make the right tradeoffs. It's all about trying to provide new information, which may be with modeling or trying to fill in the gaps with the stuff we don't know. And to better quantify the environmental impacts, benefits, and costs.

## Where do you see your research headed in the next decade?

A longer-term project I have is investigating the regional planning process, which I think is really problematic. The models have gotten so complex, they're really more of a barrier to planning than they are helpful, and they cost a lot to develop. I would like to find a better way to do this modeling that is still realistic enough but is simple enough that we can involve more people's ideas.

## NOTABLES

Received Early Career Award from the Environmental Protection Agency, 2016

Created ABQ Stumbler website (abqstumbler.tumblr.com) to expose bad sidewalks in Albuquerque

Former science fellow, Natural Resources Defense Council, Santa Monica, California

THE UNIVERSITY of NEW MEXICO

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## TRANSFORMATIVE THINKERS


There's a lot of talk these days about how to attract more students to engineering, especially students from diverse backgrounds.

But a team from UNM took that talk and put it into action. The team received a $2 million grant from the National Science Foundation as part of the $14 million RED (Revolutionizing Engineering Departments) initiative.

The team, made up of **Abhaya Datye, Sang M. Han, Eva Chi, Sung (Pil) Kang, Vanessa Svihla, Jamie Gomez,** faculty from UNM's Department of Chemical and Biological Engineering, and the Organization, Information and Learning Sciences program, and **Marina Miletic,** will execute this project, which seeks to address the urgent need to produce more engineers who are ready to solve societal problems that include clean water, a clean environment, diverse and sustainable energy sources, and improved health care.

This is an exciting initiative, but to achieve maximum success, your input and ideas are needed. Alumni, especially those in the chemical engineering field, are encouraged to get involved by letting the team know what is needed in engineering education today.

***Those interested in getting involved can contact Abhaya Datye at datye@unm.edu.***