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**NM** College of  
**STATE** Engineering

**GODDARD**  
B R O A D C A S T

Spring 2018

A group of six young men, the recipients of the Eisenhower Fellowship, are standing in a workshop or laboratory. They are dressed in casual attire, including t-shirts, a polo shirt, and a button-down shirt. One student is wearing a black t-shirt with "UNIVERSITY OF NM STATE 18 AGGIES 88" printed on it. The background shows industrial equipment and green-painted metal structures.

## SIX NMSU CIVIL ENGINEERING STUDENTS AWARDED EISENHOWER FELLOWSHIP



**The Dwight David Eisenhower Transportation Fellowship** will provide six New Mexico State University civil engineering graduate students \$29 thousand to support their research projects.

Doctoral students Mark Manning and Alain Cuaron along with master's students Adam Sanchez, William Toledo, Jason Alcantar and Arno Cheng are the 2018 recipients of the fellowship.

"I am very pleased that our students have once again been offered Eisenhower Transportation Fellowships," said Lakshmi Reddi, College of Engineering dean. "Their success is testament to the strength of our Civil Engineering Department's transportation program. I'm confident that this support will further them into positions of leadership in their careers."

Manning was awarded \$10,000, and his research is focused on working with Ultra-High Performance Concrete or UHPC, which is very strong and durable and less likely to crack and weather. UHPC has a longer service lifespan and less maintenance is expected during that time.

Sanchez received \$7,500, and is researching the use of UHPC for box girder joints. He will study the best mixtures and use of local materials. After successful testing, he hopes this research will aid in building a bridge in New Mexico in fall 2018.

Toledo received \$5,000, and is studying the overlay potential of UHPC on existing concrete bridge decks. The goal of the project is to develop overlay technologies that can reduce maintenance costs, protect the underlying concrete deck, and extend the bridge service life.

Cuaron received \$3,500, and is evaluating the performance of both High Performance Concrete, or HPC, and UHPC bridges using an embedded fiber optic sensor system. He will use sensors to learn about pre-stress losses, deformations, strains, thermal effects and curvature of a bridge.

Alcantar and Cheng each received \$1,500. Alcantar is studying root-inspired foundations and retaining systems and how to create a tubular system through a pile foundation. Cheng is evaluating local pre-stressed concrete double tee bridges that don't have design plans.

Read more at [enr.nmsu.edu/eisenhower/](http://enr.nmsu.edu/eisenhower/)





## NMSU PROFESSOR USES AUTONOMOUS VEHICLES TO TEACH INTERDISCIPLINARY ENGINEERING

**Liang Sun**, an assistant professor in the Mechanical and Aerospace Engineering Department in the New Mexico State University College of Engineering, is bringing the interdisciplinary nature of real-world engineering to his students.

Sun's teaching, research and projects are focused on autonomous unmanned systems, such as drones and robots, which rely on a number of engineering disciplines, as well as computer science.

Sun is developing a ground robot that can hear, mimicking the ability of mammals to identify the location of something through the sound it produces. This bio-inspired approach uses only two microphones, just like ears, that can discern the location of multiple sound sources. In a search and rescue operation, the robot can sense the environment and find the target of interest – perhaps a

human calling out or blowing a whistle. Other uses include localization and mapping or abnormality detection, such as air leaking in a spacecraft.

Another of Sun's projects that has already garnered a provisional patent involves tethered drones, just like kites, to resolve several concerns of drones.

The tether could serve as a powerline, enabling them to run 24-7. Eliminating the battery would allow for a more powerful motor that would support a bigger payload. The physical tether connection can be used to locate a lost drone or prevent drone mishaps. The drone can identify its location through the tether by applying estimation techniques.

Each project involves both graduate and undergraduate students. Sun has extended exposure of this interdisciplinary research to

numerous students through his courses and capstone projects.

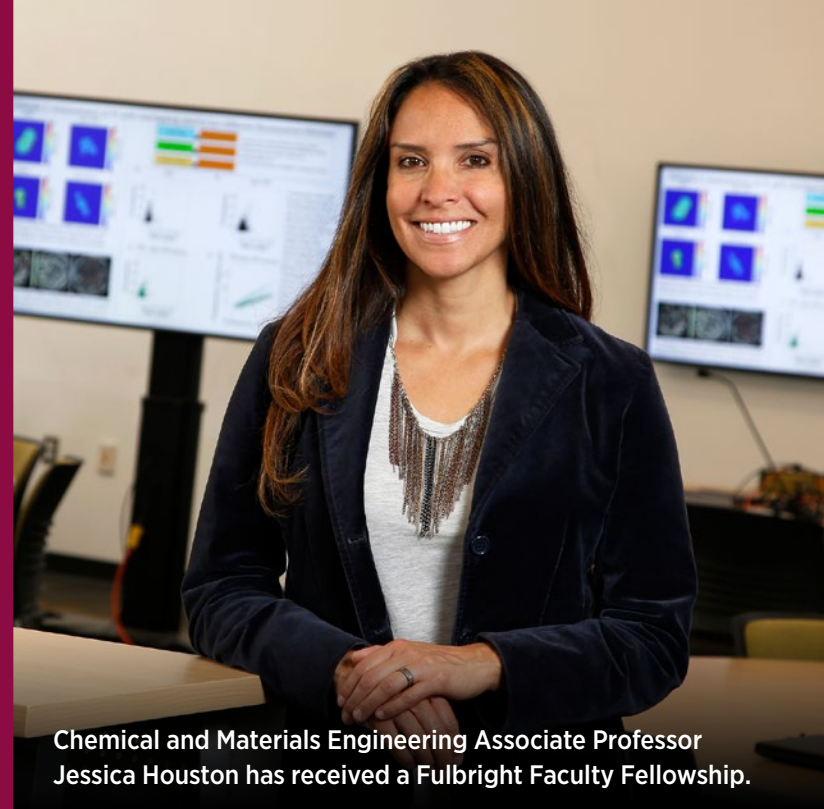
Sun teaches two courses that build on the interdisciplinary concept through hands-on experiential projects. ME 210, Electronics and Systems Engineering, introduces entry-level mechanical and aerospace engineering students to fundamentals in electronics and engineering and management of complex systems. Students in ME 487, Mechatronics, combine mechanics and electronics in flying vehicles, such as unmanned aerial vehicles and advanced ground robots.

"I want to give students the opportunity to experience this cutting-edge, interdisciplinary research by incorporating it into my teaching," Sun said.

**Read more at**  
[enr.nmsu.edu/autonomous](http://enr.nmsu.edu/autonomous)



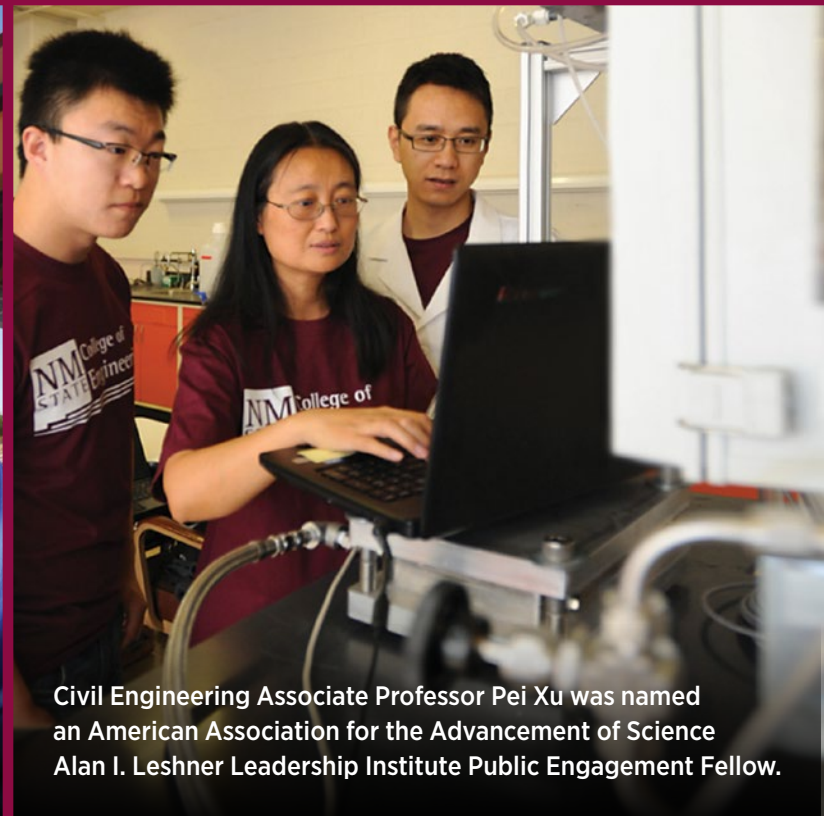
# ENGINEERING FACULTY MEMBERS HONORED



Chemical and Materials Engineering Associate Professor Jessica Houston has received a Fulbright Faculty Fellowship.



Civil Engineering Associate Professor Brad Weldon was named Harold Foreman Endowed Professor of Excellence in Civil Engineering.



Civil Engineering Associate Professor Pei Xu was named an American Association for the Advancement of Science Alan I. Leshner Leadership Institute Public Engagement Fellow.



## NMSU GEOMATICS, INDUSTRY PARTNERSHIP **ENHANCED WITH NEW GIFT**

**The New Mexico State** University Foundation has received a two-year, \$200,000 gift from PNM Resources Foundation to enhance the geomatics program in the College of Engineering. The gift was a result of the New Mexico Professional Surveyors partnership to increase enrollment, and subsequently, the number of employable NMSU graduates for companies and services in need of professionally licensed surveyors in New Mexico.

“There are a lot of employers who need the service of a licensed surveyor,” said Thomas Jenkins, head of the Department of Engineering Technology and Surveying Engineering. “NMPS’ concern was making sure there was a greater opportunity for NMSU to service that need for both the industry and our graduates.”



Conrad Roybal, president of NMPS, estimates the average age of a land surveyor to be 58. Currently, NMSU has nearly 100 percent placement in the field, mostly in New Mexico. With the expectation that within the next 10 years the demand for land surveyors will increase tenfold, NMPS members believe the energy spent to strengthen the program is crucial and consider NMSU graduates to be the future of their profession.

NMSU’s geomatics program is one of only a handful of four-year degree programs in the nation accredited by the Engineering Accreditation Commission of the Accreditation Board of Engineering and Technology. Graduates meet the educational requirements for registration as a professional land surveyor, which is required for most positions within New Mexico.

**NEW MEXICO STATE UNIVERSITY**

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**NM** College of  
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“Goddard Broadcast” pays homage to wireless communication pioneer Ralph Willis Goddard, one of the founders of the engineering school in 1914, and former dean of engineering at NMSU, originally known as the New Mexico College of Agriculture and Mechanic Arts.

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