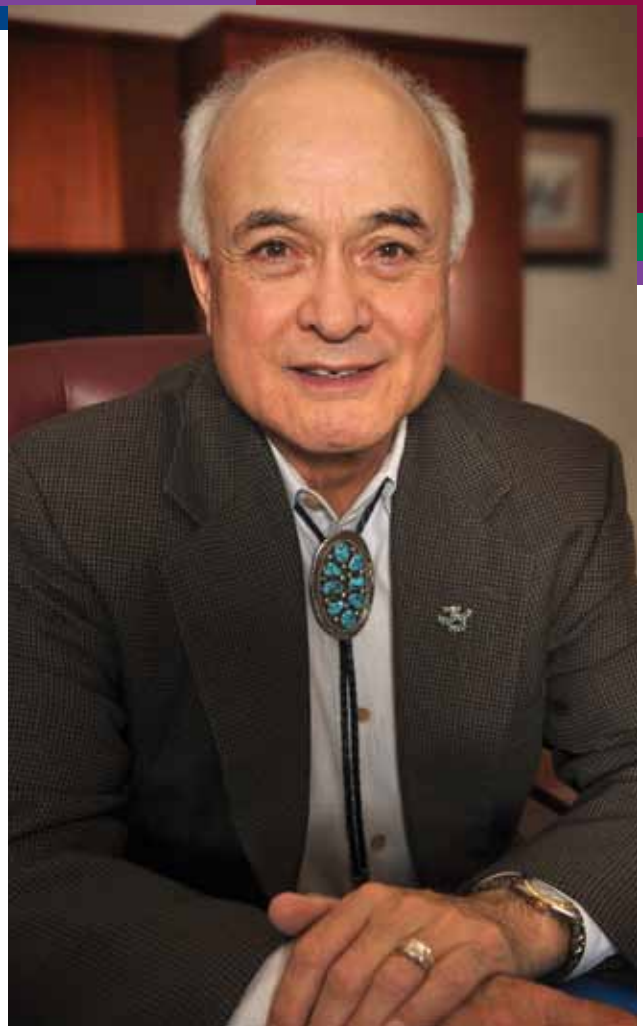
NM STATE College of Engineering
Live, Learn and Thrive.™

Highlights of the YEAR 2011 2012



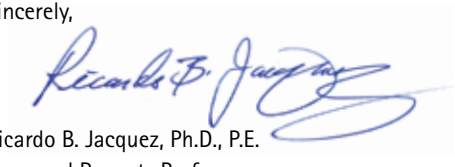
A Message from the Dean

NMSU recently celebrated the sesquicentennial of the Morrill Act, signed into law by President Abraham Lincoln on July 2, 1862. The legislation established the land-grant system of colleges in the U.S. and New Mexico State University traces its roots back to it. NMSU's predecessor, the New Mexico College of Agriculture and Mechanic Arts, was founded in 1888, starting a proud engineering tradition at New Mexico's only land-grant university.

Technology is becoming part of our daily lives at an ever-increasing speed and to a greater degree and the need for engineering solutions grows with it. NMSU engineers, as they have since 1888, continue to address the growing and changing needs of the communities we serve. Our expert instruction, world-class research and community outreach serve New Mexico, the desert southwest and far beyond. After all, this is our land-grant mission.

Once our engineering students graduate, they enter into government, academia and industry. They carry with them that same commitment to service and a drive to utilize their skills for the betterment of mankind. Our graduates play an important role in seeking out solutions to the challenges of the modern world. Within these pages you will find just a few examples of the progress we have made toward that end. These accomplishments are only possible with the backing of colleagues, friends and supporters like you, those who share our belief that, together, we can make the world a better place.

Sincerely,



Ricardo B. Jacquez, Ph.D., P.E.
Dean and Regents Professor

Our cover: Freshman mechanical engineering student Rachel Tessier is an undergraduate research assistant in the Reduced Gravity and Biomechanics Laboratory. She became involved with the lab while a senior in high school dual-enrolled at NMSU.

College Profile

Degrees Offered

Aerospace Engineering (BS, MS and Ph.D.)
Chemical Engineering (BS, MS and Ph.D.)
Civil Engineering (BS, MS and Ph.D.)
Electrical and Computer Engineering (BS, MS and Ph.D.)
Engineering Physics (BS)
Engineering Technology (BS, majors in Civil, Electronics and Computer, Information, or Mechanical)
Industrial Engineering (BS, MS and Ph.D.)
Information and Communication Technology (BICT)
Mechanical Engineering (BS, MS and Ph.D.)
Surveying Engineering (BS)

National Faculty Awardees

Presidential Award for Excellence in Science, Mathematics and Engineering Mentoring . . . . . **Ricardo B. Jacquez**
Department of Energy PECASE Award . . . . . **Jeanine Cook**
National Science Foundation CAREER Award . . . . . **Charles Creusere**
Gabe Garcia
Jessica Houston

Endowed Chairs

Ed and Harold Foreman Endowed Chair in Civil Engineering . . . . . **Nirmala Khandan**
Frank Carden Endowed Chair for Telemetering and Telecommunications . . . . . **Charles Creusere**
PNM Endowed Chair for Utility Management . . . **Satish Ranade**
William Kersting Endowed Chair in Power Systems Engineering . . . . . **TBD**

Endowed Professorships

Harold Foreman Distinguished Professorship in Civil Engineering . . . . . **Rola Idriss**
Ed Foreman Distinguished Professorship in Civil Engineering . . . . . **Zohrab Samani**
John Clark Distinguished Professorship in Civil Engineering . . . . . **Peter T. Martin**
Paul W. and Valerie Klipsch Distinguished Professorships in Electrical and Computer Engineering . . . . . **Vojin Oklobdzija**
Kwong Ng
Jaime Ramirez-Angulo
David Voelz
Robert Davis Distinguished Professorships in Chemical Engineering . . . . . **Shuguang Deng**
Dwight and Audrey Chapman Distinguished Professorship in Mechanical Engineering . . . . . **Eric Butcher**
Wells-Hatch Endowed Professorship in Civil Engineering . . . . . **David Jáuregui**
Robert G. Myers Endowed Professorship in Mechanical Engineering . . . . . **Ian Leslie**
International Foundation for Telemetering Professorship in Electrical and Computer Engineering . . . . . **Deva Borah**
Mechanical and Aerospace Engineering Academy Professorship . . . . . **Igor Sevostianov**
John Kaichiro Nakayama and Tome Miyaguchi Nakayama Professorships for Research and Teaching Excellence (2) . . . . . **TBD**

College of Engineering Leadership

Ricardo B. Jacquez, Dean
Sonya L. Cooper, Associate Dean of Academics
Martha C. Mitchell, Associate Dean of Research
Patricia A. Sullivan, Assistant Dean of External Relations and Director of Engineering New Mexico Resource Network
Ian Leslie, Interim Mechanical and Aerospace Engineering Department Head
Jeffrey S. Beasley, Engineering Technology and Surveying Engineering Department Head
Satish Ranade, Electrical and Computer Engineering Department Head
Peter T. Martin, Civil Engineering Department Head
David A. Rockstraw, Chemical Engineering Department Head
Edward Pines, Industrial Engineering Department Head

Accreditation

Baccalaureate programs in civil, chemical, electrical and computer, engineering physics, industrial, mechanical, and surveying engineering are accredited by the Engineering Accreditation Commission of ABET, Inc. Baccalaureate programs in civil, electronics and computer, and mechanical engineering technology are accredited by the Engineering Technology Accreditation Commission of ABET, Inc.

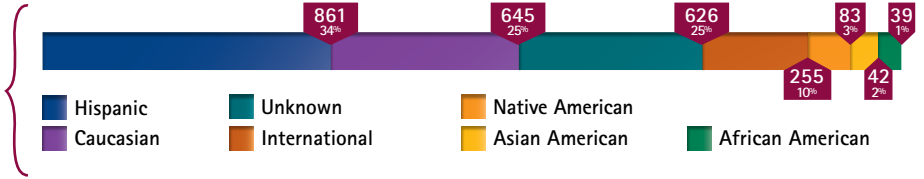
Commission of the Accreditation Board for Engineering and Technology www.abet.org

College Statistics

New freshman enrollment 2011

Student enrollment 2011

Student ethnicity Fall 2011



Student gender Fall 2011

College endowment 2011-12
(in millions)

Total gifts received 2011-12
Monetary gifts Gifts-in-kind (in thousands)

Number of scholarships awarded 2011-12*

Total value of scholarships awarded 2011-12*
(in millions)

*Note: This incorporates all financial aid processed through the College of Engineering.

Engineering New Mexico Resource Network

The College's Engineering New Mexico Resource Network delivers a range of engineering-based outreach programs to businesses, government agencies, teachers and K-16 students from across the state. The initiative is focused on enriching the state's economic competitiveness through the advancement of innovation, entrepreneurship and employee preparedness required to meet the changing needs of the 21st century.

During the past year, the college reached more than 13,250 students who participated in K-16 STEM programs. More than 1,200 individuals were trained through professional development, certificate programs and short courses. Some 81 businesses received technical assistance to enhance their economic and technical competitiveness.

Delivery of hands-on programs for K-16 students that support critical thinking, educational attainment, entrepreneurship and innovation are a major focus of the Engineering New Mexico Resource Network. Professional development programs have been designed to ensure a highly skilled workforce that is available to meet current and future needs. New Mexico-based businesses are assisted through customized training, innovative solutions to engineering and design problems as well as manufacturing and prototype development that boosts the competitive nature of small- and medium-sized businesses.

For more information about the Engineering New Mexico Resource Network, visit engr.nmsu.edu/outreach.shtml.

Professional Development

- Electric Utility Management Program Professional Engineer Refresher Course
- Climate Station Training
- Weather and Climate Short Course
- Bridge Inspection Training
- Bridge Inspection Refresher
- Quality Concrete School
- Project Lead the Way Teacher Training
- Southwest Technology Development Institute Photovoltaic/ National Electric Codes Training
- Manufacturing Technology and Engineering Center Training
- Institute for Energy and the Environment Pollution Prevention Training
- Wells, Pumps, Etc.
- FPGA Nano-board Short Course
- Institute for Energy and the Environment ReEnergize the Americas Conference

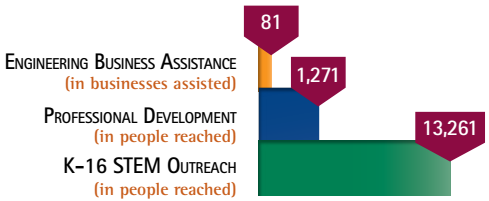
Engineering Extension Business Assistance

- Engineering Technology and Surveying Engineering Outreach Projects
- Institute for Energy and the Environment P2/E2 Assessments
- Southwest Technology Development Institute Engineering Assistance
- Manufacturing Technology and Engineering Center Business Assistance Projects

K-16 STEM Outreach

- NM Project Lead the Way
- NM Pre-freshman Engineering Program
- NM Boosting Engineering, Science and Technology Robotics
- NM Alliance for Minority Participation Programs
- NM Reaching the Pinnacle
- Institute for Energy and the Environment Pollution Prevention, Energy Efficiency and Water Programs
- Institute for Energy and the Environment Environmental Design Contest
- Career Awareness Programs
- Regional Alliance Summer Science Institute
- Wizards of Goddard Hall Summer Camp
- City of Las Cruces Water Festival

2011-2012 Engineering Outreach



Engineering joins forces with agriculture to promote renewable energy

The College of Engineering partnered with NMSU's Cooperative Extension Service (CES), administered by the College of Agricultural, Consumer and Environmental Sciences, to create a series of short videos that promote renewable energy.

Topics include small wind turbines, stand-alone solar arrays and sterling engine models. The videos, each about four minutes in length, can be viewed on the NMSU website and YouTube.

NMSU Engineering Technology Professor Tom Jenkins demonstrates the use of a solar-powered water pump.

"This first series on renewable energy supports the growing need for applications that meet the needs of the state's rural population; we are pleased to team with CES in making these materials available," said Patricia Sullivan, assistant dean of the College of Engineering.

"The video project came about through discussions with CES," said Thomas Jenkins, engineering technology and survey engineering professor at NMSU. "We talked about answering renewable energy questions for constituents."

"As energy costs continue to climb, New Mexicans are increasingly asking our Extension faculty, located in every county of the state, for down-to-earth information about alternative energy," said Jon Boren, associate dean and director of CES.

"Because NMSU is a land-grant institution we have a mission to do this kind of work for the people it serves," added Jenkins.

"Many of the demonstrated modules were designed as student projects," Jenkins said. "We apply students' hands-on experiments, and they become a benefit to the community through service learning."

To view the videos, visit engr.nmsu.edu/outreach.professional.shtml.

NMSU "Lego Lab" helps students learn robotics, builds interest in engineering

White coats, safety glasses and serious scientists are what most of us would expect to see in an engineering lab. However, in one lab, for 25 years, researchers have been using a favorite childhood building block to stir creativity and problem-solving skills in thousands of students.

The Controls and Automation Lab is a sector of the Manufacturing Technology and Engineering Center (M-TEC) and is an instructional lab that specializes in teaching industrial controls and automation.

Appropriately nicknamed the Lego Lab, this facility specializes in support for high school robotics competitions, workshops to educate teachers about robotics and competitions to build student interest in engineering through the use of specialized Lego training kits that result in the completion of a small robot.

Yu-Ping Tang, the on-site engineer, developed the bright red training kits, which function at three levels of difficulty, with 15 exercises at each level. They all contain motors, various mechanisms, sensors, controls and, of course, Legos. Intricate picture diagrams give students step-by-step instructions on how to build the robots.

Tang has worked with approximately 5,000 to 6,000 regional students since he started at M-TEC. Tang said the Lego robots follow the same principles as real-life devices and use the same system processes and design.

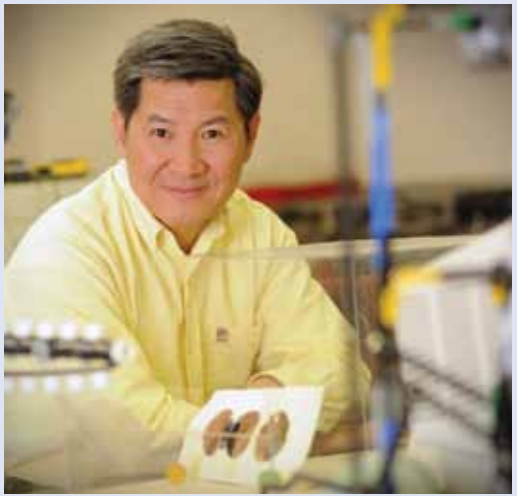
"If you like this kind of work, engineering is for you; but other majors are welcome, too. Hands on can apply to other aspects of life," Tang said.

The Lego Lab began as a portable tech mobile, which was taken to local schools to promote interest in robotics and machinery. It evolved into the facility it is today, which has catered to up to 2,500 visitors a year for the past 25 years.

There are a variety of robots. One navigates a maze, then locates and extinguishes a flame, while another climbs up the wall using vacuum technology. A "Lego Automotive Manufacturing Plant" demonstrates every step that goes into building cars, from detailing to quality control, all within a few square feet.

The age groups Tang works with are just as diverse as the types of robots in his lab. The M-TEC employee welcomes elementary-school-aged students all the way up to those in college-level electronics classes.

Tang's job does not require him to work in the Lego Lab. As a senior engineer his responsibility is to provide small business assistance and work with projects such as Space Alliance Technology Outreach Program, but he volunteers to run the lab.



Yu-Ping Tang is the on-site engineer in the Controls and Automation Lab, also known as the Lego Lab, at NMSU's Manufacturing Technology and Engineering Center.

"Yu-Ping is a very technical and analytical person, but shares a big part of his job to help and volunteer with kids," said Anthony Hyde, supervisor of M-TEC.

Research

Engineering faculty pursue solutions to Engineering Grand Challenges

Building on the strength of our research activities, we are actively pursuing projects that contribute toward the National Academy of Engineering's Grand Challenges—engineering solutions that will help people and the planet thrive. Our faculty members are working on a number of the challenges identified by the academy. Many of our programs have a long history of research devoted to some of these important issues.

Making solar energy more economical

We have created significant programs aimed at developing renewable resources and electric power systems engineering to address the growing nationwide demand for power. We are examining ways to develop alternative sources of energy and utilize traditional fossil resources to provide cost-effective, distributed electricity to our communities. Our Electric Utility Management Program has been developing students with the engineering skills and business acumen to serve as leaders in this complex industry for nearly 40 years. We are conducting innovative research into incorporating the use of alternative energy sources through micro-grid technology development. Our Southwest Technology Development Institute, established in 1977, is the lead in a Department of Energy initiative for setting national codes and standards for integration of solar energy.

Restoring and improving the urban infrastructure

NMSU has a long history of research and collaboration with industry through our Bridge Research Center. Launched in 1972, it is working to improve the safety and performance of our nation's bridges. The program offers the only Bridge Safety Inspection training program in the nation through which bridge inspectors from throughout the nation receive certification. This program fostered our world-renowned research in "smart bridge" technology that incorporates fiber optics to monitor bridge performance. Our research also extends to new technologies for improving highway safety, evaluation methods and performance.

Providing access to clean water

Our expertise in ensuring water quality and quantity crosses a number of disciplines that address local issues for our arid region but have worldwide application. Such research includes novel methods of desalination, cost-effective methods to remove arsenic from drinking water and the use of satellite data to measure agricultural crop evapotranspiration. We are part of the National Science Foundation Engineering Research Center for Re-inventing America's Urban Water Infrastructure. We are partnering with the Office of Naval Research and General Electric Water and Process Technologies at the Tularosa Basin National Desalination Research Facility to investigate ways to make the vast reservoir of brackish water lying underneath most of the state of New Mexico usable to its citizens. Our goal is to combine innovation and technology to provide clean, affordable water today and in the future.

New Research Awards and Renewals
(in millions)

Research Expenditures
(in millions)

Intellectual property activity

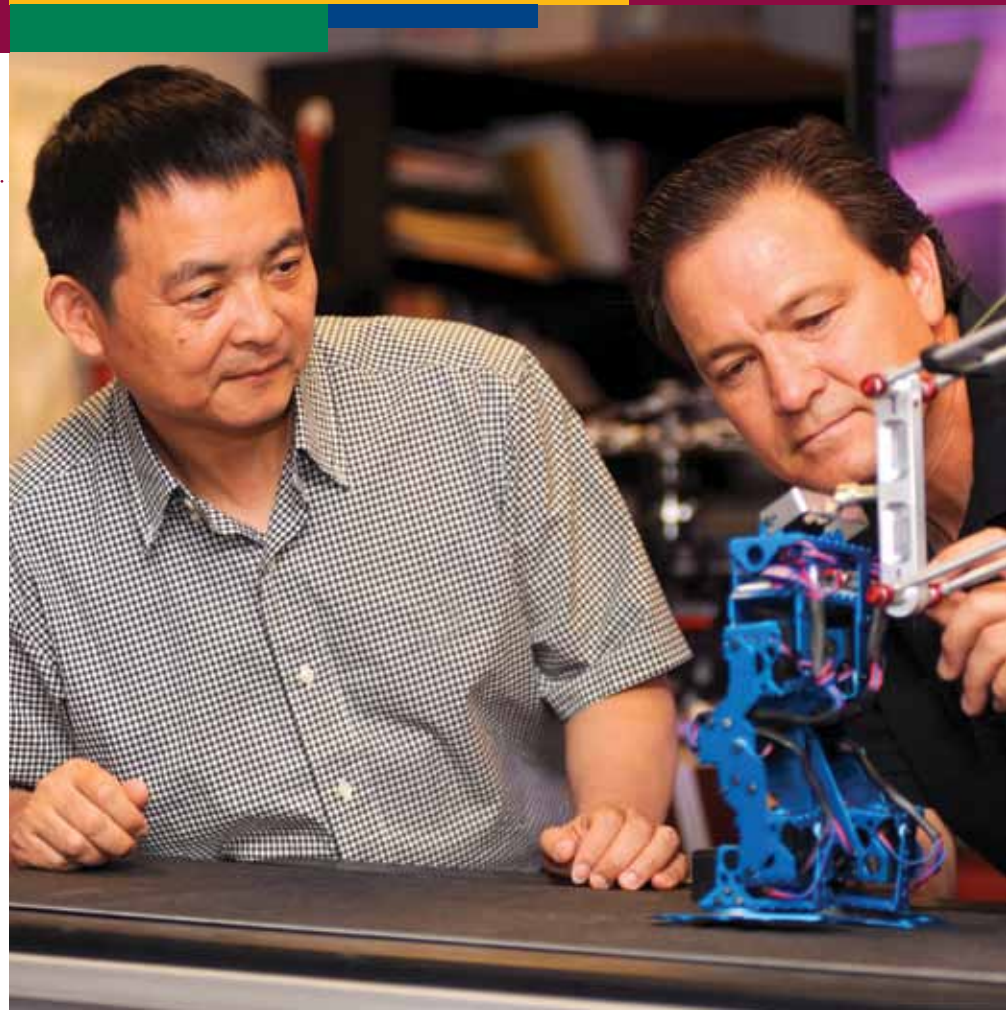
U.S. Patents Awarded

- Nagamany Nirmalakhandan, Veera Gnaneswar Gude, "Desalination Using Low-Grade Thermal Energy"
- SaiRamesh Nammi, Deva K. Borah, "List-Based Detection in Fading Channels with Long Intersymbol Interference"
- Nagamany Nirmalakhandan, Shuguang Deng, Geoffrey Smith, "Method and Apparatus for Membrane-Based, Two-Stage Gas Production from Solid Biomaterials"
- Ou Ma, Jiegao Wang, "Apparatus and Method for Reduced Gravity Simulation"

U.S. Patents Pending: 7

U.S. Provisional Patents Filed: 1

Invention Disclosures Filed: 10



Ou Ma (left) recently received a U.S. patent on reduced-gravity technology that can not only train astronauts to work in space, but can also help persons with disabilities who have walking impairments. Engineer Ken Ruble leads the Reduced Gravity and Biomechanics Laboratory where this research is conducted.

Key university research collaborations

National Science Foundation Louis Stokes Alliance for Minority Participation

New Mexico State University (Lead)
New Mexico Highlands University
Eastern New Mexico University
New Mexico Tech
University of New Mexico
Western New Mexico University
Central New Mexico Community College
Diné College
Luna Community College
New Mexico Junior College
New Mexico Military Institute
New Mexico State University-Alamogordo
New Mexico State University-Carlsbad
New Mexico State University-Doña Ana
New Mexico State University-Grants
Northern New Mexico College
San Juan College
Santa Fe Community College
Southwestern Indian Polytechnic Institute
University of New Mexico-Gallup
University of New Mexico-Los Alamos
University of New Mexico-Valencia

National Alliance for Advanced Biofuels and Bioproducts

Donald Danforth Plant Science Center (Lead)
Los Alamos National Laboratory
New Mexico State University
University of Arizona
Texas A&M University
Pacific Northwest National Laboratory
Others

The Wind Alliance

Texas Tech University (Lead)
New Mexico State University
University of Houston
Texas A&M University
Rice University
University of Texas
University of Iowa
University of California, Davis
Florida State University
BP Wind Energy
Shell Wind Energy
TECO Westinghouse
Vestas Technology
Others

Office of Naval Research and Bureau of Reclamation, NMSU Water Security Program

New Mexico State University (Lead)
General Electric

NASA, Investigation of Composition of Cosmic Rays

New Mexico State University (Lead)
University of New Hampshire
Stanford University
Goddard Space Flight Center

National Science Foundation Engineering Research Center, Re-inventing America's Urban Water Infrastructure

Stanford University (Lead)
New Mexico State University
University of California, Berkeley
Colorado School of Mines

Army High Performance Computing Research Center

Stanford University (Lead)
New Mexico State University
University of Texas, El Paso
Morgan State University
High Performance Technologies, Inc.

Department of Homeland Security Center of Excellence in Border Security and Immigration

University of Arizona (Lead)
New Mexico State University
Arizona State University
San Diego State University
University of Minnesota
University of Washington
West Virginia University
Others

Chemical Engineering

Professor researches chemical solutions to create metal-oxide films

Ongoing research led by Assistant Professor of Chemical Engineering Hongmei Luo could lead to more cost-effective ways to create metal-oxide films that are used in the production of electronic and optical devices. Luo's work could ultimately reduce the cost to end-users of these products.

Metal-oxides, chemical compounds containing at least one oxygen atom as well as at least one metal element, are becoming increasingly important because of the range of electronic, magnetic, optical and thermal properties they possess. Metal-oxide films are used to make photovoltaic devices, gas sensors, microelectronics and corrosion-protection devices.

Traditional methods to produce metal-oxides with particular chemical compositions and coat them as thin films on a variety of surfaces involve physical- and chemical-vapor deposition. These techniques require large and expensive vacuum systems. While they deliver quality metal-oxide films, the cost is high and they are limited by the inability to coat large areas. Chemical solution deposition methods are less expensive, easier to setup and have the ability to coat large areas, but it is a challenge to produce high-quality films with controlled compositions and film thicknesses.

Luo and a team of student researchers are developing a polymer-assisted chemical solution approach to create high-quality film of nearly any metal-oxide. The films range in thickness from 10 nanometers to hundreds of nanometers. Metal ions are stabilized in polymer solution that can be applied by dipping or spin-coating. The polymer is baked off, leaving a thin film of metal-oxide on nearly any shape of surface. The thin film is less susceptible to cracking and its properties can be precisely controlled.

"Metal-oxides have many valuable properties and a wide variety of applications. We hope to use this less expensive method to produce materials that are comparable in quality to those prepared by other techniques," said Luo.

Luo has about 11 years of experience in nanomaterial research, including work as a post-doctoral research fellow at Los Alamos National Laboratory where she and associate researchers have filed for four patents relating to this technique. When she joined the NMSU faculty in 2009, she introduced this new line of research, bringing a variety of opportunities to chemical engineering students.

Luo developed and teaches a new elective materials course, Nanoscience and Nanotechnology, that has attracted undergraduate and graduate students from the physics, chemistry, electrical and chemical engineering departments.

Ten graduate and three undergraduate students are currently conducting research in Luo's thin films and nanomaterial laboratory. Three master's students have already graduated, two of whom are now doctoral students in her group. Due to Luo's connection, five graduate students and one undergraduate student have had the opportunity to work at Los Alamos and Sandia National Laboratories during the summer.

Over the course of three years at NMSU, members of Luo's group have published 20 papers and have made more than 40 presentations at conferences and schools. The group is working on a variety of research projects supported by NMSU new faculty start-up funds, NMSU Interdisciplinary Research Grants, NMSU Graduate Research Enhancement Grants, Air Force Research Laboratory, National Science Foundation, New Mexico Space Grant Consortium and Los Alamos National Laboratory.

Luo and colleagues recently received an NSF grant for the acquisition of a state-of-the-art high-resolution atomic force microscope that will promote a college-wide initiative in materials research and education.

NMSU has recently honored Luo for her research with the University Council Early Career Award for Exceptional Achievement in Creative Scholarly Activity.

For more information, visit Luo's research page on the NMSU website at http://chemeng.nmsu.edu/HL/research.html.

Within the chemical engineering department, research is underway that will advance the production of metal-oxide films; it also provides research opportunities for graduate students. Shown, from left, doctoral student Gen Chen and chemical engineer Hongmei Luo.

Civil Engineering

NMSU researchers part of NSF effort to reinvent America's urban water infrastructure

Over the next five years, NMSU researchers will receive nearly $3 million for their role in an National Science Foundation-funded, multi-university effort to reinvent America's aging and inadequate water infrastructure. NMSU, along with Stanford University, Colorado School of Mines and University of California, Berkeley, form the Urban Water Infrastructure Engineering Research Center. NSF will invest $18.5 million in the center over five years, with additional funds to follow based on in-progress reviews.

Engineering Research Centers (ERC) are interdisciplinary, university-based hubs where researchers work in close partnership with various industries to pursue strategic advances in complex engineered systems and technologies. The Urban Water ERC, led by Stanford, includes researchers trained in the fields of environmental engineering, earth sciences, hydrology, ecology, urban studies, economics and law.

Civil Engineering Professor Nirmala Khandan is co-investigator on the project.

"At this level of collaboration, we can achieve much more than any one individual campus could alone," he said. "We are starting with a clean slate and developing entirely new philosophies about how to recreate our urban water systems."

Khandan serves as the education director for the center, along with his counterpart at the Colorado School of Mines.

The cornerstone of these efforts is NSF's Research Experiences for Undergraduates program, which supports active research participation by undergraduate students in the areas of research funded by the NSF. Undergraduate students worked with faculty doing hands-on research over the summer.

The program will also incorporate NSF's Research Experiences for Teachers, through which middle and high school teachers can work with faculty over the summer in water-related areas. Participating teachers are required to incorporate 40 hours of water-related educational activities in their classrooms.

Water-related courses will be developed and offered for undergraduates across all four institutions. Additionally, workshops will be developed for practicing water technicians to expose them to the ERC's research and new technologies.

"Education is a very important component so that we can sustain these new approaches to urban water management," said Khandan.

Khandan also serves as the leader of ERC's research at NMSU. Along with four other NMSU faculty members, he is conducting research that holds the promise of new strategies to rebuild the crumbling water infrastructure.

Khandan's ongoing research on the use of algal systems to produce biofuel and treat wastewater fits well into the ERC's goals. For the past three years, he has been growing different species of algae to determine how much oil can be gathered from each. While Khandan is investigating the optimal conditions for algae growth and providing nutrients from recycled wastewater, chemical engineering Professor Shuguang Deng concentrates on making it useable as a source of energy.

Bernhard Leinauer, professor and extension specialist in the College of Agricultural Consumer and Environmental Sciences, is investigating the beneficial use of treated wastewater. His research focuses on using brine, a byproduct of treated wastewater, for landscaping.

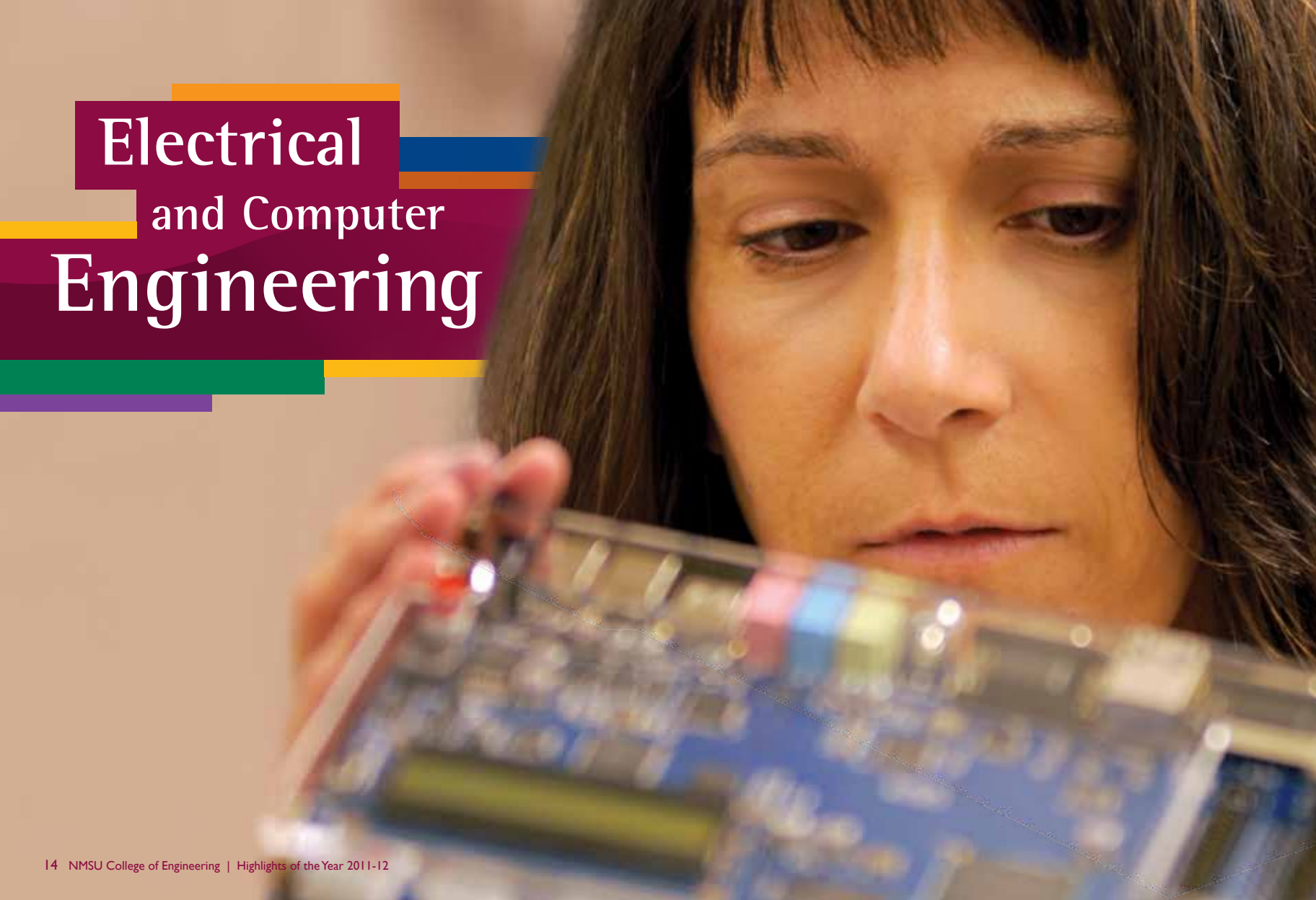
Even as Khandan, Deng and Leinauer are investigating beneficial uses of wastewater, James P. King, civil engineering professor and associate department head, is looking to create new ways to capture and use storm water.

Civil engineering Professor Salim Bawazir is focusing on novel methods to manage vegetation in riparian zones in order to improve and conserve water quality and habitat as well as apply them in urban settings.

For more information, visit the Engineering Research Center on Reinventing Urban Water Infrastructure online at urbanwatererc.org.

(Left to right) Ed and Harold Foreman Endowed Chair Nirmala Khandan, post-doctoral student Ambica K. Pegallapati, and doctoral candidate Yalini Arudchelvam, discuss an algal reactor for treating sewage with simultaneous biodiesel production. This new type of energy-efficient reactor is being developed under the NSF ERC, REinventing the Nations's Urban Water Infrastructure (RENUWIt).

Electrical and Computer Engineering



NMSU research may help solve some of the biggest computer problems

A partnership between Jeanine Cook, associate professor in the Klipsch School of Electrical and Computer Engineering, and Sandia National Laboratories has resulted in a project that will push the limits of computing power to help scientists solve complex problems that are important to areas such as national security and medical research.

The four-year National Science Foundation project aims to develop an entirely new computer system focused on solving complex, graph-based problems that will reach into the next frontier of supercomputing: exascale processing is 1,000 times that of the fastest computer currently operational at one quadrillion operations per second.

"A simple example of a graph-based computer problem is Facebook," explained Cook, who directs the Advanced Computer Architecture Performance and Simulation Laboratory at NMSU. "When you make a profile and begin adding friends, Facebook goes out and identifies other friends that you might add to your network. It's all based on a giant graph of connections showing relationships among people."

Computers are increasingly being used to solve graph-based, data-intensive problems in application areas such as cybersecurity, medical informatics and social networks.

But computers aren't designed specifically to solve these kinds of problems.

"Our system will be created specifically for solving these types of very complex problems. Intuitively, I believe that it will be an improvement. These are the most difficult types of problems to solve, mainly because the amount of data they require is huge and is not organized in a way that current computers can use efficiently," Cook stressed.

Cook specializes in micro-architecture simulation, performance modeling and analysis, workload characterization, and power optimization.

"I create software models of computer processor components and their behavior and use these models to predict and analyze performance of future designs," Cook noted.

It was her work while on sabbatical with Sandia's Algorithms and Architectures group in 2009 that led to the $2.7 million NSF collaborative project. Cook developed processor and simulation tools and statistical performance models that identified performance bottlenecks in Sandia applications.

While at Sandia, Cook worked with Richard Murphy, who was interested in developing a system that would solve graph-based problems faster while consuming less energy. Together they assembled a team of researchers from Sandia, NMSU, Indiana University and Louisiana State University. Cook, Murphy and NMSU Electrical Engineering doctorate students Patricia Grubel and Samer Haddad are collaborating on hardware development. Colleagues Andrew Lumsdaine, at Indiana University, and Thomas Sterling, at Louisiana State University, are developing the software.

A main goal of the design is to incorporate programmable hardware, known as Field-programmable Gate Arrays (FPGAs), to provide customized circuitry for executing graph algorithm operations.

Another goal is to make it available for public license. The system will be described in VHDL, a hardware description language that is an international standard. This description will be made available to users who perform graph-based computing—such as government laboratories, commercial enterprises and academia.

"Anyone could buy off-the-shelf reprogrammable hardware and download our architecture and software and replicate the system," Cook said.

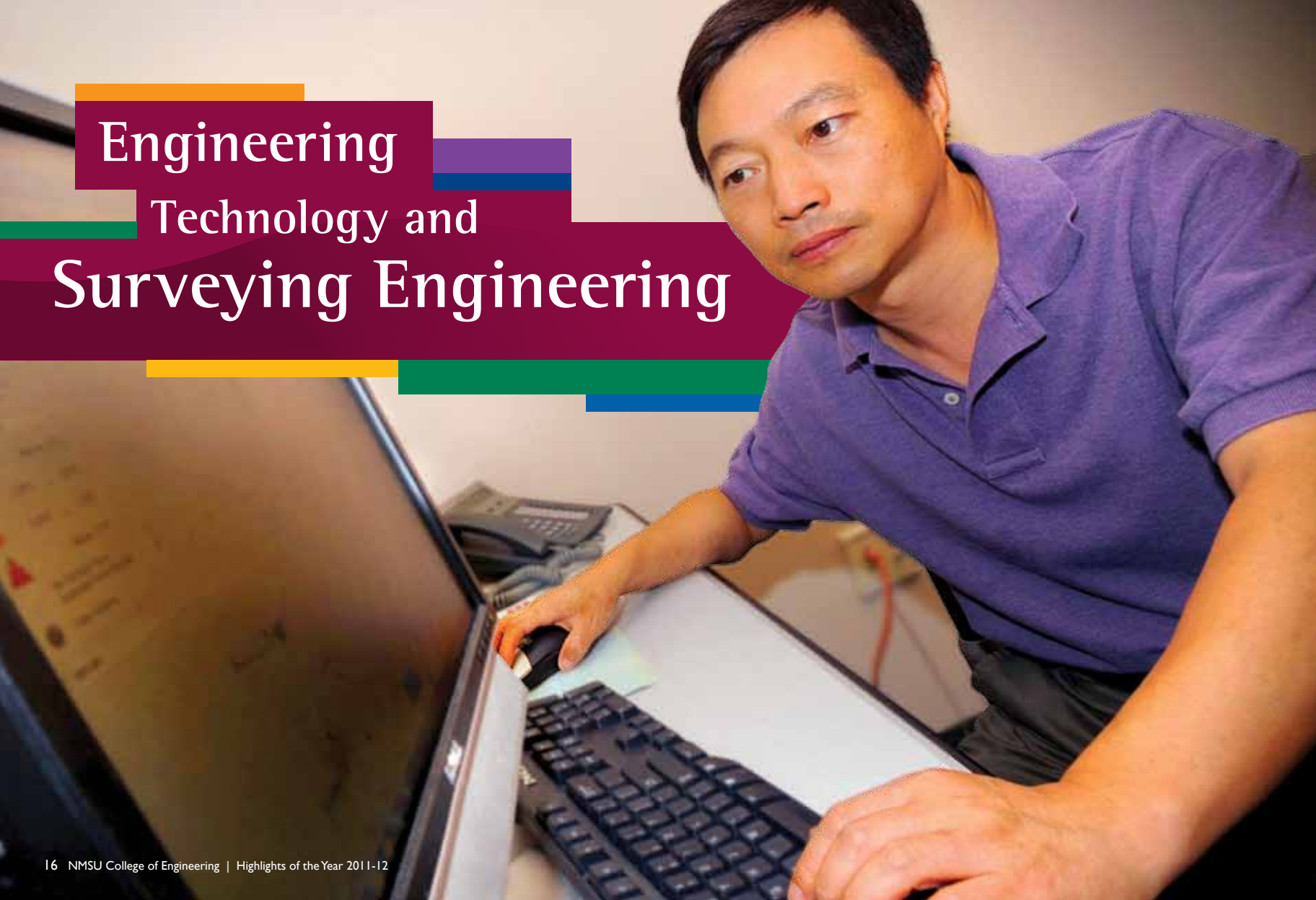
Among the primary objectives are improved performance and energy efficiency.

"This system will be faster because the processor will be custom designed to execute these specific applications, so performance will be optimized. The current systems used for running graph-based problems are relatively slow," explained Cook.

"They will also use less energy because FPGAs are very energy efficient," she added. "This is a significant consideration because it reduces the cost of running these types of large applications. And everyone is having trouble paying their electric bills these days."

Electrical and Computer Engineering Associate Professor and winner of the Presidential Early Career Award for Scientists and Engineers Jeanine Cook examines a logic board used for research testing related to graph processing.

Engineering Technology and Surveying Engineering



NMSU engineers testing dust storm detection and notification system

Dust storms have long plagued the desert southwest and while they may be annoying, they can also be extremely dangerous — deadly even — for motorists. The New Mexico Department of Transportation District One office contracted with the Department of Engineering Technology and Surveying Engineering at NMSU to find and deploy an automated system that will notify motorists of limited visibility conditions and direct them how to respond during the storms.

"In southern New Mexico every year, from March until sometimes up to September, we have problems with dust," said Ruinian Jiang, NMSU associate professor of engineering technology and surveying engineering. "When the spring wind speeds get up to higher than 20 to 25 miles per hour, we have a huge problem on the roads. The dust will blow from the roadsides and suddenly blind people's eyes; they cannot see anything."

Jiang added that though people who have lived here for a little while might be used to the dust and know how to deal with it, people passing through likely will not, and will need to know what to do if they find themselves stuck in a dust storm.

The Road Weather Information System (RWIS) might be the solution. The system is comprised of weather stations set up on the roadside. Jiang and NMDOT officials can monitor the system from the comfort of their desks, saving the time and money required to go out to the field to observe weather conditions. Jiang said the system can capture and report temperature, moisture, humidity, air pressure, wind speed, wind orientation and visibility. With additional sensors, the system could also report pavement temperature and relay information about whether or not slippery, icy conditions might exist.

Jiang said that the contract with NMDOT District 1 was granted in three phases. Phase I consisted of a needs assessment and equipment survey. During Phase II, equipment recommended during Phase I was purchased, installed and preliminarily evaluated. Equipment operators received training during this time.

"The New Mexico Department of Transportation just installed several cameras, digital message boards and beacons along Interstates 10 and 25 within District One," said Frank Guzman, New Mexico Department of Transportation District One engineer. "These devices, along with the RWIS technology, will serve as key components in gathering data in regard to wind speeds and monitoring dust storms within this region. This system allows the District office to view this information and report these changes by activating the boards and beacons in order to alert motorists."

Now, during Phase III, NMSU faculty members are working with NMDOT for long-term evaluations of the RWIS and to determine the best way to alert motorists when a dust storm is imminent or present.

"We started Phase III last month and it will last three years," Jiang said. "It is to test the accuracy of the instruments long-term for effectiveness, and to figure out the best way to inform the public" about what to do during a dust storm.

Jiang said that they are evaluating different types of public notification, including television and messages posted in kiosks in rest areas. Phone messages, Facebook and Twitter notifications also are being considered.

The department has already experienced high winds with dust storms this year and NMDOT used these tools to alert motorists and the traveling public of closures and conditions along the roadways.

"As the district engineer, I have had the privilege to take part in this project from the research phase to the hardware deployment phase within our district office," said Guzman. "These measures will enhance traffic safety along Interstate 10."

Ruinian Jiang is working with the NM Department of Transportation to gather data about wind speeds and the monitoring of dust storms in the region. This research will help identify tools to alert motorists and the traveling public of closures and conditions along the roadways.

Industrial Engineering

NMSU engineers work to improve hospital patient care

Visits to the doctor are something people never look forward to, but thanks to research conducted by a New Mexico State University professor and his student, those visits might become a little less burdensome.

Yu-Li Huang, industrial engineering assistant professor, and doctoral student Justin Marcak spent three months collecting data at Mimbres Memorial Hospital in Deming, N.M. During that time, the two studied the patient scheduling system and the factors that affect the length of patients' appointments.

Results from that research have aided Huang and Marcak in developing what seems to be a more efficient scheduling system.

"Basically, the research is to develop a scheduling system that takes characteristics from a patient into account," explained Marcak. "The characteristics we looked into include a patient's gender, the time of day that a procedure was performed, mobility of a patient, what type of procedure and what part of the body the procedure was performed on.

"These characteristics were first tested using analysis of variance to determine if they were significant in determining the amount of time a patient will need to have a procedure performed."

A report by Huang and Marcak showed the factors defined from the data collection for analysis also included where the patient was sent from (walk-in, emergency room, in- or out-patient unit) and appointment time.

These factors were significant in both determining the amount of time a patient required and in redesigning the length of procedure time slots.

"The data was entered into a computer software program that allowed us to perform a decision tree method," Marcak said. "The software gave us a number of groups based on the procedures. We then grouped together the patients that had similar statistics into 15-minute slots."

Five groups were placed into 15-, 30-, and 45-minute time slots and tested (moved around) to determine the coefficient of variance.

"The setup that gives the lowest CV is the best solution," added Marcak. "Using the setup with the best CV and the amount of workload for each of the time slots, a patient schedule can be developed."

Huang and Marcak studied a variety of procedures including x-rays, CAT scans, ultrasounds, mammograms and MRIs. Because of low patient volume, nuclear medicine is one procedure they were unable to study, said Huang.

They concluded that using their new scheduling procedure, patient waiting time could be reduced by up to 71 percent for x-rays – from 13 to four minutes.

"Patient access to care is increased by 125 percent for both CAT scans and ultrasounds ..." they reported. "The proposed scheduling scheme does allow for some flexibility in meeting different patient needs that may arise on any given day."

"For example, if more 15-minute slots are needed, a 30-minute slot can be split up," said Marcak. "For future research, it is proposed to come up with a grid system that would help schedulers based on available resources."

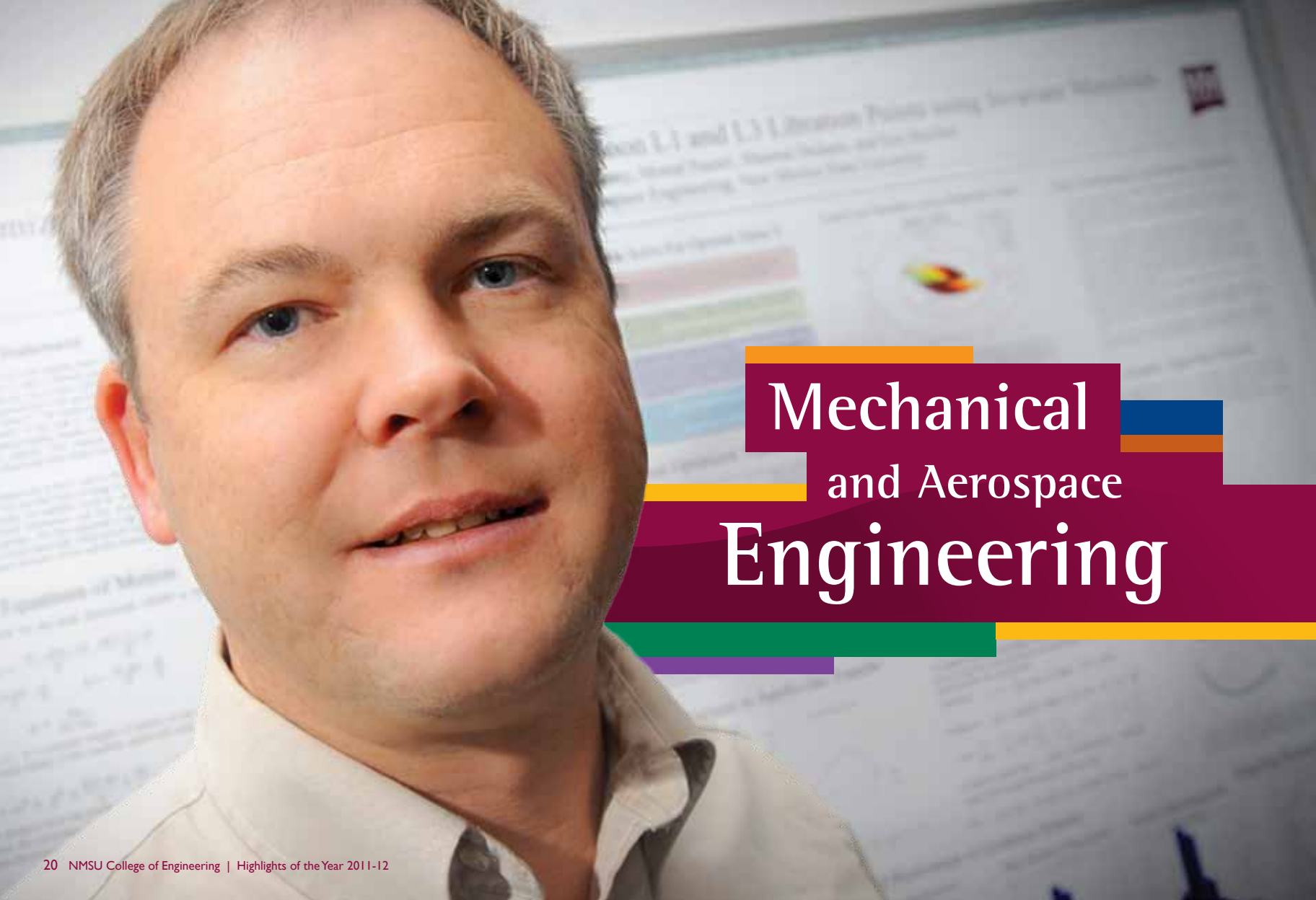
Huang explained that the county's population – approximately 25,000 residents – was one of the reasons the hospital was chosen for the experiment.

"[Mimbres Memorial Hospital is] the only facility serving the population of Luna County with radiological services," he said. "It is critical to improve the patient access to care for this facility.

"The research was conducted May through August 2011, and the analysis was done during the fall. Results were provided to the hospital January 2012. The algorithm is generalized enough to be used at other facilities, but the data collection is specific to the facility and is required to be completed again."

Marcak said he hopes to continue working on the project, and hopefully conduct research at other hospitals in the future.

Yu-Li Huang (left) and doctoral student Justin Marcak have been creating a more efficient patient scheduling system for a regional hospital.



Mechanical and Aerospace Engineering

Engineering research explores new locations for satellites

Space is becoming more littered with debris that poses a risk to expensive military and scientific satellites. This is but one of several reasons that Eric Butcher, associate professor of mechanical and aerospace engineering, is conducting research that may lead to placement of important space assets further from Earth than they are currently located.

Butcher received funding from the U.S. Department of Defense Air Force Office of Scientific Research for his research. He is the Dwight and Audrey Chapman Distinguished Professor in Mechanical Engineering.

Locating military satellites used for surveillance and communications further from Earth will also make them more secure, rendering them less susceptible to interference and tracking by unfriendly entities. It may also increase global coverage, giving them a wider range of observation, both of the Earth and of other satellites.

Butcher's research centers on special locations in the Earth-Moon system (libration or Lagrange points) where, due to the balance of gravity, a spacecraft may remain motionless in the rotating frame of two bodies such as the Earth and the Moon. While there are five such locations (L1-L5), the research will mostly focus on two of them (L1 and L3). In addition, although libration points were discovered in the mid-1700s, various orbits (called "halo orbits") near L1 and L2 have been discovered in the past 50 years that would enable good observability characteristics with low station-keeping costs.

While several scientific spacecraft have ventured to the Sun-Earth libration points, the NASA ARTEMIS mission in 2010 was the first to reach the Earth-Moon points L1 (located between the Earth and Moon) and L2 (located on the far side of the Moon from Earth), each about 61,000 km (38,000 miles) above the lunar surface. The ARTEMIS mission involved two sister spacecraft, which were actually two of the five spacecraft used in the previous THEMIS mission to collect new science data in the Sun-Earth-Moon environment. The two spacecraft were redeployed to the Earth-Moon L1 and L2 locations using low-cost transfers that utilize special pathways called invariant manifolds, which are properties of the nonlinear dynamics of the restricted three body problem, and hence require much less fuel than do traditional lunar transfers. Navigation and station keeping data from the NASA ARTEMIS mission will be used in this project.

While halo orbits around L1 and L2 and low-cost transfers to them have received much recent attention by researchers, part of Butcher's research will focus on these features of the relatively less studied location L3, as well as "exterior weak stability boundary" transfers which involve the spacecraft flying far outside the Earth-Moon system to the vicinity of the Sun-Earth L1 location before returning back, again for less fuel than a direct transfer. Special "tadpole" and "horseshoe" orbits that weave back and forth at approximately the moon's distance among the L3, L4, and L5 Lagrange points will also be investigated for their coverage characteristics and applicability to military missions.

Butcher and others at NMSU will work on this project with researchers in the Aerospace Engineering Sciences Department at the University of Colorado at Boulder and at the Air Force Research Laboratory in Albuquerque. They will investigate the use of libration point orbits for military satellites, study the coverage characteristics from these locations, find new low-cost transfers, and also study autonomous navigation and station-keeping strategies for these missions.

This three-year project is the first funded grant in aerospace engineering at NMSU that concerns topics in orbital mechanics and astrodynamics and will benefit students in the aerospace engineering program. A portion of the budget is dedicated to building a new visualization facility in Jett Hall for research and instruction in orbital mechanics and spacecraft trajectories. Additionally, Butcher is teaching a new graduate-level aerospace engineering course in astrodynamics which deals with the topics in this project and will prepare students to participate in the research. Butcher also teaches an undergraduate course in orbital mechanics.

Eric Butcher, holder of the Dwight and Audry Chapman Professorship in Mechanical Enginnering, is conducting research that may lead to placement of important space assets further from Earth than they are currently located.

Faculty Spotlight

Deng awarded first Fulbright Distinguished Chair in Energy Conservation

The Fulbright Distinguished Chairs Program comprises approximately 40 distinguished lecturing and/or research awards ranging from three to 12 months. Awards in the Fulbright Distinguished Chairs Program are viewed as among the most prestigious appointments in the Fulbright Scholar Program, awarded to eminent scholars who have significant publication and teaching records.

Shuguang Deng's academic record is, indeed, distinguished.

Deng graduated with a bachelor of science and a master of science in chemical engineering from Zhejiang University in Hangzhou, China. He received his doctoral degree in chemical engineering from the University of Cincinnati.

Following his stint in the private world, Deng joined the NMSU chemical engineering faculty as an assistant professor in 2003. He is now a full professor and the holder of the first Robert Davis Professorship, named for chemical engineering alum and former president and chief executive officer of Chevron Chemical Co.

Deng has published more than 100 peer-refereed journal and book articles, has received 19 patents/applications and has made nearly 90 conference presentations. He is on the editorial board of the "Journal of Chemical Engineering and Process Technology," the "Journal of Environmental Protection" and "Recent Patents on Chemical Engineering."

More notably, Deng has created research programs at NMSU in hydrogen fuel cells and water treatment technology, obtaining grants of approximately $6 million through which 24 graduate students, as well as undergraduates and post-doctoral fellows, have had the opportunity to work under his advisement.

From February 2013 to August 2013, students at the National University of Science and Technology in Moscow, Russia, will also have the opportunity to benefit from Deng's expertise. His Fulbright award will fund a joint research and teaching project in hydrogen fuel cell and energy conservation.

The objective of Deng's research is to evaluate the hydrogen storage performance of materials to be used in automotive applications and to promote hydrogen fuel cell technology as an effective method for energy conversion and conservation.

In addition to his research, Deng will teach "Fuel Cell and Hydrogen Technology," one of the most popular chemical engineering elective courses at NMSU, which Deng developed and has taught for the past seven years. He will also present a series of seminars on energy conversion, conservation and sustainability for students, as well as interested professionals, and advise his host institution on its energy and environment-related curricula.

"I grew up in Russia's Socialist younger brother, China. I'm familiar with Russian history since 1918," said Deng. "It will be a very interesting experience."

Shuguang Deng, holder of the Robert Davis Professorship, will conduct research and teach in Moscow as part of his Fulbright Distinguished Chair.

Student Spotlight

NMSU grad student receives prestigious NSF grant

When she began her studies at NMSU, Theresa Aragon never imagined that she would one day receive a $40,000 annual grant from the National Science Foundation to support her research. Aragon is a recent NMSU civil engineering graduate now pursuing her master's degree.

The NSF's Graduate Research Fellowship Program is a prestigious award for students who have demonstrated their potential for significant achievements in the fields of science and engineering. GRFP provides three years of support to students.

Aragon will receive a $30,000 annual stipend, while another $10,500 is allocated for tuition and fees. This will allow her to focus her time and energy on her research. She is currently investigating the behavior of multi-story coupled walls using un-bonded, post-tensioned, precast, concrete coupling beams under lateral loads.

"It has to do with the size and behavior of a structure and it's a lot of modeling on a computer," she explained. "Whenever [there is] an earthquake, buildings obviously move back and forth."

Aragon is working on using concrete materials that will help reposition the building to its original state. This research is an expansion of work done by her adviser, Brad Weldon, civil engineering assistant professor.

In his dissertation, Weldon conducted investigations for single-floor level structures, which demonstrated that the system offered many advantages for seismic regions.

Aragon's research focuses on multi-story walls. This research will aid in the advancement of seismic design tools and procedures for multi-story, concrete coupled wall structures under seismic loading.

Aragon initially planned to study aerospace engineering. After taking one of Weldon's courses, Aragon said she became infatuated with how structures are built and decided to switch her major from aerospace to civil engineering.

"At that time, Theresa received funding through the New Mexico Alliance for Minority Participation to work as an undergraduate research assistant," said Weldon.

"She continued to work for me the rest of her undergraduate career. She has really taken over the research project investigating seismic behavior of an innovative coupled wall system and made it her own."

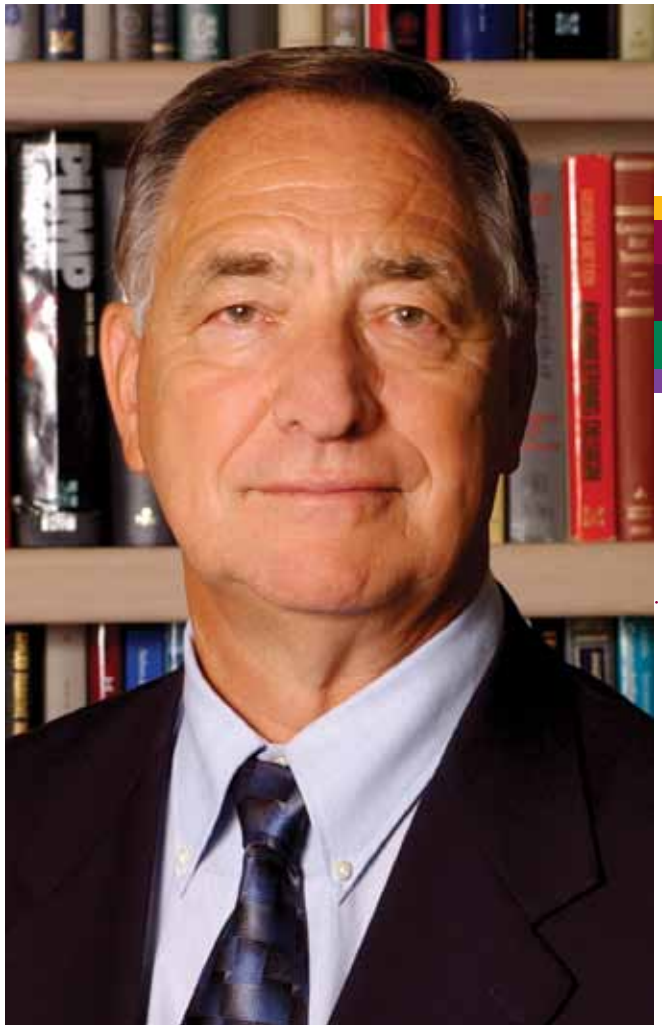
As an undergraduate assisting Weldon in his work, Aragon faced a few challenges.

"Some of the theoretical background required for parts of this research was not addressed in my undergraduate curriculum," she said. "So I had to do a thorough literature review, along with receiving a lot of assistance from Dr. Weldon.

"The challenges and triumphs that come with performing research energize me. I look forward to continuing on this project for my thesis," said Aragon, adding that she also hopes to pursue a Ph.D.

In fall 2011, Aragon was chosen by the College of Engineering as Outstanding Senior. She is also a member of Chi Epsilon Civil Engineering Honor Society and the American Society of Civil Engineers.

NMSU civil engineering graduate student Theresa Aragon has been awarded a prestigious National Science Foundation Graduate Research Fellowship Program grant.



Gifts to the College

King's gifts promote excellence in College of Engineering

Gerald "Jerry" King may not have lived in the Land of Enchantment for most of his adult life but he is very proud of his New Mexico roots and his engineering degree from New Mexico College of Agriculture and Mechanic Arts (now NMSU). He grew up in Corona, N.M. and graduated from Carrizozo High School in 1953.

A first-generation college student, outside financial support enabled him to attend NMSU. He was accepted into the co-op program operated by the university and White Sands Missile Range. This experience, combined with a hands-on education in the mechanical engineering department, led to a career as an engineer and corporate executive.

Jerry King established an engineering scholarship to benefit students and made a significant gift toward the support of faculty through completing the funding for an endowed professorship.

King remembers being influenced by many individuals. In particular, he counts Louis Klein, Jack Hardgrave and Jimmy Fields among those who "taught us what it takes to make something, not just envision it."

While in college, he married his high school sweetheart and the young couple soon welcomed their first child. Juggling studies, the co-op job and family life presented challenges. King switched to working as a night watchman for the Physical Science Laboratory on campus to make more study time available.

At graduation in 1958, he had several job offers. After meeting a representative from Boeing, he chose the company's aerospace division. The family, which now included two children, moved to Seattle.

King was giving serious thought to making a change when Boeing assigned him to the Minuteman ICBM program at Edwards Air Force Base in California. Over the next decade, the family relocated several times, returning to Seattle in 1969 when Boeing selected King to attend their executive development program.

In 1982, he became a Boeing vice president, heading up different product divisions. Next, he was promoted to executive vice president of the defense and space programs. He was named president of the Defense and Space Group in 1993, a position he held until retirement in 1997. Among his final responsibilities was overseeing the merger of Rockwell and McDonnell Douglas into Boeing.

Although it took him five years to do it, King says he is now fully retired and enjoying what has been a great life.

Appreciating all that his education enabled him to achieve, King has generously contributed to support a scholarship endowment and, most recently, donated the final funding piece for an endowed professorship established by the Mechanical Engineering Academy.

"Jerry is a wonderful example of someone who remembers his roots by investing in the future," said Ricardo Jacquez, dean of the College of Engineering.

"Not only has he been generous to the College of Engineering, but he has provided opportunities to students who come from small communities who may not have many other sources of support. These are extraordinary gifts for which we are most grateful," Jacquez added.

Engineering establishes water laboratory with Freeport-McMoRan gift

In 2007, the New Mexico State University College of Engineering received the first installment toward a total gift of $1.5 million to establish the Freeport-McMoRan Copper & Gold Water Quality Laboratory. The gift, which was fully funded this past year, was made by the Freeport-McMoRan Copper & Gold Foundation.

The gift has enabled the development of a full-service analytical laboratory equipped to identify the chemical and colloidal characteristics of a water/particle system. It replaced three small and aging analytical laboratories that were no longer sufficient to support research activities.

"The gift was timely, relevant and is ensuring that environmental issues are addressed to retain quality of life in the region. More importantly, it will play a major role in training high-quality engineering students and enhance water quality research programs," said College of Engineering Assistant Dean Patricia A. Sullivan. "Freeport-McMoRan is a valued corporate partner and employer of our engineering graduates."

Approximately $1 million of the request was used to acquire analytical equipment for the laboratory. The remaining $500,000 was placed in an endowment with the NMSU Foundation with annual earnings used to support and maintain the laboratory.

The water quality lab brings new, cutting-edge research capability that did not previously exist within the state or the region. The lab is also an important addition to the campus-wide natural resources and sustainability research cluster initiative, which supports the development and implementation of strategies that build sustainable water, energy and land resources.

The College of Engineering has identified providing access to clean water, which is one of the National Academy of Engineering's Grand Challenges, as a strategic research area and is conducting numerous research projects in the civil and chemical engineering departments as well as through the Institute for Energy and the Environment.

Highlights in Brief

Faculty Accomplishments

- Jessica Perea-Houston, assistant professor of chemical engineering, was recently honored with a National Science Foundation Faculty Early Career Development award in recognition of her commitment to research and education.
- For the second year in a row, Edward Pines, industrial engineering department head, has been recognized for his efforts by the Daniels Fund Ethics Initiative, a "multi-university project to strengthen principle-based ethics education and to foster a high standard of ethics in young people."
- Following are engineering researchers who secured more than half a million dollars in funded research during fiscal year 2011.
  - Eric Butcher, Mechanical and Aerospace Engineering
  - Jeanine Cook, Electrical and Computer Engineering
  - Abbas Ghassemi, Chemical Engineering
  - James King, Civil Engineering
  - Ricardo Jacquez, New Mexico Alliance for Minority Participation
  - David Jáuregui, Civil Engineering
  - Nirmala Khandan, Civil Engineering
  - Satish Ranade, Electrical and Computer Engineering
  - Andrew Rosenthal, Southwest Technology Development Institute
  - Rudi Schoenmackers, Engineering Research Center
  - John Wiles, Southwest Technology Development Institute
- Paul M. Furth, associate professor of electrical and computer engineering, was honored with the NMSU Donald C. Roush Excellence in Teaching Award.
- Yu-Ping Tang, a senior engineer at the Manufacturing Technology and Engineering Center, received the Space Alliance Technology Outreach Program 2010-2011 Top Performance Partner Engineer Award.
- Associate Dean of Academics Sonya Cooper received the NMSU Regents Professorship. Regents professors hold the title for as long as they continue to teach at NMSU.
- Electrical and Computer Engineering Professor Vojin G. Oklobdzija was re-elected for a second two-year term as vice president for Technical Activities of the Institute of Electrical and Electronics Engineers Circuits and Systems Society.
- Deva Borah, associate professor in electrical and computer engineering, has been awarded the International Foundation for Telemetering and Telecommunications Professorship.
- Igor Sevostianov, associate professor of mechanical engineering, is the first recipient of the Mechanical and Aerospace Engineering Academy Professorship.

Student Achievements

- Students from chemical engineering and Physical Science Laboratory travelled to Washington, D.C., in January for the Environmental Protection Agency's P3: People, Prosperity and the Planet Student Design Competition for Sustainability. The NMSU team is comprised of project leader Peter Dailey and Tapaswy Muppaneni and Shuguang Deng, professor and adviser. All three are from the chemical engineering department. Team members from the Physical Science Laboratory are Adam Willis, Edward Garcia, Chris Garcia and adviser Chris Wise.
- Nathanael Macias, electrical engineering major, interned at Johns Hopkins University Applied Physics Laboratory for two summers before he graduated in May 2012. After graduation he returned to work at Johns Hopkins under a GEM Fellowship.
- Five student members of the NMSU Chapter of Chi Epsilon, the civil engineering honor society, attended the 42nd Biennial Chi Epsilon National Conclave in Los Angeles this spring. They were accompanied by the faculty adviser Paola Bandini. The NMSU students chaired the Southwest District Caucus meeting and the Government Committee. Theresa Aragon received the Chi Epsilon Graduate Fellowship in recognition of her outstanding academic and leadership achievements. Associate Professor Paola Bandini received the Arthur N. L. Chiu Outstanding Faculty Adviser Award. Associate Professor David Jáuregui was presented the Excellence in Teaching Award of the Southwest District
- Eric Reed, a NMSU civil engineering major, was one of two students awarded the Bette Worley National Student Exchange Student Achievement Award. Reed was selected from among nearly 3,000 students who participate in NSE annually.
- Ntengwa Mukosa, industrial engineering graduate student, won "Outstanding Poster" at the 2011 PACE Annual Forum at the University of British Columbia, Vancouver British Columbia, Canada. Mukosa's poster,

Jessica Perea-Houston (center) a, chemical engineering assistant professor, received the National Science Foundation Faculty Early Career Development Award.

Faculty and student members of the NMSU Chapter of Chi Epsilon, the civil engineering honor society, received honors at the 42nd Biennial Chi Epsilon National Conclave in Los Angeles this past spring.

Students make last-minute adjustments at the 2011 NM BEST Robotics competition. The event is made possible through the generosity of numerous supporters.

"Harness Design for Reduced Gravity Simulation" is based on research work done as part of the Reduced Gravity and Biomechanics Laboratory.

Significant Gifts to the College

- Engineering scholarships scored a hole-in-one at the Second Annual Volt Information Sciences Slide Rule Golf Tournament held at the NMSU Golf Course in February. As title sponsor, Volt Information Sciences founder and NMSU alum Jerry Shaw was present for the event, which raised $22,000.
- The College of Engineering and the NMSU Library received a gift of $16,000 from the Robert E. and Evelyn McKee Foundation of El Paso. The gift will be used to support engineering scholarships and acquisition of current engineering reference materials for the library's collection. The McKee Scholarships support an average of 10 undergraduate engineering students per year.
- A new endowment was established by alumnus Joe Nakayama, who completed his studies in agricultural engineering on the GI Bill after World War II. Joe established the endowment in honor of his parents; it will support two engineering professorships.
- Intel Corp. made a $30,000 gift to the college in support of the NM Pre-freshman Engineering Program, a six-week summer outreach program for middle- and high-school-aged students.
- Following the untimely death of their son Ryan, scheduled to graduate from NMSU in summer 2011, Leedrue and Sandy Hyatt established two memorial scholarships. One will support a student enrolled in surveying engineering, the degree Ryan would have received. The second scholarship will support an undergraduate student pursuing a degree in communication disorders (College of Education); this is in recognition of Ryan's support for children with autism.
- Western Refining Co. made a gift of $50,000 to provide scholarships, equipment for the civil engineering department, and other support to the chemical engineering department.
- TRAX International, formerly known as the New Mexico Technology Group, LLC (NewTec), presented the college with a $25,000 check to support the continuation of an agreement to educate and employ engineering talent in the region.
- Electrical engineering alum Larry Stolarczyk supported an engineering capstone project. He purchased equipment that was necessary for the completion of the project which remains at NMSU to be used by students in the future. Stolarczyk also served as a mentor to the students, providing guidance and research resources.
- Halliburton made a gift of $15,000 to support scholarships through the Halliburton Global Scholars 21st Century Engineers program, established in 2009.
- The Boeing Company made gifts totaling $45,000 to provide scholarships, funding for student design projects focused on electrical and computer, industrial and mechanical engineering, and support for the NM BEST Robotics Competition.
- ExxonMobil made a gift of $14,000 to support student organization activities and provide undergraduate engineering scholarships for under-represented minorities.

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