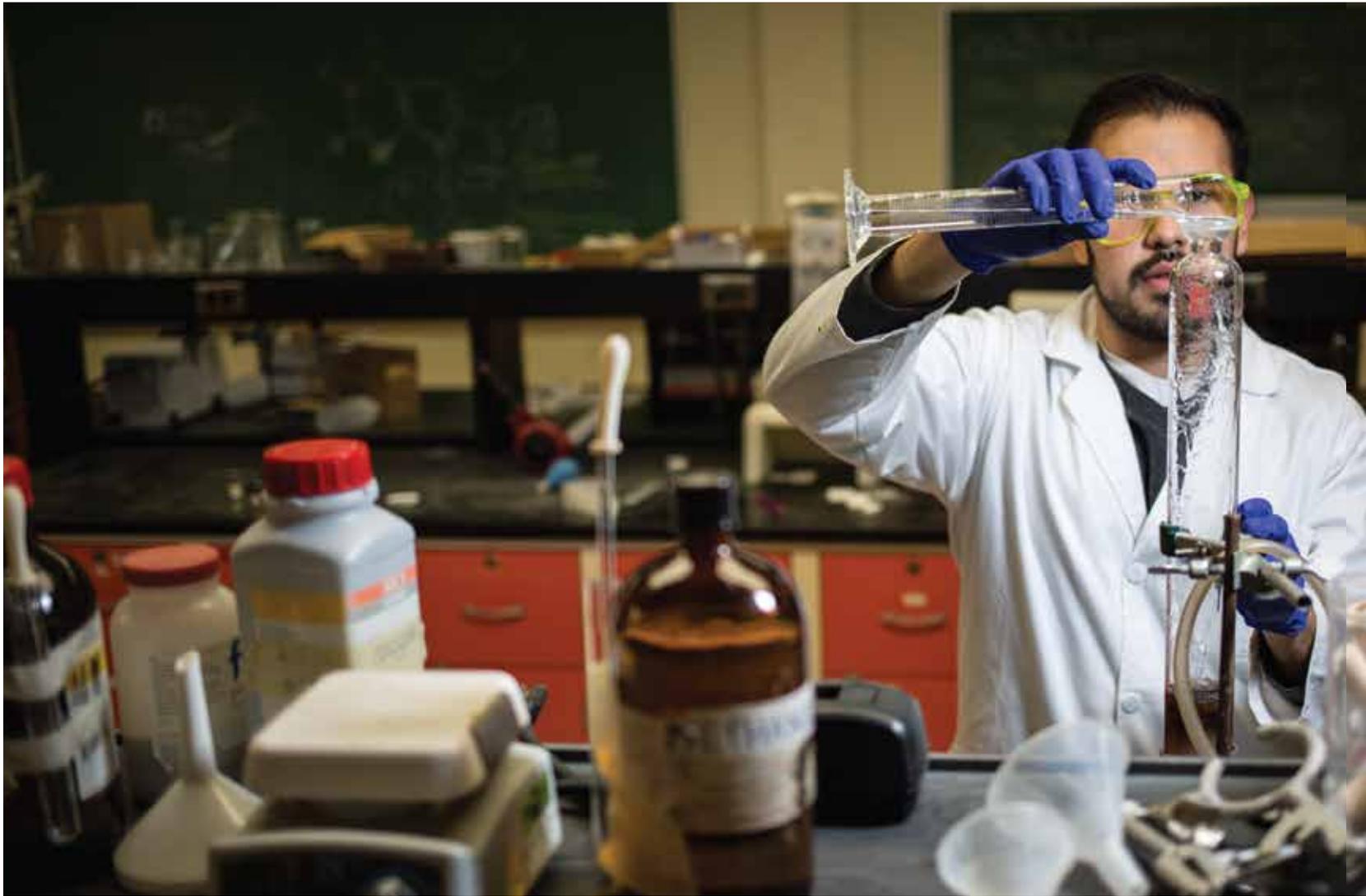


New Mexico Tech

**2017  
ANNUAL  
REPORT**

**Tradition. Innovation.  
World-Class Education**



## New Mexico Tech's Mission

Serve New Mexico and beyond through exceptional education, research, and service, focused in science, technology, engineering, and mathematics.

Serve the public through applied research, professional development, and teacher education, benefiting the people of New Mexico.

Serve New Mexico through innovation to commercialization, benefiting the economy of the state and creating opportunities for success.

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# Foreword

## *Letter from President Wells*

Dear Friends,

As President of the New Mexico Institute of Mining and Technology, it is my pleasure to highlight the statewide, national and international educational and research activities of our university.

This annual report affords us a chance to feature a few of the many academic, scientific, and technical accomplishments of the past year and thank New Mexico Tech's exceptional faculty, students, and staff. Collectively they form the core engine of Tech, making the Institute both successful and an inspiring place to innovate, study, and work.

Throughout these pages you will read about New Mexico Tech's faculty, scientists, engineers, students, and staff from all walks of life making profound impacts through their scholarly endeavors and persistent dedication to improving our citizens' lives here in New Mexico, as well as advancing people's lives throughout the nation and around the globe.

For decades, New Mexico Tech has worked to ensure we provide our students a world-class STEM education at an exceptional value. These efforts have not gone unnoticed. New Mexico Tech is currently ranked by numerous publications as one of the top universities in the nation in terms of value in engineering, physics,

computer science and more. For example, Niche, a data analytics website, utilizes federal data on academics, admissions, financial value and student life to come up with the best colleges in each state. New Mexico Tech was named the best in the Land of Enchantment!

In addition to providing cost-effective, high-value education for students, New Mexico Tech also serves the state via a number of critical research divisions. Tech has been widely praised for its scientific and technical research as well as building innovative kinds of applied research programs that are critical to creating an advanced STEM workforce in this state. A number of our research divisions are doing work vital to the advancement of our national security. Thus, we have included summaries of significant research endeavors underway at Tech. These projects will have lasting impacts on New Mexico's economy, as well as people's lives.

As we look to the future of the university, we will follow a trajectory that goes beyond STEM, offering our students insights, inspiration, and opportunities into the entrepreneurial world, or STE2M – science, technology, engineering, entrepreneurialism and technology. Our trajectory will also be one that leverages our knowledge-based capital into developing, marketing, and monetizing the intellectual property developed at New Mexico Tech. It is in this spirit that we're launching the Center for Technology Commercialization (CTC), the focal point for leveraging the outstanding innovation that occurs on our campus. Within our STE2M and CTC effort lies tremendous opportunity for raising the value of our students' degrees as well as growth, both for our university and our state's economy.

*All the best,*



President Wells



# World-Class Educational Value

## New Mexico Tech Top Ranked Nationally for Engineering, Physics

*New Mexico Tech repeatedly among the nation's elite in terms of education, value, and return on investment*

**BEST COLLEGES**

**U.S. News & World Report**

**RANKINGS**

New Mexico Tech ranks again among the nation's elite universities in academic value and quality of education in a number of science and engineering disciplines according to new data released by College Factual and Payscale for their 2018 college rankings.

For the second year in a row, College Factual ranked New Mexico Tech No. 1 nationwide among all universities for best colleges for the money and best value in both Engineering and Physics. Tech also repeated its No. 1 ranking in Chemical Engineering and Mechanical Engineering while remaining in the Top 2% among all universities in Computer Science and in the Top 2% in Physical Sciences.

Tech is also in the Top 1% nationwide in Mathematics, Top 2% in Mathematics and Statistics, Top 2% in Computer and Information Sciences, and Top 5% in Electrical Engineering. Overall, Tech ranks No. 1 in New Mexico, No. 2 in the Southwest, and 31st among all public universities nationally.

Overall, New Mexico Tech received 44 awards from College Factual in its 2018 rankings, all of which are granted to universities ranked in the top 15 percent nationally in one of its categories.

### Best Universities and Colleges by Salary Potential

New Mexico Tech is ranked No. 19 nationally among all public universities by salary potential and No. 6 on return on investment by PayScale. Tech is also ranked 21st among America's engineering schools and 75th among 1,509 of the nation's universities and colleges, public or private.

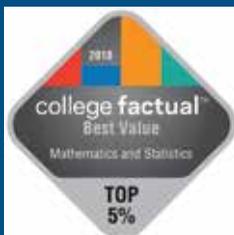
New Mexico Tech ranks 28th out of 967 public universities and colleges on PayScale's Best Value Public Colleges list. For overall return on investment, Tech is ranked 27th among engineering schools and 52nd among the 1,833 colleges and universities ranked by PayScale.

### U.S. News & World Report

New Mexico Tech is ranked No. 3 among U.S. News and World Report's Top Public Schools in the west and the No. 23 among all universities.

### CEOWORLD Magazine

New Mexico Tech's Department of Petroleum and and Natural Gas Engineering is ranked No. 14 among the world's best universities for oil, gas and petroleum engineering in 2017 by CEOWorld Magazine.



## President Wells Announces Entrepreneurial Center For Tech

*Center for Technological Commercialization Now Central Point of Contact*

President Stephen Wells, in his first 100 days as New Mexico Tech's chief executive, announced a central point of contact for entrepreneurial activities campus-wide. The Center for Technology Commercialization (CTC) and its Executive Director, in coordination with the Vice President for Research and Economic Development, and under general direction from the President, will provide direction and leadership in the development, marketing, and monetization of intellectual property (IP) developed at New Mexico Tech.

Executive Director Dr. Peter Anselmo envisions a technological development fund to finance ideas in the early stages of development, such as product prototypes, and to provide support to help develop ideas from incubation to commercialization for faculty and students. The CTC already has a three-year footprint as the Center for Leadership and Technology Commercialization, including developing the inaugural Inventors and Entrepreneurs Workshop earlier this year; a second workshop will follow in spring 2017.

"I have very high hopes for the CTC and the potential to streamline the process for IP and technological commercialization efforts on campus," President Wells said. "It is absolutely critical to know where to go."

The CTC will work with the New Mexico Tech Research Foundation and the Office for Advancement on fundraising support, and will interact with the New Mexico Tech Research Park Corporation with regard to IP commercialization and marketing strategies. Dr. Anselmo is expected unveil a draft IP policy for faculty and students in early 2017.

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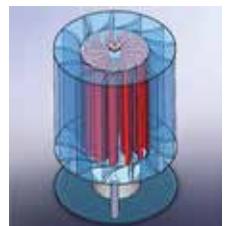
## Student Team Places 2nd At Business Entrepreneurship Pitch Competition

A team of New Mexico Tech undergrads won second place in the "Innovate New Mexico Student Pitch Competition" in April. The students presented a research funding proposal as part of the ES 316: Engineering Economics class during the spring 2016 semester.

Team members Myissa Weiss, John Sanchez, Christen Barger, Andrew Peterson and Phillipp Baldovi

won for their pitch, "Biomimetic Blade Profile for Vertical Axis Wind Turbine."

The event was the third annual Idea Pitch Competition hosted by STC.UNM and the UNM Innovation Academy, and marks the first year New Mexico Tech participated.



**Biomimetic Blade Profile for Vertical Axis Wind Turbine.**



# Risksense Continues To Grow, Reap Recognition In Cybersecurity Technology

## Spin-off of New Mexico Tech and its ICASA Division

RiskSense®, Inc., the pioneer and market leader in proactive cyber risk management, has earned several Gold and Silver 2017 Golden Bridge Business and Innovation Awards for Information Security and Risk Management, Vulnerability Assessment and Remediation, and Security as a Service Innovations.



RiskSense is a spin-off company for New Mexico Tech, having been born at New Mexico Tech's ICASA (Institute for Complex Additive Systems Analysis). RiskSense is quickly growing into one of New Mexico's higher-profile success stories. The company was named one of the Most Innovative Companies in New Mexico for the second year in a row by Albuquerque Business First this past July.

The Golden Bridge Awards are an annual industry and peer recognition program that honors the Best Companies, Products, Innovations, Management Teams, Women in Business, and more from all over the world. Winners will be honored in San Francisco on Monday, September 18, 2017 during the annual Red Carpet Golden Bridge Awards Ceremony.

"This latest round of industry accolades provides further proof that RiskSense continues to set the pace for



Company founder Srinivas Mukkamala is the CEO. He earned his master's (2002) and Ph.D. (2005) in computer science at New Mexico Tech.

technology innovation in cyber security risk management with its unmatched attack surface validation model that spans networks, applications, databases, and even lo-T devices," said Dr. Srinivas Mukkamala, co-founder and CEO of RiskSense. "By integrating vulnerability assessment with internal and external threat intelligence and business criticality, we enable organizations to prioritize and focus on re-mediating risks that pose the most imminent danger to their business."

The RiskSense Platform provides continuous diagnostic and mitigation capabilities by ingesting, unifying, and contextualizing vast volumes of internal security intelligence with external threat data and correlating the findings with business criticality to continuously reveal cyber risk exposure across a growing attack surface spanning the network, servers, endpoints, applications, and databases. RiskSense enables enterprises to minimize cyber risk by closing the

most critical security gaps first, and gain valuable, continuous situational aware-ness that helps them keep cyber adversaries at bay.

RiskSense®, Inc. is the pioneer and market leader in pro-active cyber risk management. The company provides enterprises and governments with clear visibility into their entire attack surface, including attack susceptibility and validation, as well as quantification of risks based on operational data.

By leveraging RiskSense cyber risk management solutions, organizations can significantly shorten time-to-remediation, increase operational efficiency, strengthen their security programs, heighten response readiness, reduce costs, and ultimately minimize cyber risks.



# Materials Engineering Doctoral Student, Research Team, Earn Provisional Patent

*New method of separation research synthesizes near pure chemicals, holds vast commercial potential*

Lindsay Candelaria has a Master's degree in Chemistry from New Mexico Tech, and she is now a Ph.D. student in the Materials Engineering department with a scheduled graduation date of Dec. '18.

But even as a six-year-old growing up in Bloomfield, N.M., she knew she wanted to find a way to help people suffering from disease.

Cancer her recently taken her grandmother from Lindsay and her three older siblings, and the four of them decided then that they would do all they could to help people who are suffering from life-threatening diseases.

That experience fueled Lindsay's drive to execute the kind of research she's now doing at New Mexico Tech. She's part of a research team that has been working on a new method of chemical separation that synthesizes nearly pure chemicals. For their efforts, Lindsay and her research team have received a provisional patent for the new technique.

The method's practical application lies in the pharmaceutical industry, where this chemical separation research has resulted in creating purer forms of medications. That means the medicine you might be taking in the not-too-distant future will result in far fewer side effects and require smaller doses for the same level of treatment. Lindsay's research holds the potential to reduce the overall cost of recovering from a wide variety of illnesses.

"A lot of times, there are problems with current drugs in the market, and from my perspective, this has the potential to make medications more effective," Lindsay said. "It has the chance to reduce costs, and I think that's a pretty important thing as well."



Lindsay was the first person to get the technique to work. Her research has pushed the technology forward and has received both regional and national media attention. Both Albuquerque's Fox and NBC news affiliates have featured Lindsay's work, and she's seen articles written about her in magazines and newspapers. She was also a featured guest on iHeart Radio's KTEG's morning radio talk show.

Lindsay is fulfilling the promise she made to her siblings and that six-year-old version of herself, and she's doing it at New Mexico Tech.

# New Mexico Tech breakthrough promises disease-resistant plants

*New research holds potential change the way crops are grown across the country*



A scientific breakthrough made at New Mexico Tech could soon change the way crops are grown across the country, including one of the state's most famous exports.

Dr. Watkins is an associate professor of biology at New Mexico Tech in Socorro. She and her students may have sealed the fate for these young chile plants, but it is all in the name of science.

She holds up another plated sample of what appears to be a furry fungus.

"This is the cure," said Dr. Watkins. "We can grow up this organism, spray it onto the plant and then this guy will kill this guy."

Watkins is referring to one of the organisms that causes powdery mildew. It is always in the soil, but she says a slight change in the environment can create disease.

"So it's a problem for everybody whether they realize it or not," said Dr. Watkins.

She says there are effective treatments for other crops, but for plants like chile, they all involve harsh chemicals. It's what makes Dr. Watkins' breakthrough one of a kind.

"This organism has a distinct advantage over those methods because it doesn't harm the plant, it has no effect on human beings," explained Dr. Watkins.

**New Mexico Tech Assistant Biology professor Siv Watkins examines soil samples from harvested plants.**

Now, she is effectively treating diseased plants, even preventing powdery mildew, altogether, by putting her cure in the soil.

While Dr. Watkins has already seen success with chile, the end goal is to use her cure to treat a similar plant on a large scale — medical cannabis. What's more, she says commercial medical cannabis growers take a hit.

As the medical marijuana industry becomes more prevalent and producers look to grow more product, Watkins expects they will see more cases of powdery mildew and need more effective ways of treating it. Yet, she says this small project revolving around this modern medicine is part of a larger effort to determine what affects the health of cannabis plants.

Dr. Watkins and New Mexico Tech are currently in the process of obtaining a patent for what she describes as "antibiotics for powdery mildew."

"What we want to do is feed back into the community in rural New Mexico, places like Socorro, which I love," said Dr. Watkins.



# New Mexico Tech New Home to Microwave Defense System



*Representatives of the U.S. Army, Air Force, Leidos, and New Mexico Tech commemorated the transfer of the MaxPower defense system from the Air Force to the Army at New Mexico Tech.*

New Mexico Tech is the new home for the massive MaxPower microwave defense system. The vehicle-mounted system, designed to uncover and destroy improvised explosive devices, was developed by the Air Force Research Laboratory at Kirtland Air Force Base and was turned over to the Army for new rounds of testing.

The MaxPower system packs a full gigawatt on the back of a military truck, roughly one million times the power of a normal, household microwave. Officials from the Air Force, the Army, Leidos, and New Mexico Tech attended a ceremony to officially hand over the keys to the vehicle in Socorro on Friday, May 19.

The Energetic Materials Research and Testing Center on the campus of New Mexico Tech will house the equipment. The center includes a 40-square-mile field lab that is well suited for potential future development and testing.

The Army's Armament, Research, Development and Engineering Center, or ARDEC, is now in charge of further development of the anti-weapons system. New Mexico Tech will help ARDEC re-purpose MaxPower for more battlefield uses against explosive hazards, said Carlos Romero, the university's associate vice president for research and economic development.

AFRL's Directed Energy Directorate built the system for \$50 million from 2007 to 2012, with a full round of successful testing at Kirtland Air Force Base. The system was then deployed for nine months of testing in Afghanistan in 2015 and 2016.



# New Mexico Tech Contributes to New Mexico Small Business Assistance Program

## *Both Faculty and Students Taking Part in NMSBA*

New Mexico Tech has continued to provide technical assistance to small, in-state business clients under contracts with Sandia National Laboratories and Los Alamos National Laboratory funded by the New Mexico Small Business Assistance (NMSBA) program. The NMSBA contract enables the University to assist small businesses in need of technology solutions or commercializing new technology.

Faculty from Management (Dr. Frank Reinow), Computer Science and Engineering (Dr. Subhasish Mazumdar), and Materials Engineering (Dr. Paul Fuierer) guided students to perform the research.

The University provided assistance to four New Mexico clients on five projects this year, as follows:

1. Evaluated a new software application available on the market that identified usability and functionality problems that have been built into their software updates.
2. Evaluated asphalt problems in a high altitude location for a construction company. The students used laboratory and field testing under varying temperatures and composites, resulting in composite and operational changes (two projects).
3. Evaluated the inventory control requirements for a winery experiencing significant growth with recommendations for building an integrated inventory management system to improve business processes.
4. Performed an assessment of the material properties for a client's Recycled Cardboard Block used for building construction. The student team analyzed the material in terms of axial compressive strength and shrinkage.

The NMSBA program allows New Mexico small businesses facing a technical challenge to access the unique expertise and capabilities of the state's national



labs. At no cost to the business, small businesses with a technical challenge can seek assistance from lab scientists or engineers for projects that require testing, design consultation, and access to special equipment or facilities that are not available in the private sector.

# Electrical Engineering's Arechiga Spent Summer with NASA

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Dr. Rene O. Arechiga, an associate professor with the Electrical Engineering Department, spent the Summer of 2016 as a Faculty Fellow at the NASA Glenn Research Center in Cleveland. He collaborated with Dr. Lennart Hultgren in evaluating, developing, and validating advanced source separation methods. An article produced from the collaboration is titled, "NASA/TM-2016-219419: Full-Scale Engine Noise-Source Separation Using a Four-Signal Method."

Contributions from the combustor to the overall propulsion noise of civilian transport aircraft are starting to become important due to turbofan design trends and expected advances in mitigation of other noise sources. During on-ground, static-engine acoustic tests, combustor noise is generally sub-dominant to other engine noise sources because of the absence of in-flight effects. Consequently, noise-source separation techniques are needed to extract combustor-noise information from the total noise signature in order to further progress.

A novel four-signal source-separation method is applied to data from a static, full-scale engine test and compared to previous methods. The new method is, in a sense, a combination of two- and three-signal techniques and represents an attempt to alleviate some of the weaknesses of each of those approaches. This work is supported by the NASA Advanced Air Vehicles Program, Advanced Air Transport Technology Project, Aircraft Noise Reduction Subproject, and the NASA Glenn Faculty Fellowship Program.

Dr. Arechiga has been with New Mexico Tech for over 10 years. He said experience at the NASA complex was a once-in-a-lifetime experience, and he is grateful for the opportunity to have conducted research at such a recognized facility.

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## Mechanical Engineering's Jamie Kimberley: Building a Better Shield

Researchers in the Department of Mechanical Engineering, in collaboration with the Consortium for Materials in Extreme Dynamic Environments (CMEDE), are developing methods to design advanced lightweight armor materials to better protect American soldiers. The Consortium brings together researchers from universities and research institutions nationwide to collaborate with those at the Army Research Laboratories.

At New Mexico Tech, Dr. Jamie Kimberley is leading a team of student researchers to better understand the dynamic response of magnesium. The metal was selected by CMEDE for its very low density (roughly 1/5 that of steel) and a crystal structure that leads to unique deformation and failure modes when subjected to high rate loading. Dr. Kimberley hopes improved understanding of these failure mechanisms will eventually allow for their control via material design and processing routes.



CMEDE's overall goal is to decrease the weight of armor materials by 40 percent while maintaining or improving performance. Researchers are working in four model material systems: metals, ceramics, polymers, and composites. In all cases, researchers are focusing on observing, understanding, and controlling failure mechanisms that are activated under blast or impact loading.

The hope is that this mechanism-based approach to materials development will provide a tool that will decrease the time to respond to new challenges posed by the ever-evolving battlefield threat landscape.

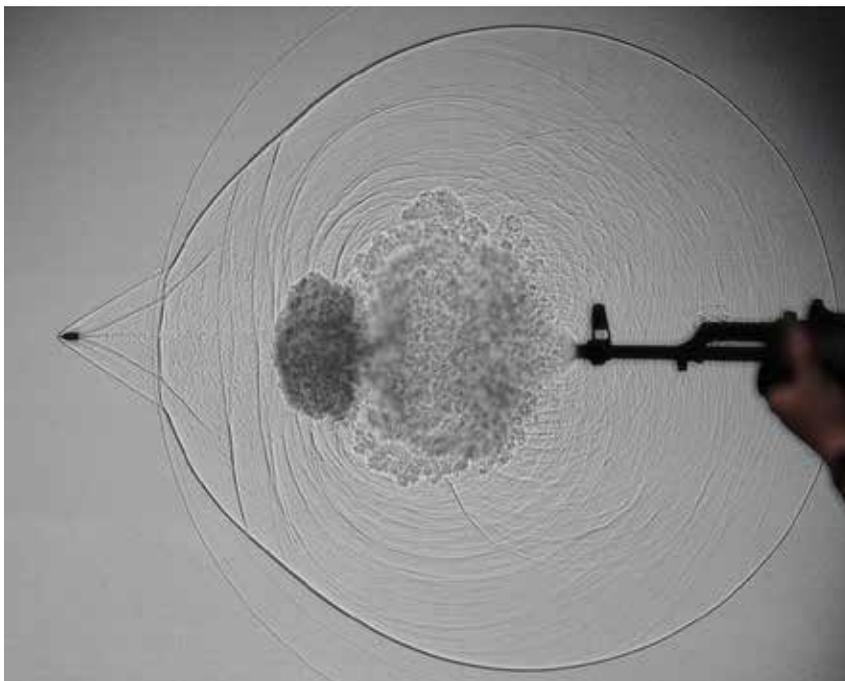
# Academic Achievements

## State Approves Three New Technology Ph.D. programs



Three state-of-the-art doctoral graduate degree programs have been approved for New Mexico Tech, all are expected to fill a critical need and to stimulate economic development opportunities in the state's technology sector.

New Mexico's State Board of Finance approved NMT to offer Doctorates of Philosophy in Biotechnology, Mechanical Engineering, and Intelligent Energetic Systems beginning in the Fall 2016 semester. In 2017, the state approved a Ph.D. program in the Electrical Engineering Department specializing in cyber electronic systems.



The approvals conclude a multi-year effort by New Mexico Tech to add the new programs. It is the first time in 10 years that New Mexico Tech has added a doctoral program to its degree offerings.



"These degree programs hold vast potential for our students that will benefit the state of New Mexico," New Mexico Tech President Dr. Stephen Wells said. "These are three significant Ph.D. programs. There is a tremendous need, specifically in this state, that we can now start to meet."

## NMT Team Deploys Innovative Water Purification System

A team of New Mexico Tech students has made a significant breakthrough with a “Geothermal Membrane Distillation” prototype device that is currently being deployed at the Masson Farms commercial greenhouse operation at Radium Springs, N.M.

Under the tutelage of Dr. Frank Huang, more than two dozen students have participated in this five-year project supported by N.M. EPSCoR (Established Program to Stimulate Competitive Research), which is funded by the National Science Foundation.

Huang and the student team leaders assembled and installed the prototype at the farm in May. Since then, they’ve been fine-tuning the device on a daily basis. The next step would be to scale up the system to handle 50 to 100 gallons per minute.

“The end goal is to come up with a design for a full-scale system and do a cost analysis,” Huang said. “We are exploring the potential for a pilot plant, which may be built at Masson greenhouse. When you try for commercialization, you have to have something to show people.”



**Members of the EPSCoR team on site at Masson Farms with their prototype water purification system**



## NMT Makes Strides in Cancer Research

New Mexico Tech has made significant, and possibly life-saving gains in the realm of cancer research. Tech faculty has made potentially game-changing breakthroughs in developing new anti-cancer and antifungal agents, as well as new delivery methods. The New Mexico Tech team, headed by Biology Professor Dr. Snezna Rogelj, has found success synthesizing compounds that show promise towards successfully treating the disease.

Professors, researchers, and students from Tech’s Biology, Chemistry, and Chemical Engineering Departments have been collaborating for several years on projects related to the fight against cancer. NMT has supported one successful patent in this area, has another patent pending, and several other projects that are under development. Over the years, more than 50 students have contributed to research that has made this area of study important to NMT’s future.

This research has provided evidence to support the creation of New Mexico Tech’s new Ph.D. program in Biomedical Engineering Department in 2016, one of three Ph.D. programs recently approved and implemented within the last year.

## Tech Professor Awarded Patent For New Water Treatment Technology

The Forward Osmosis Device Aims To Clean Oil Field Water. Mechanical Engineering Professor Dr. Ashok Ghosh was awarded a patent for a new method and apparatus for removing dissolved organic solids from produced water. This invention has direct applications in the oil and gas industry in New Mexico.

This patent is the result of a \$1.4 million grant from the Department of Energy in 2008 to develop this multi-step system to desalinate and further treat produced water.

The oil and gas industry in southeast New Mexico produces about 400 million barrels of water every year, nearly all of which is deposited in evaporation ponds. The grant proposal is aimed to find a cost-effective method of converting that water to a useful state.

Over the course of the project, five professors were involved. The project supported one post-doc and four graduate students and more than a dozen undergraduate students. The treatment process employs forward osmosis to force water through a nano-membrane, filtering out dissolved solids. The system was field tested in Jal, N.M., in 2010 and in Abilene, Texas, in 2012. Ghosh's preliminary studies showed that produced water in southeast New Mexico contains an average of 212,000 parts per million of dissolved solids. "Many people have tried this, but there's such a high level of total dissolved solids that it's very difficult to find a cost-effective method," Ghosh said. "What we've done is increased our throughput up to 60 to 70 times greater than other systems."

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## NMT Students Claim National Award For Designing Microelectronic System

A team of three New Mexico Tech students won the annual MEMS University Alliance Design Competition in July.

The team consisted of grad student Phillip Clift and undergrads Yuqi Ma and Bowen Shang. Dr. Arash Mousavi was the advisor for the team, helping them through the whole process. Although this was the first time most of the team members were exposed to MEMS, they accomplished admirable results with their hard work.

I was happy for these students because they had limited experience with this sort of project," Dr. Mousavi said. "I was really pleased that they did so well."

Competing in the Commercialization category, the Tech students designed a biological radio frequency pressure sensor that can be inserted into cells. The sensors are able to differentiate between a healthy cell and a diseased or cancerous cell.

The team proposed sensors that would be hundreds of microns in size. To scale these sensors for human cells, they would have to be only tens of microns. This year, the Tech team competed in the Commercialization category and won first place in this category.

# Computer Science Department Maintains Cybersecurity Recognition

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The Computer Science and Engineering Department at New Mexico Tech has served as a powerhouse for educating better cyber-defense workforces in the nation. The department was successfully re-designated this past year as a National Center of Academic Excellence in Cybersecurity Research (CAE-R) until 2019.

The CAE-R program, jointly sponsored by the National Security Agency (NSA) and the Department of Homeland Security (DHS), aims to reduce vulnerability in our national information infrastructure by promoting higher education and research in cyber defense and producing professionals with cyber defense expertise. CAEs are academic institutions and programs that have undergone an in-depth assessment and have met the rigorous requirements to be designated a Center of Academic Excellence.

NMT's National Center of Academic Excellence in Cybersecurity Research designation is valid for five academic years, after which the school must successfully re-apply in order to retain its CAE designation. Students attending Center of Excellence schools are also eligible to apply for the Federal Cyber Service Scholarship for Service Program. New Mexico Tech's Scholarship for Service (SFS) program prepares students for government service in cybersecurity. Students receive full tuition scholarships and then are required to work for a government agency for two years after graduation.

Under Dr. Lorie Liebrock and Dr. Dongwan Shin, the SFS cohort performed security analysis for a New Mexico village that helped the village identify, evaluate, and remediate security vulnerabilities. The students did everything from social engineering and deep network scans to application testing. The experience allowed students to demonstrate their skills in an environment with a wide diversity of infrastructure while helping a community be more secure. A significant performance improvement was an unexpected side effect of the analysis done by the cohort, a misconfiguration was discovered that was interfering with the village's primary software.



## 2016 BEST COMPUTER SCIENCE DEGREES

<u>Institution</u>	<u>Ranking</u>
Queens College	1
MIT	6
Harvard	11
Columbia	13
RPI	20
<b>NEW MEXICO TECH</b>	<b>22</b>
UC Irvine	23
UC Berkeley	26
Colorado School of Mines	31
Cal Tech	33
USC	36

# 'Techpreneurs' Preparing for Industry

*Management 101 Course, Office of Student Learning providing marketing, licensing, patent, and copyright expertise*

A research-based learning communities program that gets students involved in design or research projects as freshmen has had notable success at New Mexico Tech. One of the newest research-based learning community options for freshmen or other first-time students is "Techpreneurs," which teaches management principles even as students pursue degrees in other fields.



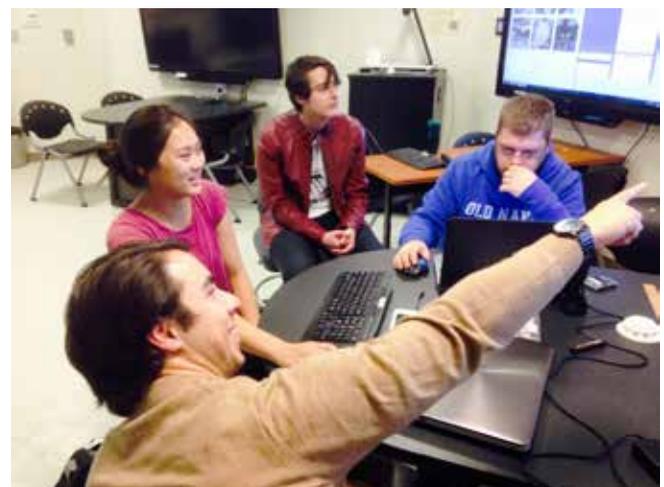
Tech's Techpreneurs are exposed to the concepts of marketing, licensing, patents, copyrights, and working with potential customers. They also are assigned to develop a "value proposition" for an innovative product or service.

Dr. Peter Anselmo teaches the Management 101 course linked with Techpreneurs L, a program housed in the school's Office for Student Learning (OSL) under Director Lisa Majkowski. Tech's original Learning Communities program began in 2011 with 39 students working on one research project; the OSL now supports 13 research-based options with an enrollment of over 200 students. This early experience in working with research peers, faculty, and the public proves invaluable in the long run.

"If you start out of the gate with all this impetus to do research or design projects, imagine what that looks like by the time these students are juniors," Majkowski said.

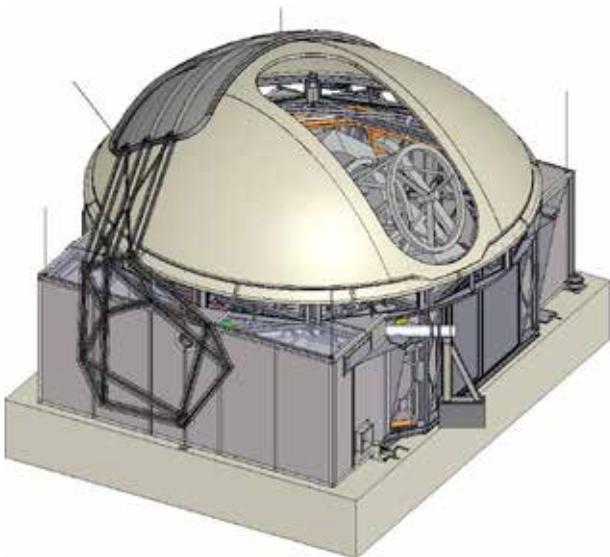
Learning coaches are an integral part of the LLC program. Senior John Paul Norman leads a Techpreneurs group working on an application for a uniform seating system for intimate-sized theaters. A second group is developing a concept for a jungle-gym type of entertainment center in Socorro.

First sessions were strictly for brainstorming. Coming in as freshmen, students needed to learn basic principles of market research, along with coming up with an original technological idea, according to Dr. Anselmo. The longtime management professor is also Director of New Mexico Tech's Center for Technology Commercialization (CTC), the hub for the University's entrepreneurial efforts.



# Campus Growth & Expansion

## Magdalena Ridge Observatory Sees First Light at Interferometer



The first telescope of the Magdalena Ridge Observatory Interferometer will experience first light on the evening of Tuesday, November 29.

The array will eventually include 10 telescopes of 1.4-meter diameter on a ridge at an altitude of 10,460 feet. This cutting edge instrument is being designed and installed by New Mexico Tech and the University of Cambridge under federal funding administered by the Air Force Research Lab.

The mission of the MROI is three-fold: to study astronomical science, to contribute to space situational awareness, and to contribute to education and outreach. The science mission for the interferometer, from which the design requirements are derived, has three main components: a) the study of stellar and planetary formation, b) the development of a better understanding of physical processes at various stages of stellar evolution, and c) the characterization of the innermost regions of active galactic nuclei.

The MROI will contribute to space situational awareness through its ability to image geosynchronous satellites, which include numerous commercial satellites such as Dish Network, DirectTV, XM Radio, Weather monitoring, Internet services, and military assets.

Once fully operational, the telescopes can be moved along the array arms from a minimum of 7.8 meters (25.6 feet) to a maximum baseline of 346 meters (1135 feet).



# New Mexico Tech Unveils Dr. Daniel H. Lopez Chemistry Building



New Mexico Tech officially dedicated its newest campus laboratory, the Daniel H. Lopez Chemistry Building, on Friday, August 25, in honor of its 16th president.

Lopez retired in June 2016 after 23 years in the institute's top post. He worked a total of 30 years at Tech. Lopez heaped praise on everyone involved in the development of the 40,000 square-foot, \$20 million building. He said the success of the project relied on a true team effort.

"The students are the heart and soul of New Mexico Tech," Lopez said. "The faculty are important, but the students are why we are here."

Chemistry Department Chair Dr. Michael Heagy spoke about the impact the new facility has already had on current students.

"We are joining a higher tier of research," Heagy said.

"This is big league – when you have a single discipline in one facility. We will honor that investment by the state and up our game."

Dr. Lopez also gave special thanks to the Board of Regents, both those in attendance and former board members. "You made my job a pleasure and made it easy," he said. "You have shown extraordinary leadership and supported my decisions. Other universities don't have that kind of leadership."

Current president Dr. Stephen Wells lauded Lopez for his track record of increasing research contracts. He said Dr. Lopez laid the foundation for building an entrepreneurial spirit at New Mexico Tech by leveraging the cutting-edge research activity and initiating two ventures that would contribute to successful commercial activity.

In his closing remarks, Lopez said that the new building and the campus in general are "a gem, a pearl in the desert that is truly amazing. My contributions pale in comparison to the rewards I received."



Current NMT president Dr. Stephen Wells (left) former president Dr. Daniel Lopez (center) and president of the NMT board of regents Deborah Peacock (right) at the Daniel H. Lopez Chemistry Building dedication ceremony.

# AT A GLANCE

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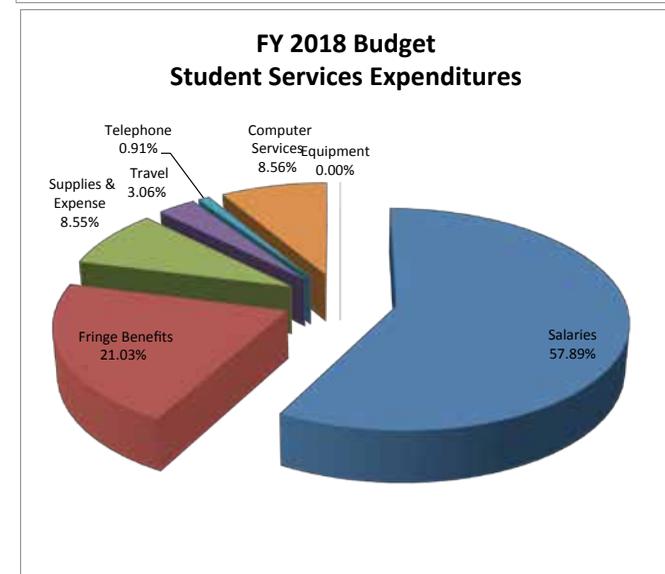
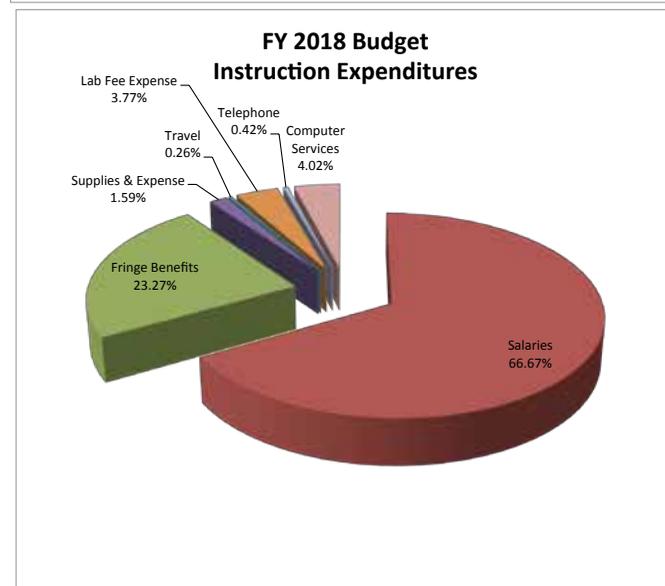
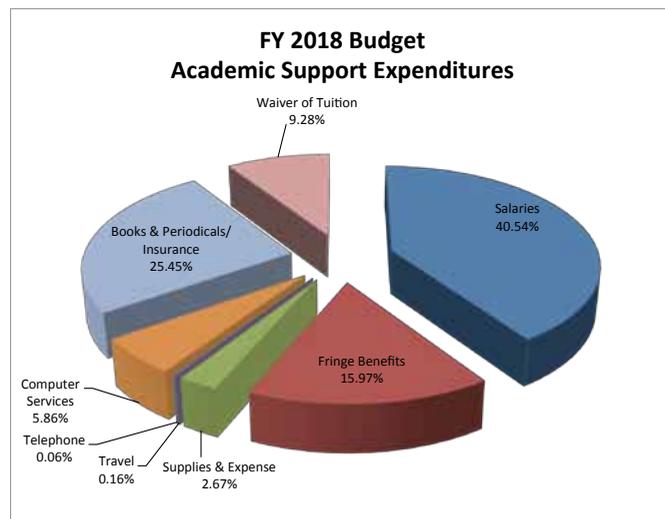
## Student Data

- Students Enrolled  
Degree-seeking Undergraduates: 1,460  
Degree-seeking Graduates: 392
- Total Enrollment: 2,135
- 475 - Graduating class of 2017  
Largest in NMT history
- 56% White, 28% Hispanic, 3% American Native  
(undergraduate)
- 72% from New Mexico
- 64% majoring in Engineering
- 77% of entering freshman retained following fall semester
- Ave. GPA 3.3%
- 74% GPAs of 3.0 and greater
- 55% employed in New Mexico

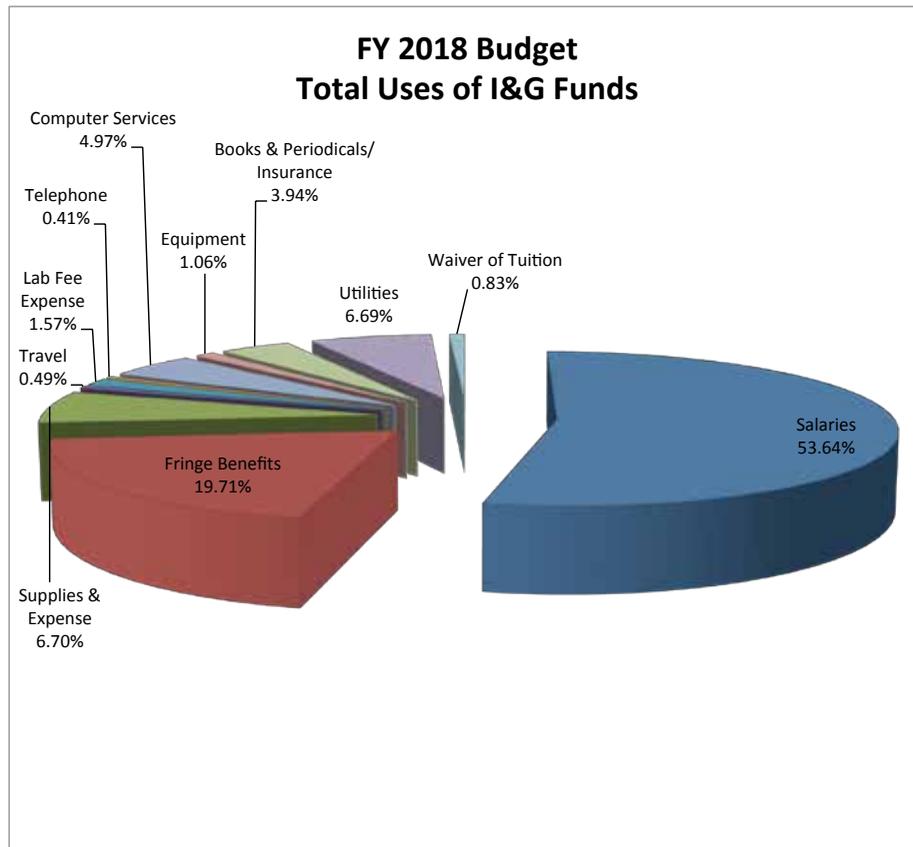


# NEW MEXICO TECH BY THE NUMBERS

- Total Revenue = \$144M
- 35.1% of total revenue from state government (among the lowest in NM)
- Tuition & fees = 8.2% of total revenue
- 888 employees (665 Full-time), including faculty, researchers, staff
- 211 faculty (full- & part-time)
- 19 academic programs
- \$53.1M in External Awards
- Student-faculty ratio: 11-1
- Average class size: 18
- Students from 31 countries and 44 states
- Freshman-to-sophomore retention rate: 78%
- 2018 Hispanic Serving Institution



# NEW MEXICO TECH BY THE NUMBERS



## New Mexico Higher Education Department Budget Approval Form FY 2016-2017

### New Mexico Institute of Mining & Technology

<b>Expenditures</b>	<b>Unrestricted</b>	<b>Restricted</b>	<b>Total</b>
Current Funds	\$65,352,554	\$72,873,973	\$138,226,527
Plant Funds	\$13,512,371	NA	\$13,512,371
<b>Total</b>	<b>\$78,864,925</b>	<b>\$72,873,973</b>	<b>\$151,738,898</b>

# NEW MEXICO TECH LEADERSHIP

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Jerry Armijo, Secretary/Treasurer  
David Gonzales  
Donald Monette  
Emily Silva

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President

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Vice President for Research and Economic Development

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Charlotte Lamont, Assistant Secretary  
James Reist, Assistant Secretary  
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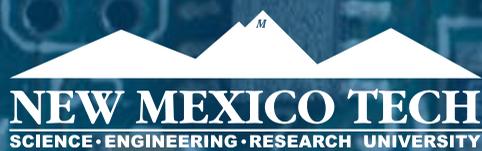
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meet the challenges of  
tomorrow through applied  
innovation, transdisciplinary  
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collaborations.