

*New Mexico Tech was named the No. 9 program in the nation for online master's in science education by [bestvalueschools.com](http://bestvalueschools.com), 2018*



*13:1 student to faculty ratio*



*New Mexico Tech is ranked #1 in Return on Investment in New Mexico and #9 nationally—[Payscale.com](http://Payscale.com), 2018*



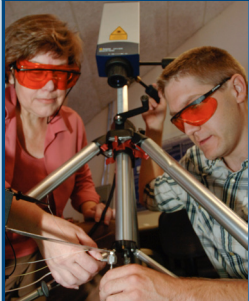
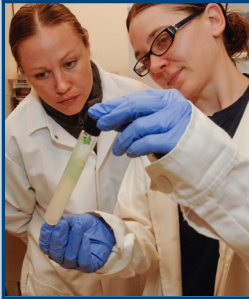
New Mexico Tech (NMT or Tech) is a public, Hispanic Serving Institution of higher learning that serves a diverse population by integrating education, research, public service, and economic development through emphasis on science, technology, engineering, mathematics, natural resources, communication, and cultural awareness. NMT offers Bachelor's, Master's, and Doctoral degrees in science and engineering disciplines. The campus is located in sunny Socorro, NM, boasting over 300 days of sunshine per year, and situated one hour south of Albuquerque in the Rio Grande valley at an elevation of 4,600 feet. Graduate students make up nearly 25% of the total student population of approximately 2,100. Tech's overall student to faculty ratio of 13 to 1 allows for intensive one-on-one interaction between students and faculty.

### Why should you do your graduate work at New Mexico Tech?

Graduate education provides students the opportunity to specialize beyond the general undergraduate education. NMT provides a high quality, low cost (see Financial Assistance on page 27) graduate education with extensive opportunities to engage in research to advance science and engineering. Students in Master's programs will deepen their understanding of a specialty area and engage in a research project that may lead to publication. Doctoral students go beyond the Master's level in a number of ways. They are required to advance understanding in their field with original contributions in addition to receiving education and mentoring. Generally, doctoral students will publish and present their research, often publishing numerous papers with their research advisor(s). In many cases, doctoral students mentor small research groups of less advanced students to practice for leading major research programs in their future careers. These experiences at NMT prepare our graduate students to excel in their careers and result in an excellent return on students' investments of time and tuition.

We invite you to join our outstanding students in these graduate opportunities.

Lorie M. Liebrock, Ph. D.  
*Dean of Graduate Studies*



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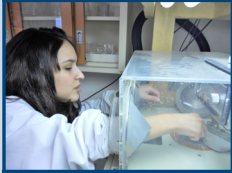
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**ENGINEERING**

Business and Technology Management	5
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The engineering programs are known for their dedicated faculty, advances in applied and basic research, and return on educational dollars invested. Close proximity to, and association with, research facilities such as Energetic Materials Research and Testing Center, Langmuir Laboratory, Magdalena Ridge Observatory, National Radio Astronomy Observatory, Incorporated Research Institutions for Seismology, Petroleum Recovery Research Center, and Institute for Complex Additive Systems Analysis provide access to exceptional facilities and research opportunities.

**Dr. Kevin Wedeward**  
*Dean of Engineering*





## BUSINESS AND TECHNOLOGY MANAGEMENT

The Department of Business and Technology Management provides undergraduate degree programs that draw heavily on Tech's strengths in science, engineering, and technology. The aim of the department is to develop in students substantive decision-making skills and tools, as well as the functional knowledge required to effectively manage complex technology-based organizations in today's competitive global economy. Students take the same basic science and math courses required of every Tech student: two semesters each of chemistry, physics, calculus, and another lab science such as biology, engineering, or geology. Added to this foundation are courses in accounting, business computer systems, economics, finance, management, marketing, operations research, and statistics. In 2014 the department's most significant achievement was the launching of the Center for Leadership in Technology Commercialization. The graduate program is positioned at the intersection of engineering and business, with an emphasis on achieving depth of understanding of issues specific to innovation in a technology environment.

<http://www.nmt.edu/academics/management> • [frank.reinow@nmt.edu](mailto:frank.reinow@nmt.edu) • 575.835.5440

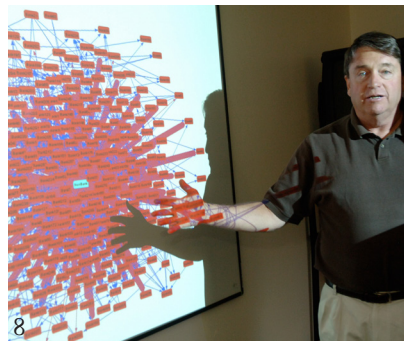
### Areas of Research

Modeling and Simulation  
of Complex Social Systems,  
Evolution of Innovation,  
Technology Commercialization  
—Dr. Peter Anselmo

Leadership Development,  
Technology Commercialization,  
Decision Analysis and Heuristics  
— Dr. Frank Reinow

Management Science, Data  
Envelopment Analysis, Policy  
Analysis  
—Dr. Toshi Sueyoski

Applied Economics, Econometrics  
—Dr. Yan Yuan

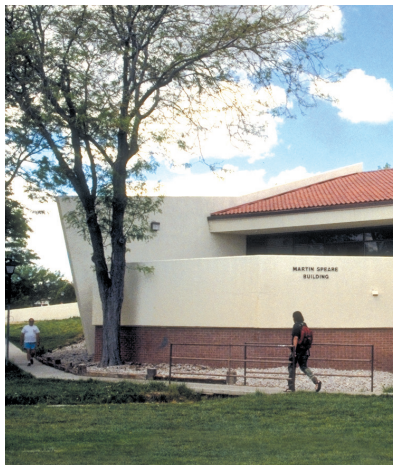


### About Our Department

Faculty: 4  
Adjunct faculty/lecturers: 3  
Undergraduates: 7  
Graduate students: 11

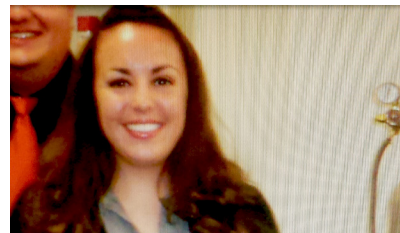
### Degrees Offered

B.S. in Management  
B.S. in Management of  
Technology  
Master of Engineering  
Management (MEM)  
Technology Leadership Certificate



Speare Building, home of Engineering Management

### Graduate Student Profile



*Sarah Quintana is an R&D Engineer at the Los Alamos National Laboratory and is currently pursuing a Master's degree in Engineering Management as a distance education student. She is working on her final project, "Development of an Improved Process for Installation Projects of High Technology Manufacturing Equipment". High technology manufacturing equipment is utilized at LANL to support Nuclear Missions; the process required to complete projects involving this equipment is unique and involves numerous steps. Based on her recent work with the Direct Current Arc Glovebox Design, Fabrication and Installation Project, Sarah is working to improve these processes and implement lessons learned for continued project improvement and success.*



## CIVIL AND ENVIRONMENTAL ENGINEERING

The Department of Civil and Environmental Engineering at New Mexico Tech offers a Bachelor's degree in Civil Engineering (with areas of specialization in structural, geotechnical, or water resources) and Bachelor's and Master's degrees in Environmental Engineering.

Both undergraduate programs are designed to give students a strong foundation in engineering and science, and strive to produce well-balanced graduates ready to enter the civil engineering and environmental engineering industries or continue their education with graduate studies.

The Environmental Engineering graduate program at New Mexico Tech provides a unique educational and research experience in the engineering and science of the natural environment and environmental protection. The research and plan of study are fine-tuned for each individual, drawing upon the strengths of the student, taking advantage of program capabilities, and complementing research activities within and outside New Mexico.

<http://www.nmt.edu/academics/ceeng/envegl> • 575.835.5500

### Areas of Research

Structural Mechanics, Structural Health Monitoring  
—*Dr. Mohammad Azarbayejani, P.E.*

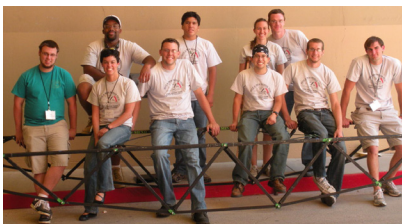
Air Quality Monitoring, Air Pollution Control  
—*Dr. Christian Carrico*

Structural Engineering  
—*Dr. Wesley Cook, P.E.*

Hazardous Waste Management, Biological and Chemical Waste Treatment, Risk Assessment  
—*Dr. Frank Y.C. Huang, P.E.*

Water and Wastewater Treatment, Groundwater Contamination, Site Remediation, Solid and Hazardous Waste Management, Risk Assessment  
—*Dr. Clint Richardson, P.E., B.C.E.E.*

Structural Engineering, Earthquake Engineering, Structural Dynamics, Transport Engineering  
—*Dr. Claudia M.D. Wilson*



*Steel bridge competition*

### About Our Department

Faculty: 6  
Adjunct faculty: 5  
Undergraduates: 83  
Graduate students: 7

### Degrees Offered

B.S. in Civil Engineering  
B.S. in Environmental Engineering  
M.S. in Environmental Engineering



*Jones Hall Annex, home of Civil and Environmental Engineering*

### Graduate Student Profile



**Cassandra Sanchez**, from Albuquerque NM, is conducting research with the Osmotic Power Development component of NM EPSCoR (Experimental Program to Stimulate Competitive Research). Her thesis focuses on the use of Computational Fluid Dynamic Simulations to determine the effects of membrane packing density and flow rate on the productivity of membrane distillation hollow fiber modules.

**Leticia Countinho**, from Rio de Janeiro, Brazil, is working with the Petroleum Resource Recovery Center (PRRC) at New Mexico Tech. Leticia is researching the viability of CO<sub>2</sub> carbon capture and sequestration (CCS) in a depleted oil and gas reservoir in Texas.



## COMPUTER SCIENCE AND ENGINEERING

Computer Science and Engineering offers graduate degrees in the exciting, rapidly growing, and constantly changing field of Computer Science and Information Technology. The department has led efforts resulting in Tech's designation as a *Center of Academic Excellence in Information Assurance Education and Research* by the National Security Agency and the Department of Homeland Security.

Our graduate programs provide students the opportunity to take courses, select advisory committee members, and pursue research in an area of interest to the student and a faculty supervisor. The Master of Science program is designed for students who wish to further broaden or deepen their knowledge of computer science; both thesis and non-thesis options are offered. The Ph.D. program is appropriate for students with motivation for research and either a superior track record in coursework or substantial experience in industrial research and development.

Graduate students have several possible funding opportunities including teaching and research assistantships, the Scholarship for Service program, and on-campus funding opportunities from ICASA, PRRC, and EMRTC. (See *Research Opportunities*, pages 24-26). After graduation, our students have found employment in large, medium, and startup companies; in national labs; in government agencies and as faculty members.

*www.nmt.edu/academics/compsci • secretary@cs.nmt.edu • 575.835.5126*

### Areas of Research

Cyber Security, Parallel Processing,  
Visualization —*Dr. Lorie Liebrock*

Mobile Security, Integrity and Privacy,  
Analysis and Design of Large Datasets  
—*Dr. Subhasish Mazumdar*

Complexity Classes for Emerging  
Computational Models, Artificial  
Intelligence. —*Dr. Ramyaa*

System Security, Usable Security,  
Cloud and Distributed Computing,  
Software Engineering  
—*Dr. Dongwan Shin*

Data and Communications,  
Sensor Networks, Neural Network  
Applications —*Dr. Hamdy Soliman*

Mobile Computing, Computer and  
Network Security, Machine Learning  
and Applications  
—*Dr. Jun Zheng*

### About Our Department

Faculty: 9  
Undergraduates: 195  
Graduate students: 36

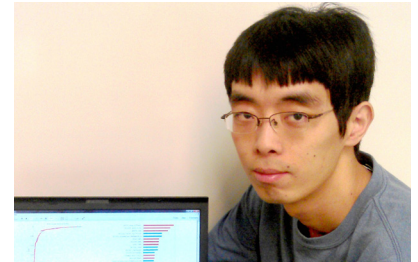
### Degrees Offered

B.S. in Computer Science  
B.S. in Information Technology  
M.S. in Computer Science  
M.S. in Computer Science with  
Specialization in Information  
Technology  
Ph.D. in Computer Science  
Graduate Certificate in  
Cybersecurity



*Cramer Hall, home of Computer Science and Engineering*

### Graduate Student Profile



*Yang Wang is a Ph.D. student from China researching mobile device security while working as a Teaching Assistant in the department. He has developed a method of evaluating the security risk of Android applications based on their requested permissions and a platform to automatically test and analyze the applications in both static and dynamic ways. He has also created visual tools to notify users of the potential risks from applications being installed.*





## ELECTRICAL ENGINEERING

The Department of Electrical Engineering blends a strong undergraduate program with an active, research-based graduate program. Both programs strive to provide a balance of theory and practice to prepare graduates for success in their profession or advanced education.

Members of the faculty have a variety of research interests that provide a range of opportunities for graduate students. Research interests center around sensing and instrumentation with applications in spacecraft, optics, thunderstorms, imaging, inertial navigation, and robotics. Students are also provided unique research opportunities thanks to the department's close association with research facilities on campus. These facilities provide opportunities for students to participate in leading scientific and engineering projects and acquire valuable educational and research experiences.

<http://www.nmt.edulacademics/eleceng/> • [ee-dept@nmt.edu](mailto:ee-dept@nmt.edu) • 575.835.5330

### Areas of Research

Digital Signal Processing Applied to Thunderstorms and Speech Recognition —*Dr. Rene Arechiga*

Communication Theory, Estimation Theory, Signal Processing, Aided-Inertial Navigation —*Dr. Aly El-Osery*

Remote Sensing Applications, which include Embedded Multispectral/Hyperspectral Imaging Systems, Unmanned Aircraft Systems-Based Inspection Applications —*Dr. Hector Erives*

Spacecraft Instrumentation, Astronomical Instrumentation, Data Assimilation, Space Plasma Physics, Optical Interferometry, Sensor Networks —*Dr. Anders Jorgensen*

Signal and Image Processing with emphases on Nonuniform Sampling, Modeling and Estimation of Wireless Communication Channels —*Dr. Seda Senay*

Optics and Wavefront Science, Adaptive Optics, Photonics, Optical Coatings, Electrical Properties of Energetic Materials, Internal and External Ballistics —*Dr. Scott Teare*

Analysis and Control of Electro-mechanical Systems, Power Systems, Robotics —*Dr. Kevin Wedeward*

### About Our Department

Faculty: 7  
Undergraduates: 123  
Graduate students: 11

### Degrees Offered

B.S. in Electrical Engineering  
M.S. in Electrical Engineering  
Graduate Certificate in Electrical Engineering  
Ph.D. with Dissertation in Cyber Electronic Systems



*Workman Center, home of the Electrical Engineering Department*

### Graduate Student Profile



*Joseph Gabaldon is developing new signal detection algorithms for cognitive radio. Because of the rapid increase of cheap and small wireless communication devices that are readily available, the demand for efficient frequency spectrum utilization has increased tremendously. As part of this research, newly developed algorithms are implemented and tested on software defined radios.*

*The newly developed algorithms enhance spectrum sensing capabilities and result in a more efficient utilization of the scarce spectrum. Through spectrum sensing, cognitive radios will be able to dynamically adapt to ensure reliable communication.*





## MATERIALS AND METALLURGICAL ENGINEERING

Materials and their many uses dominate our world. Developing new materials, new processes to make them, new theories and computational models to understand them, and new means to measure their properties are the emphases of Materials and Metallurgical Engineering at New Mexico Tech.

Our research is diverse—from environmentally benign polymers for electronics packaging to foundational theory to extend the life of bonding agents; from photonic band gap analyses of protective coatings to combating microbial induced corrosion; from smart adaptive shape-memory metals to biologically inspired metal-ceramic interfaces for orthopedics; from super ion-conducting ceramics to terahertz photodetectors; from ultralight nanostructured aluminum composite armor cladding to single crystal superalloys for high performance aircraft engines.

The department is distinguished by the broad range of hands-on experimental techniques in materials science, the strong integration between its undergraduate and graduate programs, and the ability to approach new frontiers in materials technology through close interaction across the primary materials sub-disciplines of polymers, ceramics, metals, composites, and nano/bio materials. The atmosphere for graduate research in materials is distinguished by having world-leading faculty working closely with graduates and post-graduates to create personalized research and learning experiences. Students are funded through teaching and research assistantships.

<http://www.nmt.edu/academics/mateeng> • [mtls@nmt.edu](mailto:mtls@nmt.edu) • 575.835.5229

### Areas of Research

Electrochemical and Corrosion Studies of Magnesium Alloys, Roll-bonded Aluminum, Tarnish-resistant Copper, Anodized Steel — *Dr. David Burleigh*

Fabrication and Characterization of Ceramics, Novel Ceramic Processing, Thin Film Processing, Hot Forging of Oxide Ceramic Composites — *Dr. Paul Fuierer*

Ni-base Superalloys, First-principles Diffusion Calculations, CALPHAD Modeling and Database Development — *Dr. Chelsey Hargather*

Nanoparticle Reactor Design, Nanomaterial Transport Modeling, Applied Nanotechnology, Optical Waveguides — *Dr. Dale Henneke*

Optoelectronics, Nanostructures, Nanotechnology, Terahertz Lasers and Photodetectors, Solid State Physics of Nanostructures, Semiconductor Materials — *Dr. Nikolai Kalugin*

Deformation and Fracture of Metals, Composites, Thin Films, Microstructure/Property Relationships, Super Alloys, Smart Materials — *Dr. Bhaskar Majumdar*

Thermal and Mechanical Properties of Epoxies, Thermodynamics of Phase Transitions and Inhomogeneous Polymeric Materials, Chemical Kinetics, Molecular Dynamics Simulations, Density Functional Theory, Glass Transition — *Dr. John McCoy*

Computational Modeling of Materials for Energy and the Environment, Surfacing Engineering, Catalysis, Gas Sensors, Proton Transport — *Dr. Pabitra Choudhury (Joint)*

Biofuel Conversion and Production, Catalyst Characterization, Hydrogen Production — *Dr. Corey Leclerc (Joint)*

Lipid Particle Characterization, Biomedical Imaging, Liposomes, Fluorescence Microscopy — *Dr. Michaelann Tartis (Joint)*

### About Our Department

Faculty:	7
Joint faculty:	3
Adjunct faculty:	14
Undergraduates:	53
Graduate students:	30

### Degrees Offered

- B.S. in Materials Engineering
- M.S. in Materials Engineering
- Ph.D. in Materials Engineering

### Graduate Student Profile



*Gabriel Archederra's M.S. Materials Engineering research is focused on understanding the effects of aging in polymeric glasses. A glass forming thermosetting epoxy used in aerospace applications is being investigated to see how its properties change as it increases in extent of cure and approaches structural equilibrium. This research effort requires exposing epoxy samples to up to a year of elevated temperatures then using thermomechanical instruments to measure the change in properties which are then related to the relaxation rates and cure mechanisms. The research is expected to show that the epoxy has distinct low temperature and high temperature reactions and relaxation mechanisms that uniquely affect the physical properties.*



## MECHANICAL ENGINEERING

The mission of the Department of Mechanical Engineering at New Mexico Tech is to provide a quality education, to conduct strong research programs, to foster a close partnership with industry and government, and to provide related service to the campus community and the community at large.

A major focus of the department's activities is to provide quality engineering education with sufficient scope to include the basic and specialized engineering training necessary for current and emerging needs of society.

The department has related responsibility to contribute to the advancement of knowledge by conducting research at the cutting edge of science and technology.

<http://www.nmt.edu/academics/mecheng/> • [mecheng.dept@npe.nmt.edu](mailto:mecheng.dept@npe.nmt.edu) • 575.835.5693

### Areas of Research

Solid Mechanics: Shock Dynamics and Thermal Properties of Fluid-Filled Opencell Foams

—*Dr. Ashok Ghosh*

Robotics: Haptic Technologies, Dynamic Modeling

—*Dr. David Grow*

Shock and Gas Dynamics: Experimental Thermal-Fluid Dynamics, High-Speed Gas Dynamics, Thermal Convection Problems —*Dr. Michael Hargather*

Solid Mechanics: Impact Studies, Dynamic Behaviors of Materials

—*Dr. Jamie Kimberley*

Explosives Engineering: Energetic Materials, Linear and Conical Shaped Charges, Oblique Shock Reflection —*Dr. Bin Lim*

Thermal Fluid Science: Wall-Bounded Flow, Flow Instabilities, Enhancing or Reducing Heat Transfer Coefficients, Turbulent Mixing, Fluid Drag —*Dr. Tie Wei*

Computational Fluid Dynamics: Internal Combustion Engines, Renewable Energy

—*Dr. Nadir Yilmaz*

Mechatronic Systems Engineering: Intelligent Systems, Complex Nonlinear Systems, Structural Monitoring —*Dr. Andrei Zagrai*

### About Our Department

Faculty: 11  
Adjunct faculty: 12  
Undergraduates: 358  
Graduate students: 56

### Degrees Offered

B.S. in Mechanical Engineering

M.E., M.S. in Mechanical Engineering with Specialization in Explosives Engineering, Fluid

and Thermal Sciences, Mechatronics Systems and Robotics, or Solid Mechanics

Ph.D. in Mechanical Engineering with Dissertation in Intelligent Energetic Systems

### Graduate Student Profile



*Ben Cooper's Master's research is a collaboration with the Air Force Research Lab to develop next generation space systems. He is involved in the design of science payloads for high altitude balloon and suborbital rocket launches, as well as a student-designed nano-satellite for low earth orbit. His primary research is in Structural Health Monitoring, which uses ultrasonic wave pulses to interrogate a structure and detect damage.*



*Weir Hall, home of Mechanical Engineering*



## MINERAL ENGINEERING

Mineral Engineering is a non-traditional mining program that builds upon the more traditional degrees of geological engineering and mining engineering. The program is designed to meet the needs of the changing industries of mining and construction. Students seeking a Master of Science in Mineral Engineering may specialize in Mineral Exploration, Geotechnical Engineering, or Explosive Engineering.

The department has modern, well-equipped labs for instruction and research in soil and rock mechanics, ventilation, blast vibrations, mineral evaluation, and computer applications. The department also maintains its own experimental underground mine for instruction and research use by the students and faculty. Students often work with faculty members on research and consulting projects both in the labs and in the field at the mine site. Such opportunities allow students valuable hands-on experience in solving mining/mineral-related and geotechnical problems.

<http://www.nmt.edu/academics/mining/> • [navid.mojtabai@nmt.edu](mailto:navid.mojtabai@nmt.edu) • 575.835.5836

### Areas of Research

Applied Mineral Exploration,  
Ore Deposits, Natural Resource  
Utilization

—*Dr. William X. Chávez, Jr.*

Geomechanics, Numerical  
Modeling, Code Development

—*Dr. Ali Fakhimi*

Site Investigation, Blasting and  
Rock Fragmentation, Mine  
Design, Geomechanics

—*Dr. Navid Mojtabai*

Soil Mechanics, Image Processing,  
X-Ray Computer Tomography

—*Dr. Mehrdad Razavi*

### About Our Department

Faculty: 4  
Adjunct faculty: 6  
Undergraduates: 12  
Graduate students: 27

### Degrees Offered

B.S. in Mineral Engineering  
M.S. in Mineral Engineering  
M.S. in Mineral Engineering  
with Specialization in Mineral  
Exploration, Geotechnical  
Engineering, or Explosive  
Engineering

### Graduate Student Profile



*Ali Tarokh joined the Mineral Engineering graduate program coming from a mining engineering background and based on the recommendation of a friend studying at Tech. “Most of the research going on in the department was focused on interdisciplinary studies with applications in mining, civil and petroleum engineering that seems to be a trend for the future. During my stay at Tech I was fortunate to work with Dr. Fakhimi on a unique but controversial research topic of ‘size effects on fracture process zone.’ This research involved conducting numerical simulations of rock fracture and investigating the issue of scale effect. We published several journal and conference papers. I won two prestigious awards from the American Rock Mechanics Association . . .”*







## PETROLEUM AND CHEMICAL ENGINEERING

New Mexico Tech has more than 80 years experience educating petroleum engineers, dating from the 1930's when we were known as the New Mexico School of Mines.

Today, with the world's demand for oil still growing, we are at the forefront in petroleum education and technology. Opportunities exist to conduct either applied or basic research at the Petroleum Recovery Research Center (PRRC), a research division of New Mexico Tech, or within the Petroleum and Chemical Engineering program. Graduates are well-positioned to acquire high paying, technical jobs in the oil and gas industry.

*www.nmt.edu/academics/petreng • petro@nmt.edu • 575.835.5412*

### Areas of Research

Well Testing, Reservoir, Analytical Solutions —*Dr. Her-Yuan Chen*

Formation Evaluation/  
Petrophysics, Naturally Fractured Reservoirs, Unconventional Gas Recovery —*Dr. Thomas Engler*

Production and Pressure Transient, Tight Gas Reservoirs, Well Testing —*Dr. Mike Kelly*

Catalysis for Biorefineries, Hydrogen Generation, Biofuels, Petrochemicals, Ethanol Conversion —*Dr. Corey Leclerc*

Tight Gas Reservoirs, Horizontal Wells —*Dr. Jiajing Lin*

Drilling Fluids, Multiphase Flow and Artificial Lift —*Dr. Tan C. Nguyen*

Gas Flooding Processes, Flow Heterogeneities —*Dr. Hamid Rahnema*

### About Our Department

Faculty: 11  
Adjunct faculty: 9  
Undergraduates: 291  
Graduate students: 37

### Degrees Offered

B.S. in Chemical Engineering  
B.S. in Petroleum Engineering  
M.S. in Petroleum Engineering  
Ph.D. in Petroleum Engineering

*Petroleum Recovery Research Center (see Research Opportunities, page 22)*

### Graduate Student Profile

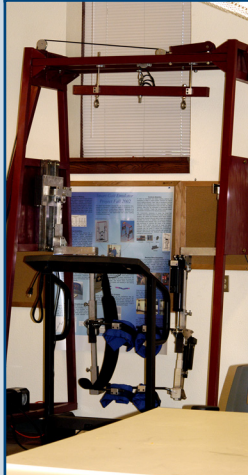
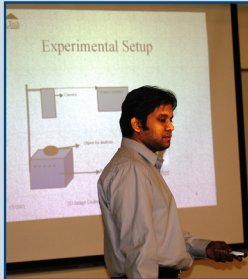


*Kelsey Seals is a Master's student in Petroleum Engineering from Peralta, New Mexico. She earned her B.S. in Geology from New Mexico Tech. She is focusing her thesis on improving hydrocarbon recovery in unconventional reservoirs in southeast New Mexico by studying ways to optimize well completion designs based on rock characteristics.*

*New Mexico Tech's Petroleum Engineering Department is researching a variety of cutting-edge research projects that could impact and enhance New Mexico's oil and gas industry. Kelsey recently presented her research to the New Mexico Legislature at Graduate Education Day.*







## **INTERDISCIPLINARY/TRANSDISCIPLINARY**

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Interdisciplinary programs include and integrate education from multiple disciplines. Transdisciplinary programs further integrate the methods, theories, techniques, and perspectives of multiple disciplines to develop new approaches to solve complex, real-world challenges.

Transdisciplinary graduate programs give students the opportunity to build depth in multiple disciplines and contribute to foundations beyond individual disciplines, while doing research with dedicated faculty from multiple disciplines. Join this community of scholars to be prepared to solve the future's most challenging problems.

**Dr. Lorie M. Liebrock**  
*Graduate Dean*



## BIOTECHNOLOGY

This novel program prepares students at the highest level for careers in research, development, and practical applications of the tools of biotechnology, e.g., biomolecular, biochemical, biomedical and bioengineering approaches. Biotechnology has huge potential for solving societal problems and for creating useful products, processes, and economic development. This program prepares students for the biotechnological workforce and bioentrepreneurship, and is among Tech's highest priorities.

**Participating Departments:** Biology, Chemistry, Psychology, Computer Science, Mathematics, Earth and Environmental Science, Engineering Management, and Chemical, Mechanical, Materials and Environmental Engineering.

<http://www.nmt.edu/academics/interdisciplinary/biotech.php> • [thomas.kieft@nmt.edu](mailto:thomas.kieft@nmt.edu) • 575.835.5612

### Areas of Research

Biotechnology Intellectual Property and Commercialization

—Dr. Peter Anselmo

Hydrology at Intersection Between Ecosystems and the Hydrological Cycle

—Dr. Dan Cadot

Bioengineering, Biomimetic Materials, Soft Electronics

—Dr. Paul Calvert

Atomistic Modeling and Simulations, 2D Materials and Bio-molecular Interactions

—Dr. Pabitra Choudhury

Plasmonic Nanomaterials, Nanoparticles Biomolecular Interaction, Single Molecule Microscopy, Proton Transport Membranes

—Dr. Sanchari Chowdhury

Plant Ecology, Climate Change, Soil Science, Applied Ecology

—Dr. Ben Duval

Neuroscience

—Dr. Taffeta Elliott

Drug Design and Synthesis, Modified Metallic Surfaces for Compound Separation, Uranium Removal from Drinking Water

—Dr. Liliya Frolova

Extremophiles

—Dr. Thomas L. Kieft

Haptic Technologies, Robotics, Dynamic Modeling

—Dr. David Grow

Bioengineered Water Treatment

—Dr. Frank Huang

Graphene for Chemical

Separations

—Dr. Nikolai Kalugin

Biofuels

—Dr. Corey Leclerc

Bioinformatics

—Dr. Oleg Makhnin

14

Bioinformatics

—Dr. Subhasish Mazumdar

Experimental Biochemistry, DNA Damage and Anti-cancer Drugs

—Dr. Praveen Patidar

Biochemistry, Molecular Modeling

—Dr. Sally Pias

Pathogen Detection, Chemical Sensing, and Diagnostics

—Dr. Menake Piyasena

Cell and Molecular Biology, Biosensors, Anti-bacterial, Anti-cancer and Anti-parasite Drug Discovery, Biomaterials

—Dr. Snezna Rogelj

Mathematical Biology

—Dr. William Stone

Bioengineering, Drug Delivery, Biomedical Imaging

—Dr. Michaelann Tartis

Anti-cancer Drug Design and Synthesis

Neuroscience, Inherited Disease, Translational Research

—Dr. Stewart Thompson

Biomechanics and Biological Fluid Dynamics

—Dr. Lindsay Waldrop

Cannabis sp. Microbiome, Algal Biofuels, Algal Viruses, Bacteriophages, Genomics

—Dr. Siobhan Watkins

### About Our Program

Graduate students: 2

### Degree Offered

Ph.D. in Biotechnology

### Graduate Student Profile



**Danielle Turner** is on track to earn the department's first Ph.D. in Biotechnology. Her interdisciplinary research requires working with the Chemistry (drug discovery), Materials, Chemical Engineering, Engineering Management (drug marketing), and Computer Science departments. The focus of her study, Chagas Disease, is a tropical parasitic disease spread by the triatomine insect. "I have been able to transform the un-infectious form of the parasite — readily available to researchers — into the infectious forms of the parasite without the need for insect or mammalian hosts," Turner explained. Recapitulating the entire life cycle in the lab without the need for hosts allows researchers to test drugs more quickly and efficiently.



## SCIENCE FOR TEACHERS

The Master of Science for Teachers program is designed to provide graduate-level classroom and laboratory instruction for K-12 teachers of science, mathematics, engineering, and/or technology. The emphasis of the courses is on content, rather than pedagogy. MST students are encouraged to develop laboratory exercises, demonstrations, and teaching methods from the course content and apply these as projects in their own classrooms during the academic year. Courses for the participants are offered in a variety of disciplines and are taught by New Mexico Tech faculty, with focus on fundamental principles, new concepts, and novel teaching methods. Courses are offered throughout the year via distance instruction and as live courses on the New Mexico Tech campus and around the state.

<http://www.nmt.edu/academics/psych-ed/graduate.php> • [megha.khandelwal@nmt.edu](mailto:megha.khandelwal@nmt.edu) • 575.835.5470

### Areas of Research

Chemistry —Dr. Jeff Altig

Problem Solving and Recreational Math —Dr. Brian Borchers

Geology, Mining Engineering —Dr. William X. Chávez, Jr.

Optics —Ray Collins

Technical Communication —Dr. Julie Ford

Physics of Aviation —Dee Friesen

Microscopy —Dr. Kaarin Goncz

Soils, Climate Change, Earthquakes —Dr. Bruce Harrison

Information Technology —Rob Hepler

Probability and Statistics —Dr. Anwar Hossain

Optical Astronomy —Dr. Dan Klinglesmith

Water as a Resource, Renewable Energy —Lynne Kurilovitch

Cyber Security, Parallel Processing, Visualization, Supercomputing Challenge —Dr. Lorie Liebrock

Weather, Climate —Dr. Ken Minschwaner

Human Genetics, Modern Genetics —Dr. Rebecca Reiss

Environmental Studies, Science, Engineering —Dr. Clint Richardson

Space Science: Hazardous Asteroids, Telescopic Observations —Dr. Eileen Ryan

Educational Testing —Dr. Mark Samuels

Research and Documentation —Dr. Steve Simpson

Electricity, Electromagnetism and Light —Dr. Richard Sonnenfeld

Archaeology —Dr. Elisabeth Stone

Concepts in Mathematics, Calculus, Modeling, Fractals, Chaos —Dr. William Stone

Physics, Mobile Computing and Science Teaching, Radio Astronomy —Dr. Dave Westpfahl

Paleontology, Evolution, Zoology, Biology, Forensic Geology, Natural History —Dr. Don Wolberg

### About Our Program

Active graduate students: 150

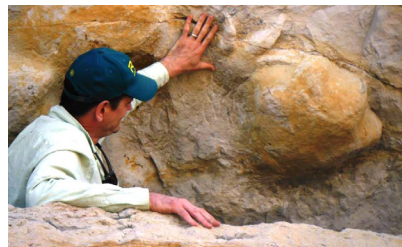
Courses offered: 74

### Degree Offered

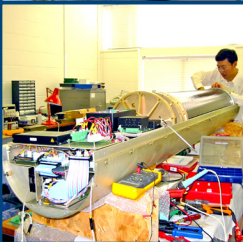
Master of Science for Teachers (MST)



### Graduate Student Profile



*Scott Larson (MST 2016) has taught middle and high school science, math, and technology both internationally and in New Mexico. He recently contributed to the accreditation of Mandela International Magnet School to become the first public International Baccalaureate School in Santa Fe, NM. Scott stated, "The MST Program at Tech has had a huge impact on me professionally, personally, and academically. The professors in the MST program did an outstanding job of individualizing the course projects and assessments so I could apply it directly to my classroom and to my school's STEM program development. The content knowledge I gained allows me to be more confident in my course delivery, while the summer field experiences made the concepts relevant and inspiring. . . The independent study allowed me to research the Next Generation Science Standards in depth, resulting in improved student performance in formulating evidence-based arguments. This study completely transformed my understanding of science education."*



## **SCIENCE**

Biology	17
Chemistry	18
CLASS	19
Earth and Environmental Science	20
Mathematics	21
Physics	22

New Mexico Tech offers many opportunities to work with the dedicated faculty, doing cutting-edge research and advancing our scientific understanding. You will work directly with world class faculty and with other students from around the world. Join our community of scholars and find your path to a rewarding career.

**Dr. William D. Stone**  
*Dean of Arts and Sciences*





## BIOLOGY

The Biology Masters program prepares students for further graduate study and for private and public sector jobs in research, education, medicine, and environmental management. Graduate seminars promote the development of essential research and written communication skills while addressing cross-cutting topical issues such as astrobiology, aging, genomics, and nanotechnology.

Faculty in the Biology Department at New Mexico Tech have secured research funding in recent years from multiple sources including the National Science Foundation, the National Institutes of Health (NIH), the Office of Naval Research, the New Mexico Waste Management Education and Research Consortium, and the New Mexico Water Resources Research Institute. This extracurricular funding provides stipends for graduate research assistants. Students conduct research on topics that span a wide range of medically and environmentally related areas, frequently in collaboration with other departments, such as Chemistry, Mathematics, Chemical Engineering, Materials Engineering and Earth and Environmental Science. Graduate coursework supports these efforts.

See page 14 for details on the Biotechnology Ph.D. program.

[nmt.edu/academics/biology/](http://nmt.edu/academics/biology/) • [biology@nmt.edu](mailto:biology@nmt.edu) • 575.835.5612 Facebook: [facebook.com/NmtBiologyDept](https://facebook.com/NmtBiologyDept)

### Areas of Research

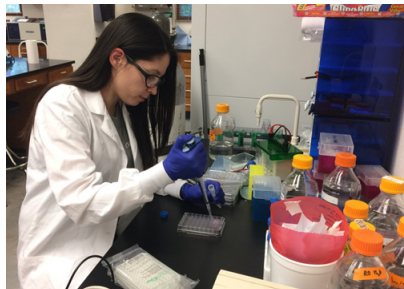
Plant Ecology, Climate Change,  
Soil Science, Applied Ecology  
—*Dr. Ben Duval*

Deep Subsurface Biosphere,  
Animal-microbe Interactions  
—*Dr. Tom Kieft*

Drug Discovery, Cancer,  
Pathogens, Biosensors, Anti-  
microbial Materials  
—*Dr. Snezna Rogelj*

Biomechanics and Biological Fluid  
Dynamics —*Lindsay Waldrop*

Cannabis sp. Microbiome, Algal  
Biofuels, Algal Viruses, Bacteriophages,  
Genomics — *Siobhan Watkins*



*Talysa Ogas, Biology MS student, conducting research with a new, NMT-developed anti-cancer compound*



*Dr. Siobhan Watkins at a medicinal marijuana facility, collecting soil to analyze the microbiome that facilitates a plant's ability to elaborate its active ingredients*

### About Our Department

Faculty: 5  
Undergraduates: 98  
Graduate students: 8

### Degrees Offered

B.S. in Biology  
B.S. in Biomedical Sciences  
M.S. in Biology  
Ph.D. in Biotechnology

### Graduate Student Profile



*Cecelia Ogunro is developing and validating a viability assay for a pathogen lethal to amphibians by collecting data from her cell cultures, which she quantifies with a microplate reader. Data she collects from the microplate reader will be available for future use in a wide range of temperature experiments with the pathogen. Ultimately, the assay Cecelia develops can be used to study fungal pathogens, how they respond to their thermal environments and how the pathogen-environment interaction influences disease dynamics.*



## CHEMISTRY

The Chemistry Department offers a balance between pure and applied chemistry. The program emphasizes development of a strong foundation in the fundamental areas of chemistry, preparing students for the diverse opportunities available to chemists. Well-equipped teaching and research laboratories offer general instruction and research in specialized areas. Students have the freedom to select courses to meet individual interests and objectives.

Research in chemistry at New Mexico Tech is focused on chemical problems that affect human society. Recent and current research projects include the following:

- New solar energy technology using organic dyes, biosensor development, and bio-analytical chemistry
- Study of novel materials' optoelectronic properties for solar energy harvesting, conversion, and storage
- Study of mineral dust and its environmental impact
- Modeling of chemical processes in the atmosphere and their effect on climate change
- Understanding proteins and other molecules using computational modeling
- Synthesis and study of natural products and medicinal organic compounds
- Development of portable detection systems for malaria and other infectious diseases

<http://nmt.edu/academics/chemistry> • [chem@nmt.edu](mailto:chem@nmt.edu) • 575.835.5263

### Areas of Research

Computational Chemistry,  
Chemical Education —*Dr. Jeff Altig*

Synthetic Organic and Medicinal  
Chemistry —*Dr. Liliya Frolova*

Physical Organic Chemistry  
—*Dr. Michael Heagy*

Experimental Biochemistry, DNA  
Damage and Anti-cancer Drugs  
—*Dr. Praveen Patidar*

Computational Biochemistry  
—*Dr. Sally Pias*

Bioanalytical Chemistry  
—*Dr. Menake Piyasena*

Physical Chemistry, Ultra-fast  
Spectroscopy  
—*Dr. Mahinda Ranasinghe*

Environmental and Analytical  
Chemistry  
—*Dr. Gayan Rubasinghe*

Synthetic Organic and Medicinal  
Chemistry  
— *Dr. Rodolfo Tello-Aburto*

Atmospheric and Global  
Biogeochemistry  
— *Dr. Oliver Wingenter*

### About Our Department

Faculty: 10  
Undergraduates: 28  
Graduate students: 16

### Degrees Offered

B.S. in Chemistry  
M.S. in Chemistry  
M.S. in Chemistry with  
Biochemistry Option  
Ph.D. in Chemistry



*New Chemistry building, completed in August of 2017*

### Graduate Student Profile



***Gary Angles** is pursuing a PhD with Dr. Sally Pias in the area of biological computational chemistry. Gary's projects focus on clarifying how the cholesterol and protein content of biological membranes influences their permeability to oxygen (O<sub>2</sub>). His work lends insight into the influence of membrane composition on oxygen bioavailability, which is crucial for normal aerobic metabolism. Membrane composition and oxygen metabolism are altered in pathologies as diverse as cardiovascular disease, diabetes, Alzheimer's, and cancer. Gary's research is supported by the National Institutes of Health and the Glendorn Foundation.*



## COMMUNICATION, LIBERAL ARTS, AND SOCIAL SCIENCES (CLASS)

The Department of Communication, Liberal Arts, and Social Sciences is a multi-disciplinary department with undergraduate degrees in Technical Communication and General Studies, and courses in many areas of the Humanities and Social Sciences. Those seeking to further develop their professional skills in writing and communication can earn a Graduate Certificate in

Scientific and Professional Communication to enhance job performance and increase professional marketability.

Professional communication is a necessity for all fields as information has become the most powerful currency in the local, domestic and global marketplace. The Graduate Certificate offers a range of courses such as international professional communication, data visualization, proposal writing, academic and popular science writing, risk communication, and even creative writing and Spanish. Fourteen credits are needed to complete the certificate, with options for distance education courses. The certificate program culminates in an “experimental learning project,” in which students do a work-related project or a project for a local non-profit and receive ideas and feedback from program faculty.

The CLASS department operates the Writing and Oral Presentation Center (WOPC) which is an important resource for graduate students working on research writing and presentations. Both on-campus and distance students can consult with our graduate STEM Communication Fellows on any work related to their degree or professional development. The WOPC also hosts an annual “*Thesis and Dissertation Boot Camp*,” which caters to graduate students nearing the end of their degree work.

<http://nmt.edu/academics/class/index.php> • [steve.simpson@nmt.edu](mailto:steve.simpson@nmt.edu) (department chair) • [liza.apache@nmt.edu](mailto:liza.apache@nmt.edu) •

### Areas of Research

Creative Writing, Poetry, Art History  
—Dr. Mary Dezember

Science and Technology Studies,  
Community and Urban Studies  
—Dr. Taylor Dotson

Creativity and Innovation,  
Improvisation —Dr. Doug Dunston

Data Visualization, International  
Professional Communication,  
Complexity —Dr. Rosário Durão

American Literature, Asian Studies  
—Dr. Shawn Higgins

Technical Communication, Composition  
—Dr. Elisabeth Kramer-Simpson

Latin American Cultural History,  
Psychoanalysis  
—Dr. Rafael Lara-Martínez

Medieval History, History of Science,  
Women in the Intellectual Tradition  
— Dr. Yulia Mikhailova

Writing Studies, Sustainability,  
Writing Center Pedagogy  
—Dr. Jesse Priest

Technical and Scientific  
Communication, Graduate-level  
Writing, ESL —Dr. Steve Simpson

### About Our Department

Faculty: 11  
Undergraduates: 19

### Degrees Offered

B.S. in Technical Communication  
B.S. in General Studies  
Graduate Certificate in Scientific  
and Professional Communication



### Graduate Student Profile



**Karen M. Balch** received her Bachelor's in General Studies at New Mexico Tech. She is a published author, has taught a creative writing class, led poetry workshops, translated her own poetry into Spanish, and has done several readings at various venues. The Graduate Certificate in Scientific and Professional Communication enhanced her skills in professional communication.





## EARTH AND ENVIRONMENTAL SCIENCE

Earth Science research is key to energy, mineral, and water resources, to the environment, and to natural hazards and understanding how our planet works as a gigantic system. E&ES is a large, well-funded, and internationally-renowned department producing highly trained undergraduates and emphasizing graduate research and education (Master's and Ph.D.) Most graduate students are supported through research or teaching assistantships.

Collaborations are common with Earth scientists at the New Mexico Bureau of Geology and Mineral Resources, IRIS-PASSCAL Seismic Instrument Center — EarthScope Array Operations Center, and the Petroleum Recovery Research Center, all on campus. Los Alamos and Sandia National Labs and the National Cave and Karst Research Institute are nearby. The scientific resources (personnel, facilities, and funding) available to graduate students are dramatically increased by these collaborations. Additionally, faculty collaborate with many institutions around the nation and the world, as well as faculty in other departments at NMT such as Physics, Math, Biology, and Mineral Engineering.

<http://nmt.edu/academics/ees> • [earthenv@ees.nmt.edu](mailto:earthenv@ees.nmt.edu) • 575.835.5634

Facebook: <https://bit.ly/2D1F6fR>

### Areas of Research

Seismic, Geologic, Hydrologic, and Geodetic Studies of the Continental Crust and Lithosphere

Ground and Surface Water, Vadose Zone Hydrology, Contaminants and Tracers

Volcanology, Volcanic Hazards, Magma Chemistry, Mt. Erebus Volcano Observatory

Subduction-zone Fluid Behavior, Earthquakes, Tsunamis

Economic, Industrial, and Strategic Minerals: Genesis and Exploration Methods

Ecohydrology, Soils, Evapotranspiration

Geothermal Systems: Characterization, Evaluation, and Modeling

Fault Mechanics, Fault-zone Evolution, Fluid Flow, Diagenesis

Reservoir and Caprock Evaluation for Petroleum-Natural Gas and CO<sub>2</sub> Sequestration, Petroleum Systems Analysis

Cave and Karst Studies, Terrestrial and Planetary Geomicrobiology

Continental Tectonics and Neotectonics: Rifting, Orogeny, Sedimentation

Geochronology and Thermochronology: <sup>40</sup>Ar/<sup>39</sup>Ar, Fission Track, Cosmogenic Nuclides

Carbonate Sedimentology and Petrology

Climate and Ice-sheet Evolution

### About Our Department

Faculty: 20

Adjunct faculty: 28

Support staff: 3

Undergraduates: 33

Graduate students: 65

### Degrees Offered

B.S. in Earth Science

M.S. in Geochemistry, Geology, Geophysics, or Hydrology

P.M. in Hydrology.

Ph.D. in Earth and Environmental Science with Dissertation in Geobiology, Geochemistry, Geology, Geophysics, or Hydrology

Graduate Certificate in Hydrology

### Graduate Student Profile



*Hilary Kelly is a Choctaw and Cherokee Native and Marine Corps veteran with a Bachelor's in Environmental Geology from Kansas University. Her NASA-funded research will develop a robotically mounted instrument to detect and characterize mineral and biological materials on other planets with terrestrial testing in caves, mines, and extreme surface environments.*

### Laboratories

High-speed Computing, <sup>40</sup>Ar/<sup>39</sup>Ar and Fission-track Dating, Stable Isotopes, Soil Chemistry, Electron Microprobe, Geomicrobiology, Speleology, XRD and XRF, Fluid and Gas Inclusion Labs





## MATHEMATICS

The Mathematics Department offers Master's degrees in analysis, industrial mathematics, and operations research and statistics, and a Ph.D. in industrial and applied mathematics.

Industrial mathematicians solve complicated problems arising in industry and government, and many students work in these areas while pursuing a degree. Graduate students can teach or work as research assistants in fall, spring, and summer semesters. Summer employment and industrial internships are available. Research opportunities for graduate students include applications of probability, optimization, statistical theory, numerical methods, mathematical physics, mathematical biology, fluid dynamics, modeling and analysis applied to science and engineering, numerical solutions of ordinary and partial differential equations, dynamical systems, uncertainty quantification, fuzzy set theory and fuzzy measure theory.

<http://nmt.edu/academics/math/> • [math@nmt.edu](mailto:math@nmt.edu) • 575.835.5393

### Areas of Research

Numerical Methods for Solving  
Partial Differential Equations

—*Dr. Rakhim Aitbayev*

Mathematical Physics, Quantum  
Field Theory, Quantum Gravity,  
Differential Geometry, Financial  
Mathematics

—*Dr. Ivan Avramidi*

Optimization, Linear and  
Semidefinite Programming,  
Applications of Optimization in  
Parameter Estimation and Inverse  
Problems

—*Dr. Brian Borchers*

Uncertainty Quantification,  
Approximation Theory, Fuzzy Set  
Theory, Fuzzy Measure Theory

—*Dr. Yanyan He*

Diagnostic Methods, Reliability,  
Multivariate Analysis, Survival  
Estimation, Bayesian Estimation

—*Dr. Anwar Hossain*

Compact Models for Circuit  
Simulators, Mixed Boundary Value  
Problems

—*Dr. Bert Kerr*

Modeling Complex Multi-  
dimensional Data, Precipitation  
Modeling, Geostatistics, Bio-  
informatics

—*Dr. Oleg Makhnin*

Mathematical Biology, Modeling of

Fluids and Glaciers, Size-Structured  
Populations, Age Distribution of  
Groundwater, Resonances in the  
Plasmosphere

—*Dr. W.D. Stone*

Partial Differential Equations,  
Infinite-Dimensional Dynamical  
Systems, Random Attractors,  
Invariant Manifolds, Random Periodic  
Solutions

—*Dr. Bixiang Wang*

Applied Mathematics, Mathematical  
Biology, Dynamical Systems,  
Differential Equations

—*Dr. Mingji Zhang*

### About Our Department

Faculty: 10  
Undergraduates: 36  
Graduate students: 21

### Degrees Offered

B.S. in Mathematics

M.S. in Mathematics with  
Specialization in Analysis,  
Industrial Mathematics, or  
Operations Research and  
Statistics

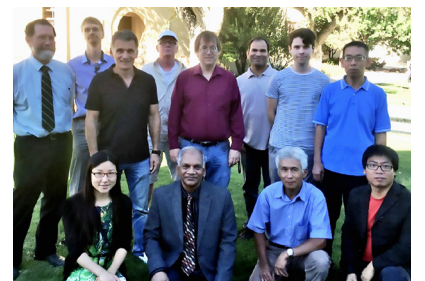
Ph.D. in Applied and Industrial  
Mathematics

Graduate Minor in Applied  
and Industrial Mathematics,  
Operations Research and  
Statistics, Numerical Analysis,  
or Analysis

### Graduate Student Profile



*Luis Zerón was born in Tegucigalpa, Honduras and came to NMT in January 2010. He is currently working on his Ph.D. in Applied and Industrial Mathematics. His research area is in the design and analysis of numerical methods for interface problems.*



*NMT Mathematics Department*



## PHYSICS

The Physics Department offers Master's degrees in Physics and in Physics with Specialty in Instrumentation, and Ph.D.'s in Physics and Physics with Dissertations in Astrophysics, Atmospheric Physics, or Mathematical Physics.

Graduate students usually receive a teaching or research assistantship for the academic year. Summer assistantships are also available.

Primary research opportunities include: cloud physics, physics of lightning and thunderstorms, chemical processes in the atmosphere, planetary atmospheres, exoplanets, galactic evolution, plasma astrophysics, star formation, and stellar evolution. Other research areas are shock physics and theoretical physics.

<http://nmt.edu/academics/physics> • [physics@kestrel.nmt.edu](mailto:physics@kestrel.nmt.edu) • 575.835.5328

### Areas of Research

Atmospheric Physics and Chemistry

—Drs. Ken Eack, Carlos Lopez Carrillo, Kenneth Minschwaner, Raul Morales Jubieras, David Raymond, Sharon Sessions, Richard Sonnenfeld

Astrophysics

—Drs. Michelle Creech-Eakman, Peter Hofner, David Meier, Dave Westpfahl, Lisa Young

Planetary Atmospheres

—Dr. Raul Morales Juberias

Mathematical Physics

—Drs. Paul Arendt, Ivan Avramidi

### About Our Department

Faculty: 12  
Undergraduates: 85  
Graduate students: 22

### Degrees Offered

B.S. in Physics  
M.S. in Physics  
M.S., Ph.D. in Physics with Specialization in Instrumentation  
Ph.D. in Physics  
Ph.D. in Physics with Dissertation in Astrophysics, Atmospheric Physics, or Mathematical Physics  
Graduate Minor in Physics

### Graduate Student Profile



*Jake Trueblood came to New Mexico Tech as an undergraduate from Palmer Lake, CO. After his Bachelor's degree, Jake stayed on to work with the Physics Department and Langmuir Lab on artificially triggered lightning for his Master's thesis. The main goal of this work is to better understand how the triggering process affects the thunderstorm and whether or not it would be a viable means for protecting personnel, property, and other assets on the ground.*



22 Workman Center, home of the Physics Department



## GRADUATE STUDENT SUPPORT

Research Opportunities	24
Distance Education	26
Financial Assistance	27

New Mexico Tech provides many forms of support for graduate students. From excellent educational opportunities, to engaged faculty advising and mentoring, to logistical support from the Center for Graduate Studies, to live Distance Education, we strive to make your education and research a stimulating experience that leads to an impassioned and productive career.

*Dr. Lorie M. Liebrock*  
*Dean of Graduate Studies*

## GENERAL APPLICATION REQUIREMENTS

1. Three letters of recommendation
2. Transcripts
3. GRE scores
4. TOEFL or IELTS scores (International students only)

Deadlines for guaranteed consideration for financial support are:  
February 15 for Fall admission (January 15 for Physics and E&ES)  
September 15 for Spring admission

For program-specific requirements, deadlines, and to apply, visit  
[www.nmt.edu/gradstudies/programs.php](http://www.nmt.edu/gradstudies/programs.php)





## Research Opportunities

In addition to research opportunities in academic departments, there are many opportunities in NMT's research divisions, as well as at our local national laboratories (Air Force Research Laboratory, Army Research Laboratory, Los Alamos National Laboratory, and Sandia National Laboratory Albuquerque). Here we introduce some of NMT's research divisions and some of their research areas. [nmt.edu/nmt-research](http://nmt.edu/nmt-research)



### Energetic Materials Research & Testing Center

EMRTC is internationally recognized with over 60 years experience in research, development, testing, and analysis of energetic materials for both corporate and government clients.

EMRTC's 40-square-mile field laboratory is located in the mountains west of campus, with more than 30 test sites, gun ranges, other research facilities and storage areas, allowing for a complete spectrum of research and testing activities.

### Etscorn Observatory



New Mexico Tech has earned a top reputation for educating future astrophysicists and astronomers, but many incoming students are unaware that Tech has a student-run observatory stocked with an

impressive array of telescopes.

Students do astrophysics lab work at the facility. Junior level astronomy labs are taught at the facility. The lab includes plenty of observing nights, including a 12-hour project. Physics students also use the observatory equipment to track and calculate the orbit of contact binary star. Students have also observed extrasolar planet X01 transiting its star.

### Incorporated Research Institutions for Seismology/ Portable Array Seismic Studies of the Continental Lithosphere



The IRIS/PASSCAL Instrument Center and *EarthScope USArray Array Operations Facility* (AOF) at NMT support cutting-edge seismological research into Earth's fundamental geological structure and processes. Scientists, technicians, and students have helped develop many innovative instruments for deployment in the harshest of conditions through the PASSCAL Polar Programs.

PASSCAL Instrument Center and AOF currently support a total of 33 professional NMT staff plus a contingent of student workers.

### Institute for Complex Additive Systems Analysis

ICASA contributes innovative and relevant solutions to national security and critical infrastructure protection in four main areas: understanding the behaviors and vulnerabilities of complex additive systems (CAS); creating inventive techniques for information assurance; training analysts, scientists, and engineers to both use and advance proposed solutions; and educating the next generation of engineers, mathematicians, and scientists in CAS security.

NMT/ICASA has been recognized by the National Security Agency and Department of Homeland Security as a *Center of Academic Excellence in Information Assurance Education* since 2001 and as a *Center of Academic Excellence in Information Assurance Research* since 2009. The state of New Mexico uses ICASA/NMT as first responders for forensic analysis of computer attacks and assistance with computer security.

### Langmuir Laboratory

Langmuir Lab is the nation's first lab devoted to lightning research.

Students work on research projects in a variety of atmospheric studies. In 2015, Drs. William Rison and Ronald Thomas in Electrical Engineering and Dr. Paul Krehbiel in Physics received a Special Award from the American Meteorological Society for Lightning Mapping Array technology. NMT Vice President of Research Dr. Van Romero said “This is an excellent example of the work that happens at Tech and, in particular, in the Langmuir research group. They look at the fundamentals of physics and, combined with electrical engineering, have created a device that protects us from lightning events.”

### Magdalena Ridge Observatory



The MRO consists of two major facilities: an operational 2.4-meter fast-tracking telescope and a ten-element optical/infrared interferometer, under construction. The MRO mission is to support astronomy, space situational awareness, and education.

MRO works with the Office of Naval Research, the National Science Foundation, and NASA to track and characterize “near-Earth objects,” such as comets, asteroids, and satellites. Students use this phenomenal facility to conduct astronomical research.

### National Cave and Karst Research Institute



NCKRI, headquartered in Carlsbad, New Mexico, conducts, supports, facilitates and promotes programs in cave and karst research, education, environmental management, and data acquisition and sharing. NCKRI sponsors student research in geology and hydrology. The Institute serves as the national clearinghouse for scientific research on karst systems, which are vital conduits of much of the nation’s potable water.

NCKRI’s research includes: Cave and Karst Studies, Basic Research (on principles of how caves, karst, and their components are created, changed, organized, and distributed), and Applied Science (to solve, manage, or prevent problems with caves and karst, and to develop or improve methods for using cave and karst resources).

### New Mexico Bureau of Geology and Mineral Resources



NMBGMR’s projects include studies of mineral resources, hydrology studies, aquifer mapping, publications, geochemistry, and geochronology. The Bureau has

staff experts in petroleum geology, mineral geology, and other vital mining disciplines.

The Bureau’s experts serve as adjunct professors, sharing knowledge and expertise with the next generation of scientific leaders. The NMBGMR’s state-of-the-art laboratory facilities serve the analytical needs of the public and support ongoing research efforts of the entire university community.

### Petroleum Recovery Research Center



The PRRC is New Mexico’s focal point for improved oil and gas recovery research to transfer technology from their research labs to the oil and gas industry.

The PRRC’s research assistantship program offers excellent opportunities for students to develop their thesis and dissertation work, to publish their work under the guidance of their research advisors, and to receive hands-on training in a professional research environment.

The PRRC has funding from numerous state and federal government agencies to support an average of 22 graduate students from disciplines including Chemical Engineering, Chemistry, Computer Science, Electrical Engineering, Civil & Environmental Engineering, Geochemistry/Geology, Geophysics, Hydrology, Mechanical Engineering, and Petroleum Engineering.





## Distance Education



### DISTANCE EDUCATION PROGRAMS

Computer Science: MS, PhD	6
Cybersecurity: Certificate	6
Engineering Management: MEM	8
Hydrology: Certificate, MS, PMH, PhD	20
Materials Engineering: MS, PhD	9
Mechanical Engineering: ME, MS, PhD	10

### Live, Interactive Webcasts At The Heart Of Tech's Distance Education Program

New Mexico Tech's Distance Education program provides live, web-based courses that allow students to participate via video and audio with instructors and other students from anywhere in the world. Tech's distance program is unique in that remote students are part of a regular class being offered on campus in one of Tech's many multimedia-enabled classrooms.

The Adobe Connect platform lets distance students see and hear everything that on-campus students can see and hear and lets them participate from desktop computers as well as most mobile devices.

Tech also offers a master's degree in Science Teaching using recorded courses and some live online and in-person courses. All distance education courses make use of Tech's learning management system, Canvas. Students need only access to a computer or mobile device with a relatively fast connection to the internet. Some instructors require students to have a webcam and microphone.

Distance students must be admitted to the university to take distance education courses. Admission and registration can be handled online.

New Mexico Tech is a member institution of the National Council for State Authorization Reciprocity Agreements (NC-SARA). As such, it can offer distance education courses and programs to students in all 50 states with the present exception of California and Massachusetts.

For more information on the Distance Education Program, call the Academic Center for Technology at [distance.nmt.edu](http://distance.nmt.edu) • [act@nmt.edu](mailto:act@nmt.edu) • 575.835.6700

Information and course listings can be found on the ACT website at <https://act.nmt.edu>.



# Financial Assistance for Graduate Students

A majority of full time graduate students at New Mexico Tech receive financial aid in the form of assistantships, fellowships, study grants, or part-time employment. Requests for financial support should be made on the Application for Admission form or in writing to the department if the student is already registered. To qualify for these aids, the student must first be admitted as a regular full-time student. Assistantships normally require half-time service in teaching or research (20 hours per week). Quarter-time appointments may be made in some cases. Students holding assistantship appointments qualify for resident tuition. Fellowships are grants in aid for full-time study and research leading to an advanced degree.

## **WESTERN REGIONAL GRADUATE PROGRAM (WRGP)**

New Mexico Tech has listed all of our graduate programs (certificates, Master of Engineering programs, Master of Science programs, Professional Master programs, and Doctoral programs) in the WRGP. This allows residents of WICHE member states (<https://wiche.edu/wrgp>) to request resident tuition if they are admitted to any of our graduate programs. To be considered for resident tuition, you must identify yourself as WICHE WRGP applicant in your statement of purpose. Contact the Center for Graduate Studies after you have been admitted to obtain resident tuition prior to your first semester of registration.

## **TEACHING ASSISTANTSHIPS**

Teaching assistants are typically appointed for nine months at competitive stipend levels. Additional teaching duties or research opportunities during the summer are sometimes available. Teaching assistants will have from six to ten contact hours per week plus preparation and grading of assigned recitation, laboratory, or tutorial duties. The maximum teaching load for regular instructional duties is six credit hours.

## **RESEARCH ASSISTANTSHIPS**

Many graduate students are supported on grants, contracts, or division research funds under the supervision of a faculty member. Research done under the assistantship may be applicable to thesis or dissertation requirements. Research assistants commonly receive summer appointments as well as nine-month academic year appointments.

## **FELLOWSHIPS**

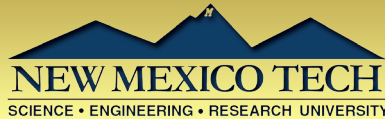
Fellowships for the support of graduate students are available from the Institute, professional and industrial organizations, and certain federal agencies. Amounts range from those covering tuition and fees to full support through monthly stipends. Fellows must devote full time to studies and research.

For information about financial assistance, please contact your prospective department or the Center for Graduate Studies.

Current tuition information can be found at <http://www.nmt.edu/finaid/tuition.php>



New Mexico Tech is accredited by the North Central Association of Colleges and Secondary Schools as a doctoral degree-granting university. Its credits are accepted by leading colleges and universities throughout the United States. It is approved by the Attorney General of the United States for the attendance of non-immigrant students, by the United States Department for Exchange Visitor Program P-I-1282, and by the Veteran's Approval Division of the Office of Military Affairs for attendance by students entitled to veteran's benefits. (<http://www.ncache.org/> (312) 263-0456)



## ENGINEERING

Computer Science	MS, PhD
<i>Cybersecurity<sup>^</sup></i>	
<i>Information Technology</i>	MS*
Electrical Engineering <sup>^</sup>	MS
<i>Cyber Electronic Systems</i>	PhD*
Business & Technology	MEM
<i>Technology Leadership<sup>^+</sup></i>	
Environmental Engineering	MS
Materials Engineering	MS, PhD
Mechanical Engineering	
<i>Explosives Engineering</i>	ME*, MS*
<i>Fluid and Thermal Sciences</i>	ME*, MS*
<i>Mechatronics Systems Engineering</i>	ME*, MS*
<i>Solid Mechanics</i>	ME*, MS*
<i>Intelligent Energetic Systems</i>	PhD*
Mineral Engineering	MS
<i>Explosive Engineering</i>	MS*
<i>Geotechnical Engineering</i>	MS*
<i>Mineral Exploration</i>	MS*
Petroleum Engineering	MS, PhD

## TRANSDISCIPLINARY

Biotechnology	PhD
Master of Science for Teachers	MST

## SCIENCE

Biology	MS
<i>Biochemistry</i>	MS*
Chemistry	MS, PhD
<i>Biochemistry</i>	MS*
Earth & Environmental Science	
<i>Geochemistry</i>	MS, PhD*
<i>Geology</i>	MS, PhD*
<i>Geophysics</i>	MS, PhD*
<i>Hydrology<sup>^</sup></i>	MS, PhD*
<i>Professional Masters of Hydrology</i>	PMH+
<i>Geobiology</i>	PhD*
Mathematics	
<i>Analysis</i>	MS*
<i>Industrial Mathematics</i>	MS*
<i>Operations Research &amp; Statistics</i>	MS*
<i>Applied &amp; Industrial Mathematics</i>	PhD
Physics	MS, PhD
<i>Instrumentation</i>	MS*, PhD+
<i>Astrophysics</i>	PhD*
<i>Atmospheric Physics</i>	PhD*
<i>Mathematical Physics</i>	PhD*

Scientific and Professional  
Communication<sup>^</sup>

\* *Dissertation or Specialization*

<sup>^</sup> *Graduate Certificate*

+ *New Program*

## CENTER FOR GRADUATE STUDIES

[nmt.edu/gradstudies](http://nmt.edu/gradstudies) • [graduate@nmt.edu](mailto:graduate@nmt.edu) • 575.835.5513

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