

# Center for Graduate Studies

Featuring NMT's Research Centers



# 125+

Years  
Making a  
Difference

<https://www.nmt.edu/gradstudies>



## Doctor of Philosophy

### ENGINEERING

Chemical Engineering:  
Surface Engineering  
Computer Science  
Electrical Engineering:  
Cyber Electronic Systems  
Materials Engineering  
Mechanical Engineering:  
Intelligent Energetic Systems  
Mineral Engineering  
Petroleum Engineering

### TRANSDISCIPLINARY

Biotechnology  
Cybersecurity\*

### SCIENCE

Chemistry  
Earth & Environmental Science:  
Geobiology; Geochemistry;  
Geology; Geophysics;  
Hydrology  
Mathematics:  
Applied & Industrial Mathematics  
Physics:  
Astrophysics; Atmospheric Physics;  
Instrumentation;  
Mathematical Physics

*RA/TA opportunities provide a great professional development experience preparing students for post-graduate work.*

\* Distance programs

Various programs are offered via distance

## ENGINEERING

Chemical Engineering:  
Surface Engineering  
Civil & Environmental Engineering  
Computer Science  
Electrical Engineering  
Engineering Management  
Materials Engineering  
Mechanical Engineering:  
Explosives Engineering; Fluid & Thermal Science;  
Mechatronics Systems & Robotics; Solid Mechanics  
Mineral Engineering  
Petroleum Engineering

### TRANSDISCIPLINARY

Cybersecurity\*  
Public Engagement in Science, Design,  
and Communication\*

## Master of Science

### SCIENCE

Biology  
Chemistry  
Geochemistry  
Geobiology  
Geology  
Geophysics  
Hydrology  
Mathematics:  
Analysis; Industrial Mathematics;  
Operational Research & Statistics  
Physics:  
Instrumentation

Advance your career with solid education

## Professional Masters

Hydrology\*  
Cybersecurity\*

## Master of Engineering

Chemical Engineering:  
Surface Engineering\*  
Materials Engineering\*  
Mechanical Engineering\*

## Master of Engineering Management\*

## Master of Science for Teachers\*



<https://www.nmt.edu/gradstudies>

## Graduate Certificate

### COMMUNICATION

Scientific & Professional Communication\*

NMT  
fosters an ideal learning  
environment, innovative research  
opportunities, and a strong sense of  
community" -

Talysa Viera  
Ph.D. Biotechnology Program - 2021  
Graduate



## EDUCATION

Elementary Alternative Licensure  
Secondary Alternative Licensure

## SCIENCE

Hydrology\*

## ENGINEERING

Cybersecurity\*  
Electrical Engineering  
Explosives Engineering\*  
Technology Leadership\*





# MRO

The Magdalena Ridge Observatory 2.4-meter telescope is one of the largest in the world that has as its primary mission the characterization of small bodies (both natural and artificial) in the solar system. Major science milestones include discovering the three fastest spinning asteroids in the Solar System, acquiring high-precision astrometry of potentially hazardous asteroids and comets, and supporting NASA's spacecraft missions via astrometry and the acquisition of physical data. In addition to these endeavors, the 2.4-meter facility contributes to the instructional program at NM Tech by providing hands-on research experiences for students.

The Magdalena Ridge Observatory Interferometer (MROI) will (R = 0.64 μm) and into the near infrared J, H, and K bands (J = 1.25 μm, H = 1.65 μm, and K = 2.20 μm). These wavelengths were chosen because many important astrophysical processes associated with spectroscopic line emission and hot dust are brightest at these wavelengths. Stars will be one of the main categories of objects the MROI will observe. Stars are key to the evolution of the universe and create all the elements in the periodic table after hydrogen and helium. They are not strictly round and yellow, like our Sun, but exist in many different sizes, shapes, and temperatures. MROI will be able to resolve objects in the sky that have an angular size within the range of 0.3–30 milliarcseconds (mas) (a milliarcsecond is the approximate height of a person standing on the surface of the Moon, as seen from Earth). This high resolution will allow the MROI to resolve closely separated binary stars such as cataclysmic variables (CVs) and some of the inner structures around black holes in external galaxies (what astronomers refer to as AGN – Active Galactic Nuclei).



## Small School Big Science

## High Impact

## PRRC

# Langmuir Laboratory

The Langmuir Laboratory for Atmospheric Research, built by New Mexico Tech in 1963, is located at an elevation of 10,630 ft in the Magdalena Mountains. The facility was constructed to study thunderstorms up close, which form during the summer months over the mountain range. It hosts a suite of cutting-edge lightning sensors, designed and built by researchers and students from NMT, and offers invaluable hands-on experience to students including field work, instrumentation design, and advanced data analysis.

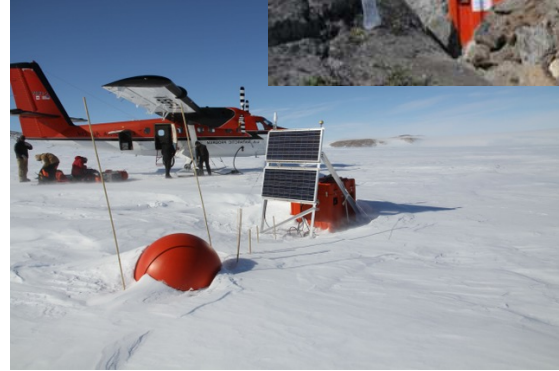


The Petroleum Recovery Research Center (PRRC), established by the state legislature in 1977 and the only research center of its kind in New Mexico, is a scientific research organization dedicated to solving problems related to the oil and gas industry. The PRRC's mission is to develop, through theoretical and practical research, improved oil recovery methods to increase oil and natural gas recovery from New Mexico's and the nation's oil and gas reservoirs and to transfer new technology to the industry and to local independents. In recent years the PRRC has been a leader in carbon sequestration research.



# IRIS PASSCAL

The IRIS Portable Array Seismic Studies of the Continental Lithosphere (PASSCAL) Instrument Center at New Mexico Tech support cutting-edge seismological research into Earth's fundamental geological structure and processes. The facility provides instrumentation and support services for the National Science Foundation, Department of Energy, and otherwise funded seismological experiments around the world.



World Class Research

# NM Bureau of Geology & Mineral Resources

Since 1927, the New Mexico Bureau of Geology and Mineral Resources has been pursuing fundamental geoscience research on the geologic framework of our state. This work has included geologic mapping and assessments of the state's natural resources, as well as research on diverse aspects of the state's geology.

Throughout our history we have conducted statewide resource inventories and evaluations of oil & gas, coal, potash, and other minerals. We are also responsible for archiving and providing this information to other researchers, government agencies, industry, educators, and the general public.

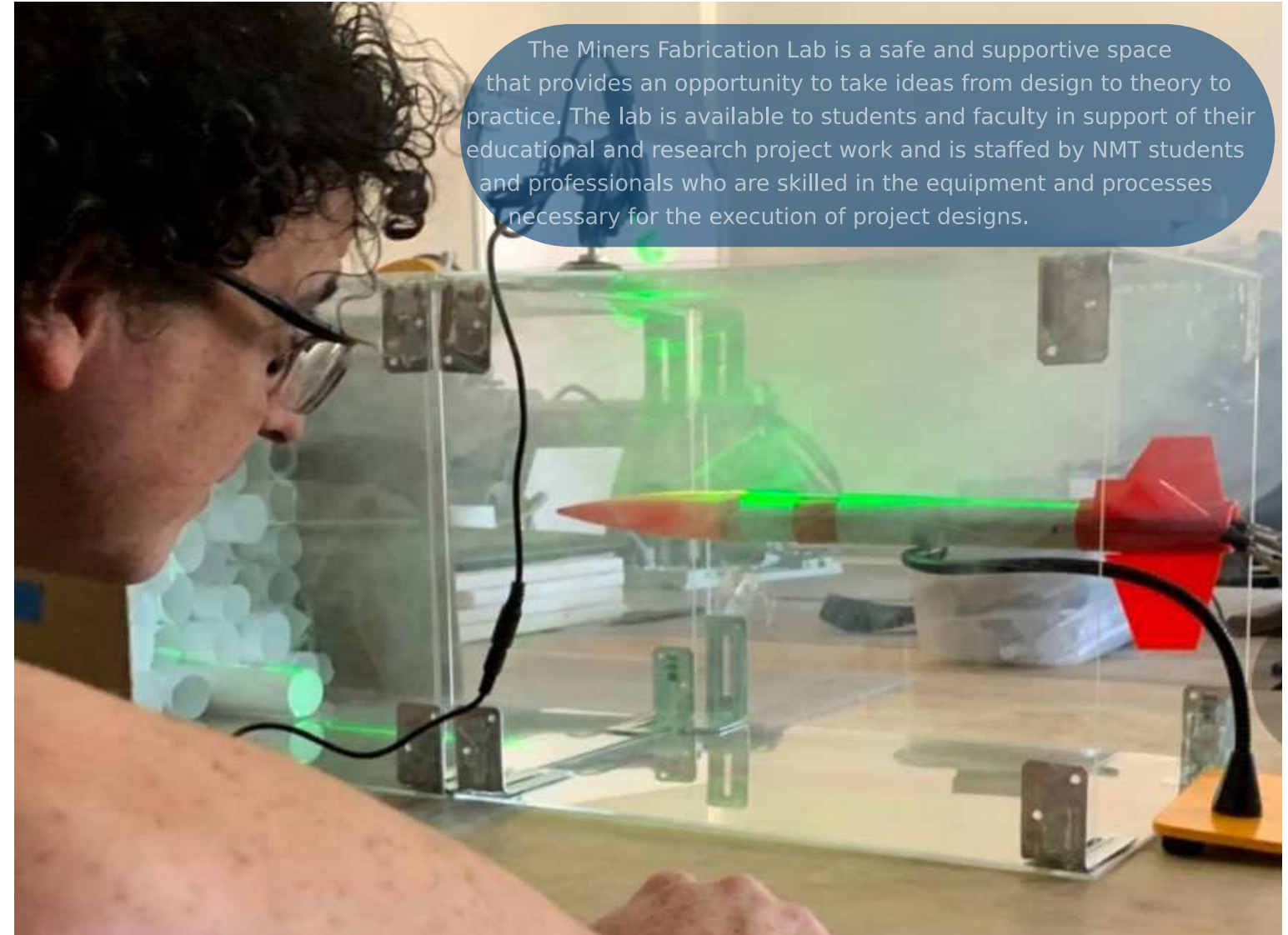


# NCKRI



The National Cave and Karst Research Institute (NCKRI) was created by Congress to study all aspects of caves and the karst areas in which most of them occur. Current projects include cave and karst hydrogeology, geophysics, microbiology, geomicrobiology, environmental management, and planetary geology. Areas of interest include cave and karst paleoclimatology, geoarchaeology, biology, among others. NMT's Cave and Karst Studies Program offers specific training for students interested in

# Miners Fabrication Laboratory



The Miners Fabrication Lab is a safe and supportive space that provides an opportunity to take ideas from design to theory to practice. The lab is available to students and faculty in support of their educational and research project work and is staffed by NMT students and professionals who are skilled in the equipment and processes necessary for the execution of project designs.

# Tech Transfer Collaborative Office

The Tech Transfer Collaborative Office (T2Co) is a team of tech transfer professionals located on Kirtland Air Force Base in Albuquerque, NM. The office manages a partnership between New Mexico Tech and the Air Force Research Laboratory (AFRL) to advance its tech outreach mission, as well as to transfer and transition technologies from the bench to the marketplace. Additionally, the office facilitates outreach to New Mexico Tech staff, students, and faculty and its AFRL partner. The office can facilitate New Mexico Tech engagements with AFRL related to joint intellectual property, internships, collaboration facilities, community makerspaces, equipment donations/loans, STEM K-12 outreach and faculty exchange programs/joint appointments.



# ICASA

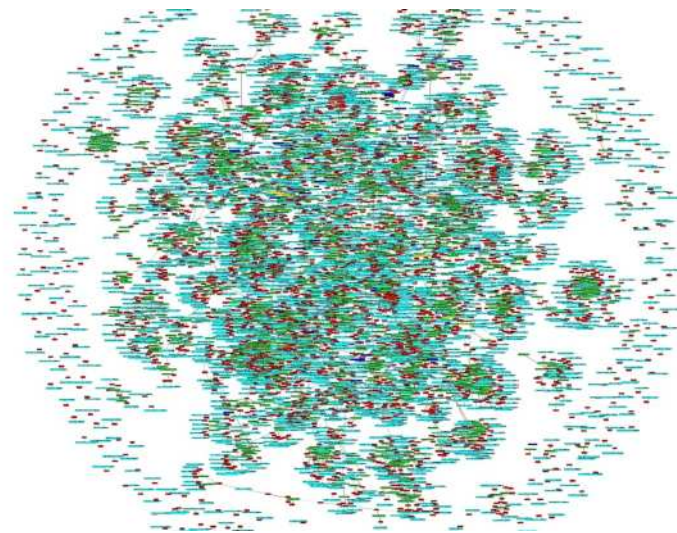
## State-of-the-Art

## Unique Capabilities

# EMRTC

The Institute for Complex Additive Systems Analysis (ICASA) is a research division of NMT. ICASA's mission is to contribute innovative and relevant solutions to national security and critical infrastructure protection problems. This is performed through examination of the control plane of the system — the mechanisms that enable it to dynamically change and respond to its environment.

ICASA integrates with the university strategic plan by supporting teaching, advising and providing research opportunities and financial support to professors and students. ICASA's vision and future plans include continuing research efforts on complex additive systems in support of information exploitation, protection, and time-critical information dissemination. Also included are sharing, developing and training in situational awareness and assessment that will allow decision makers to quickly and effectively deal with new threats.



# Cybersecurity Center

New Mexico Tech has a cybersecurity centers focused on cybersecurity education, research, and economic development for New Mexico. NMT's Transdisciplinary Cybersecurity programs prepare students with a broad understanding of cybersecurity from the foundational documents that have guided the development of the discipline to the ethical, legal, and psychological challenges that cybersecurity professionals face. Students engage in hands-on cybersecurity risk analysis, data analysis, and policy development. Students with their advisors select technical electives that provide expertise to carry out research and solve real-world challenges in cybersecurity.



NMT's Energetic Materials Research and Testing Center (EMRTC) has performed both nationally and internationally recognized research, development, test, and evaluation (RDT&E) programs for over 70 years. Our customer base includes both private industry and government agencies. Core areas of expertise include detonation theory, explosives chemistry, warhead design, ballistic penetrator and gun system design, explosive formulation development, reactive hydrodynamic calculations, and safety and characterization testing.



Fundamental and applied research is conducted on energetic materials utilizing EMRTC's explosives research facilities. EMRTC's team of experienced scientists and engineers conducted a variety of RDT&E projects for the Department of Defense, the Department of Energy, the Department of State, other Universities, and private industry. Through the years, EMRTC has worked with many graduate Students to perform their research and having the facility to conduct large explosives tests is a unique capability.



EMRTC's 40 square mile field-testing laboratory is located in the mountains adjacent to the New Mexico Tech campus. The semi-arid climate of the southwestern desert allows year round use of the facility. The field laboratory contains over 30 separate test sites, gun ranges, and research facilities, and has the capacity to detonate over 20,000 pounds of explosives in a single event.



# PTRC

Playas Training and Research Center (PTRC) serves government and industry clients, nationally and internationally, that require a controlled environment, reality-based testing and training venues in any aspect of physical security.



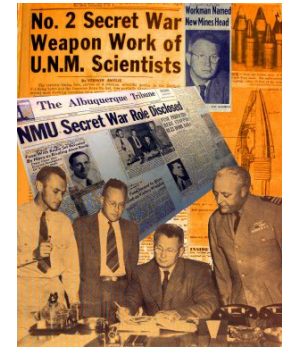
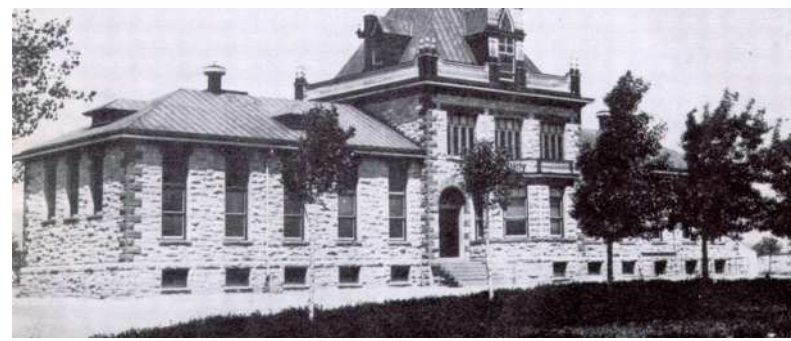
Only a glimpse of what's at NMT



# Rich History

In 1889, Socorro was a mining boom town, wild, raucous, and, at a population of about 4500, one of the largest towns in New Mexico.

The Territorial Legislature, wanting to boost New Mexico's economy, decided to found a School of Mines to train young mining engineers, and Socorro was the ideal location. The New Mexico School of Mines (NMSM) proudly opened its doors on Sept. 5, 1893, with one building, two professors, and seven students. Courses offered included chemistry and metallurgy. Some accomplishments since then include:



Dr. E.J. Workman - NMT president 1946-1965 a physicist and researcher lead the team that designed the proximity fuse.



One of New Mexico Tech's inventions was the nicotine patch resulting in a patent in 1986. Frank Etscorn came up with this idea while conducting research on nausea.

# STATE OF NEW MEXICO

Great weather  
Beautiful sunsets  
Rich history  
Diverse culture  
Amazing outdoors



**HOME OF**  
Los Alamos National Laboratory  
Sandia National Laboratories  
Kirtland Air Force Base  
Industries such as aerospace, defense, solar energy, and semiconductor manufacturing



## GSA

Come to NMT and join a welcoming diverse and inclusive community. The Graduate Student Association (GSA) provides graduate students with funding for travel, various social and professional activities, and holds annual interdisciplinary symposium among many other things.

# Highly Recognized Faculty

## Recent NSF Career Awards

Dr. Hargather's project focuses on high-entropy alloys, relatively new materials that show great potential in a wide range of engineering applications. Her project is titled "An Efficient First-Principles Method for Calculating Deformation Properties, Diffusivity, and Secondary Creep-Rate Behavior in BCC High-Entropy Alloys."



Dr. da Silva's award addresses the physics of lightning including its propagation and connection to ground structures. His project is titled "Self-consistent and Data-constrained Simulations of the Leader and Return Stroke Processes in Lightning Discharges."

## Funding Agencies Include



## Financial Aid

The majority of full time graduate students at NMT receive financial aid in the form of teaching and/or research assistantships, fellowships, or part-time employment.

## Vibrant Student Life





## How to apply

<https://www.nmt.edu/gradstudies/admissions.php>

## We Love to hear from you

Email: [graduate.dept@nmt.edu](mailto:graduate.dept@nmt.edu)

Telephone: +1 575 835 5720

