

New Mexico Tech


**Research
&
Economic Development**

Dr. Van D. Romero
Vice President


Proximity Fuse



✦ Energetic Materials Related Research



Industrial Research



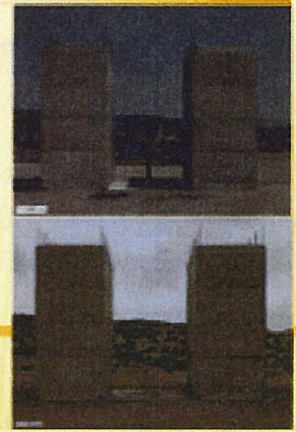
TEST AND ANALYSIS



Enhanced Novel Explosives (ENE) in a Scaled Urban Environment

Program Objectives

- Evaluate blast overpressures and damage from an ENE in an urban setting
- Design and construct a scaled urban environment
- Use data from TSWG sponsored research at DRDC Canada to develop a detailed computational fluid dynamics computer model
- Perform calibration tests at EMRTC
- Combine all results into a comprehensive data base
- Deliver a software tool that will predict damage in an urban environment from ENE's



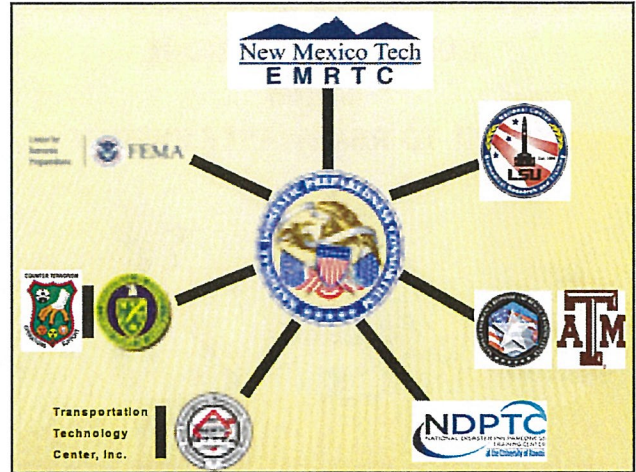
GEORGE WASHINGTON BRIDGE



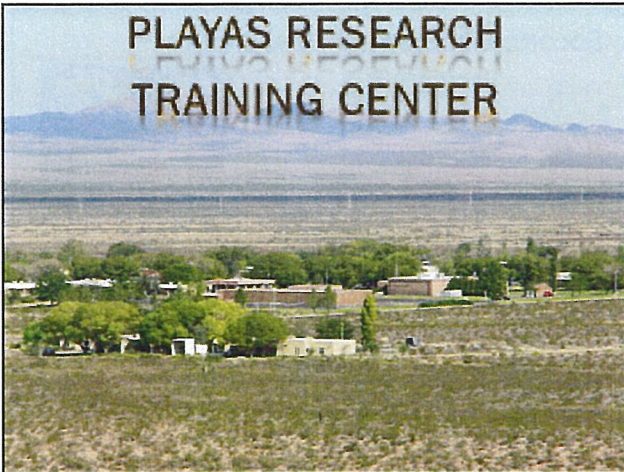
3-1-1 RULE



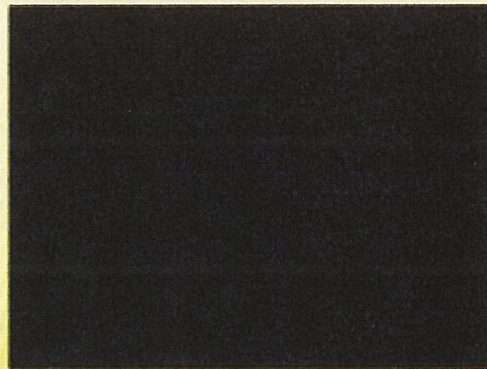
Emerging Threat



PLAYAS RESEARCH TRAINING CENTER



Playas



BUILDING THE BRIDGE FROM FOSSIL TO RENEWABLE ENERGY

ENERGY RELATED RESEARCH

Petroleum Recovery Research Center (PRRC)-Sequestration of CO₂ In a Depleted Oil Reservoir

This project employs advanced reservoir modeling and computer simulation tools, laboratory tests, field measurements and monitoring efforts to understand, predict and monitor the coupled geomechanical and hydrogeologic processes associated with down-hole injection of CO₂ at a micro-pilot scale field experiment (pump-in /pump-out scheme) into a pressure-depleted oil reservoir.

Ultimately, the models and data will be used to predict storage capacity as well as, physical and chemical changes in reservoir properties, such as fluid composition, porosity, permeability, and phase relations. In addition, a better understanding of CO₂reservoir interactions resulting from this project will improve industrial EOR flooding practices. These studies also provide a method to quantify the impact of reservoir depth, pressure and temperature, host rock permeability and porosity distributions, and mineral and fluid compositions on the migration, distribution and fate of CO₂ in the reservoir.

Socorro Geothermal Resources

Upwelling groundwater from depths of up to 4 km from the La Jencia Basin to the west is the source of Socorro geothermal waters.

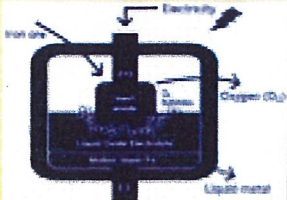


Exploration slim well drilled at the back of 1966 indicated temperatures = 42.2°C

Induced 33.2°C water; quartz geothermometer indicates source temps = 92°C

moderately warm = 32°C and their geochemistry suggests dilution by near surface waters.

Regional hydrothermal models suggest sufficient permeability to accommodate geothermal development.

MOLTEN OXIDE ELECTROLYSIS

IRIS Consortium and the PASSCAL Programs at New Mexico Tech



The Incorporated Research Institutions for Seismology (IRIS) Program for Array Seismic Studies of the Continental Lithosphere (PASSCAL) Instrument Center is a consortium of over 100 U.S. universities dedicated to the operation of science facilities in support of cutting-edge seismological research. The IRIS PASSCAL programs contribute to scholarly research and education through the EarthScope program which gains support from the National Science Foundation (NSF) to deploy numerous seismic, GPS, and other instruments to study the processes that cause earthquakes and volcanic eruptions.



The EarthScope program is an exploration of the 4-dimensional structure of the Earth. The USAArray is an integral part of the EarthScope program, that consists of four interrelated parts that together make up the 15-year program to place a dense network of permanent and portable seismographs across the U.S.

The four parts of the USAArray are:



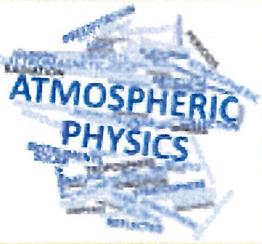

1. Transportable Array
2. Flexible Array
3. Reference Network
4. Magnetotelluric Facility

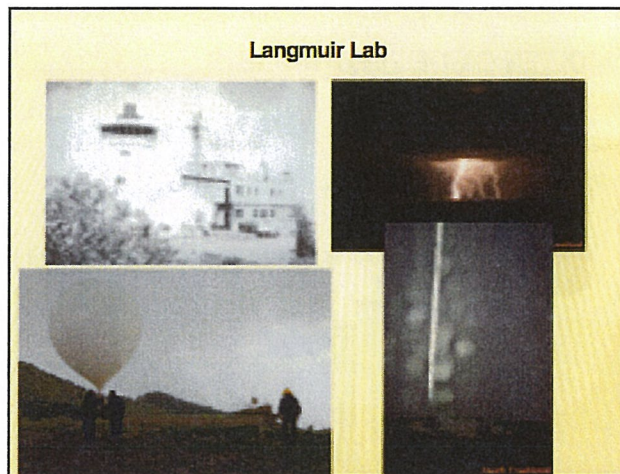
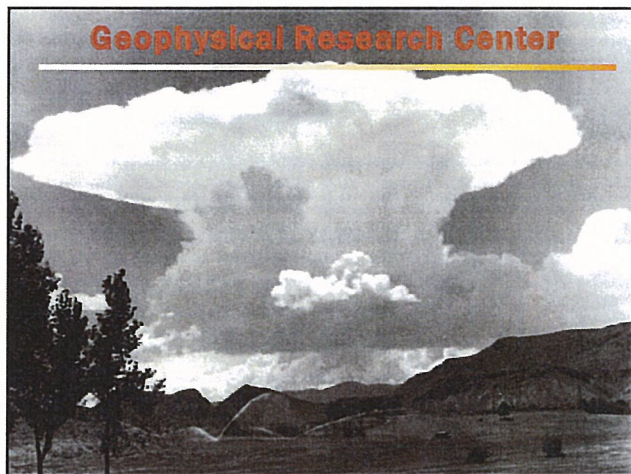


New Mexico Bureau of Geology and Mineral Resources

WATER RESEARCH



Hydrology

Sustainability of semi-Arid Hydrology and Riparian Areas (SAHRA)-

The vision of SAHRA is to develop an integrated, multidisciplinary understanding of the hydrology of semi-arid regions, and to build partnerships with a broad spectrum of stakeholders (both public agencies and private organizations) so that this understanding is effectively applied to the management of water resources and to the rational implementation of public policy.

SAHRA's purpose is to inform and support such water professionals by conducting stakeholder-relevant research, education, and knowledge transfer activities.

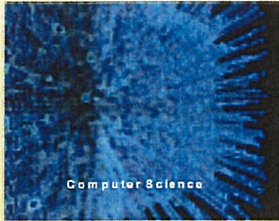
SAHRA's Partner Institutions

SAHRA's geographical focus. Dark blue signifies the San Pedro, Salt Verde basins and Red signifies the Rio Grande, Rio Conchos basins.

"Protecting our nation's infrastructure"

Focus on management, computer science and engineering

Cyber Security Related Research



Computer Science



ELECTRICAL ENGINEERING

Astrophysics

National Radio Astronomy Observatory (NRAO) & National Optical Astronomy Observatory (NOAO)



Magdalena Ridge Observatory - (MRO)



Long Wavelength Demonstrator Array - (LWA)



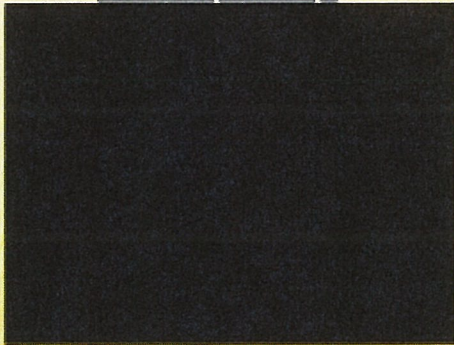
Very Large Array - (VLA)



Magdalena Ridge Observatory Interferometer (MROI)

New Mexico Tech

Magdalena Ridge Observatory



Astrophysics Related Research




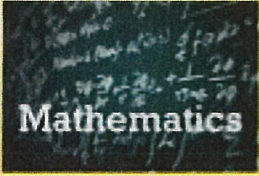


ELECTRICAL ENGINEERING



Cavendish Lab

* Biomedical & Bioinformatics Research








Microbiology

- Molecular Ecology
- Bioremediation
- Bacterial physiology
- Animal-Microbe Symbioses
- Illuminating Lampenflora

Extremophiles
Radiation resistance
Genetic response to stress

Emerging pathogens
Effect of climate change on evolution and genetic transfer of antibiotic resistance

Applied & Systems Ecology



Soil-atmosphere interactions & chemical element cycles

Can we track plant health with root chemical signals?
- Improving agricultural sustainability, soil C accounting and climate change

Invasive plant ecology in polluted environments
- Applied solutions to co-occurring problems in western US

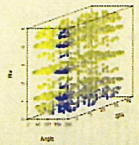
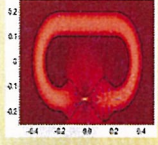


How do microbes support the growth of cannabis?
Nutrient cycling in soil
Disease/pest control
Improved sustainability

What do bacterial viruses do in the environment?
everything





Comparative biomechanics, Physiology, & Mathematical Modeling

- How variation affects evolution of structures
- Morphogenesis of hearts
- Odor capture by crabs & insects
- Computational modeling
- Experimental fluid dynamics
- High-speed videography
- LANL collaboration

Cell & Molecular Biology




- Drug Discovery
 - Anti-cancer drugs
 - Anti-bacterial drugs
 - Anti-parasitic drugs
 - Anti-microbial cream
 - Multiple patents
- Water Purification
- BioSensors

BIG SCIENCE at a small school



New Mexico Tech

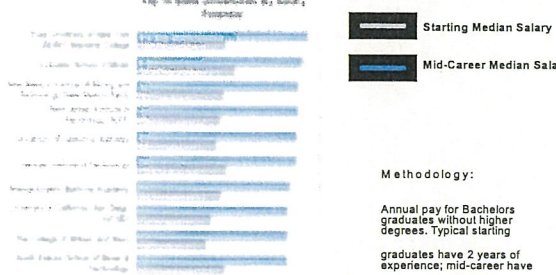


POPULAR SCIENCE
THE BIG SCIENCE ISSUE
SUPERSIZED
THE 10 MOST AWK-INSPIRING PROJECTS IN THE UNIVERSE
REIGNITERS OF THE WIND SEAS

Annual Budget: \$25,000,000
Staff: 115
Physical size: 3.2 million
Scientific activity: 11
WPI: 10
New Editor: 10

TOP 10 STATE UNIVERSITIES BY SALARY POTENTIAL AS DETERMINED BY Payscale.com

Top 10 State Universities by Salary Potential



University	Starting Median Salary	Mid-Career Median Salary
University of North Carolina	\$35,000	\$65,000
University of Texas at Dallas	\$35,000	\$65,000
University of California, Berkeley	\$35,000	\$65,000
University of Michigan	\$35,000	\$65,000
University of Wisconsin-Madison	\$35,000	\$65,000
University of Illinois at Urbana-Champaign	\$35,000	\$65,000
University of Minnesota	\$35,000	\$65,000
University of Wisconsin-Minnesota	\$35,000	\$65,000
University of Michigan-Dearborn	\$35,000	\$65,000
University of Wisconsin-Stevens Point	\$35,000	\$65,000

Methodology:
Annual pay for Bachelors graduates without higher degrees. Typical starting graduates have 2 years of experience; mid-career have 15 years.

The top 50 Universities that produce PhD students

1. Cal Tech	21. Kalamazoo College	41. Occidental College
2. Harvey Mudd College	22. Cornell University	42. Hendrix College
3. MIT	23. Case Western Reserve	43. Vassar College
4. Reed College	24. Washington College	44. Trinity University
5. Swarthmore College	25. Brown University	45. College of William and Mary
6. Carleton College	26. Wesleyan University	46. St. John College
7. University of Chicago	27. Carnegie Mellon	47. Bates College
8. Grinnell College	28. Macalester College	48. Whitman College
9. Rice University	29. Amherst College	49. Brandeis University
10. Princeton University	30. Duke University	50. Hampshire College
11. Harvard University	31. Beloit College	
12. Bryn Mawr College	32. Bowdoin College	
13. Haverford College	33. Wellesley College	
14. Pomona College	34. RPI	
15. New Mexico Tech	35. Earlham College	
16. Williams College	36. Franklin and Marshall	
17. Yale University	37. Lawrence University	
18. Oberlin College	38. University of Rochester	
19. Stanford University	39. Univ of Cal-Berkeley	
20. Johns Hopkins	40. Dartmouth College	