

Increasing the Economic Impact of NM Research A Collaborative Approach

AUGUST 24, 2021

Dr. Luis Cifuentes
Dr. Van Romero
Dr. Mary Monson
Dr. Ellen Fisher

New Mexico Higher Education
Research Institutions and
Sandia National Laboratory

Science, Technology, and Telecommunications Committee



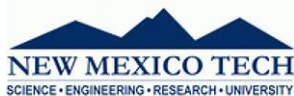
NM
STATE

“Education is the most powerful weapon which you can use to change the world.” [Nelson Mandela]

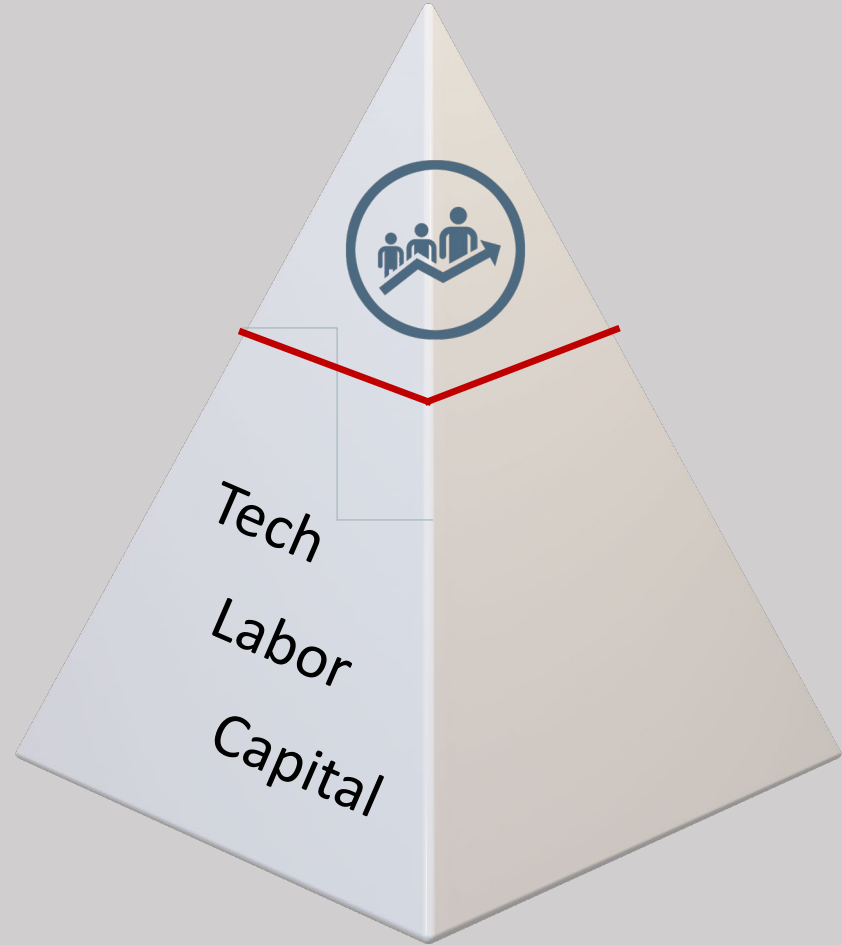
“Education is the best economic policy there is.” [Tony Blair]

“In the new economy, information, education, and motivation are everything.” [William J. Clinton]

“Education then, beyond all other devices of human origin, is the great equalizer of the conditions of men, the balance-wheel of the social machinery.” [Horace Mann]

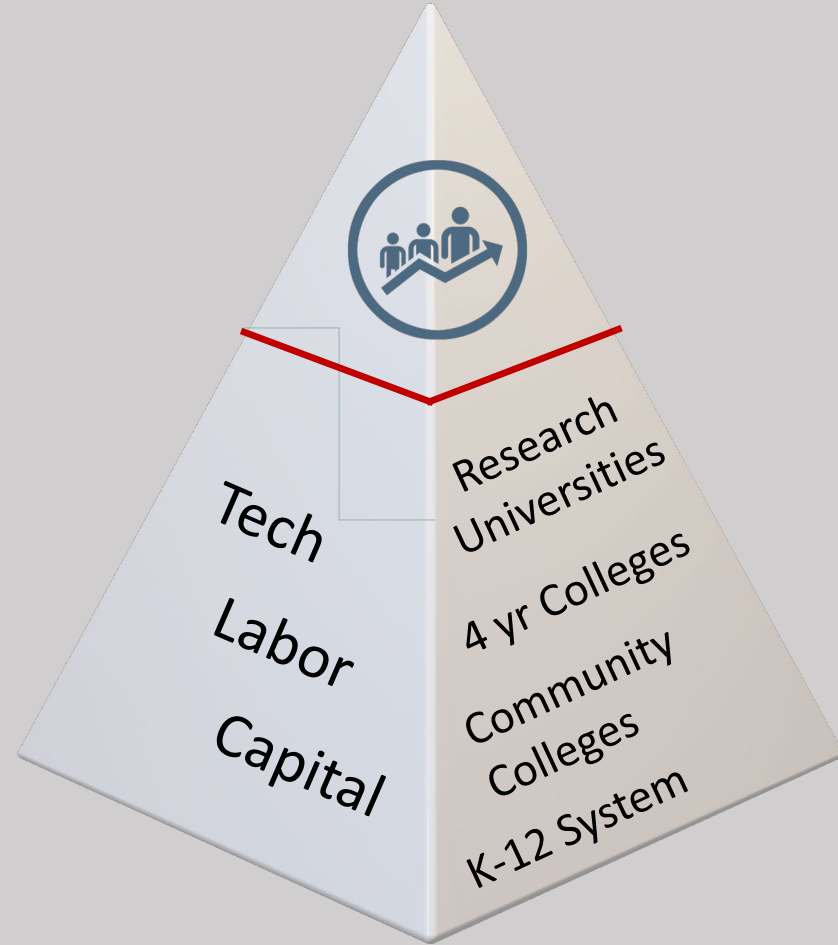


Drivers of Economic Development

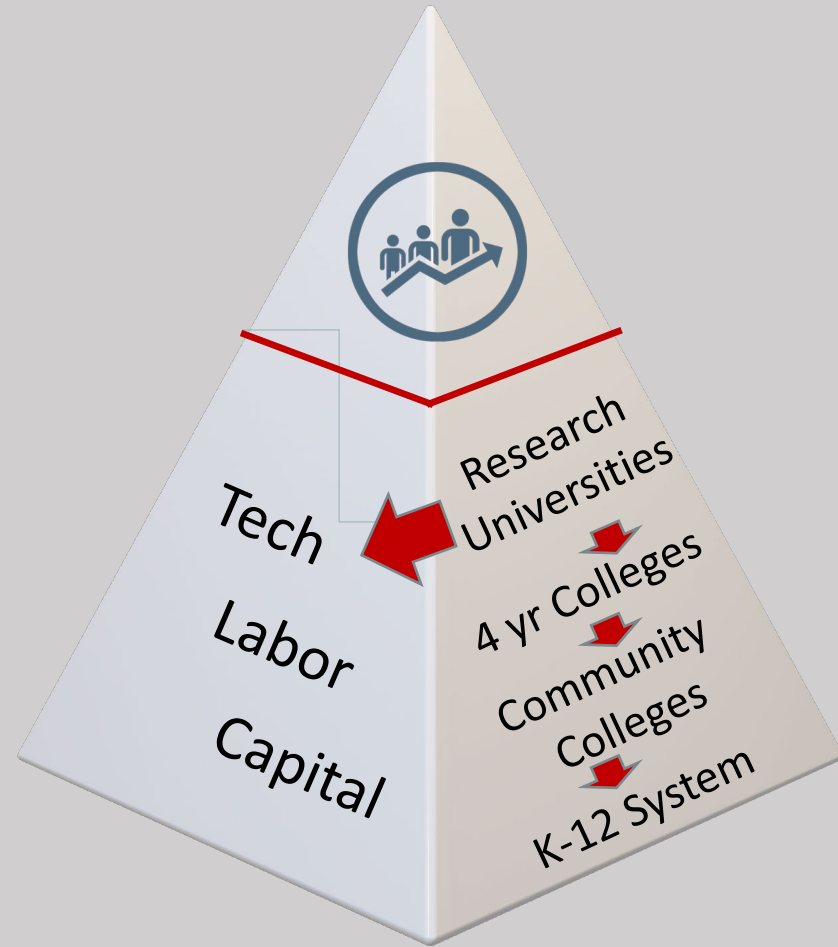


NM
STATE

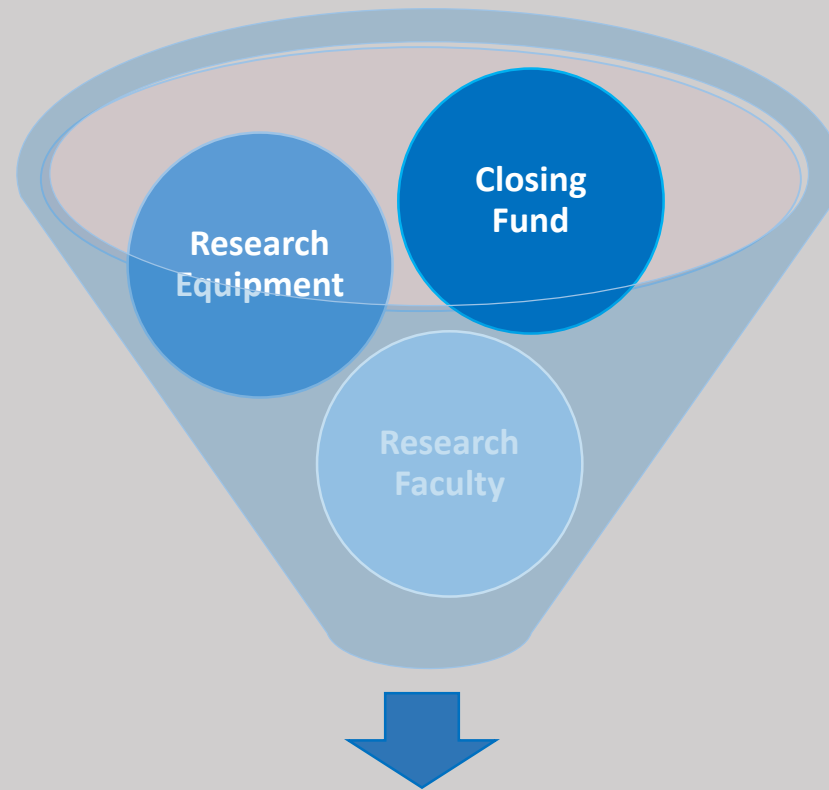
Sustainable economic development relies on education



**Research
universities
innovate and
cultivate
education and
economic
development**



Investing in Economic Development

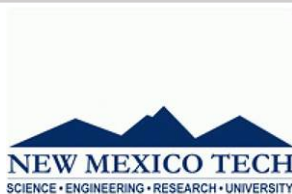
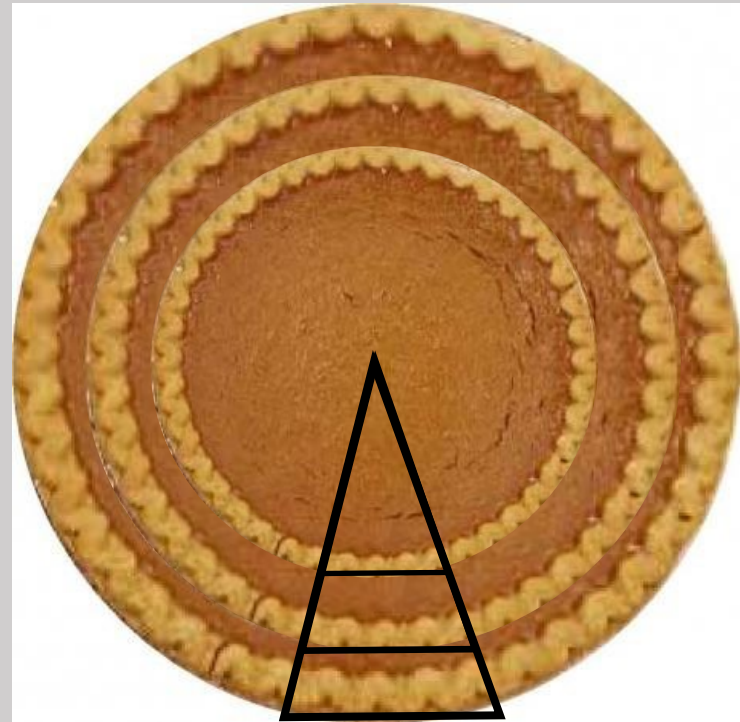


**NM Research
Universities**



NM Research Collaborative

- NM research universities compete against each other
- NM research universities join forces
- NM research universities leverage strategic partnerships jointly





Praveer Patidar
Chemistry

Developing anti-cancer drugs that create DNA damage and trigger cell death exclusively in cancer cells.

Applied for a grant from NIH (\$1.6M)

Review comment – Needed a higher quality centrifuge. Encouraged to resubmit once he obtains the necessary Centrifuge (\$60K)



NM
STATE



Ore forming processes and Rare Earth deposits
Experimental geochemistry and thermodynamics

Awarded an NSF Major Research Instrumentation (MRI) grant
to purchase a high resolution Raman microscope

Study deposits of rare earth elements and other
strategic metals used in high-tech and green
technologies as well as support studies in human health
and life sciences

Nicole Hurtig

Earth and Environmental Science

Total cost of \$619,378 with a required match of \$185,813

No funding for maintenance



NM
STATE



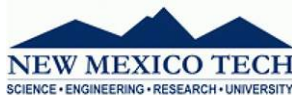
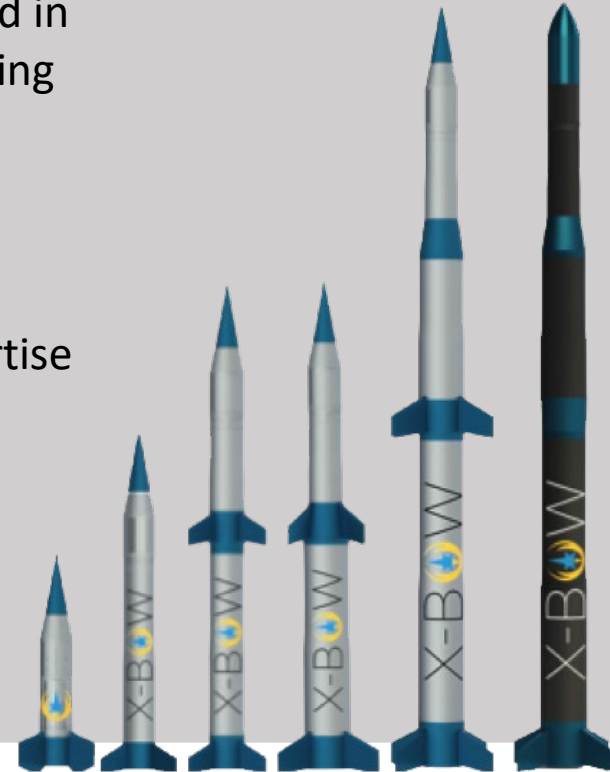
Additive manufacturing of solid composite rocket propellant, and other energetics materials processing.

New Mexico Tech is heavily invested in Additive manufacturing – 3-D printing

Chelsey Hargather
Materials Engineering

Xbow came to NMT 2 years ago because of our expertise
In energetic materials and additive manufacturing
With 2 employees

Xbow now has 60 employees located in
Albuquerque and Socorro and is working with
Sandia



Matching Funds are a Zero-Risk Investment

Funds are only required if a grant proposal is funded

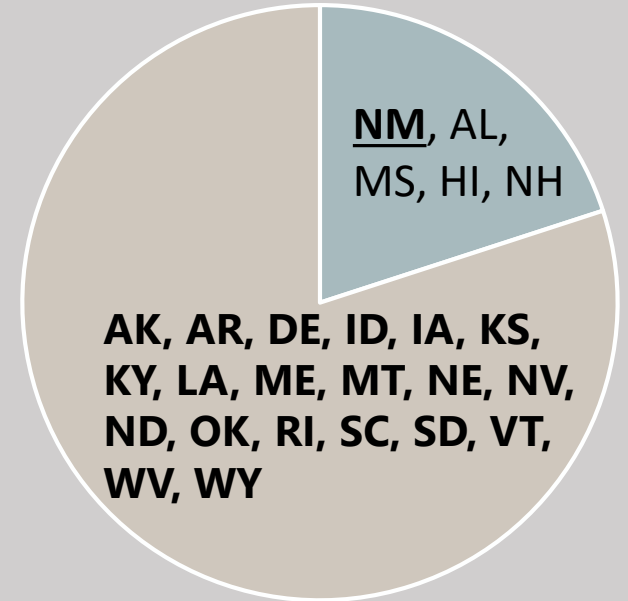
Example: Statewide, Multi-institution New Mexico EPSCoR (5 years)

NSF Track 1 Research Infrastructure Improvement
\$24 M Project: \$20 M NSF Federal Funds,
\$4 M Matching Funds

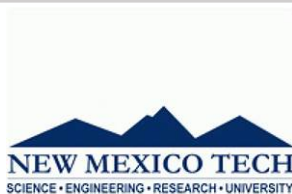
NM Tech, NMSU, and UNM, Nat. Labs application
on Intelligent Manufacturing (June 2022)
\$4 M Matching Funds Needed

- **400% Return on Investment if successful**
- **Matching funds stay in New Mexico**

20 of 25 EPSCoR states provide matching funds
through state appropriations!



- State provides matching funds
- State does not provide matching funds





Unclassified, Unlimited Release

Exceptional service in the national interest

Foundational Elements for a Thriving Research and Technology Development Economic Sector

Mary Monson

Senior Manager, Technology Partnerships and Business Development, Sandia National Laboratories

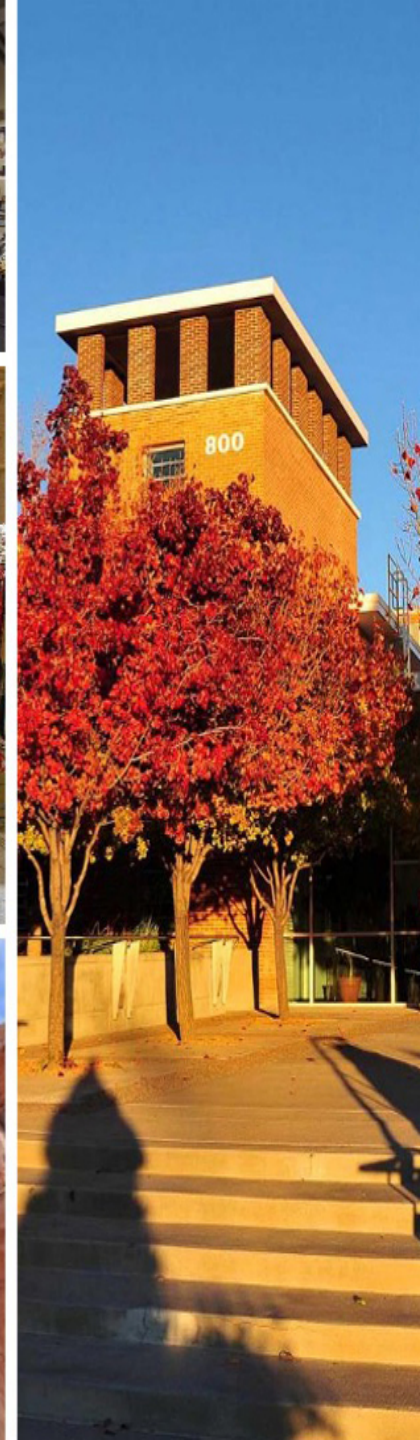
August 24, 2021

SAND2021-10166 O

Unclassified, Unlimited Release

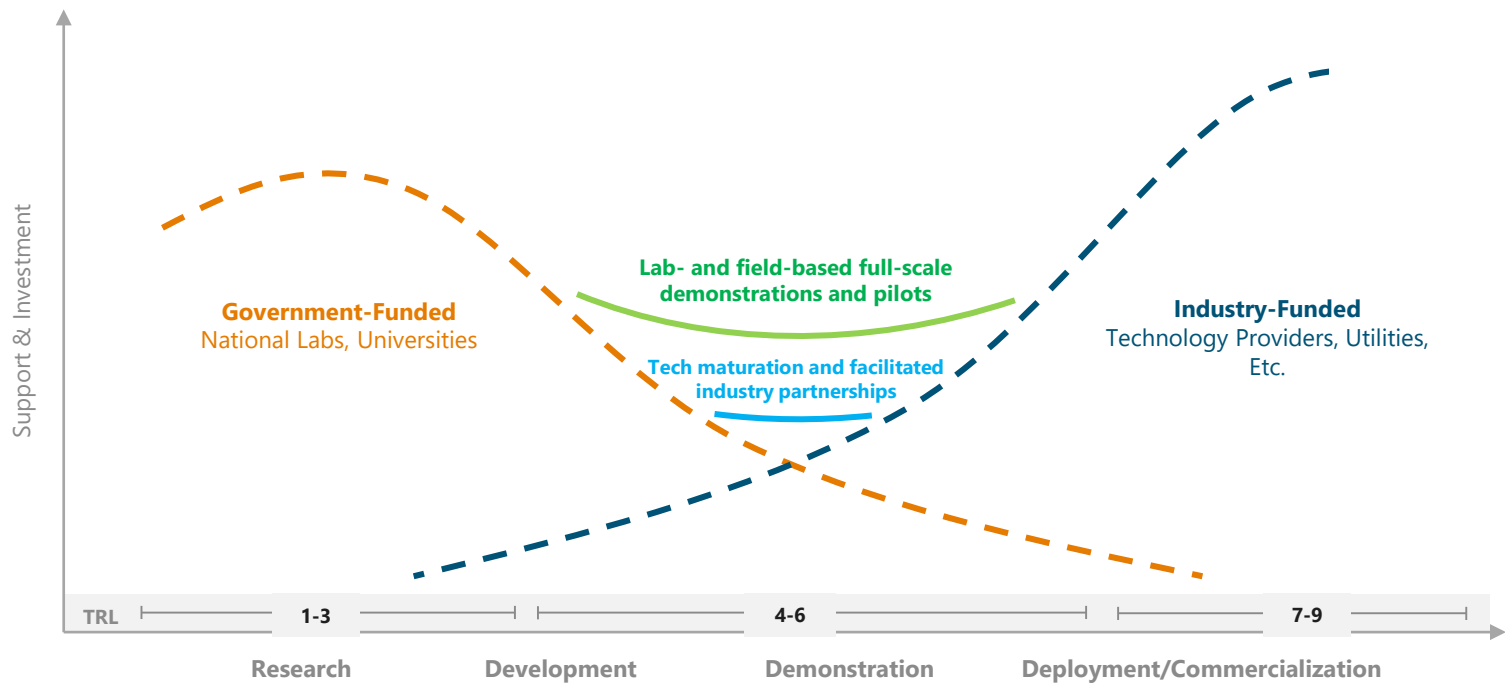


Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia LLC, a wholly owned subsidiary of Honeywell International Inc. for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.



Demonstration Facilities Fill a Gap and Build a Regional Ecosystem

Through demonstration facilities, local partners and workforce can gain increased access to national lab and university technology, equipment, expertise, and supply chain opportunities



Benefits of a Collaborative Demonstration Facility

“Hub” approach utilizes regional ecosystem partners and creates greater regional impacts

- Provides broad access to facilities and capabilities at national labs and research universities
- More rapidly moves R&D out of lab environments for access by partners
- Focus can be placed on areas (e.g., advanced manufacturing, quantum, etc.) with sustained investment and workforce needs
- Includes education and training to develop the next-gen workforce
- Flexible leadership/support model
- Requires a network of suppliers and support resources

Regardless of the model, it will be important to de-risk or ease engagement for ecosystem partners



Model of Interest: Manufacturing Demonstration Facility

- DOE demonstration facility established to provide industry with affordable and convenient access to infrastructure, tools, and expertise to **facilitate rapid adoption of advanced additive manufacturing technologies**
- Focused on cost-shared, early-stage applied R&D
- About 200 industry partners and 50 university partners (national and local) working across R&D, education, and training activities
- Increasing engagement with, and development of (via Innovation Crossroads), regional partners and start-ups



Unique Window for Collaboration to Advance New Mexico

A few examples of current collaborative opportunities

• **Additive Manufacturing**

- \$24M/5 years (20% cost share)
- Research Universities (RU)
- Tribal, regional colleges (TRC)
- National Labs (NL)
- Industry partners (Ind)
- June 2022 deadline

EPSCoR
Track 1
Proposal
Renewal

EDA Build
Back Better
Regional
Challenge

• **Quantum Materials/ Information Science/ Cybersecurity**

- Phase 1/2: \$500K/\$100M
- RU, TRC, NL, Ind
- ED organizations
- Equity emphasis
- October deadline

More to come...

- Focus on convergent research; teams
- Technology centers
- Diversified workforce
- Place-based economic development

Increased
NIH, NSF,
DOE, DOD
R&D
Budgets

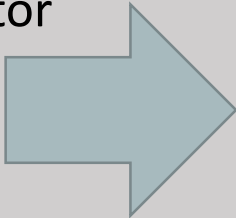
New:
Northern
Rio Grande
Corridor
Consortium

• **Climate Change/Water & Drylands Resilience**

- Build on strengths, alignment
- RU, TRC, NL, Ind, UTEP
- Kickoff symposium August 31



Federal Infrastructure Legislation: Research Opportunities

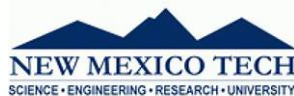
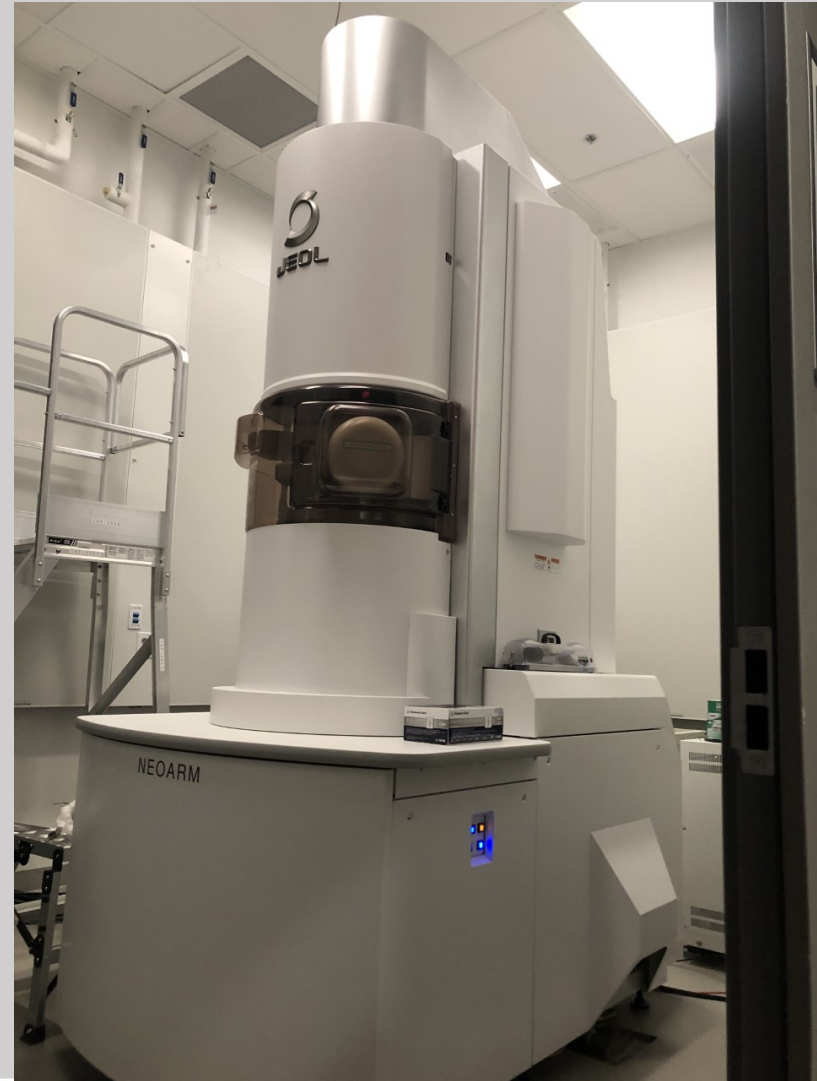
- Infrastructure Investments & Jobs Act
 - Emphasis on cooperation between public institutions and private sector
 - Incentivizing partnerships and collaboration opportunities with government agencies
- 
- Transportation & Energy Infrastructure (Tribal colleges)
 - USGS, Mining, Recycling
 - Agriculture, Nutrition, & Forestry (\$135B)
 - Commerce, Science, & Technology (\$83B)
 - Energy & Natural Resources (\$198B)
 - Environment & Public Works (\$67B)
 - Health, Education, Labor, and Pensions (\$726B)
 - Homeland Security & Government Affairs (\$37B)



Catalyst for New Knowledge and Discovery:

State-of-the-art research instrumentation...

- Enables research intensive learning environments
 - Access for diverse students to high end research & research training instrumentation
 - Integrated into graduate and undergraduate courses
 - Used for demonstrations aimed at K-12 students and teachers to enhance interest in science and engineering
- Facilitates academic/private sector partnerships
 - Stimulates innovation of next generation instrumentation
 - Build capacity for creation of new products with scientific & commercial impact
 - Expanding the pie in resource-limited environment



Health Sciences Research

- Signature programs in health issues affecting NM

- Brain & Behavioral Health
- Cancer
- Cardiovascular Disease
- Infectious Diseases
- Child Health
- Environmental Health Sciences
- Substance Use Disorders
- Healthy Aging

- Provides healthcare worker training

- Clinical/medical practice – bench to bedside to community
- Rural health research addresses rural health priorities
- Highly ranked nursing program: integrated research
 - improve nursing outcomes and patient care

- Community-based research

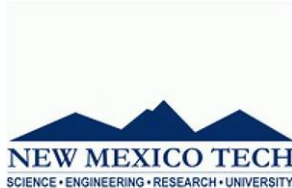
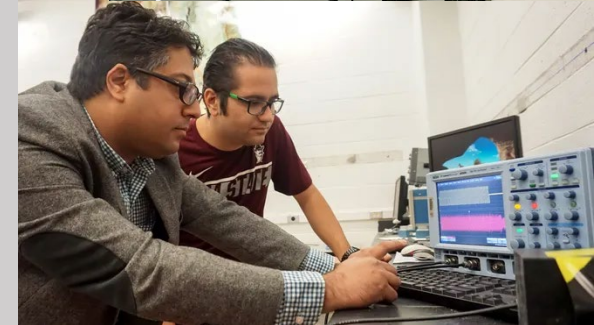
- Native American and Hispanic communities
- Partnerships with neighborhoods, schools, tribes

- Translational research/commercialization

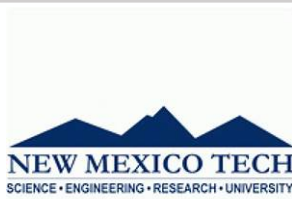
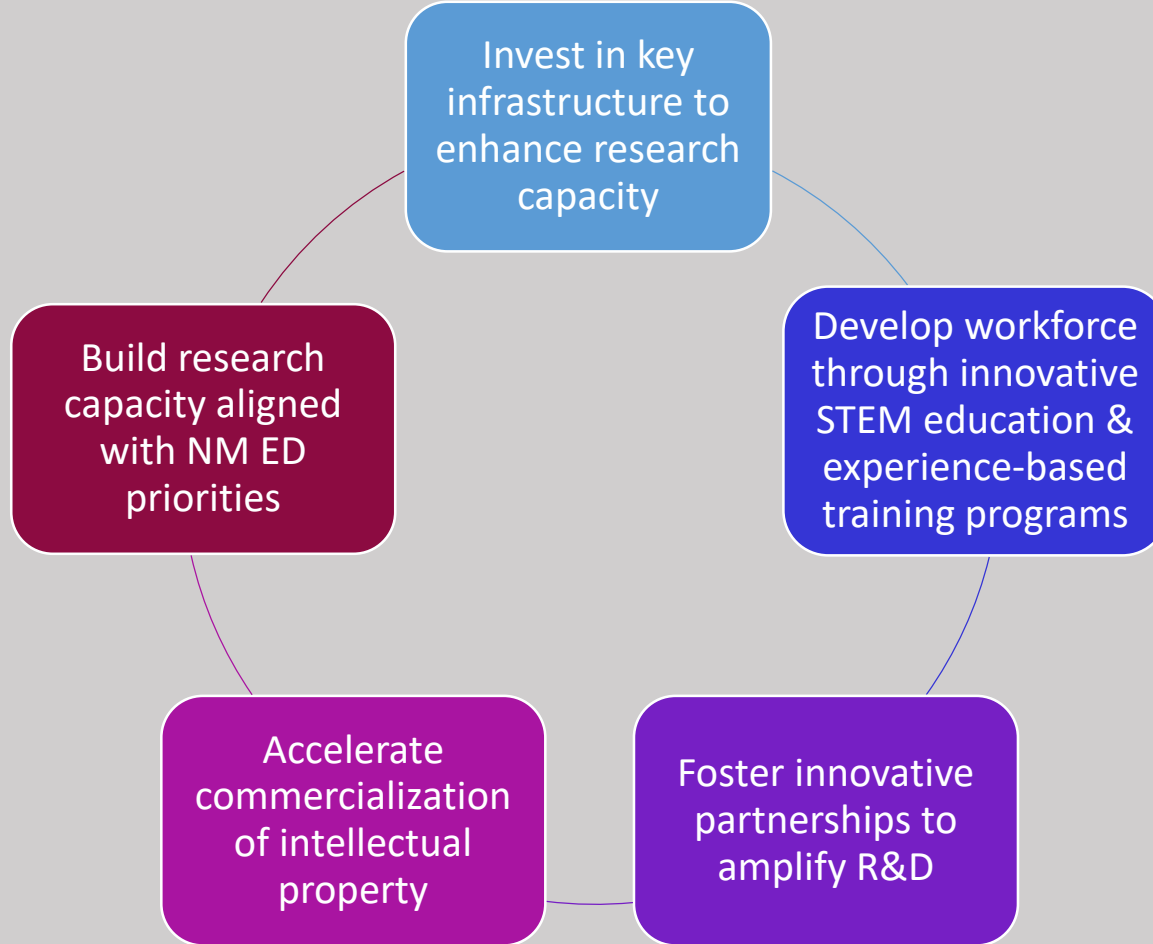


Research is Education:

- Student retention & success
 - High impact practice for student retention/graduation
 - Students participating in sponsored research have higher GPAs and retention rates than peers without that experience
 - Opportunity to explore ideas and put theory into practice
 - Connects evidenced-based research and health outcomes
 - Encourages creativity, expands opportunities
- Development of diverse competitive workforce
 - Inclusive array of students, scientists, engineers
 - Integrated environment w/cross fertilization of ideas
 - Career pathways for students
 - Interdisciplinary preparation for the workplace
 - Communication skills enhancement



Strategic Approaches



“Empower yourselves with a good education, then get out there and use that education to build a country worthy of your boundless promise.”

-Michelle Obama

“We believe that a strong technology sector is critical to our future growth.”

-NM Chamber of Commerce (2020)

“We need to go back to the discovery, to posing a question, to having a hypothesis and having kids know that they can discover the answers and can peel away a layer.”

-Dr. Shirley Ann Jackson

“Research is formalized curiosity. It is poking and prying with a purpose.”

-Zora Neale Hurston

