

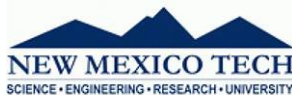
# Increasing the Economic Impact of NM Research A Collaborative Approach

**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



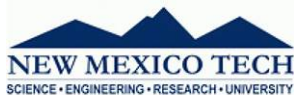
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“Education is the most powerful weapon which you can use to change the world.” [Nelson Mandela]

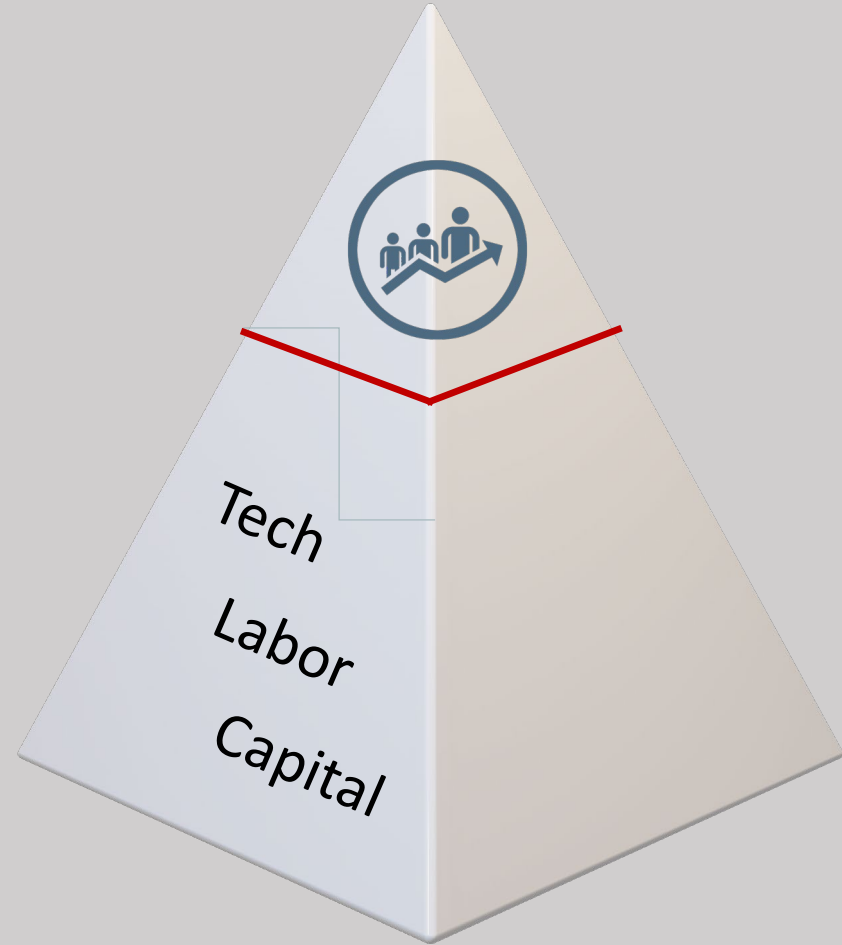
“Education is the best economic policy there is.” [Tony Blair]

“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]

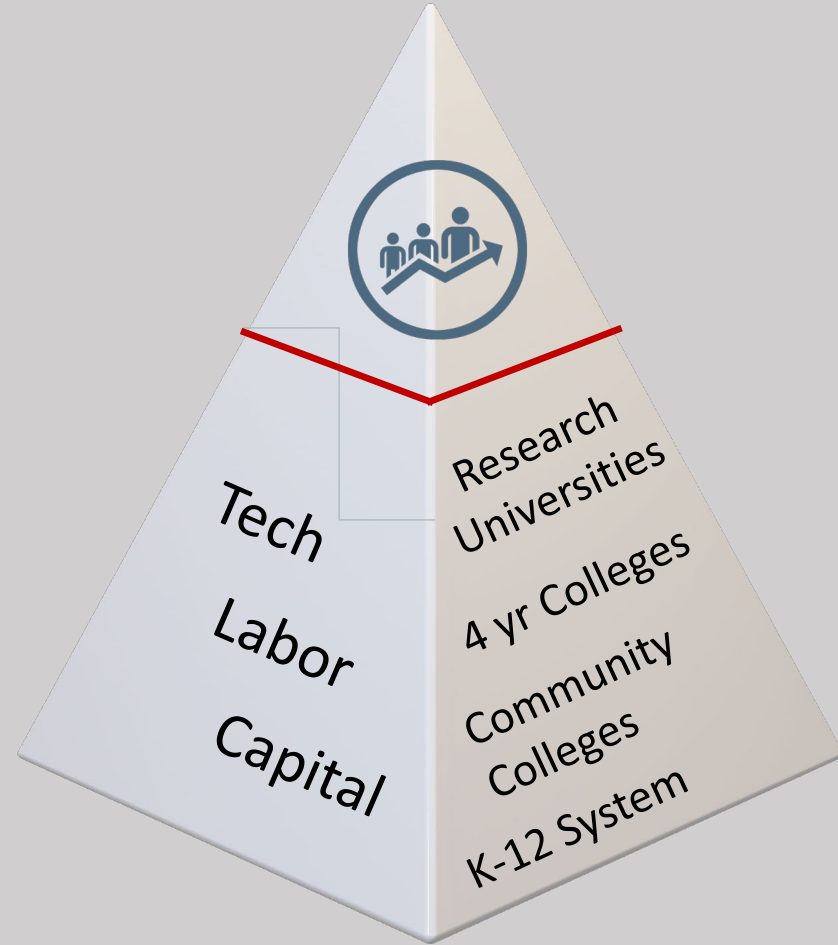


# Drivers of Economic Development

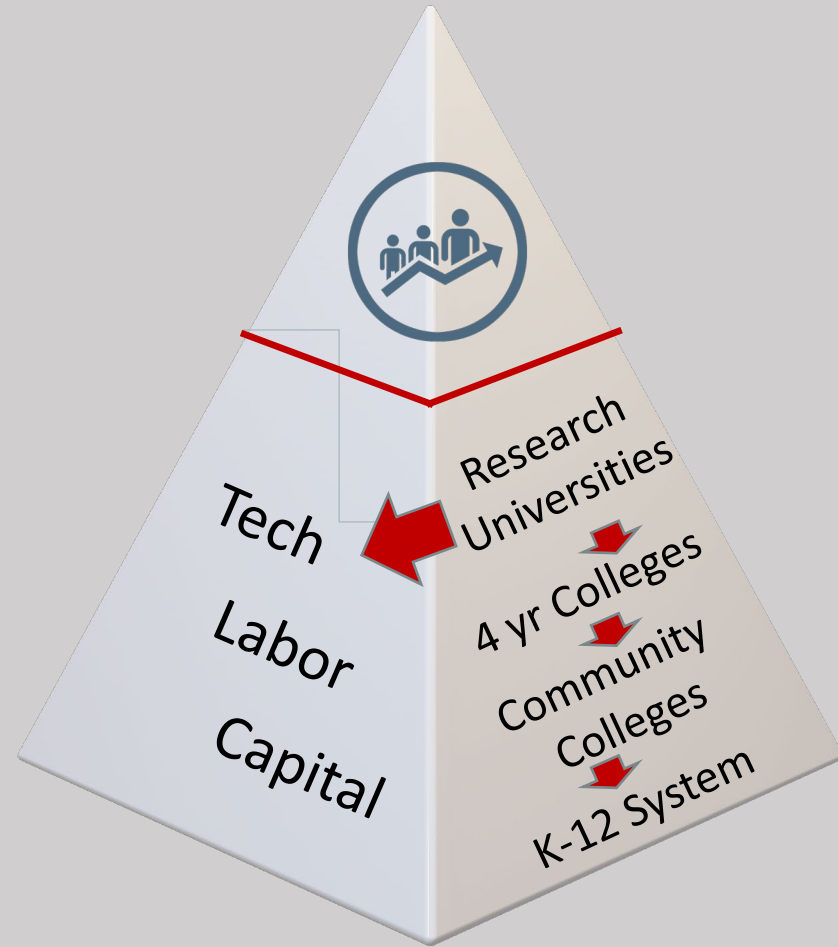


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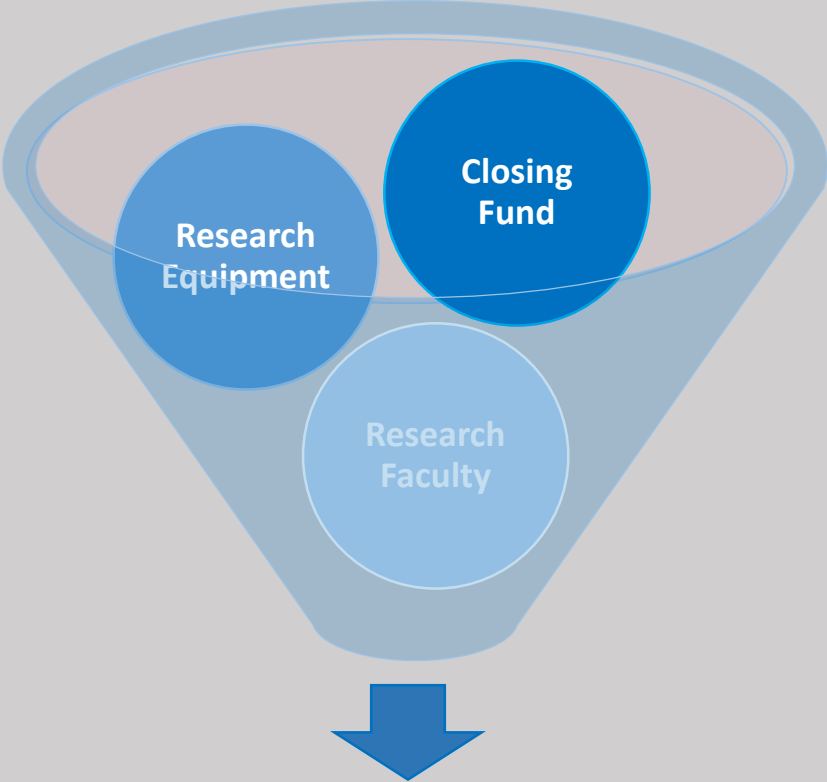
# Sustainable economic development relies on education



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



# Investing in Economic Development

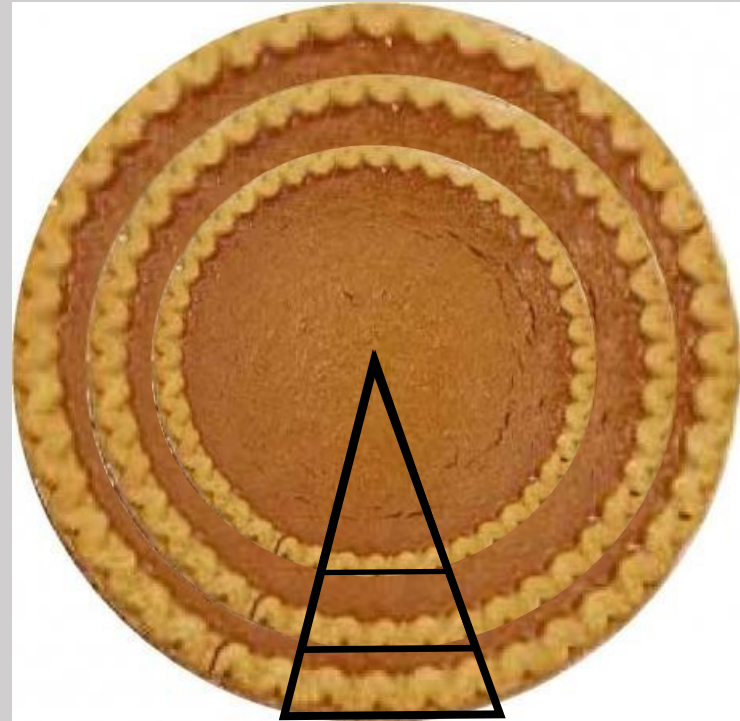


**NM Research Universities**



# 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)



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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



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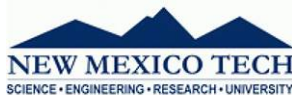
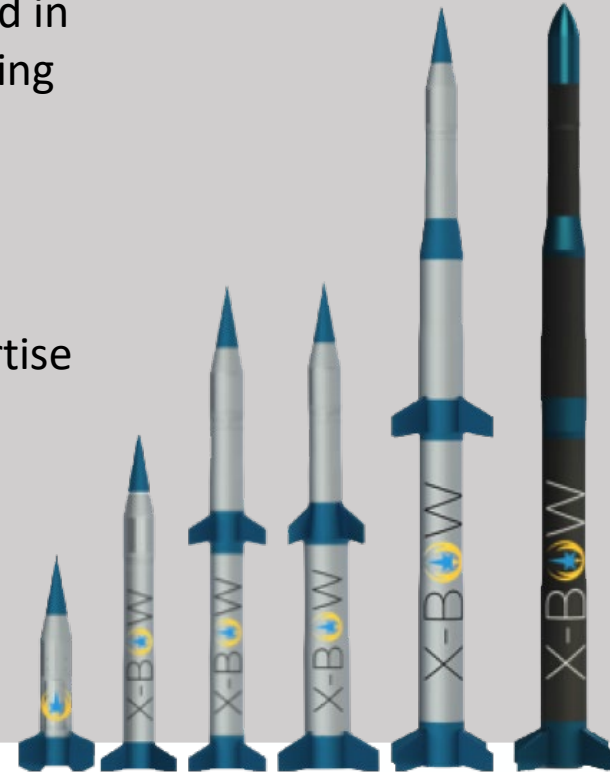
Additive manufacturing of solid composite rocket propellant, and other energetics materials processing.

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

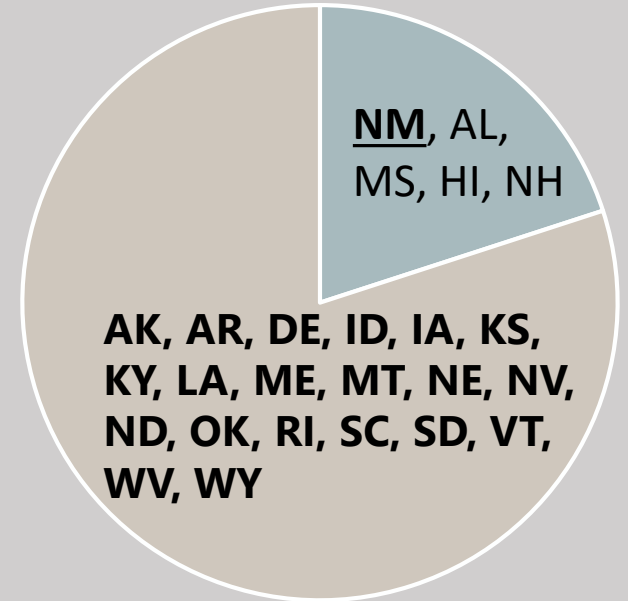
## Example: Statewide, Multi-institution New Mexico EPSCoR (5 years)

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

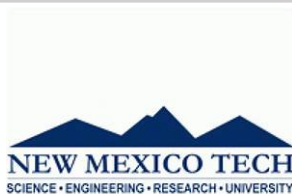
NM Tech, NMSU, and UNM, Nat. Labs application  
on Intelligent Manufacturing (June 2022)  
**\$4 M Matching Funds Needed**

- **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*

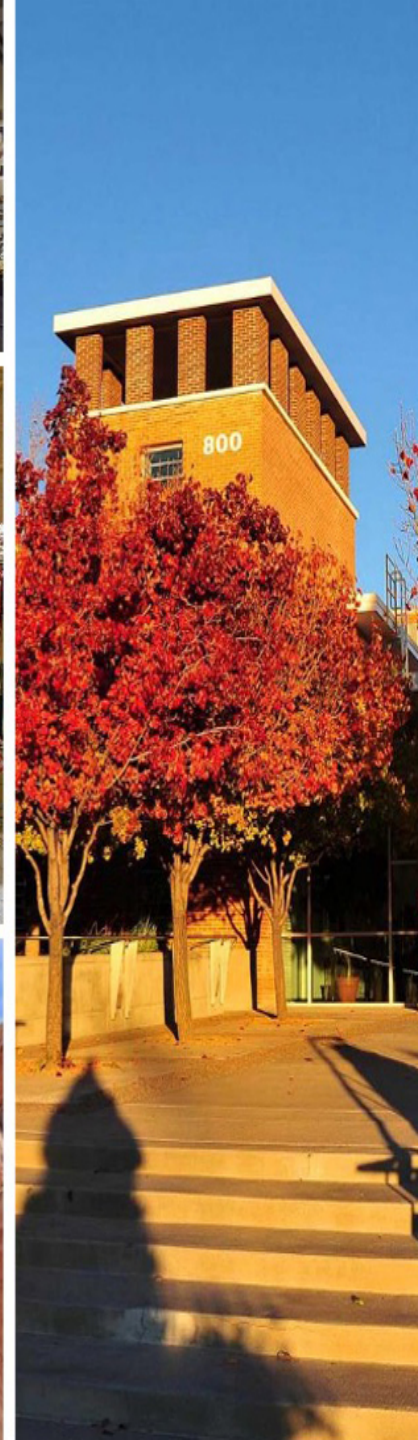
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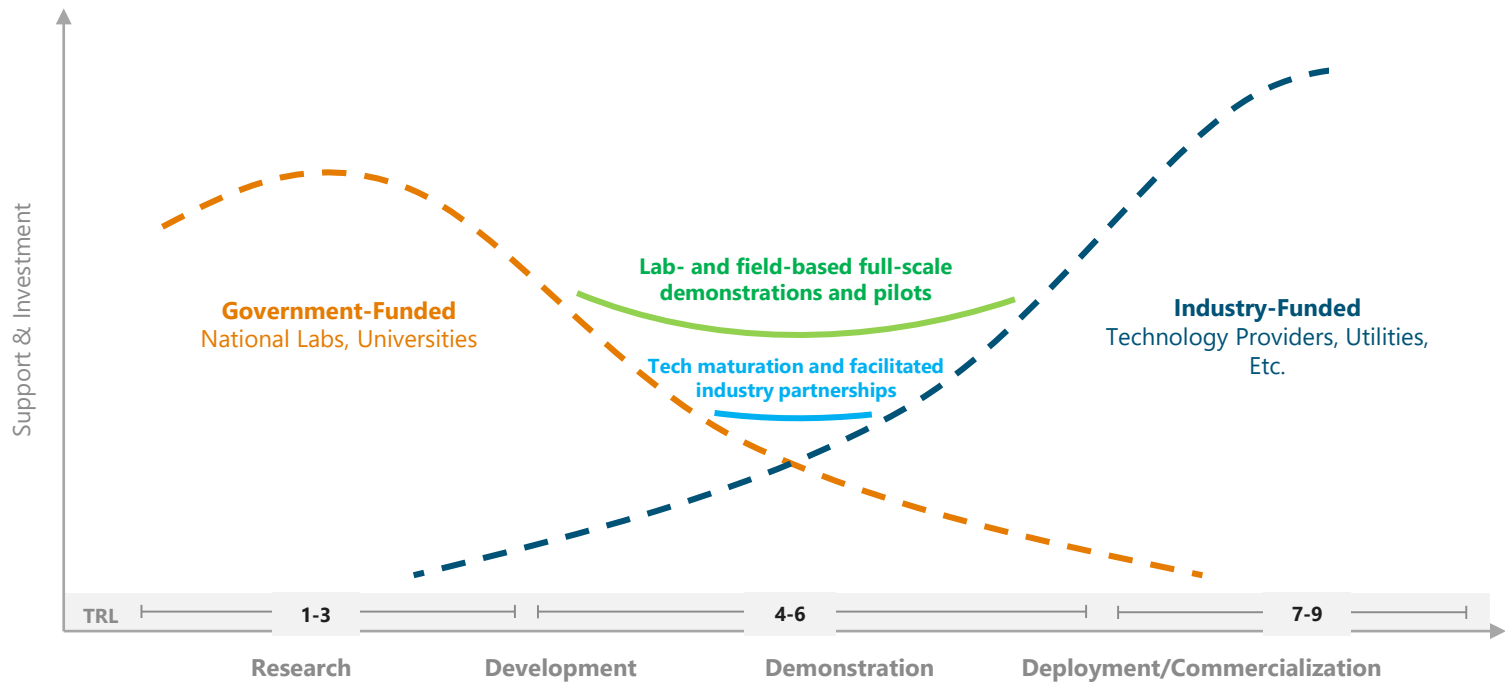


Sandia National Laboratories is a multimission laboratory managed and operated by National Technology and Engineering Solutions of Sandia LLC, a wholly owned subsidiary of Honeywell International Inc. for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525.



# 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

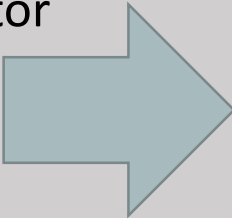
New:  
Northern  
Rio Grande  
Corridor  
Consortium

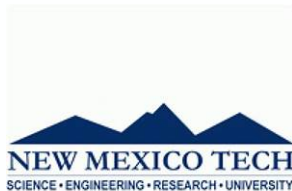
## • **Climate Change/Water & Drylands Resilience**

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



# Federal Infrastructure Legislation: Research Opportunities

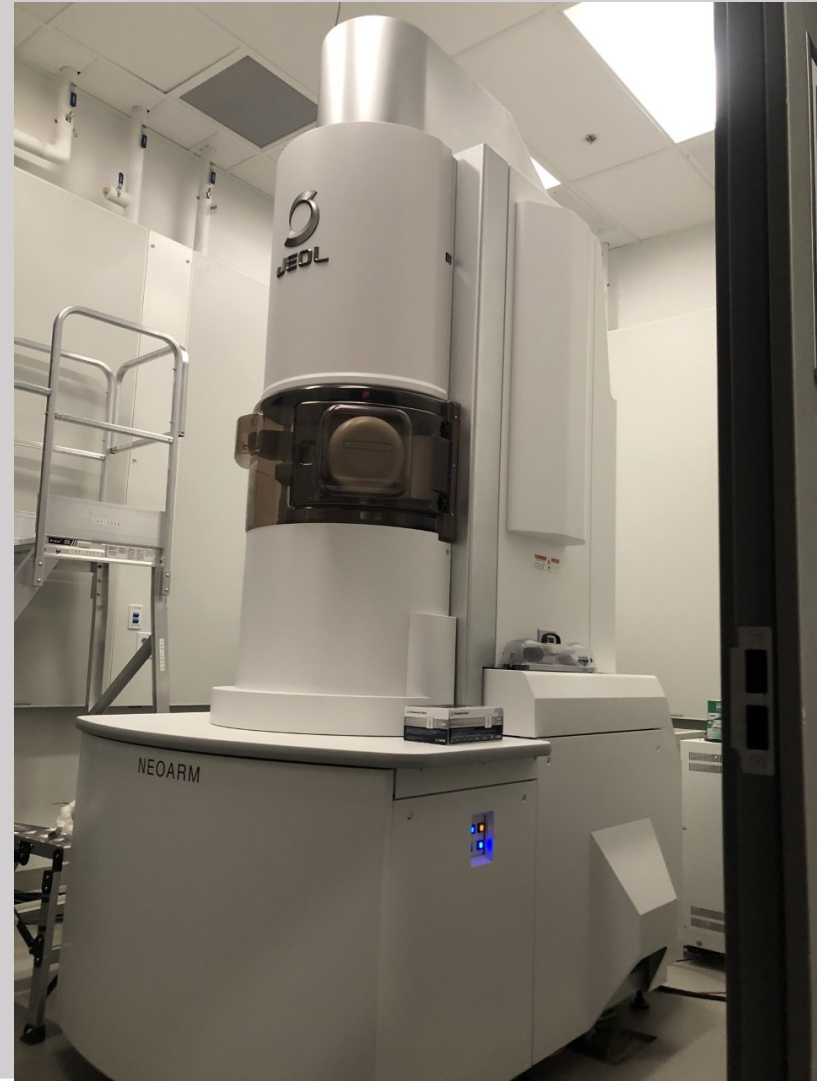
- Infrastructure Investments & Jobs Act
  - Emphasis on cooperation between public institutions and private sector
  - Incentivizing partnerships and collaboration opportunities with government agencies
- 
- Transportation & Energy Infrastructure (Tribal colleges)
  - USGS, Mining, Recycling
  - Agriculture, 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

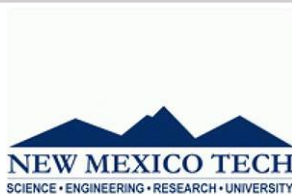
- Provides healthcare worker training

- 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

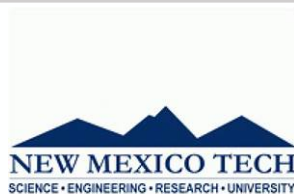
- Native American and Hispanic communities
- Partnerships with neighborhoods, schools, tribes

- Translational research/commercialization

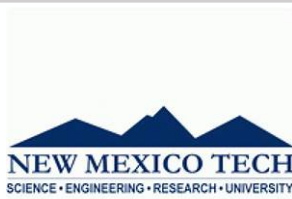
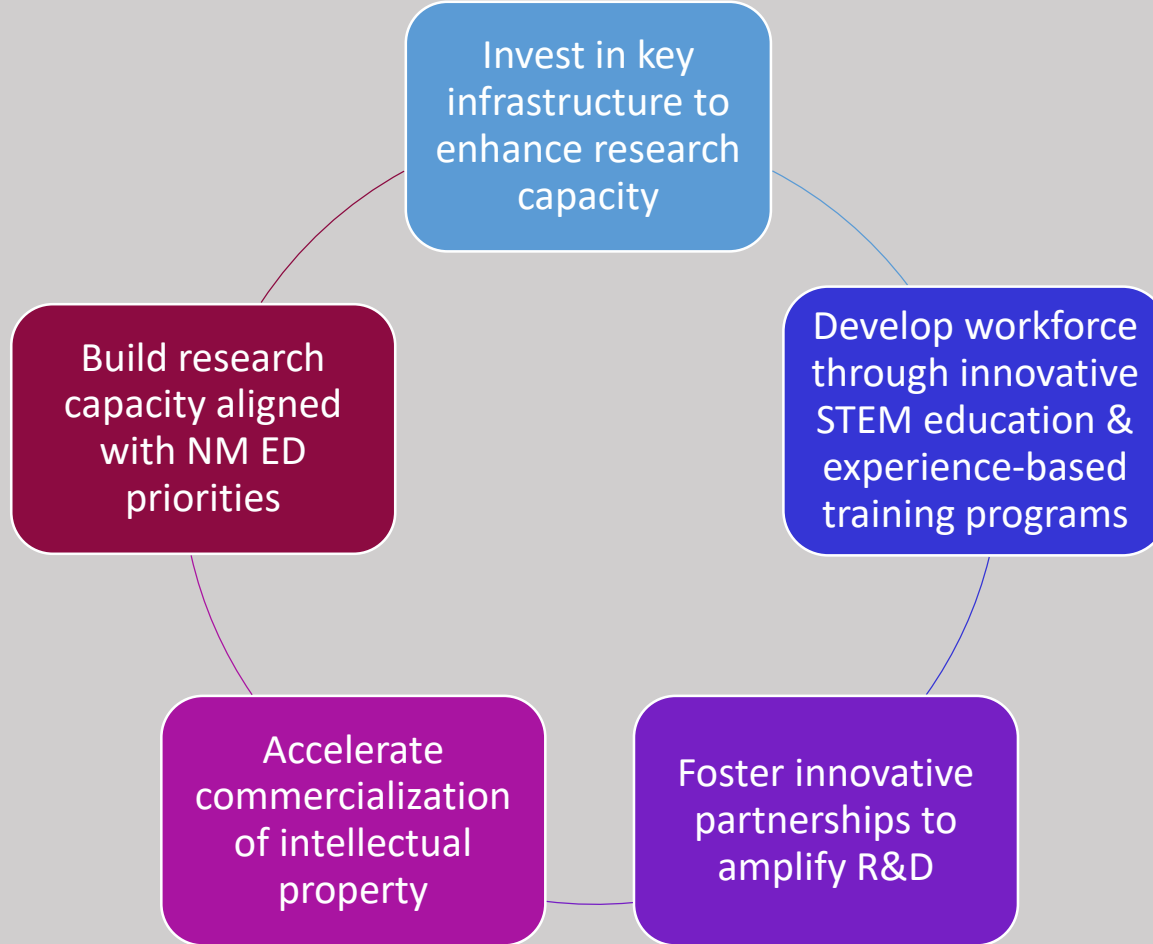


# Research is Education:

- 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

