Presentation to New Mexico Legislature
Science, Technology & Telecommunications Committee

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NNSA
National Nuclear Security Administration

Managed by Triad National Security, LLC for the U.S. Department of Energy's NNSA

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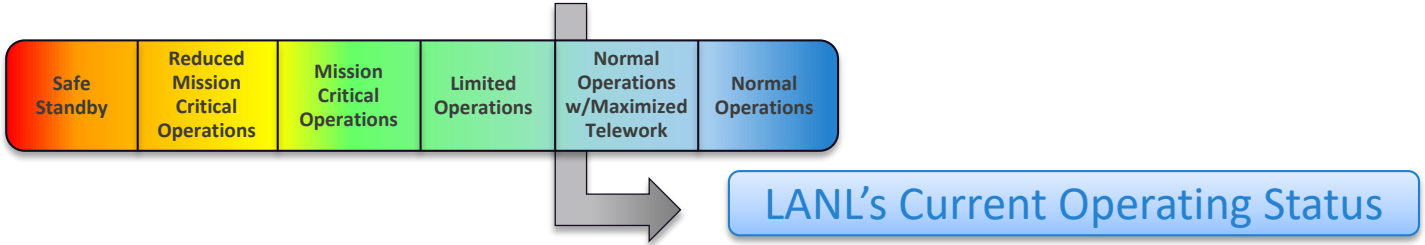
The Laboratory leverages its ST&E to manage COVID-19 response

- **Safe accomplishment of critical missions**
  - Maintained operations, meeting critical milestones
  - 20 to 50% of staff onsite during workweek
  - Telework maximized
    - Proactive about COVID training and health self-checks
    - Workforce adapted smoothly to COVID-19, avoiding costly restart activities and delivering on our mission priorities
  - Lab testing approach designed by occupational medicine
    - Workforce testing based on assignment
    - Focused on asymptomatic testing, self-screening to come onsite, and onsite safety protocols



Simultaneous excellence:
Balancing mission, ST&E, operations, and community relations

Design, produce, and certify current and future nuclear weapons and reduce global nuclear threats

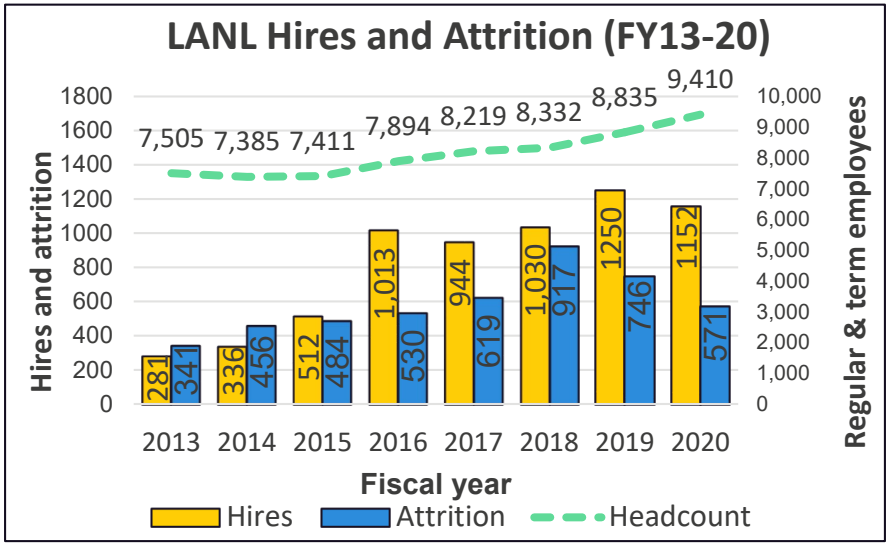
Deliver scientific discovery and technical breakthroughs that support DOE & NNSA missions

Execute sustained operations that are reliable and responsive to mission needs

Sustain and enhance LANL's partnership with the community across Northern New Mexico

Through challenging times, LANL continues to hire and focus on regional academic pipeline

- **Hiring returned to a normal pattern since the slow-down in April**
- **New Nuclear Enterprise Science and Technology (NEST) Academic Certificate and AAS degree program to be offered through UNM-LA**
  - Designed for our existing fissile material handler technician and technologist workforce
  - Approved by UNM in December
  - State HED reviewing for final approval



*Data as of 10/5/20

- **New collaboration with SFCC to revamp college's machinist program for LANL's manufacturing mission**
- **Enacting additional workforce pipeline initiatives to meet expected workforce needs, in particular for the 30 PPY mission**

Lab already seeing return on investment for Radiological Control Technician (RCT) training program

- **Lab targeted an initiative on radiation protection workforce**
  - Included tours for minority, underprivileged, STEM, and high-achieving high school students of LANL and NNMC for exposure to RCT field and pipeline educational opportunities
  - Installation of better equipment and new classroom space to enhance Radiation Protection Program delivery of pipeline training
  - Establishment of an HR incentive program to offer hire-on incentives, relocation, and temporary lodging to hard-to-recruit experienced and qualified RCTs

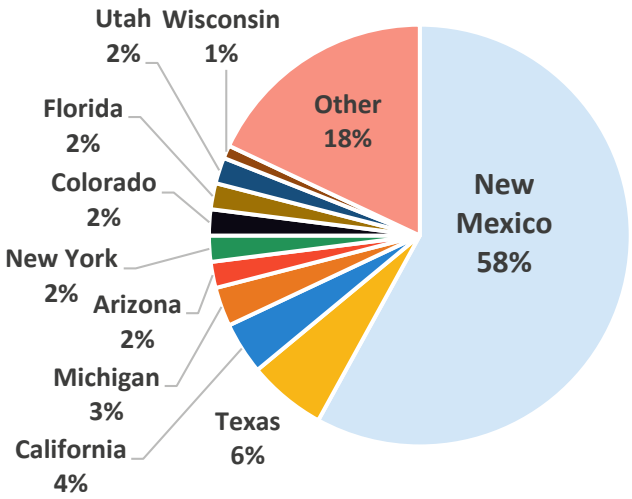
57 RCT hires this fiscal year; 9 from Northern NM College

- **These recruitment and retention efforts have resulted in a decrease in both projected attrition rates (from 30% to < 15%) and existing RCT vacancies (from more than 50 to less than 30)**
  - Work in PF-4 is no longer delayed because of an RCT shortage, thus eradicating a systemic issue in PF-4 operations

2020 virtual summer student program was a success

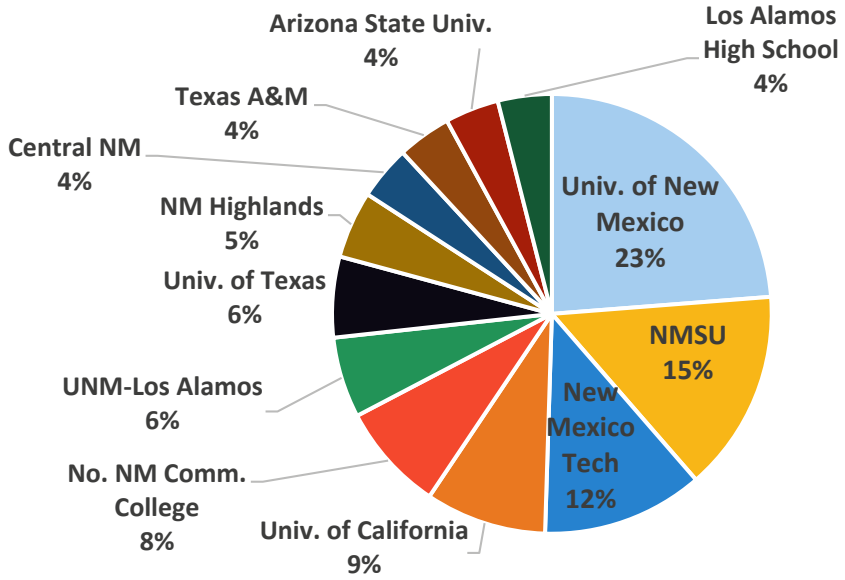
- 1,154 students at peak of summer student program (July 20)
- Students with computational skills best suited for telework
- Survey of students/mentors showed that despite this year's success, an onsite program would be preferable

States where LANL virtual interns were working



Schools where LANL students are studying

(Note: chart represents 49% of students; 51% attended other schools)



Laboratory is using world-class ST&E to support the State on COVID-related activities

- Helping lead state & national COVID-19 response
  - Stood up special office to coordinate R&D and respond to external needs
  - Collaborating with sites across the DOE complex
- Los Alamos models are helping inform the State
  - Models look at potential scenarios, assessing the risk for increased COVID-19 cases

On-site lab; supporting FDA, CDC, and others for alternative tests and protocols

- The Laboratory has also been assisting decision-makers with questions around geographical hot spots, the impact of mobility and contact tracing, and vaccine distribution strategies
- Twice weekly meetings with the State since March
  - Sara Del Valle, Paul Fenimore, Carrie Manore, Kirsten McCabe

On a national level, Lab modeling provides a framework to evaluate forecasts, potential actions, and specific scenarios

Modeling provides a framework to evaluate forecasts, potential actions, and specific scenarios

Decision Makers
- Situational assessment
- Scenarios / options
- Metrics evaluations
- Confidence assessment

Data
- Availability
- Quality/Key inputs
- Assumptions
- Model performance

MODELING

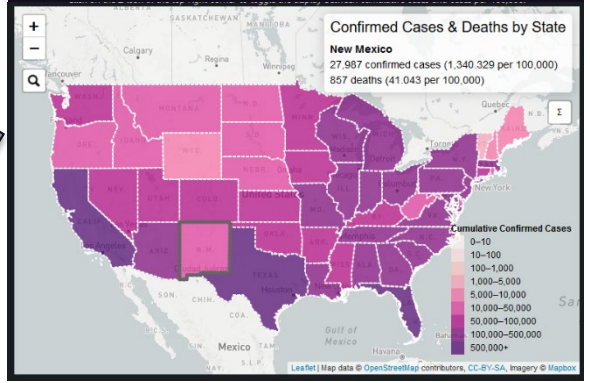
Forecasts up to 6 weeks
- Statistical approach
- Publicly available
- Originally validated with influenza

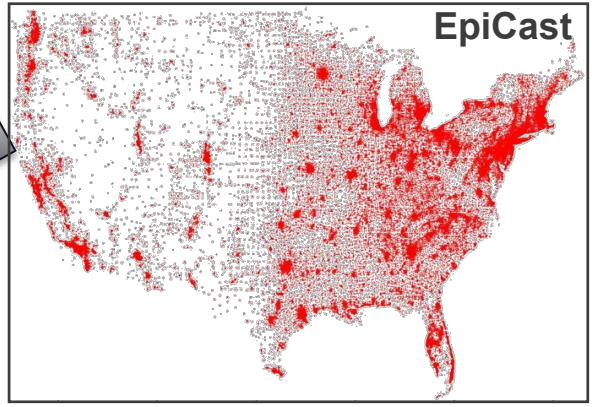
Simulation of different scenarios
- More computing required
- Designed for scenario
- Two LANL approaches
  - EpiGrid: Geographically-segregated SEIR+
  - EpiCast: Agent-based

Forecast

Prediction

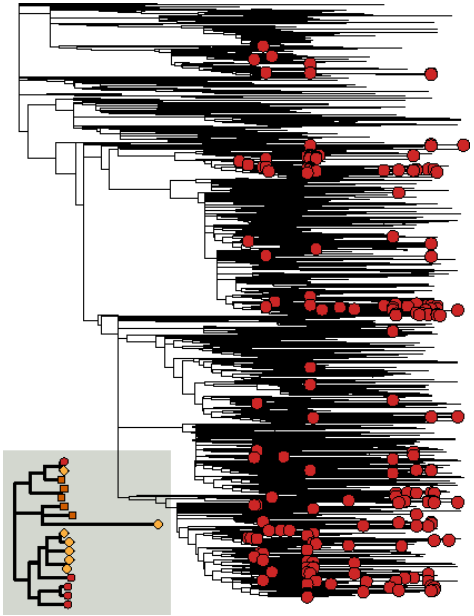
Cases and Deaths Forecasts
Based on data as of 2020-09-23
covid-19.bsvgateway.org





Research to identify transmission pathways

- We use tree-based statistical methods to infer when the virus has moved into and out of NM, revealing NM “clusters” linked by transmission
- We have found that we can identify many previously identified transmission links and support suspected transmission links
- Our findings show that outbreaks in the state often result from multiple introductions (rather than having a single source
- Our findings suggest additional cases likely to be part of designated outbreaks



Large tree identifies NM cases (red circles) among the cases from elsewhere. This shows that there were many introductions of the virus into the state.

Insert: Sub-tree distinguishes between two designated outbreaks in NM cases

Opportunities for tech transfer

- **Ventilator test bed for improved performance and understanding:**
  - Worked with Presbyterian Health Systems and San Diego-based Flowmetrics to validate a ventilator replacement system that could be assembled quickly from readily available parts
  - Transition to work on improving the performance of conventional ventilators patients on long-term ventilation

- **Improved rapid testing for COVID:**
  - Adapted Lab research on mosaic vaccine to get improved rapid testing for SARS-CoV-2, and identify genetic variants and other members of the coronavirus family
  - Partnered with Presbyterian to do a clinical trial with COVID-positive samples provided by Presbyterian

LANL ST&E continues to address long-term challenges

- **A Laboratory study measured wildfire smoke in this summer's Medio Fire**
  - The real-time study of soot, the varieties of smoke, and other airborne particles will help determine future air-quality alerts

- **Los Alamos researchers are modeling how changes in seasonal snowpack, precipitation can affect the land, water resources**
  - Model shows that changes in absorption and runoff have a significant impact on water quality and quantity in the region
  - Models like these can help guide water managers in conserving and protecting water resources

Our engagement and transparency helps achieve excellence in community relations

LANL has several avenues for investing in the community:

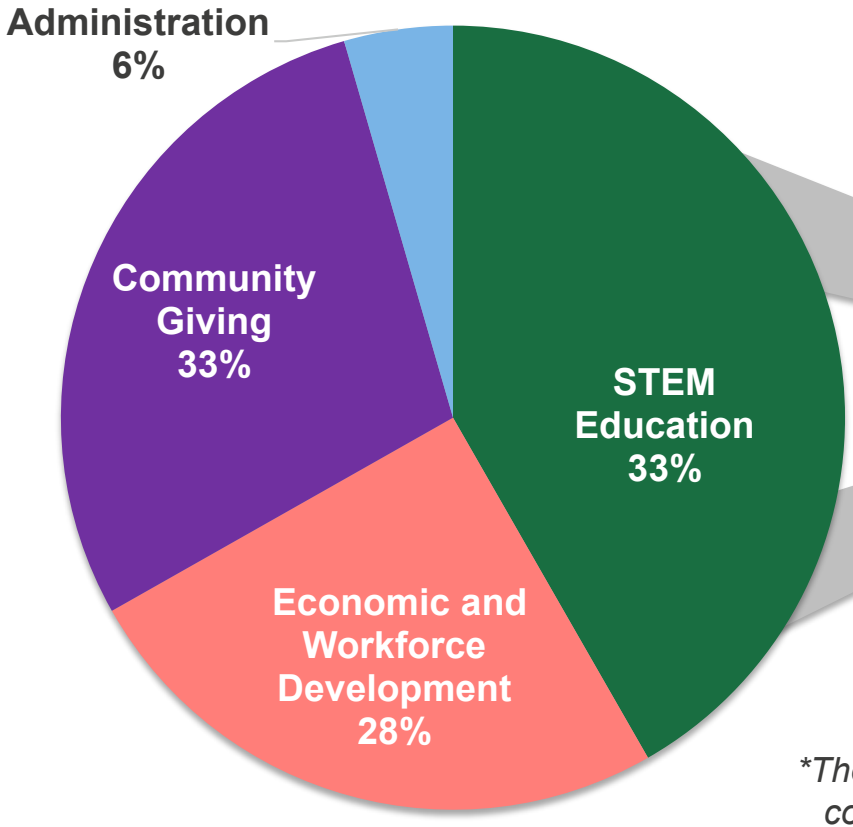
- Laboratory employees' time, talent and resources for partnerships and programs
- Support for employee volunteerism and donations
- Triad's $2M investment through the Community Commitment Plan

Our efforts focus on three areas of community benefit:

1. Workforce and economic development
2. Education
3. Philanthropy and community giving

A Laboratory education specialist works with a student at Pojoaque Middle School as part of Regional Partnership School project.

We are investing $2M in the regional areas of most need



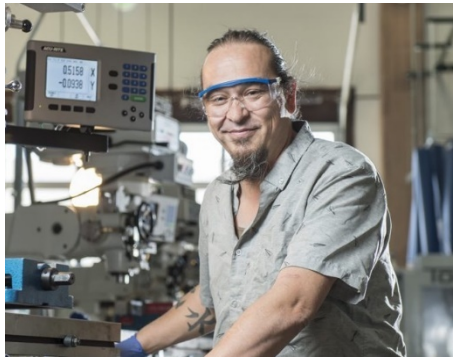
*The contract requires that the contractor fund any administrative costs needed to implement the Community Commitment Plan

Workforce and economic development:
Partnering to create jobs and opportunities

- **New pipeline programs address critical skills for a growing workforce**
  - Radiation protection degree for 40 students every year (Northern NM College, started in 2019)
  - Engineering machining degree for students who also intern at LANL (Santa Fe Community College)
  - Established high school program to prepare seniors for Craft trades with NM Building & Construction Trades Council (Taos and Questa high schools)

- **Support for Regional Development Corporation to assist regional small businesses and offer loan programs (including tribal economic diversity fund)**

A billboard promotes a collaborative degree program



An SFCC faculty member in the Machining and Tooling Lab

Education: Developing inspired students and skilled teachers

- **State is investing $350K to expand the LANL Regional Partnership School project (with Pojoaque Valley Schools) to additional school systems**
- **Los Alamos Employees Scholarship Fund awarded $743,000 in scholarships in 2020**
- **In FY20, LANL supported 34 STEM / Education programs, impacting 11,624 students and 927 teachers**

Students solve math equations as part of the "Pojoaque Project"

Students at the inaugural Governor's STEM Challenge, supported by LANL

Philanthropy: Supporting Northern New Mexico in a challenging time

- **Almost 90% of employee giving stays with local orgs**
  - $2.5M donated in the last employee giving campaign
- **Recent Triad giving has been COVID-focused to address current emergency, prioritizing healthcare, food security, childcare for essential workers, and education, including:**
  - $40K for regional foundations
  - $10K in emergency grants to Pueblo Relief Fund
  - $60K to Food Depot ($50K from employees, $10K match from Triad)
- **Long-term investment continues to United Way of NNM to support the Rio Arriba Collective Impact Initiative to End Substance Abuse and Violence**

The Food Depot received $60K

A LANL volunteer donates at a February blood drive

National Labs have been fostering a stronger economy across the state for nearly two decades

NMSBA Program results and impact (2000 – 2019)	
Los Alamos and Sandia Results	**Economic Impact**
• 3,051 small businesses assisted, 40% in rural New Mexico • $67.2M of assistance provided to small businesses	• 9,604 jobs created/retained • $372.5M salaries • $437.5M increase in revenue • $171M in new financing

Technology Readiness Gross Receipts Tax Credit (TRGR)

- **The Lab assists New Mexico companies in maturating their technologies to produce high value goods and services to grow the technology-based economy**

New Mexico business licenses a laboratory technology or engages in a research partnership.

Addresses the gap of knowledge transfer and technology advancement.

Up to **$150K** per company

TRGR is $4.5M tax credit for a three-year pilot.

Small business purchases help drive economic growth in New Mexico and the nation

NM small business purchases by the Laboratory in FY19:

- Total New Mexico Small Business purchases: **$288,646,792**
- Total Northern New Mexico Small Business purchases: **$210,113,206**

Lab is increasing local preference for Northern NM small businesses to bid on contracts from 5% to 10%

- Offering an additional 5% incentive for the Triad Pueblo Business Alliance

Two New Mexico companies that work with the Laboratory received small business awards from the Department of Energy (DOE). Charlie Smith, director of the DOE Office of Small Disadvantaged Business Utilization, presents awards to Jennifer Barajas of RG Construction Services (left), and John Santoru of Holmans USA (right).

The Laboratory continues to be essential to the nation's security

Los Alamos delivers national security mission solutions

- By applying multidisciplinary science, technology & engineering capabilities, in unique experimental, computational, and nuclear facilities
  - With an agile, responsive, and innovative workforce
    - Dedicated to addressing complex national security issues and the world's most difficult challenges