

# PERSPECTIVES 2021 ANNUAL REPORT





# \$76.1M

Technical Assistance Provided by Labs

# 3,204

Businesses Assisted

# 10,211

Jobs Created and Retained

# 33

New Mexico Counties Supported

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*New Mexico is the only state with two federal research laboratories. The unique partnerships developed with NMSBA between small business and these scientific communities are creating highly skilled jobs in New Mexico and developing innovative technologies that will improve global health, communications, and logistics.*

**ALICIA J. KEYES**  
Cabinet Secretary  
Economic Development Department  
State of New Mexico

*NMSBA provides unique technical assistance to New Mexico's small business community that grows and enhances New Mexico's economy. By harnessing the expertise of New Mexico's two national laboratories, NMSBA helps small businesses overcome obstacles to growth and success.*

**STEPHANIE SCHARDIN CLARKE**  
Cabinet Secretary  
Taxation and Revenue Department  
State of New Mexico



## Dear Governor Lujan Grisham and New Mexico State Legislators,

We are pleased to present the 2021 Annual Report for the New Mexico Small Business Assistance (NMSBA) Program. This report highlights just a few of the hundreds of successful projects from 2021 and quantifies the overall performance of NMSBA, both for the past year and since its inception in 2000.

During 2021, a total of 228 small New Mexico businesses participated in NMSBA. Thanks to the *Laboratory Partnership with Small Business Tax Credit Act*, the State of New Mexico, along with Los Alamos National Laboratory and Sandia National Laboratories, invested \$4.36 million of national laboratory expertise and resources to help small businesses in 22 counties overcome technical challenges and grow.

The success stories in this report demonstrate the impact of NMSBA on small businesses from various industries in counties around the state. Here are just a few points from some of the featured stories:

- After receiving an evaluation of their portable laser-pulse test system showing that the protease substrate generated strong signals from SARS-CoV-2, a company secured a Phase II SBIR grant worth \$1.6 million.
- Research into a new market helped a company add to its specialized clothing product line, increase sales by 150%, and hire four new employees.
- An established electroplating business used new processes and systems provided to expand into high-tech markets and achieve ISO 9001 registration while increasing revenue and adding two new employees.

NMSBA has helped New Mexico's small businesses create jobs, increase revenues, decrease operating costs, and attract new funding opportunities.

The Disinfecting Robot Leveraged Project received the *Honorable Speaker Ben Luján Award for Small Business Excellence* for demonstrating the most economic impact. The help the companies received with developing disinfection efficiency testing processes led to \$5 million in funding and the hiring of 30 new employees. The Breezy One disinfecting robot is being used in more and more facilities around the country.

NMSBA has helped New Mexico's small businesses create jobs, increase revenues, decrease operating costs, and attract new funding opportunities. Since 2000, the two national laboratories have provided \$76.1 million in technical assistance to 3,204 businesses, enabling 10,211 jobs to be created and retained across the state's 33 counties.

Your continued support of NMSBA, which promotes collaboration between our national laboratories and small business community, leads to economic development throughout our great state. Thank you!

Sincerely,

**MARIANN JOHNSTON**  
Los Alamos National Laboratory

**DAVID KISTIN**  
Sandia National Laboratories

# PROGRAM INFORMATION

## OVERVIEW

In 2000, the New Mexico Legislature created the *Laboratory Partnership with Small Business Tax Credit Act* for the purpose of "bringing the technology and expertise of the national laboratories to small businesses in New Mexico to promote economic development in the state, with an emphasis on rural areas." As a result, Sandia National Laboratories established the New Mexico Small Business Assistance (NMSBA) Program to provide technical support to small businesses throughout the state. Los Alamos National Laboratory began participating in NMSBA in 2007. Jointly, the labs are committed to solving small businesses' critical challenges with national laboratory expertise and resources; influencing New Mexico business development by building capacity, capabilities, and competencies; and acting as an advocate for small businesses through an entrepreneurial culture.

While each company utilizes NMSBA in a different way, all use it as a means to maintain or grow their business. NMSBA services are provided at no cost to participating small businesses in the form of lab staff hours valued at up to \$40,000 per calendar year for businesses located in rural counties and \$20,000 for businesses located in urban counties (Bernalillo and Santa Fe Counties). The total amount of assistance is capped at \$2.4 million annually for each laboratory. NMSBA may not provide assistance that is available in the private sector, and no equipment or cash can be given to a participating company.

## FUTURE DIRECTION

Emerging from the COVID-19 pandemic, New Mexico companies are using NMSBA to identify and capture opportunities created by change. In 2021, hundreds of companies used NMSBA for testing new product ideas, product validation, and to increase operational efficiency. NMSBA directly contributes to business expansion and retention in New Mexico. In 2022, NMSBA will continue to address technical challenges for New Mexico companies, increasing their resiliency as they become more effective at mitigating risk, adapting, and responding to significant and rapid change. As a result, these businesses continue to bring new products and services to the market, attract financing, and create meaningful jobs.

**During 2021, NMSBA helped 228 small business across the state reach business goals, develop their products for commercial use, and increase profitability.**

**NMSBA makes a statewide impact by:**

- Enabling New Mexico small businesses to access cutting-edge technology
- Increasing New Mexico small businesses' technical sophistication and capabilities
- Sharing knowledge and resources between laboratory personnel and small businesses to address issues and develop real-world applications

## TYPES OF SMALL BUSINESS ASSISTANCE

### Individual Projects

Individual NMSBA projects involve a single New Mexico for-profit small business. Projects address business-specific challenges that can be solved with national laboratory expertise and resources. Technical assistance challenges are wide ranging; however, the majority include testing, design consultation, and access to special equipment or facilities. Requests for individual projects are accepted year-round until funding is exhausted.

### Leveraged Projects

Leveraged NMSBA projects allow a group of small businesses that share technical challenges to collectively request assistance. Leveraged projects address issues that are too large or complex to solve through an individual project. Proposals for projects are reviewed semi-annually by the NMSBA Advisory Council.

### Contract Projects

Legislation allows NMSBA to contract with entities that have the capability to provide small business assistance services not available in the private sector. For the benefit of New Mexico's small businesses, NMSBA has contracts for specific services with the New Mexico Manufacturing Extension Partnership and the state's three research universities.

**The New Mexico Manufacturing Extension Partnership** provides training and assessments in the areas of quality and lean manufacturing principles.

**The Arrowhead Center at New Mexico State University** evaluates small business capabilities and technologies using subject matter experts throughout the university.

**The New Mexico Tech Business and Technology Management Program** interfaces with a variety of disciplines taught at the university to help accurately assess the current competitive position of small business technologies.

**The University of New Mexico Management of Technology Program at the Anderson School of Management** evaluates the commercial potential of small business technologies and identifies commercialization challenges and pathways.

**The University of New Mexico School of Engineering** addresses technical challenges faced by small businesses in computer science and chemical, biological, electrical, computer, civil, nuclear, and mechanical engineering.



HIDALGO AND SANDOVAL COUNTIES

# ADVANCED SEISMIC ANALYSIS LEVERAGED PROJECT

*The advanced seismic analysis performed by scientists at Los Alamos has given us necessary tools to improve the energy output and sustainability of the Lightning Dock Geothermal power plant because we now have a refined subsurface structural model, based on previously collected seismic data.*

**TRENTON CLADOUHOS PHD, PG**  
 VP of Resources  
 Cyrq Energy, Inc., parent company of Lightning Dock Geothermal, LLC

Located on the east side of the Animas Valley, Lightning Dock is a geothermal power plant producing energy from heat deep inside the Earth. To improve the output and efficiency of this plant, three organizations came together to conduct further geothermal exploration in the area: Lightning Dock Geothermal, LLC; Geo-Science Solutions, LLC; and Jhus Canyon Construction, LLC. The companies, along with Utah-based Zanskar Geothermal and Minerals, collected seismic data, performing a sort of “CAT scan” of the Earth’s subsurface, using sound waves to help locate potential geothermal resources.

Although these organizations had raw seismic data and a preliminary analysis on hand, they needed more advanced software and computational power to conduct a more precise analysis of these data. To obtain expert analytical help, the companies reached out to NMSBA, which paired them with Lianjie Huang at Los Alamos National Laboratory.

Huang and his team used advanced seismic imaging methodologies to produce high-resolution fluid flow images and subsurface structural images, enabling the companies to use the results for their needs, including reducing risk for siting new geothermal wells.

With the results of the Laboratory’s analyses in hand, the companies are now in a better position to conclude the detailed geothermal exploration needed for well-siting at the Lightning Dock Geothermal power plant, giving them more confidence that they will locate resources that can improve the energy output of the plant in the years to come.

Collecting seismic data.





Robert Durbin, Owner, Bio-Stic and Anand Kumar, Microbiologist, Los Alamos National Laboratory.

## SAN JUAN COUNTY

*Working with the scientists and other specialists through NMSBA has enabled us to create new revenue streams not previously possible.*

### SEAN CASAUS

Owner  
Bio-Stic, LLC

## BIO-STIC

People who have septic tanks in use at their homes typically pay \$400 a year to have their tanks pumped. The pumping process removes excess waste that could lead to costly and time-consuming repairs.

To prevent septic backups and significantly reduce the need for yearly maintenance, a biocatalyst product was designed at Bio-Stic. Easily installed in less than five minutes in a toilet's water tank, the product, called Bio-Stic, treats the septic system with every flush. Its eco-friendly biocatalysts ensure rapid settling of floating debris and particles to prevent costly clogs.

With Bio-Stic close to market, Sean Casaus lacked testing data to demonstrate the effectiveness of the product. To address this problem, he reached out to NMSBA, which paired him with Anand Kumar at Los Alamos National Laboratory's Bioscience Division.

Kumar and his team evaluated the efficacy of Bio-Stic for wastewater remediation under lab conditions. The scientists used wastewater samples obtained from a slaughterhouse (water similar to that in septic tanks) to conduct a series of bioremediation tests. These tests enabled scientist to understand the optimal treatment conditions at which Bio-Stic largely cleared the turbidity of the wastewater samples by settling down the floating debris.

Bio-Stic can now provide customers with quantifiable data regarding the performance of the product, giving assurance that it performs as advertised. Since receiving NMSBA assistance, the company has experienced a 10% increase in sales and is planning to expand into new application areas.



Honorable Speaker  
Ben Luján  
**AWARD**  
for Small Business  
Excellence



Xavier Lemon, Director of Sales,  
Christian Slough, Marketing & Community  
Engagement Specialist, Lauren Baca, Robotics  
Engineering Intern, Matthew Ennis, Chief Strategy  
Officer & Co-Founder, and Tyanne Hawthorne,  
Marketing Associate, Build With Robots.



## BERNALILLO AND SANDOVAL COUNTIES

*Based on Build With Robots' success with NMSBA, I've encouraged and helped other companies engage with NMSBA because they facilitate relationships with our unique research institutions that help NM businesses commercially improve their technology foundation.*

**MATTHEW ENNIS**  
Chief Strategy Officer  
Build With Robots, Inc.



## DISINFECTING ROBOT LEVERAGED PROJECT

Although people have been using disinfectant since the late 1800s, the spread of COVID-19 has set expectations that public gathering places will be routinely disinfected, particularly critical infrastructure facilities such as airports and schools. A concern when disinfecting is that workers can be exposed to chemicals and biological contaminants. Autonomous disinfecting robots protect workers and make it possible for them to complete other tasks.

To build disinfecting robots, New Mexico companies Build With Robots, Inc.; Painting Bots, Inc.; FatPipe-Rio Rancho; and BioScience Center came together. Although the companies had their Breezy One robots deployed at various airports and schools, they wanted a way to develop disinfection efficiency testing processes. To obtain analytical help, the companies reached out to NMSBA, which paired them with Mark K. Kinnan and Cathryn Mayes at Sandia National Laboratories.

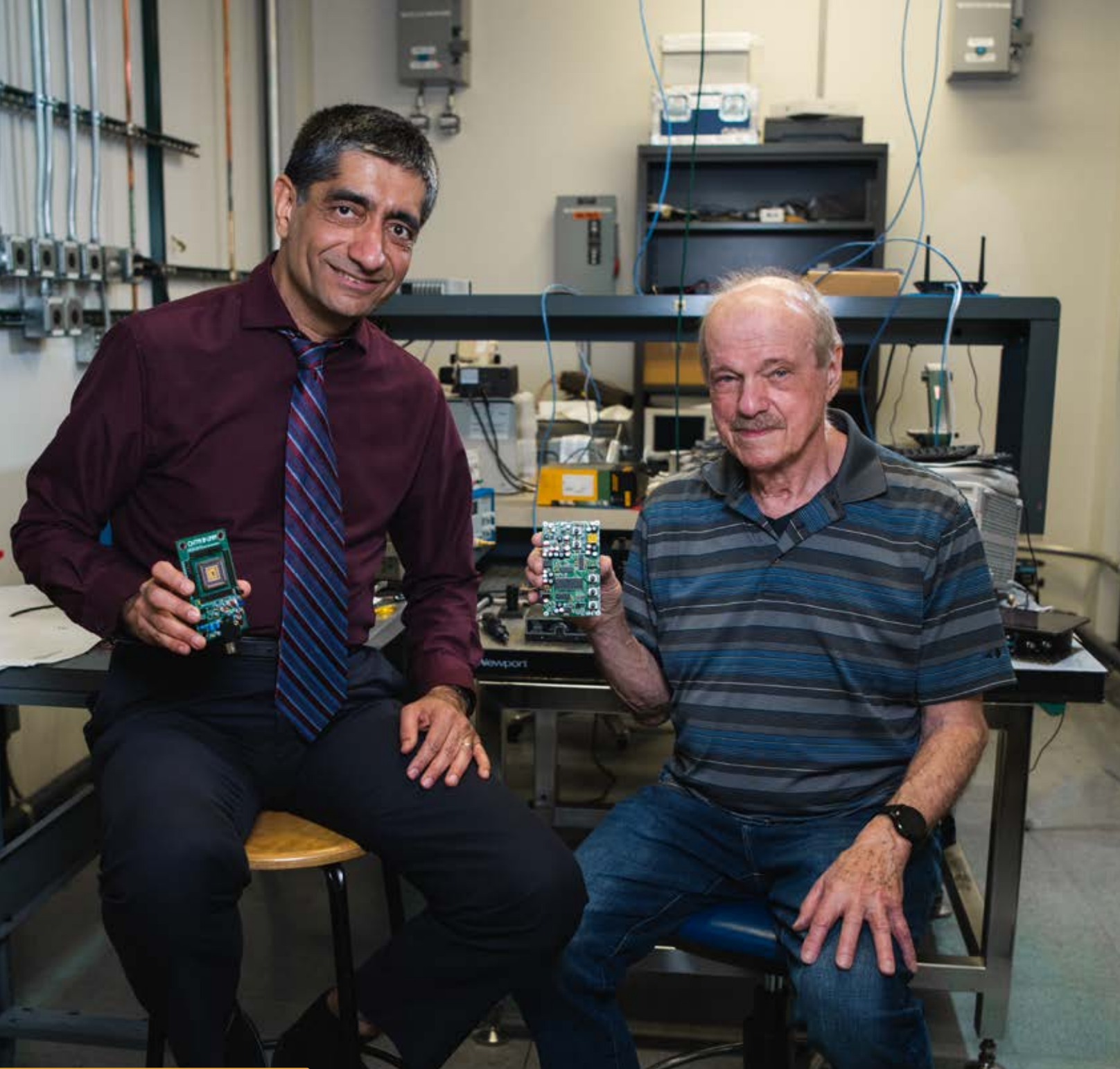
The Sandia team created and implemented a testing matrix from which they could select a range of equipment and protocols. These disinfection processes were tested in a mockup facility to evaluate the robot's efficiency in close-to-real-world scenario experiments. The processes that worked best were then set for real-world testing and validation.

Thanks to this work, the companies have secured \$5 million in funding and have hired 30 new people. Breezy One is now in use in numerous facilities around the country. The robot can effectively and efficiently eliminate pathogens, allergens, and asthma triggers common to school environments, in the air as well as on surfaces.

MEET THE  
PRINCIPAL  
INVESTIGATORS

**MARK K. KINNAN**  
Sandia National Laboratories

**CATHRYN MAYES**  
Sandia National Laboratories



Payman Zarkesh-Ha, Professor,  
Department of Electrical and Computer Engineering,  
University of New Mexico and Roger Smith, Owner,  
Fault Tolerant Technology.



SANTA FE COUNTY

*NMSBA helped me connect with technical experts that I normally would not have access to in the private sector.*

*I took advantage of these high-level resources to make my product demonstrably viable.*

**ROGER SMITH**

Owner  
Fault Tolerant Technology, LLC

# FAULT TOLERANT TECHNOLOGY

Fault Tolerant Technology developed a computing architecture that provides computers with integrated, system-wide protection against malware and spyware programs. Malicious programs can cause failure in a hardware or software component, that in turn, often leads to systematic failure. The company's computing architecture automatically corrects hardware and software errors caused by malicious programs (including viruses), enabling computer systems to be fault-tolerant, and thus continue to operate despite component failures.

Although the company had developed a Multi-Domain Architecture prototype of a fault-tolerant technology, they wanted to extend the prototype's capabilities. To help with these refinements, Roger Smith reached out to NMSBA, which paired him with Professor Payman Zarkesh-Ha and his team at the University of New Mexico Department of Electrical and Computer Engineering.

Under contract through Sandia National Laboratories, Zarkesh-Ha and his team not only helped develop additional features based on Fault Tolerant Technology's request, they also consolidated application code and created soft core processors to further refine and enhance the prototype's performance.

As a result of this technical assistance, Smith was able to move forward in demonstrating that his innovative computing architecture worked on computing systems. This enabled Smith and his company to secure a Small Business Innovative Research grant from the U.S. Air Force worth \$50,000. This additional funding helped the company further refine the prototype and hire additional staff to help with the refinements.





Aidan Trujillo, Warehouse Coordinator, Arthur Lucero, Founder/CEO, Gavin Anaya, Warehouse Manager, and Angilece Ratliff, Brand Experience Coordinator, FITScrubs.



SANDOVAL COUNTY

*As an early-stage company, we all are basically jacks of all trades. Through NMSBA, we were able to access top-tier talent to help us better design a product attractive to the national marketplace, thus enabling our business to grow dramatically in just one year.*

**ARTHUR LUCERO**  
Owner  
FITScrubs, Inc.



FITSCRUBS

Healthcare professionals often have physically demanding jobs, so like athletes, they can end up sweaty. Their scrubs can also become uncomfortable, and contaminated with other people's bodily fluids.

In 2006, while working as a trauma technician/paramedic, Arthur Lucero grew so tired of his ill-fitting scrubs that he took them off and put on some name-brand sportswear. That's when he hit on the idea for what would become FITScrubs®—scrubs designed for comfort and athleticism, but more importantly made with antimicrobial fabrics designed to protect workers from potentially hazardous microorganisms encountered in healthcare settings.

Although Lucero had a design in mind, he lacked the skills to market his product effectively. To resolve this issue, he reached out to NMSBA, which paired him with Professor Steve Walsh and his students at the University of New Mexico's Management of Technology (MOT) Program. Walsh and his students, led by Heidi Harvey, conducted expeditionary marketing studies to determine market viability, the overall need for such products, and the ideal pricing to capture and retain a foothold in the market. The students also helped make the product more attractive to users while remaining competitive in terms of overall cost.

Thanks to the efforts of the MOT students, in one year FITScrubs increased sales by 150%, going from \$650,000 to about \$1.4 million. These sales, in part, enabled the company to hire four New Mexicans to help meet the growing demand for FITScrubs products.



**STEVE WALSH**  
University of New Mexico



Daniel Kane, CEO, Frauke Rininsland, Principal Scientist, and David Bomse, President, Mesa Photonics.



SANTA FE COUNTY

*Before receiving technical assistance through NMSBA, we were having difficulties funding this project. The results that Los Alamos provided enabled us to demonstrate the feasibility of our innovative product, helping us to secure the funding to move the project into the next phase of development.*

**FRAUKE RININSLAND**

Principal Research & Operations Scientist  
Mesa Photonics, LLC

**MESA PHOTONICS**

Mesa Photonics manufactures real-time ultrafast laser-pulse systems and provides custom assay development services. The assay development team led by Frauke Rininsland has developed a unique portable fluorescence-based system that can be used to detect infections with SARS (Severe Acute Respiratory Syndrome) coronavirus, which is highly contagious and sometimes causes the fatal respiratory illness coronavirus disease, COVID.

In contrast to other COVID tests, this test detects the activity of a SARS enzyme and promises higher accuracy and decreased testing time. With support from the DoD Defense Logistics Agency (DLA), Mesa Photonics proved feasibility in biochemical assays.

To demonstrate proof-of-concept in cells, CEO and Founder Daniel J. Kane reached out to NMSBA, which paired Mesa Photonics with Nileena Velappan at Los Alamos National Laboratory.

Velappan and her team evaluated the sensitivity and specificity of the new SARS test. The results indicated that the test detected as few as 6,000 infected cells, while the company's SARS-specific substrate was not recognized by the benign coronaviruses tested. This specificity is key to a successful test. In helping this company, Velappan says that she and her team learned more about viral culture protocols, protease assay evaluation, and antibody staining of host factors used to evaluate viral infection.

With this valuable data in hand, Mesa Photonics was able to secure a Phase II Small Business Innovative Research contract from the DLA worth \$1.6 million. The company is using this funding to further develop their new SARS testing capability.



MEET THE PRINCIPAL INVESTIGATOR

**NILEENA VELAPPAN**  
Los Alamos National Laboratory



RIO ARRIBA COUNTY

*The technical assistance we received from Sandia, through NMSBA, has enabled ORC Tech to achieve milestones at a much faster rate than anticipated with respect to product development.*

**ANDREA GARCIA**  
 Chief Operations Officer  
 Optical Radio Communications  
 Technology, LLC (ORC Tech)

ORC TECH

Even with 5G technology to bolster the ability of cellphones to receive signals, there are still locations throughout the world where connectivity remains an issue.

To solve this vexing issue, developers at ORC Tech obtained an exclusive license from NASA Johnson Space Center and are adapting technology originally designed for lunar missions to improve cell coverage for people on Earth. Their antenna booster consists of a conductive material woven into fabric, making it lightweight and easy to fold small for quick storage. When a user encounters a dead area, they just pop open the booster near their cellphone to provide one or two bars.

Although Chief Technology Officer Joshua Benavidez had a design for the antenna, he needed data to optimize the antenna's performance. To resolve this issue, he reached out to NMSBA, which paired him with Stephen Neidigk and John McVay at Sandia National Laboratories. The scientists not only conducted analytical modeling at a specific frequency band and gain, they also optimized the layout of the stitched-wire reflective antenna and fabricated a prototype at Sandia's "STITCHED" lab, which uses computer-controlled embroidery to fix media such as wires and optical fibers to fabric-like materials.

Thanks to Sandia's technical assistance, the company has achieved product development milestones faster than anticipated, secured \$100,000 in investment funds from Tsay Corp, \$25,000 from the New Mexico Economic Development Department, created multiple job opportunities, and is in discussions with MARPAC, an Albuquerque-based manufacturer, to explore antenna production.



**JOHN MCVAY**  
 Sandia National Laboratories

**STEPHEN NEIDIGK**  
 Sandia National Laboratories

Joshua Benavidez, Chief Technology Officer, ORC Tech.



# PROGRAM METRICS

## VALUE OF PROGRAM ASSISTANCE IN 2021

In 2021, the state of New Mexico, along with Los Alamos National Laboratory and Sandia National Laboratories, invested **\$4.36M** helping **228** small businesses in **22** counties to solve technical challenges. The following table contains the number of small businesses that received assistance from NMSBA, dollar value of the assistance for calendar year 2021, and cumulative value from 2000 to 2021.

	Los Alamos*	Sandia	Total
<b>Number of Small Businesses Served</b>			
<b>2021</b>	<b>99</b>	<b>130</b>	<b>228**</b>
Rural	56	41	97**
Urban	43	89	131**
<b>2000 - 2021*</b>	<b>1,132</b>	<b>2,445</b>	<b>3,204**</b>
Rural	775	1,440	1,985**
Urban	357	1,005	1,219**
<b>Value of Assistance Provided</b>			
<b>2021</b>	<b>\$1,961,852</b>	<b>\$2,399,982</b>	<b>\$4,361,834</b>
Rural	\$1,324,537	\$1,051,581	\$2,376,118
Urban	\$637,315	\$1,348,401	\$1,985,716
<b>2000 - 2021</b>	<b>\$30,049,002</b>	<b>\$46,006,851</b>	<b>\$76,055,853</b>
Rural	\$24,755,764	\$31,983,643	\$56,739,407
Urban	\$5,293,238	\$14,023,208	\$19,316,446

\*Los Alamos began participating in NMSBA in 2007. \*\*Some companies are served by both laboratories.  
Note – In 2019, Santa Fe County moved from being a rural county to an urban county.

## ACCOUNTABILITY & ECONOMIC IMPACT

NMSBA, enabled by the Laboratory Partnership with Small Business Tax Credit Act, is accountable to the state of New Mexico for its expenditures. NMSBA measures its economic impact through client surveys conducted by Research and Polling, Inc., and economic analysis provided by Robert Grassberger, PhD Economist.

### ECONOMIC IMPACT FOR BUSINESSES FROM NMSBA PROJECTS 2000 - 2020\*

Small Business Jobs Created and Retained	10,211
Average Reported Salary (2020)	\$53,545
Increase in Revenue	\$459,230,134
Decrease in Operating Costs	\$262,342,950
Investment in NM Goods / Services	\$172,177,858
New Funding / Financing Received	\$214,129,531
Return on Investment (ROI)**	For every \$1.00 of tax credit invested, the state receives a return of \$1.54.

\* Economic surveys are performed six months to one year after completion.  
\*\* ROI is based on salaries of jobs created and retained.

## BENEFITS TO NEW MEXICO SMALL BUSINESSES

New Mexico small businesses achieved positive results after receiving technical assistance from NMSBA. Feedback from companies that participated in the 2020 Economic Impact for Business client survey revealed that:



NMSBA identifies the areas of technical expertise that the national laboratories and their contractors utilized in NMSBA technical assistance projects, as well as the industry sector for the participating companies. The counties in which the small businesses are located are tracked to gain a better understanding of the reach of the program across the state.

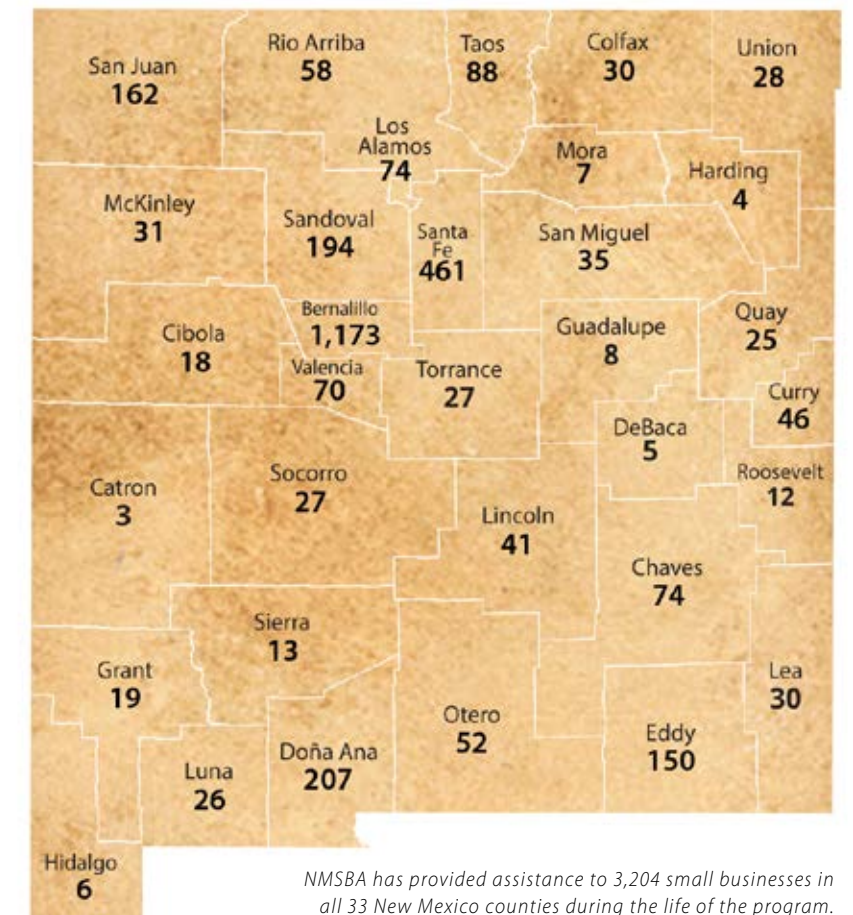
## CAPABILITIES UTILIZED IN 2021

Manufacturing.....	20.6%
Engineering.....	18.8%
Advanced Modeling and Simulation... ..	12.8%
Biological and Medical.....	12.8%
Earth and Environmental Sciences.....	8.6%
Business Development.....	6.0%
Math and Computer Science.....	5.1%
Materials Science.....	4.7%
Micro-Nano Technology.....	3.8%
Energy.....	3.4%
Chemistry.....	2.1%
Astronomy and Physics.....	1.3%

## INDUSTRIES OF SMALL BUSINESSES SERVED IN 2021

Professional, Scientific, and Technical Services.....	41.5%
Manufacturing.....	37.6%
Agriculture and Natural Resources.....	9.8%
Retail and Wholesale Trade.....	3.8%
Other Services (except Public Administration).....	2.1%
Oil & Gas, Utilities, and Mining.....	1.7%
Education Services and Health Care.....	1.3%
Real Estate, Finance, Insurance, and Management Services.....	1.3%
Media and Hospitality.....	0.9%

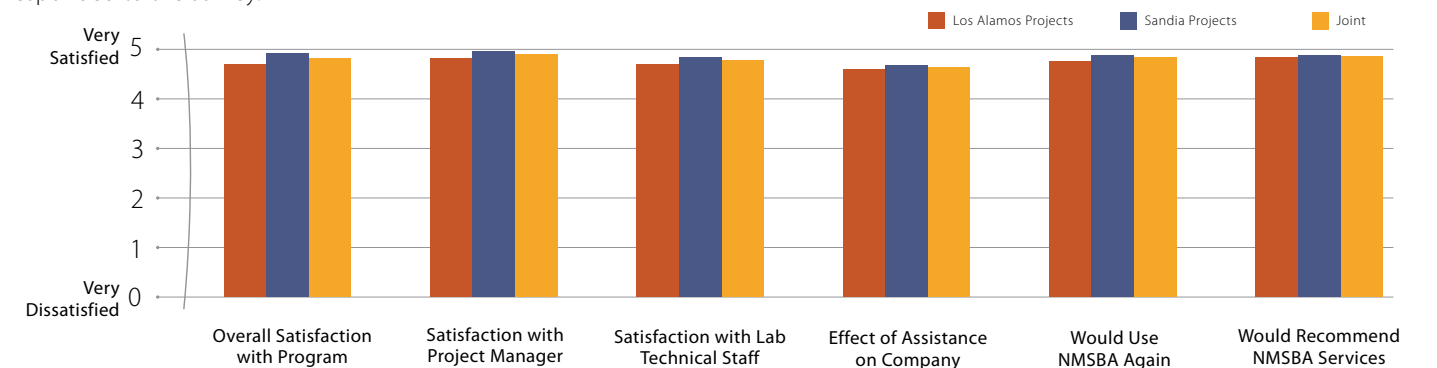
## BUSINESSES ASSISTED BY COUNTY 2000-2021



NMSBA has provided assistance to 3,204 small businesses in all 33 New Mexico counties during the life of the program.

## CUSTOMER SATISFACTION IN 2021

Each year, NMSBA surveys the participating businesses to learn about their satisfaction with the program. In 2021, 87% of the businesses responded to the survey.





John Mierzwa, CEO, Ingenuity Software Labs; Jenilee Jao, Front End Designer, John Valdez, IoT Designer, Andru Zeller, CTO, and Asher May, Machine Learning Designer, Just Health Care.



BERNALILLO COUNTY

*Through the use of advanced 3D mapping, PainScan makes visible what was once invisible, digitally capturing the patient's pain intensity in each area that the clinician touches. Thanks to the work carried out by Sandia, we are closer to having a technology to assist clinicians in quantifying and locating a patient's likely pain source.*

**ANDRU ZELLER**  
 Founder  
 Just Health Care, LLC



# PAINSCAN LEVERAGED PROJECT

Pain is the nervous system's way of signaling that something could be wrong. Until recently, assessing the type of pain, location, and intensity relied on a physician's experience and ability to touch a patient's body.

To quantify and map chronic pain patterns, Just Health Care, LLC developed a new pain-assessment technology called PainScan, with the professional support of Ingenuity Software Labs and Lynn Technical Services, LLC. PainScan is a clinical research and diagnostics tool that consists of a special glove that a physician wears to measure force of palpation, a pressure-sensitive trigger the patient uses to express pain intensity as the physician moves their hand about the sensitive area, and a computer vision camera system that uses machine learning to place the location of palpation onto a personalized 3D digital twin.

Although developers had a glove and trigger design in mind, they lacked the resources to assess the effectiveness of available technologies such as capacitive tactile sensors and optical sensors that measure blood flow. To address this problem, the companies reached out to NMSBA, which paired them with Jason Wheeler and his team at Sandia National Laboratories. The team designed a testbed to evaluate various technologies ideal for a clinical environment, as well as to help enhance the performance of the glove and patient trigger.

Sandia's test results, chronicled in a detailed report, enabled the companies to improve PainScan's performance. This work helped secure a \$256,000 Small Business Innovation Research award from the National Science Foundation and enabled the companies to hire seven new employees.



**JASON WHEELER**  
 Sandia National Laboratories



C. Aaron Velasquez, President, Theta Plate.

BERNALILLO COUNTY

*I consider NMSBA a secret weapon for small businesses throughout New Mexico. The services we received have enabled us to run with the big dogs without breaking the bank.*

*That's why I have and will continue to encourage small businesses to take advantage of this program.*

**C. AARON VELASQUEZ**

President  
Theta Plate, Inc.



THETA PLATE

Theta Plate, a longtime family-owned business operating out of Albuquerque for 46 years, specializes in precious metal electroplating. The company serves jewelry, manufacturing, aerospace, and high-tech markets, with the third generation of the family now working at the business.

C. Aaron Velasquez wanted to further expand Theta Plate's business into the aerospace, niche electronics, and technical markets. In order to modify current business systems to achieve the desired expansion while retaining legacy customers, Velasquez reached out to NMSBA, which paired him with Jeff Abrams at the New Mexico Manufacturing Extension Partnership.

Abrams and his team mapped processes, identified new requirements, and developed responsive business processes to meet these new needs while enabling the business to continue meeting its current workload. The new systems have enabled the small business to meet the new demands of aerospace, electronics, and technical customers with a high level of quality and efficiency while maintaining the high-level services expected and appreciated by long-term customers.

The NMSBA assistance also helped Theta Plate identify ISO 9001 registration as a requirement for further extending their scope into the high-tech, research, and aerospace markets. Theta Plate was then able to utilize New Mexico Economic Development Department JTIP Step Up funding to prepare for and subsequently achieve registration. Thanks to all the business improvements implemented by Theta Plate, in the past year revenue increased by more than \$200,000, enabling the company to hire two new employees.



**JEFF ABRAMS**  
New Mexico Manufacturing Extension Partnership

BERNALILLO COUNTY

# TRAIL 9 OUTDOORS

Water is life, whether you are a soldier on patrol or a civilian enjoying outdoor activities. Hydration backpacks offer wearers streamlined comfort with a slim design, but they, like old-fashioned canteens, have the same problem: after use, tiny crevices in the material can retain droplets of water, an ideal growth medium for bacteria.

To address this issue, Albuquerque's Trail 9 Outdoors designed the HyDry Pod. Short for Hydration System Drying Pod, the HyDry Pod accelerates the drying of hydration backpacks by circulating ambient air through the bladder, drink tube, and mouthpiece. By minimizing moisture, the growth of mold and bacteria is greatly reduced.

Although Steven Alderete had a design concept in mind for the HyDry Pod's drying system, he needed an airflow analysis to determine the dryer's optimal pressure, size, position of the air vent, and identify the most efficient blower/fan system. To get this specialized assessment done, Alderete reached out the NMSBA, which paired him with Kristin Morehead of the Arrowhead Center at New Mexico State University. Working with Alderete, Morehead coordinated with various engineering departments to conduct a detailed analysis of Alderete's dryer design.

The results the university provided enabled Alderete to modify his design to increase its drying efficiency and meet an assessment milestone for interested investors. Since the successful analysis and redesign, the company has received \$75,000 in investment funds from four investors, including \$25,000 from the Arrowhead Innovation Fund. The company currently has 20 prototypes built and plans to display them at upcoming outdoor industry tradeshows.

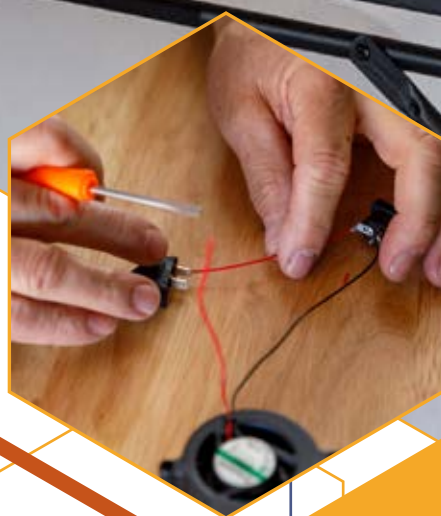
*Through NMSBA, I tapped into the resources at the Arrowhead Center, which provided me with world-class assistance to turn my idea into a reality. What small business doesn't want that?*

**STEVEN ALDERETE**  
Owner  
Trail 9 Outdoors, LLC



MEET THE PRINCIPAL INVESTIGATOR

**KRISTIN MOREHEAD**  
New Mexico State University



Steven Alderete, Owner, Trail 9 Outdoors.

# LEVERAGED PROJECTS

	PROJECT	DESCRIPTION	BUSINESS PARTICIPANTS	COUNTIES	FUNDING
Los Alamos	<b>3D Acoustic</b>	Laboratory personnel utilized unique expertise in fluid flow and acoustic numerical simulations to assist in predicting the performance of acoustic flow cells.	Andrew Shreve Consulting, LLC BennuBio, Inc. DarklingX, LLC	Bernalillo Los Alamos Santa Fe	\$66,600
Sandia	<b>Advanced Escapsulation</b>	To test and deploy the RNA, it needed to be formulated into a nanoparticle and coated with an appropriate lipid to stabilize, solubilize, and deliver it. The Labs tested a method of reproducibly encapsulating the RNA using microfluidic chips designed for this purpose. The Labs also tested an encapsulated formulation that can be stored at room temperature.	Biuveris, Inc. NTx, Inc. (Nature's Toolbox) NTxBio, Inc. VM Technology, Inc.	Sandoval Santa Fe	\$79,300
Los Alamos	<b>Air Mover Manipulation of Wildfires</b>	The businesses accessed the unique expertise of the Lab in wildfire modeling and simulation software to assist in assessing the effects of high velocity, high volume air movers on wildfire manipulation.	Edgewater Technical Associates Open Innovation, LLC	Los Alamos Santa Fe	\$40,100
Sandia	<b>Automated Disinfection</b>	A testing matrix was generated to select a range of equipment and protocols to develop multiple disinfection testing processes for evaluation. The disinfection testing processes were tested on a variety of materials. Multiple surfaces were exposed to biological agents followed by disinfection.	Build With Robots, Inc. FatPipe Rio Rancho, LLC Painting Bots, Inc. The Center for Bioscience, LLC	Bernalillo Sandoval	\$118,900
Sandia	<b>Bio-Aerosol Pathogen Mitigation</b>	The Labs provided technical assistance with computational modeling and experimental measurements of airborne pathogen paths and concentration zones in a building and an office environment. The experiments showed that the strategic placement of HEPA purifiers and UV-C light-emitting diodes in regions with the highest circulation flow rates provided an effective means of removing airborne particles.	Bright Holdings, LLC Gregory T. Hicks & Associates, P.C. Rymarc Construction, Inc. Saavedra's Electrical Contractor & Services, LLC	Bernalillo	\$79,000
Sandia	<b>Carbon Offset</b>	The Labs provided technical consulting to the companies on identifying pertinent regulatory requirements regarding Carbon Offsets, Carbon Offset protocols, and review and feedback of their use of block chain technology with respect to Carbon Offset protocols.	Cedar Creek Technologies, LLC Enchantment Organics, LLC Horsemen's Feed and Supply Platinum Star IP Partners, LLC	Bernalillo Sandoval	\$59,100

Los Alamos National Laboratory and Sandia National Laboratories provide technical assistance for both individual and leveraged NMSBA projects. The following is a listing of this year's leveraged projects.

	PROJECT	DESCRIPTION	BUSINESS PARTICIPANTS	COUNTIES	FUNDING
Los Alamos	<b>Chemically Defined Stem Cell Culture</b>	The Lab consulted with the business on cell culture media, advised on the development of standard operating procedures, and determined experimental design endpoint measurements for formula evaluation.	Daedalus Technology Group, LLC Enchanted Land Properties, LLC NM Stem Cell, LLC Reytek Equipment, LLC Science Business Software, Inc.	Bernalillo Sandoval Santa Fe	\$118,700
Sandia	<b>Dimpled Solar Collectors</b>	The Labs provided technical consulting using a computational model of a passive aluminum solar heat collector with dimpled fins, a dimpled vertical wall, and coated with high-efficiency solar paint. To validate the model, a collector was built and exposed to the sun for four days. The peak water temperature reached 116°F during the day and retained a temperature that was 20°F above ambient at night. The solar collector contains no moving parts, which increases its cost-competitiveness and enhances its potential use in off-the-grid and rural applications. Potential uses include residential heat or water heating.	3D's Plumbing, Heating and Cooling Metal Rain Tanks, LLC San Miguel Sun Dwellings	San Miguel	\$118,300
Sandia	<b>Emergency Response Platform Testing</b>	The Labs provided technical consulting on modeling and testing of radiation effects on an electronic circuit provided by the companies. Researchers exposed the electronic circuit to gamma radiation and pulsed gamma radiation in the Labs' Gamma Irradiation and High Energy Imaging facilities. An analysis of changes in circuit performance due to gamma exposure was completed and results were provided.	Aquila, Inc. Gold Standard Radiation Detection, Inc. Korwest	Bernalillo	\$49,500
Los Alamos	<b>LithTec Ag Liners</b>	The Lab evaluated the businesses' novel earth liner system for use in renewable bio-energy applications. The testing and evaluation included measurements of compressive strength, saturated hydraulic conductivity, and non-toxicity to biofuel producing algae to determine if the product satisfied the required mechanical, hydrological, and biochemical property attributes required of a pond liner system.	Blanca Peak Indigenous Investments, LLC GM Emulsion GME General Building, LLC Havens Transport, LLC Lithified Technologies US, LLC Lithified Technology Group, LLC	San Juan Santa Fe	\$117,800



# LEVERAGED PROJECTS CONTINUED

PROJECT	DESCRIPTION	BUSINESS PARTICIPANTS	COUNTIES	FUNDING	
Sandia	<b>Metamaterial Optic for Improved Laser Amplifier</b>	The Labs designed, fabricated, and delivered samples of nano-structured and non-structured optics to be tested for survivability in high-average-power, high-peak-power laser amplifiers. Structured samples were optimized for low reflectivity and for laser beam modifying characteristics. These characteristics were measured and provided with the samples. Results from the survivability tests will be used to identify the appropriate material for fabrication of the nano-structured optics.	InSync, Inc. Voss Scientific, LLC	Bernalillo	\$39,500
Sandia	<b>Micro Generator Scaling</b>	The Labs provided technical assistance with modeling studies to answer design questions pertaining to product scaling of a novel microgenerator. The model addressed scaling issues that may be encountered during the product design phase and steered efforts along paths that are feasible, manufacturable, and cost effective. Consulting also addressed various micromachining techniques and novel materials. The model was revised in order to better match measured device performance.	Civil Defense Technologies, LLC Fit to Win Cycling Merrion Oil & Gas Qynergy Corporation	Bernalillo San Juan	\$99,000
Sandia	<b>PainScan Development</b>	The Labs evaluated commercially available tactile sensors and provided guidance on integrating these components and associated electronics into the companies' wearable systems, including a glove. The Labs provided guidance and performed preliminary testing on novel methods for measuring fingertip pressures. The Labs also consulted on the instrumented grip device for pain assessment and the motion tracking system.	Ingenuity Software Labs Just Health Care, LLC Lynn Technical Services, LLC	Bernalillo	\$59,200
Los Alamos	<b>Plant-Based Sanitizer Spray</b>	Lab bioscience personnel utilized unique expertise in biosecurity and public health with specialized equipment to assess the safety and effectiveness of the businesses' plant-based sanitizer product(s).	Milkweed & Monarch, LLC dba tea.o.graphy Self-Powered Organics, LLC	Taos	\$47,400

PROJECT	DESCRIPTION	BUSINESS PARTICIPANTS	COUNTIES	FUNDING	
Los Alamos	<b>Seismic Analysis</b>	To assist in increasing the sustainability of the businesses' geothermal power generation, the Lab analyzed the businesses' active and passive seismic data using the Lab's novel seismic imaging techniques to improve subsurface reservoir characterization and imaging of geothermal fluid flow. This work was done to help reduce development and drilling risk at the geothermal area and enhance geothermal energy production.	Geo-Science Solutions, LLC Jhus Canyon Construction, LLC Lightning Dock Geothermal, LLC	Hidalgo Sandoval	\$119,000
Los Alamos	<b>UltraSonic Filtration</b>	The Lab assisted the business in evaluating novel filtration technologies for use in brewery systems. Separation tests were performed with an ultrasonic separator and a tabletop centrifuge on a variety of mostly unclarified beers provided by local craft brewers. Initial tests were designed to operate both technologies over a similar energy range, but then were modified to demonstrate similar performance more gently than industrial disk stack centrifuges. Refrigerated tests were performed on 12 beers.	Beer Creek Brewing Company Ex Novo Brewing La Cumbre Brewing Company Santa Fe Brewing Company, Inc. Taos Mesa Brewery	Bernalillo Sandoval Santa Fe Taos	\$79,700
Los Alamos	<b>Viral RNA Genomes</b>	Lab personnel utilized unique expertise in rational computational design strategies and accelerated neuromorphic computing to assist in the identifying of binding patterns of siRNA in tertiary structures.	Mountain Vector Energy Pajarito Cloud Computing, LLC Richard Sayre Consulting Spartina Biotechnologies, Inc.	Los Alamos Sandoval Santa Fe	\$55,500
Los Alamos	<b>VR Data</b>	The Lab evaluated the company's VR data product. Feedback was provided on the development of scientific domain-specific modules, engineering, physics, and outreach application. The Lab and the business established efforts to conduct external reviews with the broader scientific community through demonstrations and reviews to inform product development.	Ninja Biotech, LLC Sandia Biotech SciVista Woodruff Scientific, Inc.	Bernalillo Santa Fe	\$51,300
Los Alamos	<b>Wind Hold Lift Study</b>	The Lab provided technical assistance in collecting wind and weather data near the businesses, and modeled meteorological events using physics-based 3D computer software.	Angel Fire Real Estate, LLC Angel Fire Resort Operations Angel Fire Timeshares, LLC	Colfax	\$108,200

# INDIVIDUAL PROJECTS

## BERNALILLO

Advanced Optical Technologies, Inc.  
Affordable Solar Installation, Inc.  
AlbuGierke Environmental Solutions, LLC  
Albuquerque Computer & Electronics Recycling Co.  
AWS Bio-Pharma Technologies  
B&H Company  
BayoTech, Inc.  
BennuBio, Inc.  
BioFlyte, Inc.  
CANiv Tech, Inc.  
Continental Machining Company  
CoolJet Aerospace, LLC  
Energy Analyst, LLC  
Enthentica, Inc.  
Finches, LLC  
Galisteo Consulting Group, Inc.  
Garcia Enterprises, Inc. dba The Original Garcia's Kitchen  
Gilz, LLC  
Gratings, Inc.  
Guardian Sensors, Inc.  
Heidi's Raspberry Farm  
I AM Machining  
IC-Safety, LLC  
Integrated Deposition Solutions  
Jaguar Precision Machine Corporation  
Janine Mahon, LLC  
Jerry Daniele dba Marine Aeronautics  
Kennedy Trimnell Company  
LAD Engineering, LLC  
Ludus Brands dba FanSeat

Memzyme, LLC  
Micro-Heat Engineering  
Moore Industries, LLC  
Neo Terra, LLC  
OptiPulse, Inc.  
Osazda Energy, LLC  
ParadOxy, LLC  
Paverde, LLC  
Precision Solar Technologies Corporation  
Radiant Technologies, Inc.  
Radiation Detection Solutions, LLC  
RadPhysics Services, LLC  
Robocasting Enterprises, LLC  
Safe Station  
SC3 International  
Scintellite, LLC  
Segura Enterprises, LLC  
Sentient Data Systems, LLC  
Sigma Advanced Technologies, LLC  
Southwest Composite Works / Southwest Pattern Works, Inc.  
STEM Boomerang, LLC  
Submaterial, LLC  
T-Borg, Inc.  
Team O Productions, Inc.  
TEAM Technologies, Inc.  
Theta Plate, Inc.  
Thompson Machine the Tool & Die Group, Inc.  
Toltec Industries, Inc.  
Tonalli Group, LLC  
Trail 9 Outdoors, LLC (TRL-9)  
UpCycle Power  
Vamco, LLC  
VanDevender Enterprises, LLC  
Velocity Ventures, LLC  
Voss Scientific, Inc.  
World Exhibition Center, LLC

## CIBOLA

Chavez Plumbing and Supply, LLP

## CURRY

Petricor, LLC

## DOÑA ANA

Doctor Neon, LLC  
Full Circle Mushrooms  
Mi Abuelo Organic Chile, LLC  
Roseborough Engineering, LLC  
Sonia Gonzales dba Innovar  
Sustainable Engineering, LLC  
Worthington Farm, LLC  
Zia Cantina, LLC dba Zia Cafe

## LOS ALAMOS

Biodidact, The Community Lab  
HyPwr, LLC  
PAC Technologies  
Tibbar Plasma Technologies, Inc.

## LUNA

Gila Mining, LLC  
Luna Precision Welding, LLC  
NewDataStrings, LLC

## MCKINLEY

Navajo Spirit Southwestern Wear  
Rhino Health, Inc.  
Tosidoh, LLC

## MORA

CattleXpressions

## OTERO

NowClean, LLC

## QUAY

BugZing Devices / Zing Devices, Inc.  
Tucumcari Bio-Energy Company

## RIO ARRIBA

Black Mesa Winery  
Freshies of New Mexico, LLC  
ORC Tech, LLC  
Vela Vineyards  
Velarde Vines

## SAN JUAN

ABC Canvas, Inc.  
Alpha Bioscience Company, LP  
Analytical Technologies, Inc.  
Bio-Stic, LLC  
Black Bear Unlimited, LLC  
Breathable Moments Travel, LLC  
Buell's Fish Hook, LLC  
Hauling Accessories, LLC  
Industrial Cooling Exchanger  
Jack's Plastic Welding, Inc.  
R & T Holdings, LLC  
Real Green Building Systems  
Teresa Lackey dba Valley Mills  
Trotting On Innovations

## SAN MIGUEL

Global Conservation Assistance  
Montibon Provenance International, Inc.  
MxRam, LLC  
Seed + Stone, LLC

## SANDOVAL

CA2 Testing  
Creative LIBS Solutions, LLC  
DHF Technical Products, LLC  
EarthTek, LLC  
FITScrubs, Inc.  
Hanselmann Pottery  
Insight Lighting  
Mezel Mods  
Molten Salt Solutions, Inc.  
Pfeifer Studio  
Santa Fe Quantum Solutions  
Take a Paws  
Wildlife Protection Management, Inc.

## SANTA FE

Apogee Spirulina  
Aromaland  
Bath Thyme Bakery  
Better Music Boxes  
Bright Path Laboratories, Inc.  
Earth Traveler Teardrop Trailers, LLC  
Eldorado Biofuels, LLC  
Excedere, LLC  
Fault Tolerant Technology  
Gonzo Farms, LLC  
Hollowpoint, LLC dba Wicked Edge Sharpeners  
iBeam Materials, Inc.  
Jet Suit Racing, Inc.  
Leaf & Hive, LLC

Legacy Sustainable Development dba Transcendence, LLC  
Mesa Photonics, LLC  
NeuroGeneces, LLC  
Ocean-based Climate Solutions, Inc.  
Parting Stone, Inc.  
Rachel Wood Consulting  
Retriever Technology, LP  
Sceery Outdoors, LLC  
Social TecKnowledge, LLC dba Fidelity EHR  
Solstar Space Company  
Sun Group Design, LLC  
The RainCatcher, Inc.  
Wound Solutions, LLC

## SIERRA

St. Cloud Mining Company, Inc.

## SOCORRO

Mountain Spring Education, LLC  
Space Sciences Corporation

## TAOS

Aspena, LLC  
Diamond Sow Garden  
InBizWorks

## TORRANCE

Falcon Industries dba ERGO Grips

## VALENCIA

Mecca Enterprises dba Burritos Alinstante

# BEN LUJÁN AWARD



## DISINFECTING ROBOT LEVERAGED PROJECT

This year the Disinfecting Robot Leveraged Project received the *Honorable Speaker Ben Luján Award for Small Business Excellence* for demonstrating the most economic impact, including securing \$5 million in funding and hiring 30 people. Build With Robots was the lead company on the project.

Formed in 2017 as a way to bring automation to industries that were not yet utilizing it, Build With Robots began working with a large paint company to create painting robots. When the pandemic hit, the company shifted to development of Breezy One, a fully automated disinfecting robot that could help with safely reopening facilities. Today Breezy One is in use across the country at airports, schools, and arenas. Breezy Blue, a smaller IoT disinfecting device, is now being launched for situations where the larger robot cannot easily fit.

Build With Robots credits the local community, including its employees, investors, universities, national laboratories, and incredible local economic development programs like NMSBA, with its success. They still look to the community for introductions to prospective customers and partners.

Read about the Disinfecting Robot Leveraged Project on page 10.

# ACKNOWLEDGEMENTS

- Thank you to all the small businesses for participating in NMSBA and creating jobs and economic wealth for New Mexicans.
- Thank you to all the Los Alamos and Sandia national laboratories' principal investigators who applied their expertise and knowledge to help New Mexico small businesses solve their technical challenges.
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- Thank you to the Advisory Council for their leadership, advice, and guidance in support of NMSBA.

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Photos in the NMSBA Perspectives 2021 Annual Report follow health and safety guidelines in effect at the time they were taken.



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