

Richard P. Feynman Center for Innovation

2025 Annual Report



Next Big Idea
EcoFite

4



Entrepreneur Spirit
Plasma Liner Experiment

6



Outstanding Partnership
Japan Nuclear Fuels Limited

8

Tech Transfer Excellence
Pacific Fusion

10

Notable New Mexico Startup
VastVision

12

Tech Transfer Excellence
Gemini Energy

14

FROM DISCOVERY TO MARKET

Richard P. Feynman Center for Innovation

The Richard P. Feynman Center for Innovation helps businesses and organizations work with Los Alamos National Laboratory to turn research into practical products and solutions. We connect industry partners with new technologies, research expertise, and licensing opportunities. From protecting inventions to building collaborations, the Feynman Center makes it easier to bring scientific advances to the marketplace and create lasting impact.

BY THE NUMBERS

Impact that Drives Future Innovation



LICENSES

530

ACTIVE AGREEMENTS

\$1.34M

FUNDING FROM 224 INCOME-BEARING AGREEMENTS



PATENTS

55

APPLICATIONS

34

ISSUED



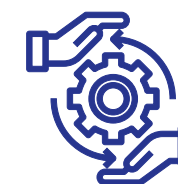
CRADAs (Cooperative Research and Development Agreements)

80

ACTIVE AGREEMENTS

\$11.18M

FUNDING



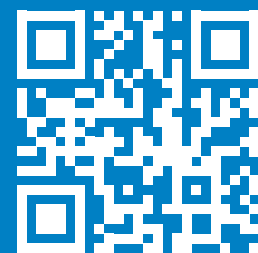
NFEs (Non-Federal Entities)

57

ACTIVE AGREEMENTS

\$13.36M

FUNDING



Scan the QR code or visit m.lanl.gov/fci

Click on Search Technologies & Capabilities

Next Big Idea EcoFite

A Microbial Platform for Resilient Crop Performance

Farmers today face increasing pressure from declining soil quality, water scarcity, and rising costs for fertilizer and other inputs. These challenges are especially significant in arid regions where growers must maintain production under variable growing conditions. EcoFite, developed at Los Alamos National Laboratory, is a microbial plant treatment designed to help crops grow more efficiently and perform reliably under challenging field conditions.

Selected for the 2025 Next Big Idea honor by Los Alamos, EcoFite is a carefully selected blend of naturally occurring beneficial microbes. When applied to seeds or leaves, these microbes colonize the inside of the plant and form a cooperative relationship with it. They help the plant draw nutrients from the soil more efficiently, stimulate stronger root systems, and activate built-in defense responses. In practical terms, this



Richard P. Feynman Center for Innovation



From left to right: The EcoFite team includes Sangeeta Negi, Matt Green, Taraka Dale, Eric Moore, and Lance Miller. Page 4: Negi and Green conduct greenhouse trials demonstrating plant growth under controlled conditions for evaluation of agricultural technologies.

boost means plants can access more of what they need to grow and are better equipped to handle drought, salinity, and other production stresses.

“EcoFite was designed to work with plants and soil as an integrated system,” said Sangeeta Negi with the EcoFite team. “By combining multiple beneficial microbes into a single, rationally designed formulation, we’re seeing encouraging gains in plant performance and resilience across very different crops and growing conditions.”

Unlike many agricultural inputs that target a single issue, EcoFite works through multiple biological pathways at once. It can be applied as a seed coating or foliar spray and is compatible with organic production systems. The formulation is adaptable across soil types, hydroponic systems, and crop species, making it suitable for greenhouse and open-field agriculture alike.

Greenhouse and field trials on lettuce, tomatoes, and sorghum in Northern New Mexico and West Texas have demonstrated improvements in root growth, yield, and tolerance to environmental stress. For growers around the world facing water limitations and soil quality challenges, technologies that improve nutrient efficiency and crop performance can help stabilize production and reduce input costs.

EcoFite is supported by disclosed intellectual property developed at Los Alamos, including patent applications covering the microbial formulation and design approach. The Laboratory is seeking commercial partners to scale production, expand field validation, and bring the technology to market through seed companies, agricultural input providers, and specialty crop producers.

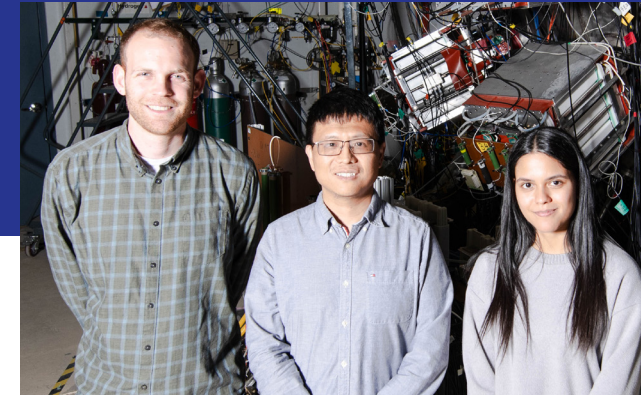
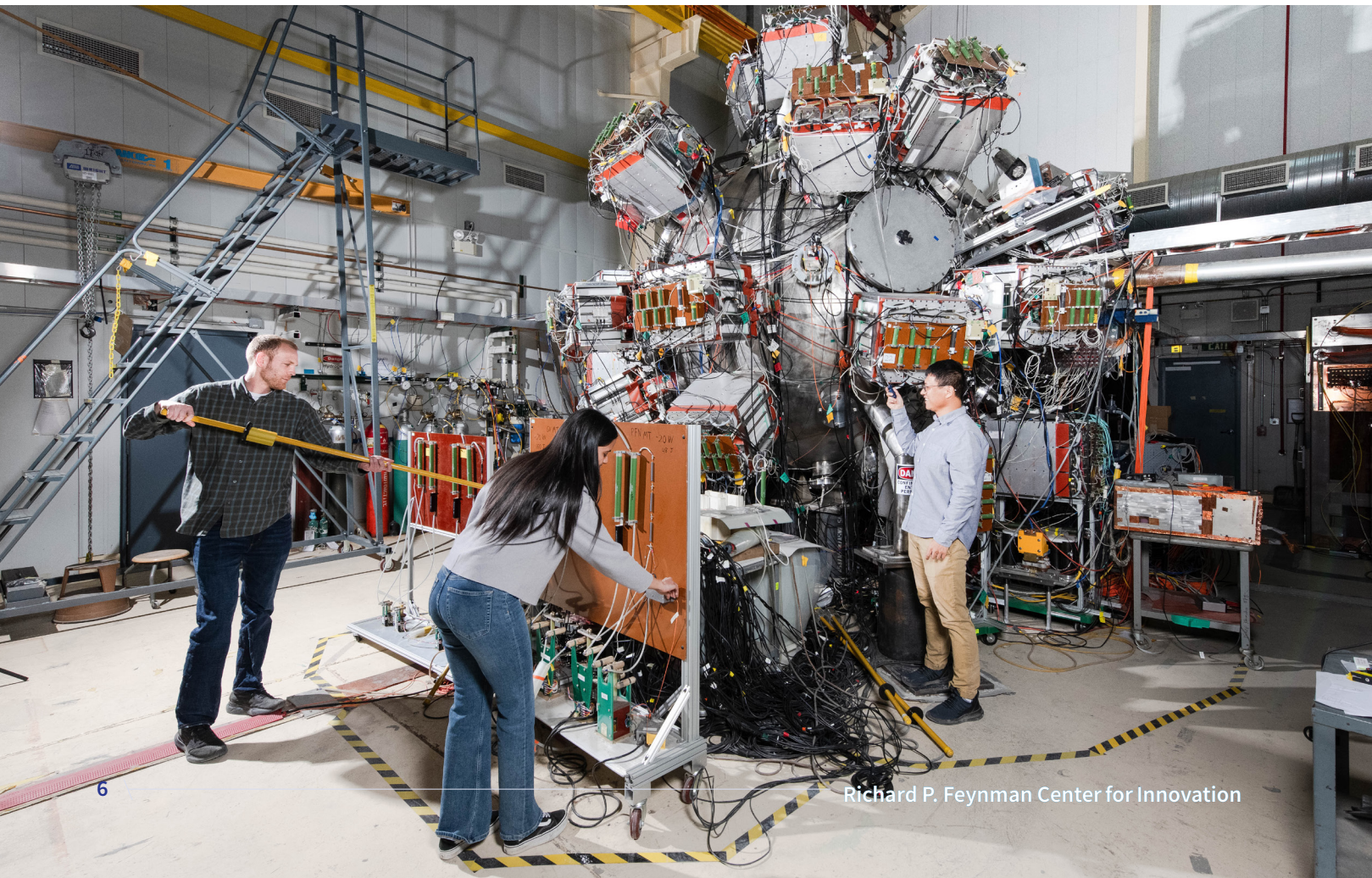
If successfully commercialized, EcoFite could strengthen the agricultural sector globally by supporting higher-value crop production and encouraging partnerships in agricultural biotechnology. At a national level, the platform contributes to ongoing efforts to improve crop productivity, enhance supply chain stability, and support long-term agricultural productivity.

Entrepreneur Spirit Plasma Liner Experiment (PLX)

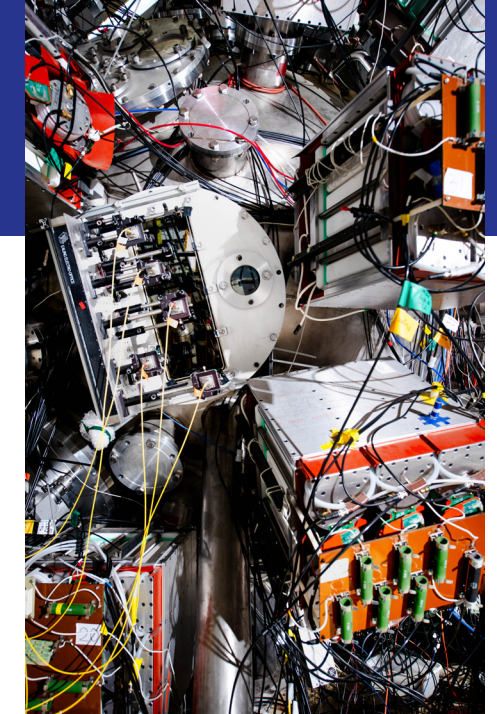
New Plasma Platform Positions New Mexico for Leadership in Advanced Energy, Testing

The Plasma Liner Experiment, known as PLX, is a technology developed at Los Alamos National Laboratory to recreate extreme conditions similar to those found in the sun. These conditions are necessary for nuclear fusion, the process that powers stars and has long been pursued as a potential source of large-scale energy.

Fusion works by forcing atoms together at extremely high temperatures and pressures, releasing large amounts of energy. Unlike today's nuclear power plants, fusion does not rely on splitting atoms and has fundamentally different safety characteristics. Scientists have searched for practical ways to make fusion energy achievable and economically viable for decades. PLX is one method within fusion research aimed at achieving the extreme conditions required for fusion, earning it the 2025 honor for Entrepreneur Spirit.



Above and page 6: Los Alamos researchers Andrew Walsten, Feng Chu, and Rachel Reuben work on the PLX system, a platform designed to generate high-energy plasma conditions for fusion research and advanced testing applications.



Close-up of the PLX system, where synchronized plasma jets are used to create extreme conditions for fusion research and materials testing.

PLX is based on Plasma-Jet-Driven Magneto-Inertial Fusion (PJMIF) technology developed in 2010. This hybrid concept between magnetic confinement fusion (MCF) and inertial confinement fusion (ICF) uses high-speed plasma jets to create a spherical plasma liner that compresses a magnetized plasma target to achieve fusion conditions. Rather than relying on massive lasers or large superconducting magnets, it fires dozens of high-speed plasma jets inward simultaneously, forming a sphere of plasma that compresses a small target at the center. This design has the potential to be more compact, flexible, and scalable than traditional fusion systems.

As the team began exploring entrepreneurial programs, its goal was to determine whether PLX could address needs to obtain the mooshot of fusion energy. Through participation in the UC-LANL Entrepreneur Postdoc Accelerator program, the team conducted customer discovery interviews with a range of stakeholders. They identified strong interest in using the PLX platform to enable cost-effective fusion energy and experimental validation for fusion technologies.

“The program helped us step outside the lab and ask where this technology could solve important challenges today,” said Dr. Feng Chu, principal investigator of the PLX project. “Identifying near-term applications gives PLX a clear path forward while we continue advancing fusion energy.”

The project made strong progress toward the Department of Energy ARPA-E technology-to-market goals, advancing four intellectual property disclosures, including two patent applications and two software systems that control and operate the platform. Customer discovery efforts also opened the door to active partnership discussions to relocate and deploy the system for commercial applications. Those engagements have since progressed to license negotiations and potential Strategic Partnership Project opportunities, along with technical assistance to help transition the technology in New Mexico.

If successfully transitioned, PLX could position New Mexico as a hub for next-generation fusion energy, supporting high-skill technical jobs and attracting industry partnerships to the region. More broadly, the technology supports Los Alamos's role in advancing scientific innovation while contributing to the long-term pursuit of fusion energy systems.

Outstanding Partnership Japan Nuclear Fuels Limited

Neutron Detection System Deploys through Strategic Sponsored Project

Through a Strategic Sponsored Project with Japan Nuclear Fuels Limited, Los Alamos National Laboratory successfully delivered and installed a sophisticated neutron detection system at Japan's Mixed Oxide (J-MOX) fuel fabrication facility in Rokkasho, earning the 2025 Outstanding Partnership honor from the Laboratory.

In an achievement for international nuclear safeguards, the Improved Plutonium Canister Assay System (IPCAS) is designed to accurately measure plutonium mass as part of the facility's nuclear material accounting and control system. The accounting of nuclear material allows the facility and international community to detect the theft or diversion of material for non-peaceful use.

Developed and built at Los Alamos, IPCAS uses neutron detection to verify the mass of plutonium in sealed canisters when the material is introduced into the facility. By identifying anomalies in declared nuclear materials, the technology can detect a diversion of nuclear material that could be used for non-peaceful use,



Above: IPCAS is lowered by crane through an opening in the J-MOX facility ceiling.
Page 8: IPCAS is prepared for shipment at the Laboratory.

a vital capability for inspectors tasked with monitoring civilian nuclear programs under international treaties.

"This project demonstrates the strength of our long-standing relationship with our Japanese partners and the Laboratory's ability to deliver complex technologies under challenging conditions," said Bill Geist, technical leader for the Lab's Safeguards Cooperation Program with Japan. "It's a testament to the scientific and logistical coordination across many teams."

In June 2025, the Lab's technical team provide consultation on the installation of the IPCAS. Post-installation testing confirmed that the system's neutron detectors were operating correctly, with background readings falling within expected ranges, and that the moisture barrier was sealed as indicated by the low humidity reading inside the instrument.

Once operational, the J-MOX facility will produce nuclear fuel using plutonium extracted from spent reactor fuel and blend it with uranium to form mixed-oxide fuel assemblies for use in Japan's commercial nuclear power reactors. Given the potential misuse scenarios of plutonium, the facility is subject to comprehensive safeguards inspections by the International Atomic Energy Agency in cooperation with Japanese regulatory authorities, in accordance with Japan's obligations under the Nuclear Nonproliferation Treaty.



Bill Geist, technical leader,
Los Alamos's Safeguards
Cooperation Program

Technology Transfer Excellence

Pacific Fusion



Above: Keith LeChien, Pacific Fusion Founder and CTO
Page 10: AI Rendering of Pacific Fusion's Albuquerque location

OpenSesame Licensing Accelerates Fusion Development, New Mexico Expansion

Pacific Fusion is developing a pulser-driven inertial confinement fusion system with the goal of delivering low-cost, commercial fusion energy. The company's approach represents a significant innovation in fusion energy, combining advances in pulsed power, high-energy-density physics, and systems engineering. With more than \$900 million raised to date, Pacific Fusion plans to achieve net facility gain by 2030 at its newly announced facility in Albuquerque, New Mexico, marking a major step toward practical fusion energy while advancing science relevant to national security.

A critical component of this effort is the ability to accurately model material behavior under the extreme pressures and temperatures encountered in fusion systems. To address this need, Pacific Fusion licensed OpenSesame, a Los Alamos National Laboratory software tool that enables the rapid development and refinement of high-fidelity material property tables derived from the SESAME database.

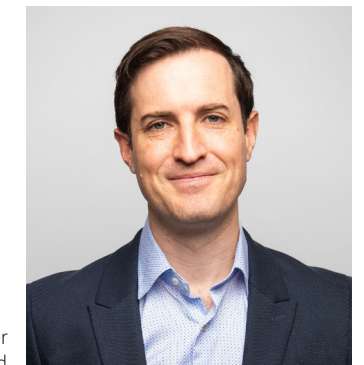
Led by J. Tinka Gammel and Carl Greeff in the Lab's Theoretical Division, OpenSesame supports precise simulation of equation-of-state, opacity, and transport properties across a wide range of regimes, making it a key enabler of advanced fusion system design. This rapid, high-impact technology transfer enabled Pacific Fusion to enhance its modeling and design capability, earning the partnership an honor for Technology Transfer Excellence.

Pacific Fusion's planned \$1 billion research and manufacturing campus at Albuquerque's Mesa del Sol is expected to deliver significant economic impact for New Mexico, including the creation of more than 200 long-term, high-wage jobs focused on scientific research and advanced component manufacturing. In addition to these permanent roles, the project will generate hundreds of construction jobs during the build-out phase, further boosting local employment.

The development also includes a dedicated "Build Center" in Los Lunas to support component manufacturing, expanding the project's regional footprint. To ensure accountability, taxpayer-backed incentives tied to the project require Pacific Fusion to meet specific hiring milestones, beginning with the creation of at least 80 jobs by December 2027, as outlined by local economic development officials.

The partnership has provided Pacific Fusion with a competitive advantage by enabling faster, more accurate simulation-driven design of its fusion system. At the same time, the collaboration advances Los Alamos National Laboratory's mission by applying its material science and high-energy-density physics expertise to a high-impact commercial effort that strengthens U.S. energy leadership and supports national security objectives.

"The ability to license and deploy OpenSesame in a matter of weeks was critical for our development timeline," said Leland Ellison, co-founder and modeling and simulations lead at Pacific Fusion. "This partnership demonstrates how collaboration with national laboratories can help private companies move advanced technologies from research into application."



Leland Ellison, Pacific Fusion co-founder and simulations lead



Richard P. Feynman Center for Innovation

Notable New Mexico Startup **VastVision**

Sensing Platform Gains Momentum through Rigorous Testing

VastVision Technologies is a New Mexico startup developing advanced sensing and intelligent asset-tracking solutions for complex, real-world environments. Built on technology originally advanced at Sandia National Laboratories, the company is working to bridge the digital and physical worlds by making it easier to monitor critical assets and infrastructure in places where traditional tracking systems often fall short.

Focused on persistent visibility in challenging settings, VastVision is building solutions with potential applications across energy, industrial operations, and national security. Its platform is designed to bring greater awareness, reliability, and decision-making capability to environments where conventional approaches to sensing and tracking can be limited.



Richard P. Feynman Center for Innovation



Products in use at VastVision are designed to bring greater awareness and reliability to environments where conventional approaches to sensing and tracking can be limited.

Since joining the fourth cohort of the New Mexico Lab-Embedded Entrepreneur Program (NM LEEP) in 2024, VastVision has made meaningful strides as a growing New Mexico company. Led by founder Kyle Guin, the company has established and outfitted a laboratory and manufacturing space in Albuquerque, grown its team to more than seven employees, and launched early pilot projects to help validate its technology in real-world settings.

NM LEEP has played an important role in VastVision's growth by connecting the company with New Mexico's innovation ecosystem and supporting it as it scales. Through the program, VastVision has strengthened relationships with national laboratory partners, including ongoing engagement through a Cooperative Research and Development agreement (CRADA) with researchers at the Center for Integrated Nanotechnologies (CINT), while expanding its presence in the state and building momentum as an emerging technology company with strong commercial potential.

"NM LEEP has been a foundational part of VastVision's growth over the past year and a half. The program connected us to a network of mentors, national lab resources, and industry relationships that we simply didn't have access to before, and that has had a direct impact on our business," said Kyle Guin, founder of VastVision Technologies. "Since joining, we've secured pilot projects with a defense prime customer and have been awarded \$925,000 in funding to advance our technology. We've hired three new employees, built our own dedicated research facility in New Mexico, and established ourselves as a serious player in the sensing and asset-tracking space."

As VastVision continues to grow, it is advancing solutions that could transform how organizations track and understand critical assets in challenging environments. In sectors where conventional systems can be limited, VastVision's platform has the potential to redefine operational awareness and decision-making through more persistent, resilient, and data-rich sensing.

From left to right: VastVision team includes Christian Arrington (founding scientist), Zachary Kirch (chief technology officer and co-founder), Kyle Guin (CEO and co-founder), Dean Eberly (electrical engineer contractor), and Jamin Pillars (founding scientist).

Page 12:
From left to right: Pillars, Eberly, and Arrington (with Kirch in background) test products.



Electrochemical Hydrogen Pump Allows for Low-Cost, Single-Step Process

The ion-pair electrochemical hydrogen pump (EHP) technology developed at Los Alamos National Laboratory has been exclusively licensed through several fields of use to Gemini Energy, a California-based company founded in 2021, earning a Technology Transfer Excellence honor from LANL.

With \$45 billion of hydrogen currently wasted annually, this new industrial decarbonization infrastructure can accelerate the hydrogen economy and impact market applications such as refineries and petrochemical, geological hydrogen, fuel-to-power, power-to-fuel, hydrogen refueling stations, and pipelines and transportation.

While visiting the Laboratory in 2023, Gemini Energy and Los Alamos researchers first recognized the transformative potential of this electrochemical technology. Their collaboration led to jointly publishing in Nature Energy in December 2024, demonstrating the technology's breakthrough performance.

"The EHP technology has the potential to address a longstanding inefficiency in industrial hydrogen processing," said Mehdi Rafiee, founder and CEO of Gemini Energy. "Hydrogen separation, purification and compression have remained energy-intensive, mechanically complex and costly for decades. This technology creates a path toward a far simpler and more efficient solid-state solution."

EHP could replace the two-step process of pressure-swing adsorption (PSA) for purification followed by multi-stage mechanical compressors with a single, solid-state electrochemical step that separates, purifies, and compresses hydrogen while achieving 99%+ recovery with >99.999% purity with zero moving parts.

"These systems do not require the large capital investments associated with PSA units, enabling lower-cost and more modular deployment," said Yu Seung Kim, a scientist at Los Alamos. "Once the system-level integration and scale-up are completed, initial commercial deployment is expected."

Once implemented into a product by Gemini, the Los Alamos electrochemical ion-pair EHP technology has the potential to fundamentally disrupt hydrogen processing by replacing century-old, energy-intensive mechanical systems with a compact, maintenance-free solid state platform that dramatically cuts energy use and capital cost while enabling scalable, integrated purification and compression.

Gemini Energy also established a Cooperative Research and Development Agreement (CRADA) with the Laboratory, focused on further advancing the membrane technology and creating a continual feedback loop on the innovation and its improvements.

"Our vision is to transform how hydrogen is recovered and utilized across industry," Rafiee said. "By integrating purification and compression into a single electrochemical platform, we believe this technology can unlock lower-cost, modular deployment across refineries, petrochemical facilities, transport, and emerging hydrogen infrastructure."



Mehdi Rafiee, Gemini Energy, founder and CEO



Yu Seung Kim, Los Alamos scientist

Cristian Pantea, a research scientist at Los Alamos National Laboratory, has been named the Lab's 2025 Battelle Inventor of the Year, recognizing his sustained leadership and innovation in acoustic sensing technologies.

Battelle manages eight national labs across the U.S. The Battelle Inventor of the Year Award recognizes a researcher at each of these labs who demonstrate outstanding creativity, impact, and commitment to advances in technology transfer.

Pantea is a nationally and internationally recognized expert in acoustic sensing, with a career at Los Alamos marked by exceptional scientific creativity and impact. He has been an inventor on more than 20 patented technologies, many of which have been protected both nationally and internationally. Several of these innovations are actively being explored in the marketplace, underscoring their real-world value and applicability.

Among Pantea's most notable contributions are advances in acoustic measurements in the frequency domain, including acoustic resonance spectroscopy (ARS), which has been

employed across the National Nuclear Security Administration (NNSA) complex. These techniques enable precise, non-destructive characterization of materials and systems critical to national security applications.

"It is especially rewarding to see these technologies move beyond the Laboratory," Pantea said. "From national security applications to commercial deployment, the ability to translate research into practice is a strength of Los Alamos."

In addition, Pantea played a central role in the development of swept frequency acoustic interferometry (SFAI), an innovative acoustic sensing approach that led to a commercial prototype for measuring oil and gas production. This technology demonstrates the Lab's ability to transition fundamental research into deployable solutions for industry.

With his focus on acoustic sensing and non-destructive evaluation, Pantea continues to expand the boundaries of measurement science while strengthening Los Alamos's role as a driver of technological advancement for national security and the broader economy.



Cristian Pantea (left) and Lewis "Lou" Von Thaeer

Partner with Us and Unlock Potential.

Los Alamos National Laboratory and the Feynman Center of Innovation thrive on collaboration. We connect with diverse partners, fostering collaboration with startups, businesses, and investors. Together, we address challenges for a sustainable, secure, and equitable future.

1

Explore

Explore our tech to boost your success.



2

Engage

Engage where your development goals intersect with our innovations.



3

Collaborate

Collaborate around the commercial opportunity to ensure mutual agreement for a successful technology deployment.



4

Accelerate

Accelerate the transition of cutting-edge research and technologies into real-world applications.



5

Commercialize

Support partners' efforts in achieving product development, manufacturing, and sales milestones.



The information provided is for informational purposes only. The technology, research, and intellectual property described are subject to ongoing research and development at Los Alamos National Laboratory, as managed and operated by Triad National Security, LLC (Triad). Triad and its members, officers, employees and agents, specifically disclaim any representation, warranty, or guarantee as to the safety, efficacy, usefulness, benefit, performance, success, or any particular outcome of the technology, research, or intellectual property relating hereto, in whole or in part. LA-UR-26-23408