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RICHARD P. FEYNMAN  
CENTER FOR INNOVATION  
at Los Alamos National Laboratory



# LEVERAGING CONNECTIONS

2018 PROGRESS REPORT



# Transitioning Los Alamos' Top Innovations

## Inventing

Los Alamos National Laboratory has been inventing for the past 75 years to accomplish the difficult, the unexpected and at times, what seems impossible. The Feynman Center is rethinking roadmaps for patent and software strategies to enable Los Alamos to achieve greater impact from its innovations.

## Innovating

The US technology advantage in national security is dependent on continual innovation. Los Alamos' immense contributions in leading edge science and technology research and development are directed into solving complex and forthcoming national security challenges. Check out the Technology Snapshot platform at <https://techsnapshot.lanl.gov> to explore Los Alamos' technologies ready to be developed into disruptive applications.

## Disrupting

Known well for developing the first nuclear weapon, big and small science at Los Alamos is behind many other disruptive innovations. This year we are highlighting Los Alamos' leadership in small modular nuclear reactor design and development, work on international nuclear safeguards electronics instrumentation, and first demonstrated deployment of non-destructive testing to measure corrosion in nuclear material storage containers.

## Partnering

Los Alamos science has assisted partners big and small with their toughest challenges, this year Los Alamos scientists assisted two New Mexico farm owners—Tim Seaman with Manzanar Los Silvestres apple orchard in Abiquiu and Christopher Bassett of Freshies of New Mexico in El Guique —protect their crops from frost.



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# Richard P. Feynman Innovation Prize Winner

## Patrick McClure and NEN-5 Team, Robert Reid and E-1 Team

Very small modular reactors can provide long-term reliable power generation for space missions, defense applications, and remote communities.

A Los Alamos National Laboratory team led by Pat McClure and Bob Reid has developed two new cost-effective, small modular nuclear reactor designs: KiloPower, for space power applications and MegaPower, for terrestrial power applications in remote locations.

Los Alamos partnered with NASA-Glenn Research Center to co-design the reactor concept known as KiloPower for space flight. To produce electricity, KiloPower uses a nuclear fission system as a heat source that transfers heat via a heat pipe to a small Stirling-engine-based power convertor. Los Alamos and NASA-Glenn Research successfully completed a proof-of-concept test in November 2012 for KiloPower space trips.

Pat McClure, Bob Reid, and their team are now collaborating with Westinghouse to commercialize MegaPower, a “microreactor” for remote terrestrial power generation. They teamed with Westinghouse to demonstrate feasibility of concept and design of small nuclear reactors. They also received funding to further design, develop, test, and manufacture components and systems.

McClure, Reid, and their team have built upon a legacy of Los Alamos’ core nuclear capabilities—including nuclear design, engineering, computational tools, advanced materials, and testing—to develop an entirely new small modular nuclear reactor system. Their unique ability to leverage this expertise and partner successfully with government and private sector organizations is making this technology a reality.



# Feynman Prize Nominations

## Matthew Newell- Safeguards Science and Technology Group

Matt Newell has been an innovative leader during his career at Los Alamos National Laboratory, culminating with several commercialization successes in international nuclear safeguards electronics instrumentation supporting Los Alamos nonproliferation mission. Newell has deployed technical solutions to develop and update nondestructive assay (NDA) electronics packages. His solutions have been key in international nonproliferation efforts. He demonstrated technology advancement working with DOE NNSA sponsors, the International Atomic Energy Agency (IAEA), and industry partners to leverage contributions from all of these stakeholders and sectors.

Newell's innovative work on NDA electronics development has significantly impacted the advancement of nonproliferation technologies in nuclear safeguards. Newell stands out as an example of taking his technology innovations and successfully leveraging resources to be deployed to meet current needs in global security missions.



## MINTS (Modular Integrated Non-destructive Test Setup) Team

*Jonathan Gigax (MPA-CINT), Matthew Davenport (SPE-2), Adrian Abeyta (SPE-2), Rajendra Vaidya (SPE-2)*

Stainless steel Hagan and SAVY containers are widely used for long-term storage of nuclear materials. While these containers are sophisticated in their design, they are prone to interior corrosion from a number of factors while in use.

The MINTS (Modular Integrated Non-destructive Test System) team demonstrated the first deployment of non-destructive testing to measure real-time corrosion. The MINTS system provides a strong non-destructive solution for analyzing plastic deformation, cracking, and corrosion of nuclear material storage containers.

This testing is versatile and user-friendly, with the ability to provide a go/no-go decision for operators. The system has the potential to shift the nuclear material container surveillance paradigm towards larger population (non-destructive) testing in a shorter amount of time, at reduced cost and worker radiation exposure.



# Innovation is powered by people

Successful innovation can be traced to a collection of talent that links together with a common purpose—the product of what we know and those whom we know. In light of this - the Richard P. Feynman Center for Innovation - Innovation Honor Society recognizes outstanding Los Alamos staff who have exceptional and longstanding contributions to scientific discovery, innovation, and technology transfer.

The criteria for induction include overall engagement in collaboration projects, protection and deployment of intellectual property, and other innovation indicators. This involvement was used to objectively generate a weighed score threshold for induction. This year 5 inductees met that threshold and will be inducted into the prestigious Feynman Center Innovation Honor Society.

## Po-E (Paul) Li

**Division:** B-10

**Technical Focus:** Sequencing, Genomics, Bioinformatics

**Primary Partner(s):** Viome

## Velimir (Monty) Vesselinov

**Division:** EES-16

**Technical Focus:** Data Analytics, Machine Learning, Transport and Fluid Dynamics

**Primary Partner(s):** Chevron

## Andrew Sutton

**Division:** C-IIAC

**Technical Focus:** Hydrogen Storage, Biomass Conversion, Catalysis applications, Organometallic Chemistry

**Primary Partner(s):** Sironix, Gevo Inc.

## John Lewellen

**Division:** AOT-AE

**Technical Focus:** High-power superconducting RF photocathode guns, Accelerator and Beam Technologies

**Primary Partner(s):** Argonne National Laboratory, University of New Mexico

## Alp Findikoglu

**Division:** MPA-11

**Technical Focus:** Large Area Monitoring, Materials Characterization, Nanotechnology

**Primary Partner(s):** Chevron

# Leveraging connections to solve New Mexico small businesses challenges . . .

The New Mexico Small Business Assistance Program “brings 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.”

Los Alamos and Sandia national laboratories solve small businesses’ critical challenges with our expertise and resources; influence New Mexico business development by building capacity, capabilities, and competencies; and act as advocates for small businesses.

In March 2019, the Lab Small Business Tax Credit Changes Act, was signed into law doubling the value of assistance each New Mexico small business can receive. NMSBA can now expand support and reach innovators in high potential clusters such as agriculture, bioscience, space and aerospace, and arts and culture. NM small business can bring new products and services to market, attract financing, and create meaningful jobs.

In 2017, two farm owners—Tim Seaman who owns the Manzanar Los Silvestres apple orchard in Abiquiu and Christopher Bassett of Freshies of New Mexico in El Guique — approached the NMSBA with concerns about protecting their crops from frost. NMSBA matched the companies with Los Alamos scientists, Mike Steinzig, Gary Goddard, and their teams to tackle the problem. Through NMSBA, the scientists examined frost-mitigation methods, to study how frost moves across varied terrain, and ultimately to provide individualized data-based recommendations for each farm to improve frost protection.



# Introducing Los Alamos Technology Snapshots...

Los Alamos has identified a broad range of technologies that could enhance an existing product, define a new product, or launch a start-up. Our technologies have the potential to give your company a competitive edge in the market. Each are at different stages of development some ready to license and others looking for a partner to help mature into a disruptive application. Visit our new website <https://techsnapshot.lanl.gov> to explore the wide variety of technologies available.



advanced materials



biology



chemistry



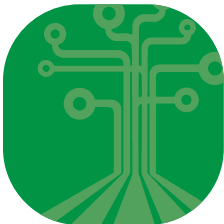
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data analytics



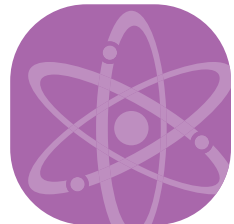
earth and environmental



infrastructure



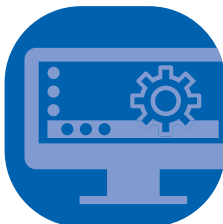
manufacturing



nuclear



sensors



software



space

## In 2018, the Feynman Center engaged in and with:

**733**

active agreements

**365**

businesses

**326**

academic/government  
organizations

## 2018 Intellectual Property and Licensing

**79**

patents filed

**87**

issued

**389**

active licenses

**\$2.1M**

## 2018 Partnerships and Agreements

**55**

collaborative research and  
development agreements

**\$4.6M**

**114**

non-federal strategic  
partnership projects

**\$17.7M**

**13**

department of health and  
human services agreements

**\$10M**

*Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is managed by Triad National Security, LLC, for the National Nuclear Security Administration of the U.S. Department of Energy under contract 89233218CNA000001.*