INNOVATION HEROES

STEPHEN L. JUDD

The simple solutions are usually the easiest to get working, the most reliable, and the most affordable – in short, the most innovative. Feynman Center has driven home the importance of simplicity in innovation: a technology that is simple to describe and build is much easier to patent and push forward with a company than something that is complex, expensive, and requires a dozen PhDs to operate.

HARSHINI MUKUNDAN

My research goals have been fueled by my first-hand experience in resource-limited areas of the world, and an understanding of the needs and demands of our troops and national health security. This requires the simultaneous participation of scientists from various disciplines, and Feynman Center to facilitate transition to real-world use. This type of collaboration can only be accomplished at an institution such as the Los Alamos—and that is our definition of innovation.

ANDREW SUTTON

After taking part in programs offered through Feynman Center, I realized the best way to see my bench-scale discovery science transition to a real application was to take more of an interest in the whole process. Through conversations with Feynman Center and industry, we found new partners and applications for some of our work and are more insightful into what we should be doing in the lab to be truly innovative.

PULAK NATH

Innovation is all about connecting the dots between technology and its users. Focusing on solutions that are quickly picked up by the users also allows us to do things in the lab more efficiently. Every innovation has its own personality. The more I interact with Feynman Center, the more it helps me to define the personalities of our innovations.

METRICS

BY 2020 MORE THAN 75% OF THE S&P 500 WILL BE COMPANIES THAT WE HAVEN'T HEARD OF YET
- RICHARD FOSTER, YALE UNIVERSITY

VC BACKED COMPANIES NOW ACCOUNT FOR A 42% OF THE R&D SPENDING BY U.S. PUBLIC COMPANIES.
(STANFORD BUSINESS SCHOOL)

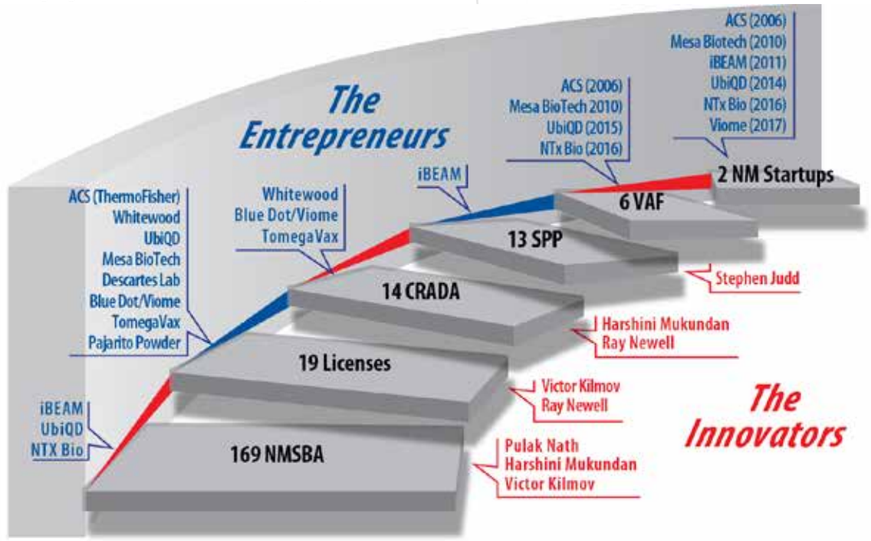
IN THE NATION'S 57 CONSECUTIVE MONTHS OF JOB GROWTH 7 MILLION OF THE 10.9 MILLION JOBS WERE CREATED BY STARTUPS AND SMALL ENTERPRISES
(SMALL BUSINESS ADMINISTRATION)

SMALL VENTURES ACCOUNT FOR UP TO 50 PERCENT OF NEW JOBS CREATED
(KAUFFMAN, 2016)

Los Alamos's Ladder of Impactful Programs

Supporting Innovation

Innovation is a challenging endeavor, Los Alamos works hard to accelerate innovation through our scientific capabilities. This graphic represents the number of agreements Los Alamos had with small businesses in 2016 and highlights where Los Alamos start-up partners have intersected.

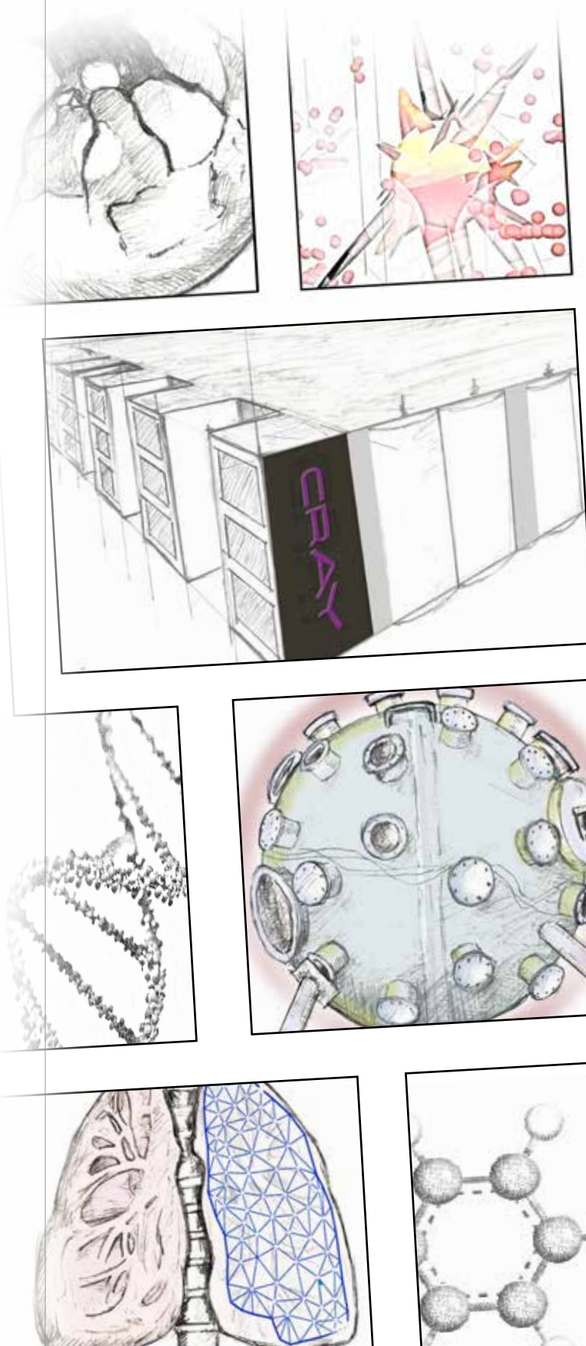


WE STRENGTHEN MISSION SUCCESS BY LEVERAGING INNOVATION.
IN 2017, OUR START-UP PARTNERS ARE POSITIONED TO RAISE OVER $200 MILLION.

Los Alamos NATIONAL LABORATORY EST. 1943

NNSA National Nuclear Security Administration

SUPER POWER OF THE ENTREPRENEUR!



THE INNOVATION PLAYBOOK

Of the world's 100 largest economic entities, 69 are corporations—and they're becoming a formidable global force (Global Justice Now, 2015). Not only are they tackling problems once limited to superpower nations—from global health to supercomputing and space exploration—many are "mini-nations" in and of themselves, comprising a diverse workforce that speaks more languages than most nations, and possessing more global reach than all but a few world powers. It's no surprise then that the pressure to survive is intense.

And that's no easy task. Corporations that have thrived for a century are being challenged by disruptive newcomers. This competitive pressure is driven by well-funded young companies with an unprecedented ability to form, scale, and adapt their businesses to take advantage of global networks of users.

Who is behind this new class of corporate powerhouses? Enter the super-entrepreneurs. These bold personalities are using transformative technologies, in combination with disruptive business models, to change the world. Closer to home, Los Alamos scientists and engineers are beginning to tap into this playbook. We're adapting our innovation strategy to sustain our unique role as one of the country's premier national security science laboratories, while simultaneously leveraging our discoveries to transition to the private sector. The right technology—coupled with the power of the private sector—can lead to worldwide impact. You can bet on it.

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RICHARD P. FEYNMAN INNOVATION PRIZE WINNER

Dr. Ray Newell has consistently demonstrated scientific and technical leadership over the past several years while leading the P-21's Quantum Communications Team at Los Alamos National Laboratory—culminating in a significant commercialization success in the last year.

Ray has played a special role in the translation of the Laboratory's quantum encryption technology into a commercial product. In his work with current and former technical leaders, Ray has extended quantum cryptography and quantum communications from theoretical concept to practical implementation. He has been able to bridge the Whitewood and Los Alamos teams to build upon technology from the Laboratory to a venture company.

Using a phenomenon of light known as photon bunching, the Entropy Engine generates an almost perfectly random signal that is digitized so that it provides an inexhaustible stream of random numbers. The Entropy Engine possesses the fundamental randomness and true unpredictability provided by quantum mechanics.

"In addition to his role as scientific leader, Ray's contribution has been invaluable to the product launch," said Richard Moulds, general manager for strategy at Whitewood Encryption Systems. The efforts of Ray and his team delivered a solution that formed the foundation for a start-up venture.

The commercial success of this technology has had added benefit of attracting new U.S. government funding that is fueling future capabilities in quantum encryption.

At an organization filled with technical innovators, Ray stands out as a "super hero" at Los Alamos for his ability to get technology out of the laboratory and into the marketplace to serve the nation.

HOW TO BECOME AN INNOVATION STAR

There are approximately 40 trillion microorganisms living in a human's gut. They help digest food, produce beneficial and harmful chemicals, control infections by pathogens, regulate immune system, and even control emotions.

Enters Viome, a wellness monitoring service based on research from Los Alamos National Laboratory to analyze the human gut microbiome in unmatched detail. Viome is being launched by entrepreneur Naveen Jain with a team of leading entrepreneurs, scientists, and physicians as the first venture brought to life by his BlueDot innovation factory.

Formerly of Bio Science Division at Los Alamos, Dr. Momo Vuyisich is leading the scientific effort at Viome. The technology developed by Dr. Vuyisich and the team at Los Alamos analyzes RNA from stool samples to determine the makeup of the microbial communities in intestines, species by species, strain by strain – not just for bacteria, but also for viruses, yeast, mold, fungi, parasites and the other organisms in the body.

Though very early in its launch, Viome is positioned to lead the innovation of helping anyone take control of their health and wellness in ways never before possible.

VIOME

2017 FEYNMAN PRIZE NOMINEES

HONG CAI

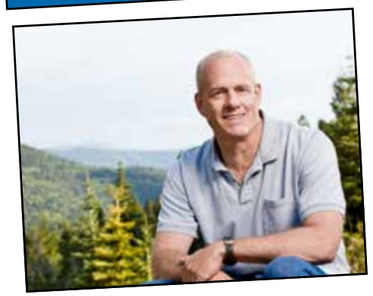
Start-up: Mesa Biotech

The scientist: While at Los Alamos, Hong led projects focused on the development of nucleic acid-based assays for various application.

The technology: Mesa's innovation seeks to enable access to the premium performance of nucleic acid amplification to the full spectrum of healthcare professionals by providing a simple, cost-effective molecular testing system at the point-of-care (POC).

Success: Mesa has been awarded approximately $25 million in grants and raised $10.5 million in private funding to continue its commercialization goal.

JOHN ELLING



Start-up: Acoustic Cytometry Systems, Inc. (ACS)

The scientist: In the early 1990s, John was a scientist at Los Alamos in the Engineering Sciences and Applications division. He was one of the first staff members to take entrepreneurial leave of absence to start his first company.

The technology: ACS was founded to commercialize a novel flow cytometry technology from Los Alamos. The ACS technology allows researchers to use sound waves to completely stop the flow of tissue samples and focus on individual cells up close.

Success: ACS was acquired in 2008 by Invitrogen Corporation, which later became Life Technologies. This acquisition was the largest equity exit from a Laboratory technology to date. Life Technologies, a brand under the Thermo Fisher Scientific, has advanced the technology to develop and sell the Attune® Acoustic Focusing Cytometer.

VICTOR I. KLIMOV

Start-up: Quantum Dot (QD) technology is being commercialized by UbiQD, LLC.

The scientist: Victor has been a leader of the NanoTechnology and Advanced Spectroscopy team (a.k.a. the Quantum Dot team) and director of the Center for Advanced Solar Photophysics (CASP).

The technology: Victor helped advance understanding of the fundamental optical processes within semiconductor nanocrystal quantum dots (QDs), particularly in Auger recombination, optical gain, and the phenomenon of "carrier multiplication."

Success: Victor's former postdoc, Hunter McDaniel, used the unique opportunity presented in QDs to found UbiQD, LLC. The connection between UbiQD and Victor's team remains vital, including multiple collaborative proposals to use the QD technology for solid-state lighting.

VLADIMIR MATIAS

Start-up: iBeam Materials, Inc.

The scientist: Vlad has over 30 years of experience with superconducting and other oxide coatings technology. He was both a team leader and project leader at Los Alamos.

The technology: iBeam seeks to disrupt the lighting, display, and wearable electronics industries by creating new game-changing LED products. Their core technology is a three-stage process to fabricate bright-printed LEDs directly on flexible, large-area, low-cost metal foils.

Success: Their cumulative commercial revenue from this business has been $800K and has won over $2.2M in federal funding. Currently, most of their customers in this sector are overseas. The company currently has five employees.