A selection of American innovation success stories made possible by federally funded research

VOLUME 3 • APRIL 2017

sciencecoalition.org
COVER PHOTOS CLOCKWISE FROM TOP:

Epicrop Technologies co-founder Sally Mackenzie (photo courtesy of University of Nebraska); Tableau Software (photo courtesy of Stanford University); M3 Biotechnology co-founder Joe Harding and CEO Leen Kawas (photo courtesy of Washington State University); technology in development for NASA’s Green Propellant Infusion Mission (photo courtesy of Ball Aerospace)
About this Report

This is the third Sparking Economic Growth report published by The Science Coalition. Each volume of the report has highlighted a different set of companies created from federally funded university research, totaling 302 companies to date. The reports are intended to showcase one of the ways that federal investment in basic scientific research helps stimulate the economy. All three reports and a database of companies are available at www.sciencecoalition.org/successstories.

All Sparking Economic Growth companies were self-selected by the member universities of The Science Coalition and are illustrative of the many companies that result from federally funded university research. Additionally, the funding amounts cited in this report and accompanying database were provided by the university affiliated with the particular company and should be considered estimates. The information about these companies was collected throughout 2016.

The Science Coalition is a non-profit, nonpartisan organization of leading public and private U.S. research universities. Its mission is to sustain strong federal funding of basic scientific research as a means to stimulate the economy, spur innovation and drive America’s global competitiveness. Learn more about The Science Coalition at www.sciencecoalition.org.
Individual write-ups on all **Sparking Economic Growth** companies, as well as a sortable database of companies, are available at

[www.sciencecoalition.org/successstories](http://www.sciencecoalition.org/successstories)
Sparking Discovery

All it takes is a spark of discovery, an “ah ha” moment, to realize a great opportunity — one that might change the world and have commercial value as well. But where does that spark come from? In the case of the companies highlighted in this report, that spark was basic scientific research — conducted at a U.S. university with funding support from America’s preeminent federal science agencies.

Every Sparking Economic Growth company is an American innovation success story. Each traces its roots back to federally funded academic research and is bringing to market transformational innovations in health, materials, technology, defense, manufacturing, education, or agriculture. Additionally, each of these companies is creating jobs and contributing to the local economy. Every Sparking Economic Growth company is a shining example of how America leads the world in science and technology — and why the United States must continue to invest robustly in basic scientific research to ensure that we maintain this leadership.1

An Undervalued Investment

The public investment in the foundational research behind these companies was just over $265 million² spread over several decades. This research of course also advanced our knowledge; educated future scientists, engineers and doctors; created direct jobs and equipment purchases; and helped build a skilled workforce. Research, and all the benefits that flow from it, help keep America globally competitive.

The federal government’s total R&D bill amounts to just 3.4 percent of the nation’s annual budget. The last time this number exceeded 5 percent of the budget was back in 1990, more than a quarter century ago. While basic research is the smallest slice of the R&D pie, accounting for less than 25 percent ($33.5 billion) of the federal government’s total $135.5 billion R&D budget in 2016,³ it is the spark that ignites discovery and innovation in the United States. The return on this modest investment is enormous.

DID YOU KNOW?

For every taxpayer dollar spent by the U.S. government, less than 1 cent goes toward federal funding for basic research.

Federal Budget: $3.54 Trillion*

$33.5 billion

*FY2016
If WWII gave rise to the U.S. research enterprise, the successful launch of the Soviet satellite Sputnik in 1957 put it into hyper-drive. The United States responded to this challenge with a huge investment in science and engineering education and research and a commitment to create the world’s best research enterprise.

It’s not a coincidence that the oldest company highlighted in this Sparking Economic Growth report is Ball Aerospace & Technologies Corp. Ball Brothers Research Corporation, as it was called then, was founded in 1956 during the early days of the space program. The company’s leaders were intent on pursuing government contract research to connect the company with a larger pool of scientific manpower and receive follow-on benefits from the resulting manufacturing process experience.

They turned to a group of University of Colorado (CU) physics students and professors to evaluate a weighing device that the company was developing. The CU group had been working to create the first biaxial pointing control for the U.S. Air Force, among other projects in the developing rocket field. The CU group ended up joining the recently formed Ball Brothers Research Corporation.

Twenty years before Forbes coined the term “start-up,” these Boulder scientists were unknowingly laying the groundwork for a company that would become a key contributor to some of America’s pioneering science missions.

BORN OF THE SPACE RACE

From its earliest days, the United States has been a place of great discovery and innovation. But the United States didn’t get serious about creating a formal system for investing in and facilitating discovery and innovation until the conclusion of World War II. President Franklin D. Roosevelt asked his Director of the Office of Scientific Research and Development, Vannevar Bush, for recommendations on how to apply the highly successful wartime scientific research effort to peacetime endeavors. The recommendations from Dr. Bush, contained in a report called “Science, the Endless Frontier,” led to the formation of the National Science Foundation in 1950 and formalized the arrangement between the federal government and universities to conduct research on behalf of the American people. This unique partnership has been a driving force behind the U.S. economy ever since.

“The rewards of [scientific] exploration both for the Nation and the individual are great. Scientific progress is one essential key to our security as a nation, to our better health, to more jobs, to a higher standard of living, and to our cultural progress.”

VANNEVAR BUSH • JULY 25, 1945
Basic Research — The Spark That Starts It All

America’s system of innovation and discovery begins with basic research, sometimes called discovery science because it is curiosity driven and seeks to fill in knowledge we don’t have. While basic research is essential to the performance of applied research and the development of new technologies and commercial products, it is largely the domain of universities and academic institutions. Academic researchers are free to focus on their scientific missions — seeking answers to basic questions about life and the physical world — over many years without having to demonstrate commercial value. Commercialization was not the goal of the researchers behind these Sparking Economic Growth companies it was simply one outcome of their work. Industry, on the other hand, has a shorter time horizon and is driven by commercial outcomes, therefore focusing most of its efforts on applied research and development.

Basic Research — An Undervalued Investment

When the Federal Government invests in basic scientific research:

- Knowledge is gained
- Discoveries are made
- Jobs are created
- Future employees are trained
- Local communities thrive
- New companies emerge
- Industry benefits
- The U.S. economy wins

Who’s doing basic research in the United States?

- 51% Academic Institutions
- 24% Business & Industry
- 13% Federal Government
- 12% Other NGOs

Breakdown of R&D conducted in the United States

- 63% Development
- 20% Applied Research
- 18% Basic Research
- 20% Total U.S. R&D funded by all sources

Federal government investment

Both Charts reflect total U.S. R&D funded by all sources
Follow the quantum dots

These tiny semiconductor particles, 10,000 times narrower than a human hair, with special optical and electronic properties, play a big role in two very different Sparking Economic Growth companies.

At Core Quantum Technologies (CQT), a spinout from The Ohio State University, quantum dots are enabling researchers to better identify and understand disease progression. In fact, it was a personal diagnosis of breast cancer and a desire to see her research impact patient health that led Jessica Winter to turn her team’s advances in nanotechnology into commercial tools for cancer research and diagnosis. CQT’s product, the MultiDot, which consists of a group of semi-conductor nanoparticle quantum dots encapsulated in polymer-based micelles, allows researchers to continuously track tagged molecules with greater brightness, longevity and stability than currently available technologies. This could enable researchers to better identify and understand disease progression as well as contribute to better clinical diagnosis. [NSF-funded research]

Three thousand miles away in California’s Silicon Valley, Nanosys has been using quantum dot technology since 2001 to provide uncompromised color accuracy and brightness for energy efficient electronic displays including tablets, smartphones, laptops and HD televisions. Known as The Quantum Dot Company™, Nanosys grew out of breakthrough research conducted at the Lawrence Berkeley National Laboratory (LBNL) in conjunction with the University of California, Berkeley. It was at LBNL that researchers discovered that these nanocrystals could be made to emit multiple colors of light depending on their size. Bigger dots emit longer wavelengths like red, while smaller dots emit shorter wavelengths like green. The ability of quantum dots to precisely convert and tune a spectrum of light makes them ideal for LCD displays. [DOE-funded research]

“This technology was originally conceived to answer research questions in biology. As commercial implications became more evident and successful prototypes were achieved, the [NSF] I-Corps program helped leverage this technology into the commercial arena. But, our work would not have been possible without federal support of basic research.”

JESSICA WINTER
CQT FOUNDER AND PROFESSOR OF BIOMEDICAL ENGINEERING
THE OHIO STATE UNIVERSITY
Tackling type 1 diabetes

These neighboring companies are pursuing very different solutions to type 1 diabetes.

At Boston University spinout Beta Bionics, their “bionic pancreas” is intended to provide a technology solution until there is a cure for diabetes. Beta Bionics co-founder Ed Damiano’s mission to engineer a way to automatically control blood sugar levels began soon after his infant son was diagnosed with diabetes in 2000. The company’s solution, called the iLet™, is a pocket-sized, wearable medical device that autonomously monitors and manages blood sugar levels in people with diabetes on a 24/7 basis. Beta Bionics hopes to have its first product on the market by the end of 2018. [NIH-funded research]

Over at Semma Therapeutics in Cambridge, MA, they are working to turn stem cells into insulin-producing cells for patients with type 1 diabetes, which would transform treatment of this disease. While a post-doctoral fellow at the Harvard University Stem Cell Institute, company co-founder Felicia Pagliuca and her research team identified a way to turn stem cells into functional, insulin-producing cells on a mass scale. The company is focused on combining these proprietary cells with a state-of-the-art device that would let doctors transplant millions of cells in diabetic patients, without immunosuppression, and enable them to generate insulin. [NIH-funded research]

“It’s virtually impossible to overstate how important NIH and U.S. government funding for basic research is to the entire enterprise of medical research.”

FELICIA PAGLIUCA
SCIENTIFIC CO-FOUNDER AND VICE PRESIDENT
CELL BIOLOGY RESEARCH AND DEVELOPMENT, SEMMA THERAPEUTICS
Growing food sustainably

As the world’s population continues to grow and human activity places increasing stress on the environment, finding new ways to increase crop yields is a global challenge. Three Sparking Economic Growth companies are pursuing solutions to this problem.

University of Nebraska spinout Epicrop is focused on the plant itself and using its epigenetic technology to improve a plant’s stress tolerance and crop yield. Epigenetic modifications are naturally occurring biological marks on the plant’s DNA, or chromatin. These marks help the plant develop normally and to adapt to its environment. Epicrop’s technology is able to improve crop yields and stress tolerance by altering these marks without changing the DNA sequence of the plant. The final crop plant is genetically identical to the starting plant and contains no foreign genes or changes to the plant’s DNA sequence. [NSF and DOE-funded research]

Tule Technologies’ irrigation system lets growers know when and how much to water their crops, maximizing yield and quality while also carefully managing water usage. The University of California, Davis spinout company’s technology measures “evapotranspiration,” the total amount of water leaving the plant and soil system, and efficiently irrigates by replacing only what is lost. [USDA-funded research]

InterSeeder Technologies began as a research project at Penn State University to help farmers have greater success using cover crops. Cover crops provide many benefits, including improving soil nutrients and reducing erosion and runoff. The project using an early version of the InterSeeder™ planting tool, which allows the planting of cover crop within rows of cash crops much earlier in the year, produced stunning results — a consistent and lush stand of cover crops growing under a dense corn canopy, followed six weeks later by a corn harvest with no yield penalty. [USDA-funded research]

“This is one of those great ‘could not have predicted it’ discoveries that comes about from federally funded research into important basic biological processes.”

DR. SALLY MACKENZIE
EPICROP FOUNDER AND PROFESSOR OF AGRONOMY
UNIVERSITY OF NEBRASKA-LINCOLN
Yes, we’ve got a test for that

Technological advancements are enabling the development of simple, fast tests to detect and prevent many serious medical conditions. Sparking Economic Growth companies are part of this trend, developing tests for cancer, platelet function, stroke, and sudden cardiac death.

Preora Diagnostics and Liquid Biotech USA are both developing cancer screening tests.

**PreoraDX**’s tests screen for the most common types of solid-tumor cancers and are simple enough to be performed in a physician’s office without extensive preparation. Its proprietary technology — Partial Wave Spectroscopic (PWS) Nanocytology imaging — was developed at **Northwestern University** and detects and measures cellular changes at the nanoscale. By detecting changes on such a tiny scale, the tests may aid in risk assessment and early detection of cancers in high-risk, asymptomatic patients. [NIH and NSF-funded research]

**Liquid Biotech**’s methodology is based on “liquid biopsy” technology developed at the **University of Pennsylvania**. It analyzes live, circulating tumor cells (CTCs) directly from patient blood and can detect the presence of CTCs in the blood when they are present at very low levels, offering the potential to manage the disease early in development. This approach also can guide physicians during treatment, as well as post-treatment, when a patient is in remission but there is the likelihood of recurrence. [NIH-funded research]
**At Stasys Medical Corporation in Seattle, they’ve developed a point-of-care device that conducts a platelet function measure in a matter of minutes, enabling doctors to make better, time-sensitive decisions about performing platelet transfusions. This is critical in major trauma patients, who can die unnecessarily from uncontrolled bleeding often caused by platelet dysfunction. Stasys’ technology, developed by a mechanical engineer at University of Washington, uses disposable micro-cards that have proprietary platelet force sensors to enable complete platelet function measures in less than five minutes. [DoD-funded research]**

Nearly 800,000 people a year in the United States will suffer a stroke and getting proper treatment within three to four hours of symptom onset is essential to preventing death and improving the odds of successful recovery. **Valtari Bio** is developing a blood test to aid in the immediate identification of suspected stroke patients. It is the first of its kind, an easy to use blood test that provides fast, unbiased, and accurate identification of stroke versus stroke-mimic in emergency settings. It works by measuring the pattern of immune response in biomarkers found in the peripheral blood. The test is based on the research of Dr. Taura Barr of the West Virginia University School of Nursing and Emergency Medicine. [DoD and NIH-funded research]

**“My ‘ah ha’ moment came when we started digging into the market analysis, and I realized that our stroke diagnostic had the potential to touch three million patients annually in the United States. Even more exciting, was the realization of what rapid diagnosis meant to patient outcomes and recovery.”**

**VALERIE M. GIONIS**
COO, VALTARI BIO

The PulsePredic™ by **3PrimeDx** uses biomarkers in the blood to predict sudden cardiac death (SCD) risk in patients with heart failure. Heart failure occurs in more than 3.5 million Americans each year, but there are no simple, reliable ways of predicting who is at highest risk for SCD and who will benefit from an implanted defibrillator. This blood test will enable the optimization of the intervention through a simple, reliable, convenient to administer, and cost-effective diagnostic tool. It is based on research conducted at the **University of Illinois at Chicago**. [NIH-funded research]
Controlling indoor environments

FreshAir Sensor co-founder Jack O’Toole’s “ah ha” moment came when he heard his future business partner talk about his nicotine sensor. O’Toole intensely disliked cigarette smoke, yet he continued to be exposed to it by other people. He knew there must be a business in protecting people from unwanted exposure to smoking.

Marketed to hotels and property managers as a way to maintain safer and healthier environments for their residents and guests, FreshAir Sensor’s plug-in device, the FreshAir1, protects people from unwanted exposure to secondhand smoke. It provides continuous monitoring and detection of smoking in unauthorized areas, immediate email notification when cigarette smoke is detected and scientific proof via a timestamped chart that smoking occurred. The polymer-based sensors at the heart of FreshAir’s product were developed at Dartmouth. [NIH and NSF-funded research]

University of Arizona spinout Acomni has developed the Ondo™, a Wi-Fi enabled thermostat-monitoring device that gathers data about a home’s heating, ventilation, and air conditioning (HVAC) cycle use. By combing utility rates and weather forecasts with a patent-pending behavioral learning algorithm, Ondo is able to learn a home’s heating and cooling requirements and provide electric utility companies with the ability to visualize energy expenses and estimate future heating and cooling costs. For homeowners, Ondo enables them to heat or cool their home — based on not just comfort, but also on how much they want to spend on electricity. [NSF-funded research]

“The federal funding was truly foundational: upon a platform for water sampling, we built new key knowledge to enable lifestyle changes. Limiting the scope of the project, without following the spark of innovation, would have limited the potential impact.”

JONATHAN SPRINKLE
CO-FOUNDER, ACOMNI
AND ASSOCIATE PROFESSOR
UNIVERSITY OF ARIZONA COLLEGE OF ENGINEERING
Powering new approaches to energy storage

Our high-tech world requires a different type of power: power that is compact, versatile, mobile and super-efficient as well as safe. These three companies are pushing the limits of what’s possible when it comes to energy storage and power.

In a research course at MIT, a teaching assistant and two of his students conducted what they call a “modest experiment in a beaker.” It involved a small enriched blob of gallium in water and a platinum wire “so thin you could barely see it.” It turned out to be the first demonstration of Open Water Power’s technology: an aluminum-water platform technology for underwater energy storage and power generation. And, it’s anything but modest. It solves a significant endurance problem for the U.S. Navy and the oil and gas industry. Open Water Power’s electrochemical system provides safe, scalable and non-toxic energy storage with extremely high energy density, promising a 10x improvement in the endurance of unmanned underwater vehicles and sensors. [DoD-funded research]

The Paper Battery Company — which manufactures an ultrathin high-energy supercapacitor that enables companies to replace batteries or use smaller batteries without compromising energy or peak performance — happened almost by accident. A professor of chemistry at Rensselaer Polytechnic Institute, Robert Linhardt, was trying to perfect a blood thinner-containing membrane for hemodialysis when he turned to a colleague, Pulickel Ajayan, in the university’s Nanotechnology Center for help. Linhardt thought carbon nanotubes might increase the strength of his membranes. Their first approach was to merge Linhardt’s cellulose with aligned carbon nanotubes and test it for strength. Upon seeing the new membrane, a student observed that if they folded it in half, they would have a supercapacitor. The student was right and the concept of a paper battery — a patented form factor solution that allows for revolutionary size changes in wearables, accessories, and mobile electronics — was born. [NSF-funded research]

The two University of Wisconsin-Madison professors behind Silatronix knew they were onto something big with their Organosilicon (OS) materials when a major global lithium-ion battery manufacturer told them of an unexpected benefit of their electrolyte — a new mechanism for improving the performance and safety of Li-ion batteries. Silatronix patented OS compounds extend cell life, increase cell capacity, expand temperature operability ranges, and allow the safe and effective use of higher charge voltages in Li-ion batteries. [NIST and NSF-funded research]
Science fiction only better

Many Sparking Economic Growth companies are pursuing technologies that are just plain cool. Here are three with a serious SciFi factor that are addressing real health and safety needs.

Epibone, created from research at Columbia University, is in the business of growing personalized bone grafts. Using a CT scan to create a precise 3D model of the anatomical defect, stem cells taken from the patient, and a custom-built bioreactor, EpiBone is able to grow a personalized bone graft — in the exact size and shape needed — that is ready for implantation. For the more than 900,000 patients who undergo bone-related surgeries each year, EpiBone’s technology offers the potential for greatly improved outcomes. [NIH-funded research]

It wasn’t until the press picked up and reported their research that the founders of EpiBone thought about the potential commercial applications of what they were doing. “This was an ‘ah ha’ moment of sorts because it gave us the idea and led to our first invitation to apply for a translational research grant.”

NINA TANDON
CO-FOUNDER, EPIBONE

Auxadyne’s foam technology is counter-intuitive; it expands outward when stretched. This means it gets thicker rather than thinner with impact, making it ideal for protective equipment, medical devices and other applications. Indeed, the foam is so novel that within a few weeks of news announcing plans to commercialize this Florida State University technology, Auxadyne was contacted by top sporting equipment companies, medical device makers and manufacturers of ballistic vests, all interested in how the foam might be used in their products. [VA and DoD-funded research]

“As a direct result of this VA research funding, Auxadyne will create high-tech, high-wage manufacturing jobs in Florida allowing us to the make the lives of leg amputees, military personnel, first responders and athletes of all ages safer.”

JOE CONDON
PRESIDENT AND CEO, AUXADYNE

TriFusion has figured out how to solve one of the biggest challenges with 3D printing, the tendency of the layers to peel apart or break under heat or stress. The Texas A&M spinout aims to use its combination of proprietary heat-responsive nanoparticles and precision electric fields to simplify and expedite the process of manufacturing custom prosthetic devices, and to do it at a lower cost. Its goal is to bring affordable prosthetic limbs to those who need them most. [DoD and NSF-funded research]

“Born from an Army Research Lab and perfected in the labs of two, public universities, the federal funding TriFusion received has allowed an idea to become a life-changing technology.”

BLAKE TEIPEL
CEO, TRIFUSION DEVICES
I’ll see your need and raise you …

It’s said that necessity is the mother of invention. These three companies definitely saw a need and knew there was a better way.

**Codapillar** is an education technology platform that teaches middle school and high school students how to code. It was the brainchild of **Pace University** undergrads — Julie Gauthier and Olga Bogomolova — who worked together at a camp for high school students interested in the STEM disciplines. After trying various resources to help students learn coding, the same problems kept surfacing. Their students were getting frustrated and so were they. This led Gauthier and Bogomolova to decide to go “off-book,” create a custom curriculum, and teach students the tools that professional web developers were using. The results were dramatic in terms of student success and happiness. [NSF-funded research]

Ear infections are the leading cause of hearing loss and surgeries in children, yet they are still diagnosed using the otoscope. The otoscope is essentially a magnifying glass that allows physicians to look at the surface of the eardrum but leaves them guessing at what might be going on in the inner ear. Frustrated by their own experiences — one a physician and all fathers of young children with chronic ear infections — the founders of **University of Illinois at Urbana-Champaign** spinout **PhotoniCare**, have developed a version of the otoscope that enables doctors to look through the eardrum into the middle ear in order to see and better treat disease. [NIH and NSF-funded research]

For **PhotoniCare**’s founders, their ‘ah ha’ moment came the first time they used their technology to see through the eardrum of a patient. “The disease in the middle ear becomes so obvious when you can visualize it directly. It was then that we knew that our technology was going to revolutionize the way middle ear infections are diagnosed and treated.”

“'As women in technology, we believe in helping to improve diversity in technology. It simply would not be possible without federal funding to sponsor programs that reach under-represented populations.'

**JULIE GAUTHIER AND OLGA BOGOMOLOVA**
CO-FOUNDERS, CODAPILLAR

**Tableau**

Their original assignment was to increase people’s ability to analyze information. What they did, however, was take data analysis and presentation to a whole new level. Working on a Defense Department project in the early 2000s at **Stanford University**, the founders of **Tableau Software** realized that computer graphics could deliver huge gains in people’s ability to understand data so they did something that hadn’t been done before: they brought together databases and computer graphics. The resulting invention, VizQL™, let people analyze data just by building “drag & drop” pictures of what they wanted to see. Tableau has been revolutionizing business analytics ever since. [DoD-funded research]
RESEARCH-DRIVEN SUCCESS

Sparking Economic Growth companies have a strong track record and are performing better on average than other new businesses in the United States. Of the 200 companies profiled in previous editions of this report, 88 percent (176) remain operational today or have successfully merged with or been acquired by another company. Significantly, 53 of those original 200 companies were considered “young” at the time they were highlighted, meaning they were less than five years old. Since only about half of all new businesses formed in the United States survive more than five years, crossing the five-year benchmark is significant. Sparking Economic Growth companies do this at a rate of 87 percent: 46 of the 53 young companies remain operational, or have been successfully merged or acquired as of 2017.

FUELING LOCAL ECONOMIES

From California to Connecticut, Minnesota to Missouri, and New Hampshire to North Carolina, Sparking Economic Growth companies are contributing to their local economies in important ways. Eighty-nine of the 102 companies in this edition of the report are located in the same state as the university from which they spun out. Looking beyond the youngest companies (those that might still be benefitting from university startup facilities and support programs) and most of the companies are still located close to home. Of the 23 companies 10 years or older (formed in 2007 or earlier), only six have located in states different than their founding university.

The companies collectively employ 8,900 people. As is typical of the U.S. economy in general, the majority of Sparking Economic Growth companies are small businesses of fewer than 500 people. However, unlike the vast majority of small businesses in the United States, which are “non-employers,” only one company reports that it does not have any paid employees at this time.

Small businesses in the United States are job creators, accounting for 63 percent of net new jobs.
The Rockford region of northern Illinois and southern Wisconsin is home to some 200 aerospace-related companies. Keeping these companies supplied with engineers, scientists and technicians is no small feat and is essential to their competitiveness and to the economic vitality of the region. This is why regional business and academic leaders are collaborating to create a pipeline of skilled talent. In 2012, the region won a federal Jobs and Innovation Accelerator Challenge grant, applying $2.4 million to strategies to accelerate job creation, global competitiveness and innovation. This work catalyzed a regional strategy to “grow our own workforce.” The first outcome was the creation of a targeted internship program, providing high school and college students in the region a path to high-quality paid internships, and for employers, a pipeline of skilled talent.

Local leaders also realized that providing more local opportunities for engineering education would be key in educating and retaining new talent in the region. Thus, in the fall of 2016, Northern Illinois University (NIU) and Rock Valley (Community) College (RVC) launched a community-based, industry-integrated engineering degree program in Rockford. Students move seamlessly from the first two years of engineering studies to bachelor’s completion programs in mechanical engineering and applied manufacturing technology taught at RVC by professors from NIU’s ABET-accredited College of Engineering & Engineering Technology. Rockford area industry has contributed $5 million so far to support renovations to RVC classrooms and laboratories, instructional support and student scholarships. Students have paid internships with local companies and are mentored by NIU and RVC alumni working in the region. This collaborative workforce development solution is being hailed by industry leaders as key to business retention and expansion in the Rockford region.

**COMPANY STATUS**

The companies span in age from 61 years to just over 1 year, with the large majority of companies (73) founded since 2010. Half of the companies (56) were formed in 2012 or more recently, making them younger than five years old. Of the 102 companies, 10 have been acquired by or merged with other companies (public and private), eight are publicly held and 84 are private.

<table>
<thead>
<tr>
<th>Decade Founded</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950s</td>
<td>➤ 1</td>
</tr>
<tr>
<td>1990s</td>
<td>➤ 6</td>
</tr>
<tr>
<td>2000s</td>
<td>➤ 22</td>
</tr>
<tr>
<td>2010s</td>
<td>➤ 73</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Status</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acquired/Merged</td>
<td>➤ 10</td>
</tr>
<tr>
<td>Public</td>
<td>➤ 8</td>
</tr>
<tr>
<td>Private</td>
<td>➤ 84</td>
</tr>
</tbody>
</table>
Research Funding

Funding estimates were provided for 92 of the 102 companies highlighted in this volume of *Sparking Economic Growth*, totaling just over $265 million. For the large majority of companies — 80 percent — initial federal funding for their foundational research conducted at universities was less than $5 million, and for 40 percent of companies, this amount was less than $1 million.

The research funding, which was competitively awarded and often spanned many years, was provided by nine separate federal agencies. While some founders cited grant awards from multiple agencies, the majority cited grants from just one agency.

<table>
<thead>
<tr>
<th>Amount of Funding</th>
<th>Number of Companies</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; $1 million</td>
<td>37</td>
</tr>
<tr>
<td>$1 million–$5 million</td>
<td>37</td>
</tr>
<tr>
<td>$5 million–$10 million</td>
<td>12</td>
</tr>
<tr>
<td>$10 million–$20 million</td>
<td>4</td>
</tr>
<tr>
<td>&gt; $20 million</td>
<td>2</td>
</tr>
</tbody>
</table>

Funding by Agency

- Department of Agriculture ➤ 6
- Department of Defense ➤ 26
- Department of Education ➤ 2
- Department of Energy ➤ 6
- Department of Homeland Security ➤ 1
- Department of Veterans Affairs ➤ 2
- National Institutes of Health ➤ 54
- National Institute of Standards and Technology ➤ 1
- National Science Foundation ➤ 36

Funding by Multiple Agencies

- One Agency ➤ 74
- Two Agencies ➤ 24
- Three Agencies ➤ 4
BRIDGING THE GAP BETWEEN INNOVATIVE RESEARCH AND THE MARKETPLACE

Called the “valley of death,” it arises when funding for a research project runs out but the researcher hasn’t yet been able to secure external funding from investors to continue the work necessary to take an innovation all the way to the marketplace. Seventy-one of the 102 Sparking Economic Growth companies reported receiving some type of venture funding, indicating the importance of this type of financing. Universities are increasingly stepping into this space with innovative programs to help bridge the funding gap.

Auburn University instituted its LAUNCH awards program in 2015 to support the efforts of Auburn faculty in bringing promising research to the marketplace. The goal is to establish an endowment of $10 million that will generate approximately $400,000 annually for research project grants. Until the endowment is fully funded, the Office of the Vice President for Research and Economic Development will provide the resources to make the awards. “Auburn researchers have the will and the talent to provide real solutions for the challenges in today’s market. Activities like LAUNCH reflect Auburn’s land-grant tradition and the university’s commitment to fuel economic growth with science-based innovation,” explains Auburn University Vice President for Research and Economic Development John Mason. The first round of LAUNCH award recipients are pursuing innovations aimed at preventing MRSA in livestock, improving wound healing and reducing dangerous infections, and preventing spontaneous combustion of hay bales and the huge financial losses that result when such fires happen.

TRANSFORMATIONAL INNOVATIONS

The innovations behind the Sparking Economic Growth companies touch all aspects of society and the economy. A majority of companies consider their work to be in the biomedical space. This broad category includes drugs, devices and diagnostics, as well as tools and materials that support biomedical research.

<table>
<thead>
<tr>
<th>Area of Innovation</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture &amp; Environment</td>
<td>2</td>
</tr>
<tr>
<td>Biomedical</td>
<td>66</td>
</tr>
<tr>
<td>Defense, Safety &amp; Aerospace</td>
<td>2</td>
</tr>
<tr>
<td>Education &amp; Language</td>
<td>3</td>
</tr>
<tr>
<td>Energy &amp; Chemicals</td>
<td>5</td>
</tr>
<tr>
<td>Manufacturing, Research &amp; Industry</td>
<td>4</td>
</tr>
<tr>
<td>Materials</td>
<td>5</td>
</tr>
<tr>
<td>Technology &amp; Web</td>
<td>15</td>
</tr>
</tbody>
</table>
SPARKING ECONOMIC GROWTH
REQUIRES STEADY INVESTMENT

Federally funded university research is building a better America. The 102 companies highlighted in this version of The Science Coalition’s *Sparking Economic Growth* report are perfect examples of how this is happening across the nation.

These American innovation success stories also illustrate why it is essential that our government prioritize funding for basic scientific research. Without the sustained federal funding for basic scientific research that occurred years ago, none of these companies would exist today. **Reducing research funding today puts at risk the next generation of job-creating, innovation-producing, and economic growth-contributing companies, along with all of the other benefits that result from federally funded basic scientific research.**

A database of all *Sparking Economic Growth* companies is available at

[WWW.SCIENCECOALITION.ORG/SUCCESSSTORIES](http://WWW.SCIENCECOALITION.ORG/SUCCESSSTORIES)

---


2Universities and/or company founders were asked to estimate the amount of federal funding that contributed to the foundational research at the root of their company’s technology. Estimates were provided for 92 out of 102 companies, totaling $265,019,045.

3The data in this paragraph is derived from tables developed by the American Association for the Advancement of Science, including “Federal R&D as a Percent of GDP” and “R&D as a Percent of the Total Federal Budget.” The tables are available here: https://www.aaas.org/page/historical-trends-federal-rd.


8The total number of employees reported is 8,301. Employee counts are not included for two small companies that were acquired and subsumed by much larger companies, Emotient by Apple and Inktank by Red Hat.

9According to the U.S. Small Business Administration Office of Advocacy, 80 percent of small businesses do not have any paid employees: https://www.sba.gov/sites/default/files/advocacy/SB-FAQ-2016_WEB.pdf.
## COMPANIES AT-A-GLANCE

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>LOCATION</th>
<th>FOUNDED</th>
<th>UNIVERSITY</th>
<th>EMPLOYEES</th>
<th>STATUS</th>
<th>INNOVATION</th>
<th>FUNDING AGENCY</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>3PrimeDx, Inc.</td>
<td>Chicago, IL</td>
<td>2014</td>
<td>University of Illinois at Chicago</td>
<td>7</td>
<td>Private</td>
<td>Diagnostic blood test to predict and prevent sudden cardiac death risk</td>
<td>National Institutes of Health</td>
<td>$1,400,000</td>
</tr>
<tr>
<td>Acomni, LLC</td>
<td>Tuscon, AZ</td>
<td>2014</td>
<td>University of Arizona</td>
<td>3</td>
<td>Private</td>
<td>Technology to forecast a home’s heating and cooling expenses, letting users decide how much they wish to spend</td>
<td>National Science Foundation</td>
<td>$350,000</td>
</tr>
<tr>
<td>Adarza Biosystems, Inc.</td>
<td>West Henrietta, NY</td>
<td>2008</td>
<td>University of Rochester</td>
<td>21</td>
<td>Private</td>
<td>Label-free biosensor assays and instruments for life science research and drug development</td>
<td>National Institutes of Health</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Aeglea BioTherapeutics</td>
<td>Austin, TX</td>
<td>2013</td>
<td>University of Texas at Austin</td>
<td>30</td>
<td>Public</td>
<td>Treatments for genetic rare diseases and cancers associated with abnormal amino acid metabolism</td>
<td>National Institutes of Health</td>
<td>not available</td>
</tr>
<tr>
<td>Agilis Biotherapeutics</td>
<td>Cambridge, MA</td>
<td>2013</td>
<td>University of South Florida</td>
<td>4</td>
<td>Private</td>
<td>DNA therapeutics for rare genetic diseases affecting the central nervous system</td>
<td>National Institutes of Health</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>AGTC</td>
<td>Alachua, FL</td>
<td>1999</td>
<td>University of Florida</td>
<td>58</td>
<td>Public</td>
<td>Using gene therapy to develop cures for rare eye diseases</td>
<td>National Institutes of Health</td>
<td>$7,040,000</td>
</tr>
<tr>
<td>AnswerDash, Inc.</td>
<td>Seattle, WA</td>
<td>2013</td>
<td>University of Washington</td>
<td>17</td>
<td>Private</td>
<td>Contextual self-service help for websites</td>
<td>National Science Foundation</td>
<td>$510,000</td>
</tr>
<tr>
<td>Aortica Corporation</td>
<td>Bellevue, WA</td>
<td>2014</td>
<td>University of Washington</td>
<td>9</td>
<td>Private</td>
<td>Software enables physician modification of endografts for treatment of complex abdominal aortic aneurysms</td>
<td>National Institutes of Health</td>
<td>$303,000</td>
</tr>
<tr>
<td>Applied Dexterity, Inc.</td>
<td>Seattle, WA</td>
<td>2012</td>
<td>University of Washington</td>
<td>4</td>
<td>Private</td>
<td>The RAVEN surgical robotics research platform</td>
<td>Department of Defense, National Science Foundation</td>
<td>$635,045</td>
</tr>
<tr>
<td>Arvinas, Inc.</td>
<td>New Haven, CT</td>
<td>2013</td>
<td>Yale University</td>
<td>31</td>
<td>Private</td>
<td>Drugs for blood cancers that “tag” disease-causing proteins for destruction</td>
<td>National Institutes of Health</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>COMPANY</td>
<td>LOCATION</td>
<td>FOUNDED</td>
<td>UNIVERSITY</td>
<td>EMPLOYEES</td>
<td>STATUS</td>
<td>INNOVATION</td>
<td>FUNDING AGENCY</td>
<td>AMOUNT</td>
</tr>
<tr>
<td>----------------------------</td>
<td>----------------------</td>
<td>---------</td>
<td>---------------------------------</td>
<td>-----------</td>
<td>---------</td>
<td>---------------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>--------------</td>
</tr>
<tr>
<td>AsclepiX Therapeutics, LLC</td>
<td>Baltimore, MD</td>
<td>2011</td>
<td>Johns Hopkins University</td>
<td>4</td>
<td>Private</td>
<td>Using bioinformatics to develop peptide drugs for ocular diseases</td>
<td>National Institutes of Health</td>
<td>$1,500,000</td>
</tr>
<tr>
<td>Auxadyne, LLC</td>
<td>Keystone Heights, FL</td>
<td>2015</td>
<td>Florida State University</td>
<td>1</td>
<td>Private</td>
<td>High performance foam padding for medical devices and protective equipment</td>
<td>Department of Defense, Department of Veterans Affairs</td>
<td>$4,900,000</td>
</tr>
<tr>
<td>Ball Aerospace &amp; Technologies Corp.</td>
<td>Broomfield, CO</td>
<td>1956</td>
<td>University of Colorado Boulder</td>
<td>2,800</td>
<td>Public</td>
<td>Instruments, spacecraft, data exploitation solutions and technologies for civil, commercial, aerospace and defense applications</td>
<td>Department of Defense</td>
<td>not available</td>
</tr>
<tr>
<td>Beta Bionics, Inc.</td>
<td>Boston, MA</td>
<td>2015</td>
<td>Boston University</td>
<td>12</td>
<td>Private</td>
<td>Portable, wearable electronic device to automate type 1 diabetes management</td>
<td>National Institutes of Health</td>
<td>$9,200,000</td>
</tr>
<tr>
<td>BioFront Technologies</td>
<td>Tallahassee, FL</td>
<td>2011</td>
<td>Florida State University</td>
<td>1</td>
<td>Private</td>
<td>Technologies and services for detecting food allergens and infectious diseases</td>
<td>Department of Agriculture, National Institutes of Health</td>
<td>$1,300,000</td>
</tr>
<tr>
<td>Blackrock Microsystems</td>
<td>Salt Lake City, UT</td>
<td>2008</td>
<td>University of Utah</td>
<td>50</td>
<td>Private</td>
<td>Advanced tools for neuroscience, neural engineering and neuro-prosthetics research and clinical work</td>
<td>Department of Defense, National Institutes of Health</td>
<td>$12,000,000</td>
</tr>
<tr>
<td>BluHaptics, Inc.</td>
<td>Seattle, WA</td>
<td>2013</td>
<td>University of Washington</td>
<td>6</td>
<td>Private</td>
<td>Technology enables telerobotic work in complex and challenging environments</td>
<td>National Science Foundation</td>
<td>$325,000</td>
</tr>
<tr>
<td>Caribou Biosciences, Inc.</td>
<td>Berkeley, CA</td>
<td>2011</td>
<td>University of California, Berkeley</td>
<td>38</td>
<td>Private</td>
<td>New applications for CRISPR-Cas gene editing</td>
<td>National Institutes of Health, National Science Foundation</td>
<td>$1,320,000</td>
</tr>
<tr>
<td>CartoFusion Technologies, Inc.</td>
<td>Corpus Christi, TX</td>
<td>2015</td>
<td>Texas A&amp;M University</td>
<td>3</td>
<td>Private</td>
<td>Mapping software allows multiple people to simultaneously and collaboratively make maps</td>
<td>National Science Foundation</td>
<td>$100,000</td>
</tr>
<tr>
<td>Clerio Vision, Inc.</td>
<td>Rochester, NY</td>
<td>2014</td>
<td>University of Rochester</td>
<td>12</td>
<td>Private</td>
<td>Vision correction procedure non-invasively writes a corrective prescription onto the cornea</td>
<td>National Institutes of Health</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>COMPANY</td>
<td>LOCATION</td>
<td>FOUNDED</td>
<td>UNIVERSITY</td>
<td>EMPLOYEES</td>
<td>STATUS</td>
<td>INNOVATION</td>
<td>FUNDING AGENCY</td>
<td>AMOUNT</td>
</tr>
<tr>
<td>-------------------------</td>
<td>------------------</td>
<td>---------</td>
<td>--------------------------------------</td>
<td>-----------</td>
<td>--------</td>
<td>----------------------------------------------------------------------------</td>
<td>------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Codapillar Inc.</td>
<td>New York, NY</td>
<td>2015</td>
<td>Pace University</td>
<td>2</td>
<td>Private</td>
<td>Education technology platform that teaches middle and high school students how to code</td>
<td>National Science Foundation</td>
<td>$20,000</td>
</tr>
<tr>
<td>Codelucia, LLC</td>
<td>Tuscon, AZ</td>
<td>2012</td>
<td>University of Arizona</td>
<td>3</td>
<td>Private</td>
<td>Error correction technology for next generation solid state drives</td>
<td>National Science Foundation</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Conidio Tec, LLC</td>
<td>State College, PA</td>
<td>2014</td>
<td>Penn State University</td>
<td>0</td>
<td>Private</td>
<td>Non-toxic product prevents and controls bed bugs</td>
<td>Department of Agriculture</td>
<td>$70,000</td>
</tr>
<tr>
<td>ContraFect Corporation</td>
<td>Yonkers, NY</td>
<td>2010</td>
<td>The Rockefeller University</td>
<td>50</td>
<td>Public</td>
<td>Therapeutic proteins and antibodies to treat deadly drug-resistant diseases</td>
<td>Department of Defense</td>
<td>$4,000,000</td>
</tr>
<tr>
<td>Core Quantum Technologies, Inc.</td>
<td>Columbus, OH</td>
<td>2012</td>
<td>The Ohio State University</td>
<td>2</td>
<td>Private</td>
<td>Using quantum dots for cancer detection</td>
<td>National Science Foundation</td>
<td>$620,000</td>
</tr>
<tr>
<td>Crossbar, Inc.</td>
<td>Santa Clara, CA</td>
<td>2010</td>
<td>University of Michigan</td>
<td>50</td>
<td>Private</td>
<td>ReRAM memory chips and IP blocks</td>
<td>National Science Foundation</td>
<td>$700,000</td>
</tr>
<tr>
<td>CytomX Therapeutics, Inc.</td>
<td>South San Francisco, CA</td>
<td>2010</td>
<td>University of California, Santa Barbara</td>
<td>60</td>
<td>Public</td>
<td>Cancer therapies that remain inactive in the body until reaching their intended target</td>
<td>National Institutes of Health, National Science Foundation</td>
<td>$1,300,000</td>
</tr>
<tr>
<td>Dataware Ventures, LLC</td>
<td>Tuscon, AZ</td>
<td>2012</td>
<td>University of Arizona</td>
<td>9</td>
<td>Private</td>
<td>Software that speeds up the flow of data through applications, optimizing performance</td>
<td>National Science Foundation</td>
<td>$1,600,000</td>
</tr>
<tr>
<td>DoseOptics LLC</td>
<td>Lebanon, NH</td>
<td>2015</td>
<td>Dartmouth</td>
<td>5</td>
<td>Private</td>
<td>Novel camera provides real-time tracking and verification of radiation dosage to patients</td>
<td>National Institutes of Health</td>
<td>$3,400,000</td>
</tr>
<tr>
<td>ECM Technologies, LLC</td>
<td>Houston, TX</td>
<td>2007</td>
<td>Texas A&amp;M University</td>
<td>1</td>
<td>Private</td>
<td>Designer collagens developed from non-animal proteins for biomedical use</td>
<td>National Institutes of Health</td>
<td>$50,000</td>
</tr>
<tr>
<td>eFFector Therapeutics</td>
<td>San Diego, CA</td>
<td>2013</td>
<td>University of California, San Francisco</td>
<td>27</td>
<td>Private</td>
<td>Drugs to treat cancer by selectively regulating protein synthesis</td>
<td>National Institutes of Health</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>Emotient, now part of Apple</td>
<td>San Diego, CA</td>
<td>2012</td>
<td>University of California, San Diego</td>
<td>N/A</td>
<td>Acquired 2016</td>
<td>Software uses facial recognition technology to detect consumer emotions</td>
<td>Department of Defense, National Institutes of Health, National Science Foundation</td>
<td>$1,500,000</td>
</tr>
<tr>
<td>Emu Solutions Inc.</td>
<td>South Bend, IN</td>
<td>2010</td>
<td>University of Notre Dame</td>
<td>20</td>
<td>Private</td>
<td>Exascale-capable computing architecture designed for Big Data</td>
<td>Department of Defense</td>
<td>$6,000,000</td>
</tr>
<tr>
<td>COMPANY</td>
<td>LOCATION</td>
<td>FOUNDED</td>
<td>UNIVERSITY</td>
<td>EMPLOYEES</td>
<td>STATUS</td>
<td>INNOVATION</td>
<td>FUNDING AGENCY</td>
<td>AMOUNT</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------</td>
<td>---------</td>
<td>-------------------------------</td>
<td>-----------</td>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>EpiBone, Inc.</td>
<td>Brooklyn, NY</td>
<td>2013</td>
<td>Columbia University</td>
<td>15</td>
<td>Private</td>
<td>Personalized, anatomically correct bone grafts</td>
<td>National Institutes of Health</td>
<td>$4,600,000</td>
</tr>
<tr>
<td>Epicrop Technologies Inc.</td>
<td>Lincoln, NE</td>
<td>2013</td>
<td>University of Nebraska</td>
<td>8</td>
<td>Private</td>
<td>Epigenetic-based technology that improves crop yields without affecting plant DNA</td>
<td>Department of Energy, National Science Foundation</td>
<td>$600,000</td>
</tr>
<tr>
<td>FastBridge Learning, LLC</td>
<td>Minneapolis, MN</td>
<td>2015</td>
<td>University of Minnesota</td>
<td>20</td>
<td>Private</td>
<td>Evidence-based classroom assessments to support individualized instruction decisions</td>
<td>Department of Education</td>
<td>$10,000,000</td>
</tr>
<tr>
<td>FORGE Life Science</td>
<td>Doylestown, PA</td>
<td>2012</td>
<td>Princeton University</td>
<td>8</td>
<td>Private</td>
<td>Broad spectrum antivirals and vaccines</td>
<td>National Institutes of Health</td>
<td>$300,000</td>
</tr>
<tr>
<td>FreshAir Sensor LLC</td>
<td>Lebanon, NH</td>
<td>2013</td>
<td>Dartmouth</td>
<td>14</td>
<td>Private</td>
<td>Novel sensors that detect and report nicotine and marijuana smoke in unauthorized areas</td>
<td>National Institutes of Health, National Science Foundation</td>
<td>$450,000</td>
</tr>
<tr>
<td>gel-e Life Sciences</td>
<td>College Park, MD</td>
<td>2010</td>
<td>University of Maryland</td>
<td>3</td>
<td>Private</td>
<td>A material, available in multiple forms, which can stop almost any type of bleeding</td>
<td>National Science Foundation</td>
<td>$500,000</td>
</tr>
<tr>
<td>Gemstone Biotherapeutics LLC</td>
<td>Baltimore, MD</td>
<td>2013</td>
<td>Johns Hopkins University</td>
<td>5</td>
<td>Private</td>
<td>Regenerative wound-care technology</td>
<td>National Institutes of Health</td>
<td>$4,000,000</td>
</tr>
<tr>
<td>Genome Profiling LLC</td>
<td>Newark, DE</td>
<td>2014</td>
<td>University of Delaware</td>
<td>10</td>
<td>Private</td>
<td>Novel epigenetic biomarkers from next-generation genome sequencing data to accelerate the promise of precision medicine</td>
<td>National Science Foundation</td>
<td>$800,000</td>
</tr>
<tr>
<td>GPB Scientific, LLC</td>
<td>Richmond, VA</td>
<td>2002</td>
<td>Princeton University</td>
<td>10</td>
<td>Private</td>
<td>Liquid biopsy technology isolates and identifies tumor cells in the blood</td>
<td>Department of Defense, National Institutes of Health, National Science Foundation</td>
<td>not available</td>
</tr>
<tr>
<td>Guavus Inc.</td>
<td>San Mateo, CA</td>
<td>2006</td>
<td>Boston University</td>
<td>250</td>
<td>Private</td>
<td>Big Data analytics operations for businesses</td>
<td>National Science Foundation</td>
<td>$6,000,000</td>
</tr>
<tr>
<td>Hexatech Inc.</td>
<td>Morrisville, NC</td>
<td>2001</td>
<td>North Carolina State University</td>
<td>22</td>
<td>Private</td>
<td>Aluminum nitride semiconductor crystals</td>
<td>Department of Defense</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>HistoSoniccs, Inc.</td>
<td>Ann Arbor, MI</td>
<td>2010</td>
<td>University of Michigan</td>
<td>13</td>
<td>Private</td>
<td>Histotripsy tool for precise tissue ablation</td>
<td>National Institutes of Health</td>
<td>$6,500,000</td>
</tr>
<tr>
<td>HylaPharm</td>
<td>Lawrence, KS</td>
<td>2010</td>
<td>University of Kansas</td>
<td>8</td>
<td>Private</td>
<td>Chemotherapies that are injected directly into a tumor to treat locally advanced cancers</td>
<td>Department of Defense, National Institutes of Health</td>
<td>$2,500,000</td>
</tr>
<tr>
<td>COMPANY</td>
<td>LOCATION</td>
<td>FOUNDED</td>
<td>UNIVERSITY</td>
<td>EMPLOYEES</td>
<td>STATUS</td>
<td>INNOVATION</td>
<td>FUNDING AGENCY</td>
<td>AMOUNT</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>-------------------</td>
<td>---------</td>
<td>-----------------------------------</td>
<td>-----------</td>
<td>-------------</td>
<td>----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>IDx, LLC</td>
<td>Iowa City, IA</td>
<td>2010</td>
<td>University of Iowa</td>
<td>17</td>
<td>Private</td>
<td>A fully automated tool for retinal imaging and disease detection</td>
<td>Department of Agriculture, National Institutes of Health, Department of Veterans Affairs</td>
<td>$2,750,000</td>
</tr>
<tr>
<td>InkTank, now part of Red Hat</td>
<td>Raleigh, NC</td>
<td>2012</td>
<td>University of California, Santa Cruz</td>
<td>N/A</td>
<td>Acquired 2014</td>
<td>Open-source cloud storage software for data systems</td>
<td>Department of Energy</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>IntelliCyt Corporation</td>
<td>Alburquerque, NM</td>
<td>2006</td>
<td>University of New Mexico</td>
<td>55</td>
<td>Acquired 2016</td>
<td>High throughput cell screening solutions for drug discovery and research</td>
<td>National Institutes of Health</td>
<td>not available</td>
</tr>
<tr>
<td>Inter Seeder Technologies LLC</td>
<td>Woodward, PA</td>
<td>2014</td>
<td>Penn State University</td>
<td>2</td>
<td>Private</td>
<td>Tool enables efficient planting of cover crops between rows of cash crops</td>
<td>Department of Agriculture</td>
<td>$10,000</td>
</tr>
<tr>
<td>Itaconix Corporation, a wholly-owned subsidiary of Revolymer plc</td>
<td>Stratham, NH</td>
<td>2008</td>
<td>University of New Hampshire</td>
<td>19</td>
<td>Acquired 2016</td>
<td>Bio-based polymers made from itaconic acid for use in detergents, personal care products and industrial coatings</td>
<td>National Science Foundation</td>
<td>$320,000</td>
</tr>
<tr>
<td>Kapteyn-Murnane Laboratories Inc.</td>
<td>Boulder, CO</td>
<td>1994</td>
<td>University of Colorado Boulder</td>
<td>28</td>
<td>Private</td>
<td>Ultrashort-pulse femtosecond laser systems for imaging, measurement and research</td>
<td>National Science Foundation</td>
<td>$7,500,000</td>
</tr>
<tr>
<td>Klogene Therapeutics, Inc.</td>
<td>Boston, MA</td>
<td>2015</td>
<td>Boston University</td>
<td>5</td>
<td>Private</td>
<td>Small molecule drug for treatment of Alzheimer’s disease</td>
<td>National Institutes of Health</td>
<td>$1,490,000</td>
</tr>
<tr>
<td>Liquid Biotech USA, Inc.</td>
<td>Audubon, PA</td>
<td>2015</td>
<td>University of Pennsylvania</td>
<td>2</td>
<td>Private</td>
<td>A rapid, non-invasive “liquid biopsy” test for cancer screening and early detection</td>
<td>National Institutes of Health</td>
<td>$932,000</td>
</tr>
<tr>
<td>LiquiGlide Inc.</td>
<td>Cambridge, MA</td>
<td>2012</td>
<td>Massachusetts Institute of Technology</td>
<td>12</td>
<td>Private</td>
<td>Coating technology allows viscous liquids to move easily</td>
<td>Department of Defense, National Science Foundation</td>
<td>$250,000</td>
</tr>
<tr>
<td>Lodo Therapeutics Corporation</td>
<td>New York, NY</td>
<td>2015</td>
<td>The Rockefeller University</td>
<td>5</td>
<td>Private</td>
<td>Using soil microbials to create therapeutics for resistant infectious diseases and cancer</td>
<td>National Institutes of Health</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>M3 Biotechnology</td>
<td>Seattle, WA</td>
<td>2011</td>
<td>Washington State University</td>
<td>15</td>
<td>Private</td>
<td>Therapeutics to alter progression of Alzheimer’s disease and other forms of neuro-deterioration</td>
<td>Department of Defense, National Institutes of Health, National Science Foundation</td>
<td>$840,000</td>
</tr>
<tr>
<td>Modulated Imaging, Inc.</td>
<td>Irvine, CA</td>
<td>2008</td>
<td>University of California, Irvine</td>
<td>5</td>
<td>Private</td>
<td>Light-based imaging devices for preventing, treating and curing medical skin conditions</td>
<td>Department of Defense, National Institutes of Health</td>
<td>not available</td>
</tr>
<tr>
<td>COMPANY</td>
<td>LOCATION</td>
<td>FOUNDED</td>
<td>UNIVERSITY</td>
<td>EMPLOYEES</td>
<td>STATUS</td>
<td>INNOVATION</td>
<td>FUNDING AGENCY</td>
<td>AMOUNT</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>---------------</td>
<td>----------</td>
<td>-------------------------------------------------</td>
<td>-----------</td>
<td>--------------</td>
<td>-------------------------------------------------</td>
<td>----------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Moterum, LLC</td>
<td>Greenville, SC</td>
<td>2014</td>
<td>University of South Florida</td>
<td>2</td>
<td>Private</td>
<td>Medical devices to aid mobility, rehabilitation and physical therapy</td>
<td>National Institutes of Health</td>
<td>$103,000</td>
</tr>
<tr>
<td>Nanosys, Inc.</td>
<td>Milpitas, CA</td>
<td>2001</td>
<td>University of California, Berkeley and Lawrence Berkeley National Laboratory</td>
<td>100</td>
<td>Private</td>
<td>Quantum dot technology for color-accurate, energy efficient electronic displays</td>
<td>Department of Energy</td>
<td>not available</td>
</tr>
<tr>
<td>Naurex, Inc., acquired by Allergan</td>
<td>Evanston, IL</td>
<td>2008</td>
<td>Northwestern University</td>
<td>5</td>
<td>Acquired 2015</td>
<td>Therapies for central nervous system disorders</td>
<td>Department of Defense, National Institutes of Health</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>NemaMetrix Inc.</td>
<td>Eugene, OR</td>
<td>2011</td>
<td>University of Oregon</td>
<td>10</td>
<td>Private</td>
<td>Portable, fast ScreenChip system for environmental testing and drug discovery</td>
<td>National Institutes of Health</td>
<td>$500,000</td>
</tr>
<tr>
<td>Network Perception</td>
<td>Champaign, IL</td>
<td>2013</td>
<td>University of Illinois at Urbana-Champaign</td>
<td>7</td>
<td>Private</td>
<td>Software illuminates firewall risks in complex computer networks</td>
<td>Department of Homeland Security, National Science Foundation</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Nexgenia, Inc.</td>
<td>Seattle, WA</td>
<td>2011</td>
<td>University of Washington</td>
<td>8</td>
<td>Private</td>
<td>Magnetic nanoparticles to improve cell separations for applications in personalized immunotherapies</td>
<td>National Institutes of Health</td>
<td>$10,000,000</td>
</tr>
<tr>
<td>NimbleGen Systems, Inc., operating as Roche NimbleGen</td>
<td>Madison, WI</td>
<td>1999</td>
<td>University of Wisconsin-Madison</td>
<td>85</td>
<td>Acquired 2007</td>
<td>High-density DNA microarrays for pharmaceutical research</td>
<td>National Institutes of Health</td>
<td>$150,000</td>
</tr>
<tr>
<td>Open Water Power, Inc.</td>
<td>Somerville, MA</td>
<td>2013</td>
<td>Massachusetts Institute of Technology</td>
<td>10</td>
<td>Private</td>
<td>A technology for underwater energy storage and power generation</td>
<td>Department of Defense</td>
<td>$400,000</td>
</tr>
<tr>
<td>Organovo Holdings, Inc.</td>
<td>San Diego, CA</td>
<td>2007</td>
<td>University of Missouri</td>
<td>115</td>
<td>Public</td>
<td>Functional, three-dimensional human tissues for research, development and therapy</td>
<td>National Science Foundation</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>Paper Battery Company</td>
<td>Troy, NY</td>
<td>2008</td>
<td>Rensselaer Polytechnic Institute</td>
<td>15</td>
<td>Private</td>
<td>An ultrathin, high energy, flexible &quot;paper&quot; battery</td>
<td>National Science Foundation</td>
<td>$100,000</td>
</tr>
<tr>
<td>Personalis Inc.</td>
<td>Menlo Park, CA</td>
<td>2011</td>
<td>Stanford University</td>
<td>89</td>
<td>Private</td>
<td>Next-gen sequencing services for precision medicine</td>
<td>National Institutes of Health, National Science Foundation</td>
<td>not available</td>
</tr>
<tr>
<td>PhageTech, Inc.</td>
<td>Irvine, CA</td>
<td>2014</td>
<td>University of California, Irvine</td>
<td>11</td>
<td>Private</td>
<td>Bio-conducting platform for developing faster, simpler medical lab tests</td>
<td>National Institutes of Health, National Science Foundation</td>
<td>$2,200,000</td>
</tr>
<tr>
<td>Pharmacyclics, an AbbVie Company</td>
<td>Sunnyvale, CA</td>
<td>1991</td>
<td>University of Texas at Austin</td>
<td>500</td>
<td>Acquired 2015</td>
<td>Cancer treatments and therapies for immune-mediated inflammatory diseases</td>
<td>National Institutes of Health, National Science Foundation</td>
<td>not available</td>
</tr>
</tbody>
</table>

26 // The Science Coalition
<table>
<thead>
<tr>
<th>COMPANY</th>
<th>LOCATION</th>
<th>FOUNDED</th>
<th>UNIVERSITY</th>
<th>EMPLOYEES</th>
<th>STATUS</th>
<th>INNOVATION</th>
<th>FUNDING AGENCY</th>
<th>AMOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>PhotoniCare, Inc.</td>
<td>Champaign, IL</td>
<td>2013</td>
<td>University of Illinois at Urbana-Champaign</td>
<td>9</td>
<td>Private</td>
<td>Tool enables physicians to look through the eardrum into the middle ear to see and better treat disease</td>
<td>National Institutes of Health, National Science Foundation</td>
<td>$5,500,000</td>
</tr>
<tr>
<td>PLS 3rd Learning</td>
<td>Buffalo, NY</td>
<td>2007</td>
<td>University at Buffalo</td>
<td>70</td>
<td>Private</td>
<td>Web portals provide access to K-12 teaching materials in the U.S. and around the world</td>
<td>Department of Education</td>
<td>$1,200,000</td>
</tr>
<tr>
<td>Preora Diagnostics Inc.</td>
<td>Evanston, IL</td>
<td>2015</td>
<td>Northwestern University</td>
<td>9</td>
<td>Private</td>
<td>A simple, non-invasive test for early cancer detection</td>
<td>National Institutes of Health, National Science Foundation</td>
<td>$20,000,000</td>
</tr>
<tr>
<td>Promentis Pharmaceuticals, Inc.</td>
<td>Milwaukee, WI</td>
<td>2007</td>
<td>Marquette University</td>
<td>5</td>
<td>Private</td>
<td>Compounds for treating schizophrenia and other central nervous system disorders</td>
<td>National Institutes of Health</td>
<td>$1,800,000</td>
</tr>
<tr>
<td>Prommune, Inc.</td>
<td>Omaha, NE</td>
<td>2002</td>
<td>University of Nebraska</td>
<td>1</td>
<td>Private</td>
<td>Vaccine development technology that relies on the body’s natural immune defenses</td>
<td>National Institutes of Health</td>
<td>$2,900,000</td>
</tr>
<tr>
<td>Psikick</td>
<td>Ann Arbor, MI</td>
<td>2013</td>
<td>University of Michigan</td>
<td>25</td>
<td>Private</td>
<td>The world’s lowest-power wireless sensing devices</td>
<td>National Science Foundation</td>
<td>$3,100,000</td>
</tr>
<tr>
<td>Q-State Biosciences, Inc.</td>
<td>Cambridge, MA</td>
<td>2013</td>
<td>Harvard University</td>
<td>23</td>
<td>Private</td>
<td>Stem cell and optogenetic technologies for drug discovery</td>
<td>Department of Defense, National Institutes of Health</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>Quantitative Radiology</td>
<td>Philadelphia, PA</td>
<td>2013</td>
<td>University of Pennsylvania</td>
<td>2</td>
<td>Private</td>
<td>Automatic Anatomy Recognition technology analyzes medical images to improve radiation therapy planning</td>
<td>National Institutes of Health</td>
<td>$2,500,000</td>
</tr>
<tr>
<td>SAGE Therapeutics</td>
<td>Cambridge, MA</td>
<td>2010</td>
<td>University of California, Davis</td>
<td>62</td>
<td>Public</td>
<td>Medicines to treat life-threatening central nervous system disorders</td>
<td>Department of Defense</td>
<td>$8,000,000</td>
</tr>
<tr>
<td>Scipher</td>
<td>Boston, MA</td>
<td>2014</td>
<td>Northeastern University</td>
<td>4</td>
<td>Private</td>
<td>Identifying new indications for existing safe drugs and predicting which patients will respond to a particular drug</td>
<td>National Institutes of Health</td>
<td>$300,000</td>
</tr>
<tr>
<td>Semma Therapeutics</td>
<td>Cambridge, MA</td>
<td>2015</td>
<td>Harvard University</td>
<td>25</td>
<td>Private</td>
<td>Turning stem cells into insulin-producing cells for patients with type 1 diabetes</td>
<td>National Institutes of Health</td>
<td>not available</td>
</tr>
<tr>
<td>COMPANY</td>
<td>LOCATION</td>
<td>FOUNDED</td>
<td>UNIVERSITY</td>
<td>EMPLOYEES</td>
<td>STATUS</td>
<td>INNOVATION</td>
<td>FUNDING AGENCY</td>
<td>AMOUNT</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------</td>
<td>---------</td>
<td>-----------------------------------</td>
<td>-----------</td>
<td>--------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Sensorygen, Inc.</td>
<td>Encinitas, CA</td>
<td>2014</td>
<td>University of California, Riverside</td>
<td>3</td>
<td>Private</td>
<td>Naturally occurring, non-toxic chemicals that modify smell and taste mediated behavior</td>
<td>National Institutes of Health</td>
<td>$1,200,000</td>
</tr>
<tr>
<td>Silatronix</td>
<td>Madison, WI</td>
<td>2007</td>
<td>University of Wisconsin-Madison</td>
<td>16</td>
<td>Private</td>
<td>Organosilicon materials that improve the safety and enable extreme performance of lithium ion batteries</td>
<td>National Institute of Standards and Technology, National Science Foundation</td>
<td>$1,680,000</td>
</tr>
<tr>
<td>SLIPS Technologies, Inc.</td>
<td>Cambridge, MA</td>
<td>2014</td>
<td>Harvard University</td>
<td>12</td>
<td>Private</td>
<td>Fully slippery coating that solves sticky surface problems in medical, industrial and consumer applications</td>
<td>Department of Defense, Department of Energy</td>
<td>$3,000,000</td>
</tr>
<tr>
<td>SOAIR LLC</td>
<td>University, MS</td>
<td>2006</td>
<td>University of Mississippi</td>
<td>4</td>
<td>Private</td>
<td>Risk monitoring technology to prevent falls in older adults</td>
<td>Department of Defense</td>
<td>$537,000</td>
</tr>
<tr>
<td>SomaLogic, Inc.</td>
<td>Boulder, CO</td>
<td>2000</td>
<td>University of Colorado Boulder</td>
<td>168</td>
<td>Private</td>
<td>Proteomics technology for detecting and diagnosing disease</td>
<td>National Institutes of Health</td>
<td>$300,000</td>
</tr>
<tr>
<td>Spheryx, Inc.</td>
<td>New York, NY</td>
<td>2014</td>
<td>New York University</td>
<td>7</td>
<td>Private</td>
<td>Suspension analysis at the sub-microscopic level</td>
<td>Department of Defense, National Science Foundation</td>
<td>$2,000,000</td>
</tr>
<tr>
<td>Stasys Medical Corporation</td>
<td>Seattle, WA</td>
<td>2013</td>
<td>University of Washington</td>
<td>4</td>
<td>Private</td>
<td>Point-of-care device that measures blood clotting ability of trauma patients and patients taking anti-platelet medications</td>
<td>Department of Defense</td>
<td>$300,000</td>
</tr>
<tr>
<td>Stratatech, a Mallinckrodt Company</td>
<td>Madison, WI</td>
<td>2000</td>
<td>University of Wisconsin-Madison</td>
<td>60</td>
<td>Acquired 2016</td>
<td>Skin substitutes for research and treatment of burns, wounds and complex skin defects</td>
<td>National Institutes of Health</td>
<td>$2,860,000</td>
</tr>
<tr>
<td>SynchroPET Inc.</td>
<td>Stony Brook, NY</td>
<td>2013</td>
<td>Stony Brook University</td>
<td>3</td>
<td>Private</td>
<td>World’s smallest PET scanners, enabling simultaneous PET/ MRI devices</td>
<td>Department of Energy</td>
<td>$10,000,000</td>
</tr>
<tr>
<td>Tableau Software</td>
<td>Seattle, WA</td>
<td>2003</td>
<td>Stanford University</td>
<td>3,200</td>
<td>Public</td>
<td>Transformative software that uses computer graphics to improve data analysis and presentation</td>
<td>Department of Defense</td>
<td>not available</td>
</tr>
<tr>
<td>Thermal Expansion Solutions, LLC (dba Allvar)</td>
<td>College Station, TX</td>
<td>2014</td>
<td>Texas A&amp;M University</td>
<td>3</td>
<td>Private</td>
<td>Programmable metal alloys that change shape with temperature for use in optics</td>
<td>National Science Foundation</td>
<td>$250,000</td>
</tr>
<tr>
<td>COMPANY</td>
<td>LOCATION</td>
<td>FOUNDED</td>
<td>UNIVERSITY</td>
<td>EMPLOYEES</td>
<td>STATUS</td>
<td>INNOVATION</td>
<td>FUNDING AGENCY</td>
<td>AMOUNT</td>
</tr>
<tr>
<td>---------</td>
<td>----------</td>
<td>---------</td>
<td>------------</td>
<td>-----------</td>
<td>--------</td>
<td>------------</td>
<td>----------------</td>
<td>--------</td>
</tr>
<tr>
<td>Topera, Inc., operating as Abbott Electrophysiology</td>
<td>Menlo Park, CA</td>
<td>2010</td>
<td>University of California, San Diego</td>
<td>100</td>
<td>Acquired 2014</td>
<td>Mapping system for isolating the source of abnormal heart rhythms and pinpointing the location for treatment</td>
<td>National Institutes of Health</td>
<td>$3,300,000</td>
</tr>
<tr>
<td>Transposagen Biopharmaceuticals, Inc.</td>
<td>Lexington, KY</td>
<td>2003</td>
<td>University of Notre Dame</td>
<td>20</td>
<td>Private</td>
<td>Unique animal models, cell lines, stem cells and technologies for drug discovery</td>
<td>Department of Agriculture</td>
<td>$275,000</td>
</tr>
<tr>
<td>Tri Alpha Energy Inc.</td>
<td>Foothill Ranch, CA</td>
<td>1998</td>
<td>University of California, Irvine</td>
<td>150</td>
<td>Private</td>
<td>Pursuing commercially competitive clean fusion energy</td>
<td>Department of Defense, Department of Energy</td>
<td>$600,000</td>
</tr>
<tr>
<td>TriFusion Devices, a wholly owned subsidiary of Essentum Materials</td>
<td>College Station, TX</td>
<td>2016</td>
<td>Texas A&amp;M University</td>
<td>4</td>
<td>Acquired 2016</td>
<td>3-D printing products and services for manufacturing custom prosthetics</td>
<td>Department of Defense, National Science Foundation</td>
<td>$350,000</td>
</tr>
<tr>
<td>Tule Technologies LLC</td>
<td>Oakland, CA</td>
<td>2013</td>
<td>University of California, Davis</td>
<td>6</td>
<td>Private</td>
<td>Irrigation technology lets growers know when and how much to water their crops, maximizing yield and quality</td>
<td>Department of Agriculture</td>
<td>$300,000</td>
</tr>
<tr>
<td>Universal Cells, Inc.</td>
<td>Seattle, WA</td>
<td>2013</td>
<td>University of Washington</td>
<td>12</td>
<td>Private</td>
<td>Universal donor cells for regenerative medicine</td>
<td>National Institutes of Health</td>
<td>$30,600,000</td>
</tr>
<tr>
<td>Valtari Bio Inc.</td>
<td>Morgantown, WV</td>
<td>2014</td>
<td>West Virginia University</td>
<td>4</td>
<td>Private</td>
<td>A blood test for quick, accurate preliminary stroke diagnosis</td>
<td>Department of Defense, National Institutes of Health</td>
<td>$1,815,000</td>
</tr>
<tr>
<td>Veriflow</td>
<td>San Jose, CA</td>
<td>2013</td>
<td>University of Illinois at Urbana-Champaign</td>
<td>18</td>
<td>Private</td>
<td>Network verification technology to prevent costly outages and breaches</td>
<td>National Science Foundation</td>
<td>$581,000</td>
</tr>
<tr>
<td>Virtually Better, Inc.</td>
<td>Decatur, GA</td>
<td>1996</td>
<td>Emory University</td>
<td>24</td>
<td>Private</td>
<td>Virtual reality environments for treatment of behavioral and cognitive disorders</td>
<td>Department of Defense</td>
<td>$33,000</td>
</tr>
</tbody>
</table>
COMPANIES BY UNIVERSITY

Printable company fact sheets are available at www.sciencecoalition.org/successstories

Boston University
Beta Bionics, Inc.
Guavus Inc.
Klogene Therapeutics, Inc.

Columbia University
EpiBone, Inc.

Dartmouth
DoseOptics LLC
FreshAir Sensor LLC

Emory University
Virtually Better, Inc.

Florida State University
Auxadyne, LLC
BioFront Technologies

Harvard University
Q-State Biosciences, Inc.
Semma Therapeutics
SLIPS Technologies, Inc.

Johns Hopkins University
AsclepiX Therapeutics, LLC
Gemstone Biotherapeutics LLC

Marquette University
Promentis Pharmaceuticals, Inc.

Massachusetts Institute of Technology
LiquiGlide Inc.
Open Water Power, Inc.

New York University
Spheryx, Inc.

North Carolina State University
Hexatech Inc.

Northeastern University
Scipher

Northwestern University
Naurex, Inc., acquired by Allergan
Preora Diagnostics Inc.

Pace University
Codapillar Inc.

Penn State University
Conidio Tec, LLC
InterSeeder Technologies LLC

Princeton University
FORGE Life Science
GPB Scientific, LLC

Rensselaer Polytechnic Institute
Paper Battery Company

Stanford University
Personalis Inc.
Tableau Software

Stony Brook University
SynchroPET Inc.

Texas A&M University
CartoFusion Technologies, Inc.
ECM Technologies, LLC
Thermal Expansion Solutions, LLC (dba Allvar)
TriFusion Devices, a wholly owned subsidiary of Essentium Materials
The Ohio State University
Core Quantum Technologies, Inc.

The Rockefeller University
ContraFect Corporation
Lodo Therapeutics Corporation

University at Buffalo
PLS 3rd Learning

University of Arizona
Acomni, LLC
Codelucia, LLC
Dataware Ventures, LLC

University of California, Berkeley
Caribou Biosciences, Inc.

University of California, Berkeley &
Lawrence Berkeley National Laboratory
Nanosys, Inc.

University of California, Davis
SAGE Therapeutics
Tule Technologies LLC

University of California, Irvine
Modulated Imaging, Inc.
PhageTech, Inc.
Tri Alpha Energy Inc.

University of California, Riverside
Sensorygen, Inc.

University of California, San Diego
Emotient, now part of Apple
Topera, Inc., operating as
Abbott Electrophysiology

eFFector Therapeutics

University of California, Santa Barbara
CytomX Therapeutics, Inc.

University of California, Santa Cruz
InkTank, now part of Red Hat

University of Colorado Boulder
Ball Aerospace & Technologies Corp.
Kapteyn-Murnane Laboratories Inc.
SomaLogic, Inc.

University of Delaware
Genome Profiling LLC

University of Florida
AGTC

University of Illinois at Chicago
3PrimeDx, Inc.

University of Illinois at Urbana-Champaign
Network Perception
PhotoniCare, Inc.
Veriflow

University of Iowa
IDx, LLC

University of Kansas
HylaPharm

University of Maryland
gel-e Life Sciences

University of Michigan
Crossbar, Inc.
HistoSonsics, Inc.
Psikick

University of Minnesota
FastBridge Learning, LLC

University of Mississippi
SOAIR LLC

University of Missouri
Organovo Holdings, Inc.
<table>
<thead>
<tr>
<th>University of Nebraska</th>
<th>University of Wisconsin-Madison</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epicrop Technologies Inc.</td>
<td>NimbleGen Systems, Inc., promoting as Roche NimbleGen</td>
</tr>
<tr>
<td>Prommune, Inc.</td>
<td>Silatronix</td>
</tr>
<tr>
<td>University of New Hampshire</td>
<td>Stratatech, a Mallinckrodt Company</td>
</tr>
<tr>
<td>Itaconix Corporation, a wholly-owned subsidiary of Revolymer plc</td>
<td></td>
</tr>
<tr>
<td>University of New Mexico</td>
<td>Washington State University</td>
</tr>
<tr>
<td>IntelliCyt Corporation</td>
<td>M3 Biotechnology</td>
</tr>
<tr>
<td>University of Notre Dame</td>
<td>West Virginia University</td>
</tr>
<tr>
<td>Emu Solutions Inc.</td>
<td>Valtari Bio Inc.</td>
</tr>
<tr>
<td>Transposagen Biopharmaceuticals, Inc.</td>
<td>Yale University</td>
</tr>
<tr>
<td>University of Oregon</td>
<td>Arvinas, Inc.</td>
</tr>
<tr>
<td>NemaMetrix Inc.</td>
<td></td>
</tr>
<tr>
<td>University of Pennsylvania</td>
<td></td>
</tr>
<tr>
<td>Liquid Biotech USA, Inc.</td>
<td></td>
</tr>
<tr>
<td>Quantitative Radiology Solutions LLC</td>
<td></td>
</tr>
<tr>
<td>University of Rochester</td>
<td></td>
</tr>
<tr>
<td>Adarza Biosystems, Inc.</td>
<td></td>
</tr>
<tr>
<td>Clerio Vision, Inc.</td>
<td></td>
</tr>
<tr>
<td>University of South Florida</td>
<td></td>
</tr>
<tr>
<td>Agilis Biotherapeutics</td>
<td></td>
</tr>
<tr>
<td>Moterum, LLC</td>
<td></td>
</tr>
<tr>
<td>University of Texas at Austin</td>
<td></td>
</tr>
<tr>
<td>Aeglea BioTherapeutics</td>
<td></td>
</tr>
<tr>
<td>Pharmacyclics, an AbbVie Company</td>
<td></td>
</tr>
<tr>
<td>University of Utah</td>
<td></td>
</tr>
<tr>
<td>Blackrock Microsystems</td>
<td></td>
</tr>
<tr>
<td>University of Washington</td>
<td></td>
</tr>
<tr>
<td>AnswerDash, Inc.</td>
<td></td>
</tr>
<tr>
<td>Aortica Corporation</td>
<td></td>
</tr>
<tr>
<td>Applied Dexterity, Inc.</td>
<td></td>
</tr>
<tr>
<td>BluHaptics, Inc.</td>
<td></td>
</tr>
<tr>
<td>Nexgenia, Inc.</td>
<td></td>
</tr>
<tr>
<td>Stasys Medical Corporation</td>
<td></td>
</tr>
<tr>
<td>Universal Cells, Inc.</td>
<td></td>
</tr>
</tbody>
</table>
COMPANIES BY FUNDING AGENCY

Printable company fact sheets are available at www.sciencecoalition.org/successstories

**Department of Agriculture**
BioFront Technologies  
Conidio Tec, LLC  
IDx, LLC  
Inter Seeder Technologies LLC  
Transposagen Biopharmaceuticals, Inc.  
Tule Technologies LLC

**Department of Defense**
Applied Dexterity, Inc.  
Auxadyne, LLC  
Ball Aerospace & Technologies Corp.  
Blackrock Microsystems  
ContraFect Corporation  
Emotient, now part of Apple  
Emu Solutions Inc.  
GPB Scientific, LLC  
Hexatech Inc.  
HylaPharm  
LiquiGlide Inc.  
M3 Biotechnology  
Modulated Imaging, Inc.  
Naurex, Inc., acquired by Allergan  
Open Water Power, Inc.  
Q-State Biosciences, Inc.  
SAGE Therapeutics  
SLIPS Technologies, Inc.  
SOAIR LLC  
Spheryx, Inc.  
Stasys Medical Corporation  
Tableau Software  
Tri Alpha Energy, Inc.  
TriFusion Devices, a wholly owned subsidiary of Essentium Materials  
Valtari Bio Inc.  
Virtually Better, Inc.

**Department of Education**
FastBridge Learning, LLC  
PLS 3rd Learning

**Department of Energy**
Epicrop Technologies Inc.  
InkTank, now part of Red Hat  
Nanosys, Inc.  
SLIPS Technologies, Inc.  
SynchroPET Inc.  
Tri Alpha Energy Inc.

**Department of Homeland Security**
Network Perception

**Department of Veterans Affairs**
Auxadyne, LLC  
IDx, LLC

**National Institutes of Health**
3PrimeDx, Inc.  
Adarza Biosystems, Inc.  
Aeglea BioTherapeutics  
Agilis Biotherapeutics  
AGTC  
Aortica Corporation  
Arvinas, Inc.  
AsclepiX Therapeutics, LLC  
Beta Bionics, Inc.  
BioFront Technologies  
Blackrock Microsystems  
Caribou Biosciences, Inc.  
Clerio Vision, Inc.  
CytomX Therapeutics, Inc.  
DoseOptics LLC  
ECM Technologies, LLC  
eFFector Therapeutics  
Emotient, now part of Apple
**National Institutes of Health continued**

EpiBone, Inc.
FORGE Life Science
FreshAir Sensor LLC
Gemstone Biotherapeutics LLC
GPB Scientific, LLC
HistoSonics, Inc.
HylaPharm
IDx, LLC
IntelliCyt Corporation
Klogene Therapeutics, Inc.
Liquid Biotech USA, Inc.
Lodo Therapeutics Corporation
M3 Biotechnology
Modulated Imaging, Inc.
Moterum, LLC
Naurex, Inc., acquired by Allergan
NemaMetrix Inc.
Nexgenia, Inc.
NimbleGen Systems, Inc., operating as Roche NimbleGen
Personalis Inc.
PhageTech, Inc.
Pharmaceuticals, an AbbVie Company
PhotoniCare, Inc.
Preora Dagnostics Inc.
Promentis Pharmaceuticals, Inc.
Prommune, Inc.
Q-State Biosciences, Inc.
Quantitative Radiology Solutions LLC
Scipher
Semma Therapeutics
Sensorygen, Inc.
SomaLogic, Inc.
Stratatech, a Mallinckrodt Company
Topera, Inc., operating as Abbott Electrophysiology
Universal Cells, Inc.
Valtari Bio Inc.

**National Science Foundation**

Acomni, LLC
AnswerDash, Inc.
BluHaptics, Inc.
Caribou Biosciences, Inc.
CartoFusion Technologies, Inc.
Codapillar Inc.
Codelucia, LLC
Core Quantum Technologies, Inc.
Crossbar, Inc.
CytomX Therapeutics, Inc.
Dataware Ventures, LLC
Emotient, now part of Apple
Epicrop Technologies Inc.
FreshAir Sensor LLC
gel-e Life Sciences
Genome Profiling LLC
GPB Scientific, LLC
Guavus Inc.
Itaconix Corporation, a wholly-owned subsidiary of Revolymer plc
Kapteyn-Murnane Laboratories Inc.
LiquiGlide Inc.
M3 Biotechnology
Network Perception
Organovo Holdings, Inc.
Paper Battery Company
Personalis Inc.
PhageTech, Inc.
Pharmaceuticals, an AbbVie Company
PhotoniCare, Inc.
Preora Dagnostics Inc.
Psikick
Silatronix
Spheryx, Inc.
Thermal Expansion Solutions, LLC (dba Allvar)
TriFusion Devices, a wholly owned subsidiary of Essentium Materials
Veriflow

**National Institute of Standards and Technology**

Silatronix
COMPANIES BY STATE

Printable company fact sheets are available at www.sciencecoalition.org/successstories

**Arizona**
Acomni, LLC
Codelucia, LLC
Dataware Ventures, LLC

**California**
Caribou Biosciences, Inc.
Crossbar, Inc.
CytonX Therapeutics, Inc.
eFFector Therapeutics
Emotient, now part of Apple
Guavus Inc.
Modulated Imaging, Inc.
Nanosys, Inc.
Organovo Holdings, Inc.
Personalis Inc.
PhageTech, Inc.
Pharmacyclics, an AbbVie Company
Sensorygen, Inc.
Topera, Inc., operating as
Abbott Electrophysiology
Tri Alpha Energy Inc.
Tule Technologies LLC
Veriflow

**Colorado**
Ball Aerospace & Technologies Corp.
Kapteyn-Murnane Laboratories Inc.
SomaLogic, Inc.

**Connecticut**
Arvinas, Inc.

**Delaware**
Genome Profiling LLC

**Florida**
AGTC
Auxadyne, LLC
BioFront Technologies

**Georgia**
Virtually Better, Inc.

**Illinois**
3PrimeDx, Inc.
Naurex, Inc., acquired by Allergan
Network Perception
PhotoniCare, Inc.
Preora Diagnostics Inc.

**Indiana**
Emu Solutions Inc.

**Iowa**
IDx, LLC

**Kansas**
HylaPharm

**Kentucky**
Transposagen Biopharmaceuticals, Inc.

**Maryland**
AsclepiX Therapeutics, LLC
gel-e Life Sciences
Gemstone Biotherapeutics LLC

**Massachusetts**
Agilis Biotherapeutics
Beta Bionics, Inc.
Klogene Therapeutics, Inc.
LiquiGlide Inc.
Open Water Power, Inc.
Q-State Biosciences, Inc.
SAGE Therapeutics
Scipher
Semma Therapeutics
SLIPS Technologies, Inc.
Michigan
HistoSonics, Inc.
Psikick

Minnesota
FastBridge Learning, LLC

Mississippi
SOAIR LLC

Nebraska
Epicrop Technologies Inc.
Prommune, Inc.

New Hampshire
DoseOptics LLC
FreshAir Sensor LLC
Itaconix Corporation, a wholly-owned subsidiary of Revolymer plc

New Mexico
IntelliCyt Corporation

New York
Adarza Biosystems, Inc.
Clerio Vision, Inc.
Codapillar Inc.
ContraFect Corporation
EpiBone, Inc.
Lodo Therapeutics Corporation
Paper Battery Company
PLS 3rd Learning
Spheryx, Inc.
SynchroPET Inc.

North Carolina
Hexatech Inc.
InkTank, now part of Red Hat

Ohio
Core Quantum Technologies, Inc.

Oregon
NemaMetrix Inc.

Pennsylvania
Conidio Tec, LLC
FORGE Life Science
InterSeeder Technologies LLC
Liquid Biotech USA, Inc.
Quantitative Radiology Solutions LLC

South Carolina
Moterum, LLC

Texas
Aeglea BioTherapeutics
CartoFusion Technologies, Inc.
ECM Technologies, LLC
Thermal Expansion Solutions, LLC (dba Allvar)
TriFusion Devices, a wholly owned subsidiary of Essentium Materials

Utah
Blackrock Microsystems

Virginia
GPB Scientific, LLC

Washington
AnswerDash, Inc.
Aortica Corporation
Applied Dexterity, Inc.
BluHaptics, Inc.
M3 Biotechnology
Nexgenia, Inc.
Stasys Medical Corporation
Tableau Software
Universal Cells, Inc.

West Virginia
Valtari Bio Inc.

Wisconsin
NimbleGen Systems, Inc., operating as Roche NimbleGen
Promentis Pharmaceuticals, Inc.
Silatronix
Stratatech, a Mallinckrodt Company
SPARKING ECONOMIC GROWTH
VOLUME 1 AND 2 COMPANIES

Printable company fact sheets are available at www.sciencecoalition.org/successstories

The companies listed here are companies that were highlighted in one of the two earlier volumes of *Sparking Economic Growth*, which were released in 2010 and 2013. Of the 200 companies contained in Volume 1 and 2, 176 are operational today or have successfully merged with or been acquired by another company. Companies that have gone out of business are not listed. Companies are listed by their affiliated university.

**Arizona State University**
AzERx, Inc. (part of Capstone Therapeutics)
Molecular Imaging Inc. (part of Agilent)

**Auburn University**
HaloSource, Inc.

**Boston University**
Allegro Diagnostics
Sample6 Technologies
Sand9 (technology acquired by Analog Devices Inc. 2015)

**Brown University**
Acoustic Magic Inc.
Nabsys
Tivorsan Pharmaceuticals

**The City University of New York**
Phoebus Optoelectronics LLC

**Columbia University**
RemoteReality

**Cornell University**
Kionix Inc (wholly owned subsidiary of the ROHM Group)
Pacific Biosciences

**Dartmouth**
Immunext

**Emory University**
GeoVax Labs Inc.
Pharmasset Inc. (acquired by Gilead 2011)
Syntermed Inc.
Triangle Pharmaceutical (acquired by Gilead Sciences 2003)
Clearside Biomedical, Inc.
Inhibikase Therapeutics, Inc.
Octogen Corporation (acquired by Ipsen 2008)

**Harvard University**
Orbital Science Corporation (Orbital ATK Inc. as of 2015)
RainDance Technologies
Diagnostics for All (DFA)
Genocea Biosciences
Infinity Pharmaceuticals

**Indiana University**
FAST Diagnostics (now called FAST Biomedical)
ImmuneWorks
Therametric Tech Inc.

**Johns Hopkins University**
Reactive NanoTechnologies Inc. (acquired by Indium Corporation 2009)
Massachusetts Institute of Technology
Cerulean Pharma Inc.
Cognex Corporation
iRobot Corporation
Momenta Pharmaceuticals
Akamai Technology, Inc.
WiTricity Corporation

Michigan Technological University
Auros Inc.
ThermoAnalytics Inc.

New York University
Spin Transfer Technologies
SyntheZyme

North Carolina State University
BioMarck Pharmaceuticals
BioResource International (BRI)
CREE, Inc.
SAS
Agile Sciences, Inc.
Galaxy Diagnostics, Inc.
ImagineOptix
Physcient, Inc.

Northeastern University
Akrivis Technologies
Metamagnetics Inc.
Novobiotic

Northwestern University
American BioOptics
Polyera Corporation

Pennsylvania State University
Melanovus Oncology (acquired by Cipher Pharmaceuticals 2015)
Strategic Polymers Inc. (now Novesentis)
WatchStander

Princeton University
BioNanomatrix (now BioNano Genomics)
TetraLogic Pharm
Universal Display Corporation
Vorbeck Materials Inc.
Aculon, Inc.
Liquid Light
TAG Optics Inc.

Rensselaer Polytechnic Institute
Crystal IS, Inc.

Rutgers University
TYRX, Inc.

Stanford University
Amati Communications Corporation
(acquired by Texas Instruments 1997)
Cisco Systems
Genentech (a member of the Roche Group)
Google
Sun Microsystems (acquired by Oracle 2010)
SunPower Corporation
Xenogen (part of PerkinElmer)
KAI Pharmaceuticals
(acquired by Amgen 2012)
Lyncean Technologies, Inc.
Picarro, Inc.

Stony Brook University
General Sentiment
MesoScribe Technologies Inc.

Syracuse University
AptaMatrix
CollabWorx

Texas A&M University
frameraty
MacuCLEAR, Inc.

The Ohio State University
Nanofiber Solutions
University at Buffalo
Buffalo BioBlower Tech
Kinex Pharmaceuticals (now Athenex)
ONY, Inc.
Tonus Therapeutics

University of California, Berkeley
Cadence Design Systems
Amyris, Inc.

University of California, Davis
Dysonics Corporation

University of California, Irvine
ALEKS Corporation
Hiperwall Inc.
SoundCure

University of California, Los Angeles
Agensys, Inc.
ArmaGen Technologies, Inc.
Solarmer Energy Inc.
Holomic, LLC (now CELLMIC)
Tribogenics

University of California, San Diego
Genomatica, Inc.
Senomyx, Inc.

University of California, Santa Barbara
Aurrion
Eucalyptus Systems
Transphorm

University of Chicago
Chromatin, Inc.
Integrated Genomics
Maroon Biotech
Advanced Diamond Technologies (ADT), Inc.
Wisegene

University of Colorado Boulder
ColdQuanta, Inc.
LineRate Systems, Inc.

University of Florida
Banyan Biomarkers, Inc.
Sharklet Technologies, Inc.
Simat
Verenium Corp. (acquired by BASF 2013)
Axogen
NanoPhotonica

University of Illinois at Chicago
Cell Biologics
Cell Habitats
EPIR Technologies
Immersive Touch
Mobitrac, Inc. (acquired by Fluensee 2006)
OrthoAccel Technologies Inc.

University of Illinois at Urbana-Champaign
Eden Park Illumination Inc.
Semprius
TetraVitae Bioscience
Autonomic Material, Inc.
Xerion Advanced Battery Corp.

University of Iowa
Integrated DNA Technologies (IDT), Inc.

University of Kansas
CyDex Pharmaceuticals, Inc.
(acquired by Ligand Pharmaceuticals 2011)

University of Kentucky
Allylix, Inc. (acquired by Evolva 2014)
Mersive Technologies
Hummingbird Nano Inc.

University of Maryland
Zymetis Inc.
OmniSpeech, LLC

University of Michigan
Arbor Networks
HealthMedia, Inc.
(acquired by Johnson & Johnson 2008)
Lycera
Quantum Signal, LLC
University of Minnesota
Image Sensing Systems Inc.
Heat Mining Company, LLC (now TerraCOH)
Steady State Imaging, LLC
(acquired by GE Healthcare 2011)

University of Nebraska
J.A. Woollam Co.
LI-COR Biosciences
Virtual Incision Corporation
Ground Fluor Pharmaceuticals, Inc.
Trak Surgical, Inc.

University of Pennsylvania
Advaxis, Inc.
Avid Radiopharmaceuticals Inc.
VGX Pharmaceuticals
Axonia Medical, Inc.
CytoVas, LLC
Graphene Frontiers
RightCare Solutions, Inc.
(acquired by naviHealth 2015)

University of Rochester
iCardiac Technologies
Praxis Biologics (part of Pfizer)
Vaccinex Inc.
Koning Corporation
Science Take Out

University of Southern California
Audyssey Laboratories
Language Weaver
(now SDL Language Weaver)

University of South Florida
Nanopharma Technologies Inc.
Natura Therapeutics Inc.
Transgenex Nanobiotech Inc.
Saneron-CCEL Therapeutics

University of Texas at Austin
Molecular Imprints Inc.
(acquired by Canon 2014)

University of Utah
Myriad Genetics, Inc.

University of Virginia
Adenosine Therapeutics, LLC
(acquired by Clinical Data, Inc. 2008)
Directed Vapor Tech International

University of Wisconsin-Madison
FluGen Inc.
TomoTherapy Inc. (acquired by Accuray 2011)
Cellular Dynamics International (CDI), Inc.
Virent, Inc.

Virginia Tech
NanoSonic Inc.

Washington State University
Food Chain Safety

Wayne State University
Advaita Corporation

West Virginia University
Protea Bioscience Inc.

Yale University
Kolltan Pharmaceuticals, Inc.
The photos in this report were provided courtesy of the following organizations:

**About This Report from top to bottom:** Ball Aerospace & Technologies Corporation; Aortica Corporation / University of Washington; 3PrimeDX, Inc. / University of Illinois at Chicago; Sensorygen, Inc. / University of California, Riverside; Tri Alpha Energy Inc. / University of California, Irvine

**Page 1 clockwise from top:** Stratatech / University of Wisconsin-Madison; National Science Foundation; SLIPS Technologies, Inc. / Harvard University

**Page 2:** Ball Aerospace & Technologies Corporation

**Page 5 left to right:** Nanosys, Inc. / University of California, Berkeley; Core Quantum Technologies, Inc. / The Ohio State University

**Page 6 top to bottom:** Beta Bionics, Inc. / Boston University; Semma Therapeutics / Harvard University

**Page 7 top to bottom:** Tule Technologies LLC / University of California, Davis; InterSeeder Technologies LLC / Penn State University; Epicrop Technologies Inc. / University of Nebraska

**Page 8:** Preora Dianogstics Inc. / Northwestern University

**Page 9 top to bottom:** Valtari Bio Inc. / West Virginia University; 3PrimeDX, Inc. / University of Illinois at Chicago

**Page 10 top to bottom:** Fresh Air Sensor LLC; Acomni, LLC / University of Arizona

**Page 11 top to bottom:** Open Water Power, Inc. / MIT; Paper Battery Company; lithium-ion photo via iStock

**Page 12 top to bottom:** EpiBone, Inc.; Auxadyne, LLC / Florida State University; TriFusion Devices / Texas A&M University

**Page 13 top to bottom:** Codapillar Inc. / Pace University; PhotoniCare, Inc. / University of Illinois at Urbana-Champaign

**Page 15:** Photo via iStock

**Page 16:** Northern Illinois University

**Page 18:** Auburn University