USTAR

2018 ANNUAL REPORT

IMPACT AT A GLANCE

Since 2016,

USTAR CLIENT COMPANIES

have raised

$123.1 MILLION

in follow-on investment, generated

$27 MILLION

in commercialized product sales, and hired

424

full-time and part-time employees.

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WELCOME

"The study has found that USTAR is strategic for the State of Utah and aligned to the legislature's technology-based economic development goals and intent."

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*

WELCOME FROM THE CHAIR

Dear Governor, Legislators, Stakeholders, and Industry Partners:

On behalf of the Utah Science Technology and Research Initiative (USTAR) Governing Authority, I am pleased to share with you USTAR's annual report for fiscal year 2018.

The past year demonstrated USTAR's critical role in fostering technology-based economic development opportunities throughout Utah. Through these efforts, USTAR-supported companies brought in $62.7 million in follow-on investment, generated $22.1 million in sales and created 206 new jobs in calendar year 2017.

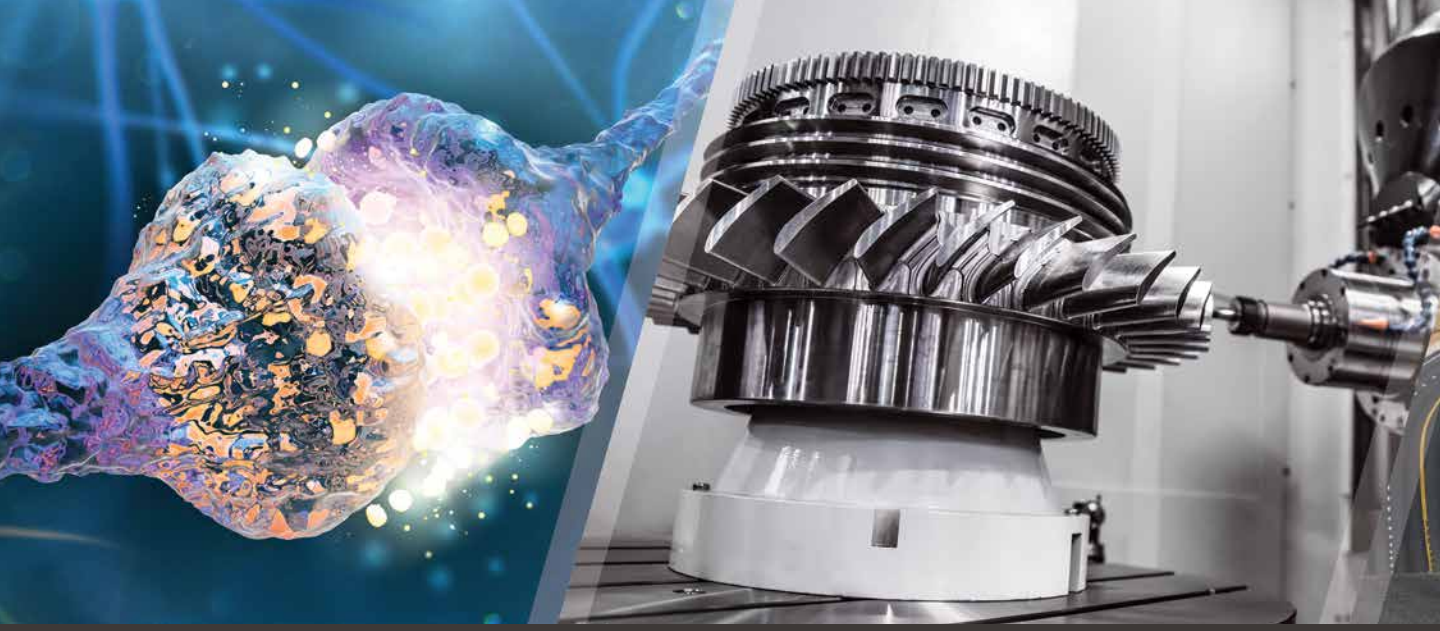
This report will delve deeper into these performance metrics, budgetary data, and economic impact of USTAR's programs. I also hope you take the time to explore this report to learn more about the vital role USTAR's technology-based economic development plays in ensuring Utah's overall economic prosperity by helping to innovate new technologies, companies, and industry sectors for future generations of Utahns.

As the Governing Authority Chair, it would be remiss of me not to note that USTAR's success and effectiveness is due to both the caliber of its staff and unparalleled engagement by its Governing Authority members. I am proud of their commitment and focus to building Utah's innovation infrastructure and the accomplishments of USTAR over the past year.

I look forward to continuing to work with our partners, government leaders, and stakeholders in continuing USTAR's success.

Sincerely,

Susan D. Opp
Senior Vice President, Strategy and Technology, L3 Technologies
Chair of the USTAR Governing Authority



EXECUTIVE SUMMARY

Over the course of the past year, the Utah Science Technology and Research Initiative (USTAR) has worked diligently to address challenges, opportunities, and questions regarding USTAR's programs and the future of technology-based economic development (TBED) in the State.

THE USTAR OF TODAY IS NOT THE USTAR OF YESTERYEAR.

USTAR was established by the Legislature in 2006 with programs to support basic research and recruit world-class researchers to the State's two public research universities. In 2016, after an exhaustive two-year analysis, the Legislature re-wrote USTAR's statute to move its focus further down the development pipeline and establish programs to promote technology commercialization in the State.

USTAR's new programs were also made available to private sector entrepreneurs and to any researcher and any non-profit university in the State on a competitive basis. In the 2018 legislative session, ties to all of USTAR's legacy programs were severed, leaving USTAR as the only state entity with an **exclusive focus on technology-based economic development** programs which help de-risk technologies and move entrepreneurs through the "Valley of Death" to attract private risk capital and commercial sales.

USTAR IS PERFORMING FAR BEYOND ITS BENCHMARKS.

Guiding the re-write of USTAR's statute in 2016 was an independent analysis and prospectus completed by the Stanford Research Institute (SRI International), perhaps the leading research institute in the world. SRI's prospectus laid out 5-year performance benchmarks for USTAR's new programs.

USTAR has met its 5-year benchmarks in just two years. USTAR-supported companies have received **$123 million** in follow-on funding, created **424** high-wage full- and part-time jobs, and

generated **$27 million** in product sales, including an increase of **351 percent** in sales from the first to second year of USTAR's new programs. This is a remarkable testament to the effectiveness of USTAR's programs, and the efficiency and expertise of USTAR's staff which run them.

USTAR IS REMOVING OBSTACLES FOR DEEP TECHNOLOGY INNOVATION IN UTAH.

According to a recent analysis by TEConomy Partners, LLC, another expert in TBED field, **"USTAR's current programs are strategic, aligned to the state's technology-based economic development goals, and focused on an important market gap that is constraining deep technology startup growth and economic diversification."**

Nearly every U.S. state and nearly every economically-advanced nation operates some form of TBED program to build their innovation infrastructure, promote deep technology startup activity, grow strategic sectors and clusters, and promote economic diversification.

To quote further from TEConomy Partners' analysis, **"Eliminating USTAR would send a strong message that the State of Utah is retreating from its long-term commitment and investment to the growth of its research- and technology-based sectors at a time when Wyoming, Virginia, and Wyoming and increasing investments in theirs."**

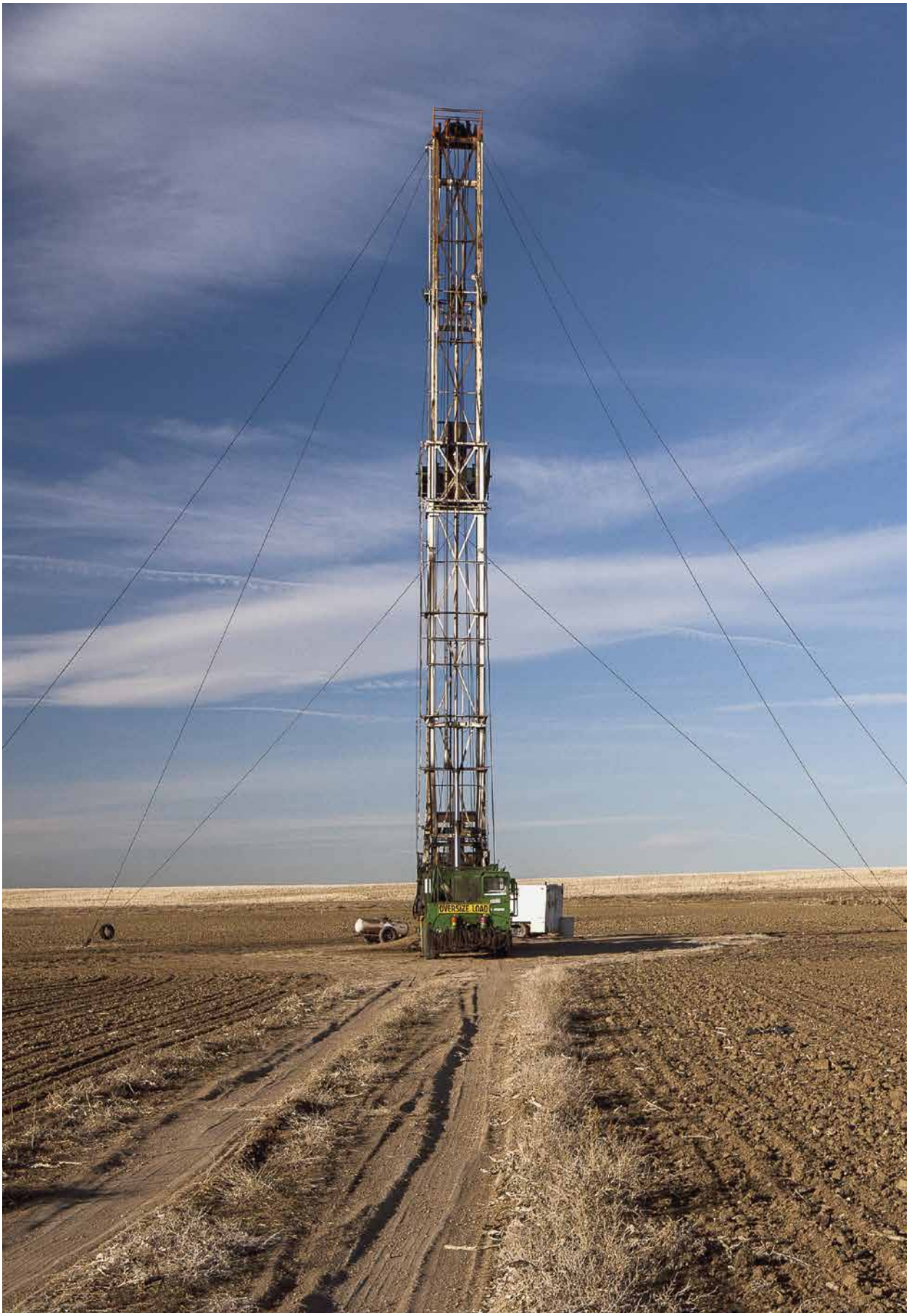
I invite you to peruse this annual report—and the third-party analyses included in the addendum—to judge for yourself the strategic need for and the efficiency of USTAR's programs.

Brian Somers
Managing Director, USTAR

THE NEED FOR USTAR

"USTAR's current programs are strategic, aligned to the state's technology-based economic development goals, and focused on an important market gap that is constraining deep technology startup growth and economic diversification."

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*


OVERSIZE LOAD

BUILDING AN INNOVATION INFRASTRUCTURE

Industry, innovation, and infrastructure are at the heart of economic growth and prosperity. Technological innovations in mass transport, energy, and manufacturing are key to finding solutions to some of the economic and environmental challenges facing today's globalized economy.

Investment in infrastructure and innovation is crucial to promoting the growth of new industries and opportunities across Utah, as well as maintaining the state's economic competitiveness. A healthy innovation infrastructure requires private, public, and academic support to create an environment where technology entrepreneurs can seed and thrive.

While business plays a central role in economic growth, government innovation policies and programs like USTAR, can help maximize growth opportunities.

According to the Boston Consulting Group, deep technology firms will be at the center of the next wave of industrial and information revolution. However, because of the intense focus on science and technology, deep-tech startups face challenges other startups do not, which is why an innovation ecosystem, or infrastructure, is crucial for helping deep tech entrepreneurs best start and grow their businesses.[1]

A FOCUS ON "DEEP TECHNOLOGY"

USTAR is focused on diversifying and building Utah's deep technology sectors and industry clusters. Deep technology companies are characterized by being more R&D-intensive, involving more complex scientific and engineering concepts, requiring larger amounts of capital investment to prototype and validate, and having a longer time horizon before generating sales.[2]

The Boston Consulting Group notes that deep technology is different from other industries and sectors in several ways: it involves a strong research base, a challenging business model, and large investment needs. As a result, these factors—combined with the complexity of the technology itself—truly disruptive deep technologies can require considerable development time before being brought to market.[3]

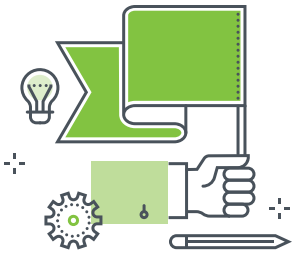
Currently, USTAR targets the life sciences, aerospace and advanced materials, energy and cleantech, robotics and automation, and big data and cyber systems, because these technology sectors are aligned to priority industry sector development in the state. USTAR does not fund IT projects that are only software development and have a low barrier to entry.

[1] Harlé, N., Soussan, P., & De la Tour, A. (2017). What Deep-Tech Startups Want from Corporate Partners (Rep.). The Boston Consulting Group.

[2] TEConomy Partners, LLC (2018). Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness: Response to Utah Code 63M-2-802(6)(b).

[3] The Boston Consulting Group.

TECHNOLOGY-BASED ECONOMIC DEVELOPMENT



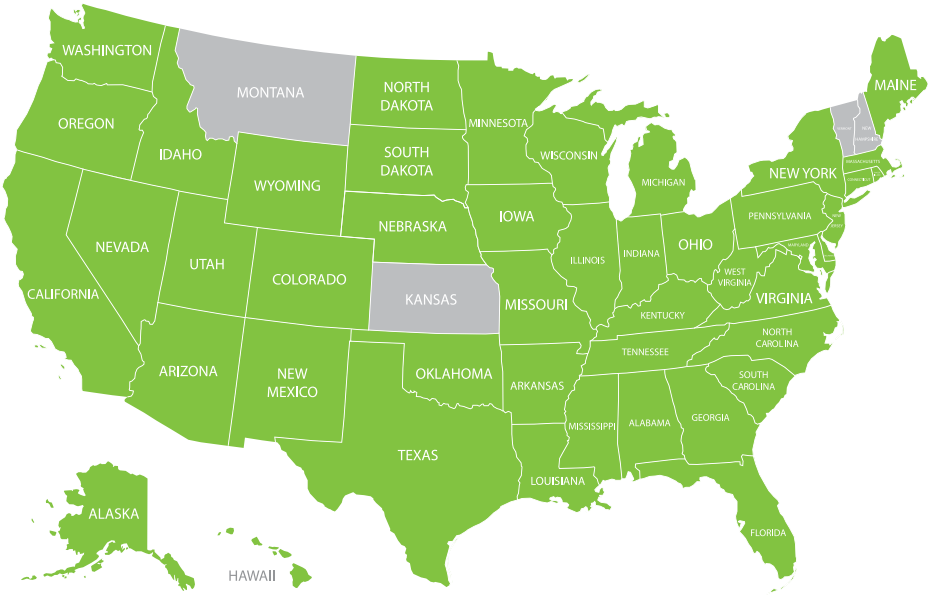
Technology-based economic development (TBED) is a strategic approach to promote economic expansion and diversification through technology development and technology commercialization.[1] TBED programs are designed to grow the economy through innovation and invention—by creating new technologies and new companies—not just the expansion, retention, or recruitment of existing technologies and companies.

TBED ACROSS THE UNITED STATES[2]

Utah is one of 46 states that actively practices TBED.

Kansas, Montana, New Hampshire, and Vermont do not have TBED programs. Of these states, Vermont has been consistently ranked as one of the three worst states for business, according to Forbes, for the past several years.

States with TBED programs use a variety of approaches to create an innovation-friendly environment. These include building research capacity, commercializing research, promoting entrepreneurship, increasing access to capital and building a technically skilled workforce.



Many of these programs, such as Ben Franklin Technology Partners in Pennsylvania, have been running for decades. Others, such as the Massachusetts Technology Commercialization Center (MTCC) and Massachusetts Technology Development Corporation and the Trust Fund were founded more recently.

Both of these programs were founded and created during Mitt Romney's tenure as governor of Massachusetts.

Utah's neighbor, Colorado, also has a robust TBED framework. Their program includes the Advanced Industries Accelerator Grant Program, which provides capital and grants to companies in the state's advanced manufacturing, aerospace, bioscience, electronics, energy and natural resources, infrastructure engineering, and information and technology industries. These seven sectors account for nearly 30 percent of the state's total sales revenues.

[1] The State Science & Technology Institute (SSTI). What is TBED? Retrieved September 24, 2018, from https://ssti.org/TBED

[2] A full list of sources and state budgets used in this data analysis may be found on page 84.

UTAH VS OTHER TBED PROGRAMS

Across TBED programs throughout the United States, capital support involves one or more of the follow four features: grants, loans, equity and tax incentives. Nationwide, 33 TBED programs feature competitive grants, 26 take some form of equity in companies, 16 offer tax incentives and 10 offer non-recourse or similar loans. USTAR's current programs, like the majority of national programs, offer competitive grants.

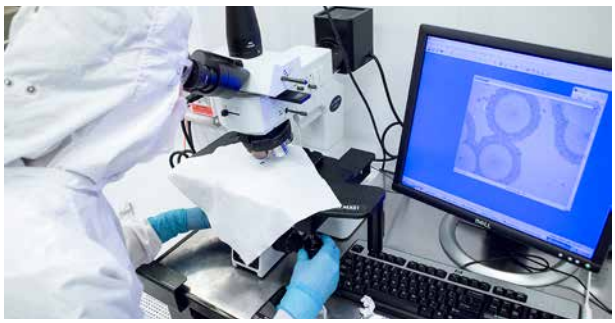
Compared to other states' TBED and economic development programs, USTAR is relatively small, spending just $5 per capita (18 out of 50), compared to state's such as Nevada and South Dakota($6), Arizona ($7), Colorado ($10), and New York ($90).

USTAR's budget represents less than 3% of Utah's overall economic development budget.

TBED VS OTHER ECONOMIC DEVELOPMENT PROGRAMS IN UTAH

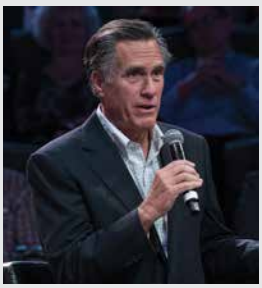
Utah spends $71 million on economic development programs and another $524 million on economic development tax incentives, the majority of which go toward larger or established companies.

However, Utah will spend just $14 million in FY19 to support the growth of new, home-grown, deep technology companies through USTAR. USTAR's budget represents only 2.5% of current economic development expenditures. USTAR's budget represents only .09% of the FY2019 state budget. BEDL's pass-through expenditures (RFAs) were more than $20M in the final FY2019 budget.[1]



[1] TEConomy Partners, LLC (2018). Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness: Response to Utah Code 63M-2-802(6)(b).

TBED SPENDING PER CAPITA



"About 90 percent of venture capital in our state... has gone to software and service businesses. Very little actually gets into some of the deep technologies that are so essential to our long-term growth. And that's, of course, where USTAR fits in."

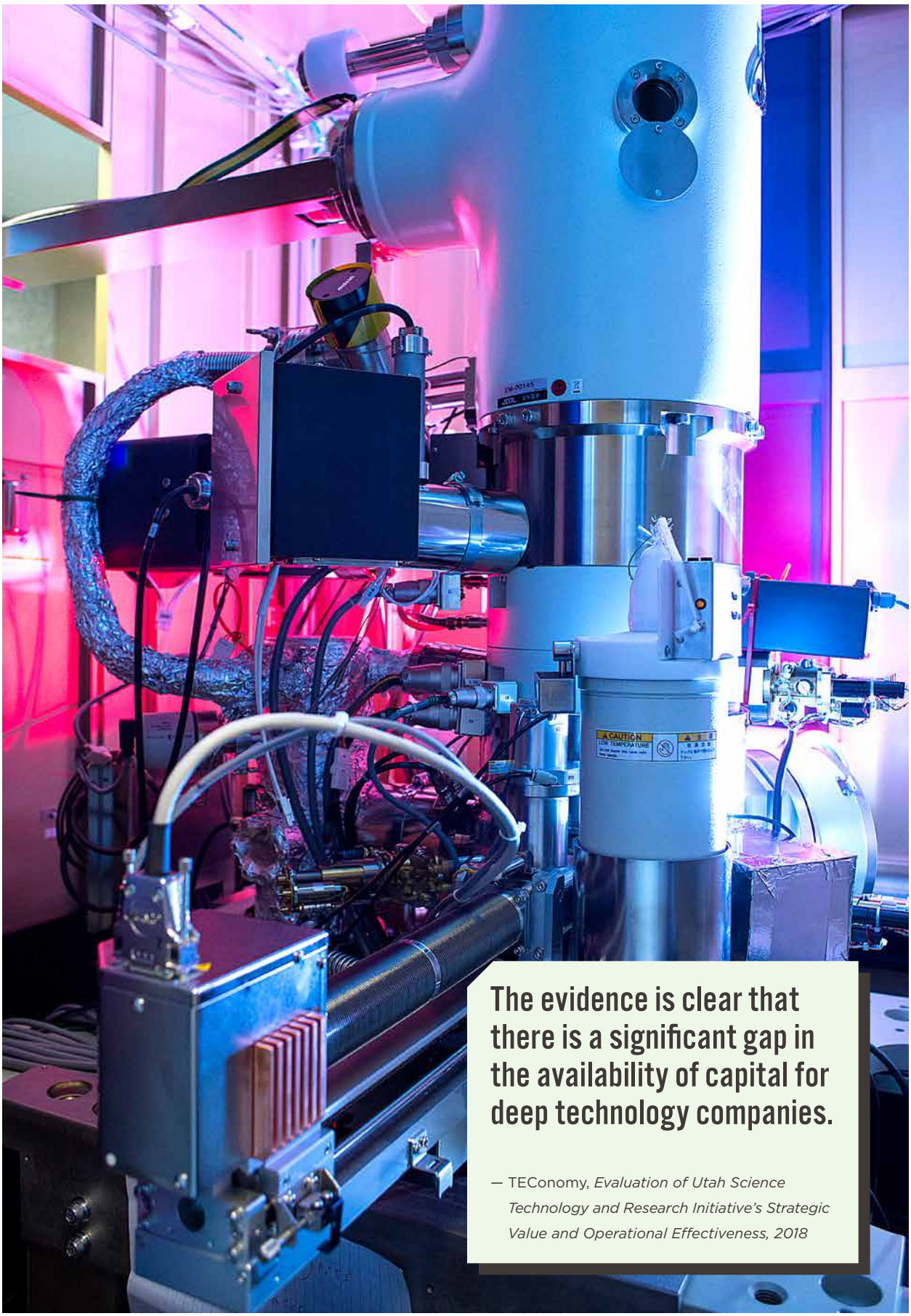
— Mitt Romney, Keynote Speaker, Utah Technology Innovation Summit

UTAH RANKS 18TH IN PER CAPITA SPENDING ON TBED PROGRAMS

Rank	State	Per Capita Spending on TBED Programs
1	Texas	$174
2	New York	$90
3	Michigan	$24
4	Kentucky	$21
5	Maine	$15
6	Ohio	$14
7	Wisconsin	$13
8	Colorado	$10
9	New Jersey	$10
10	Hawaii	$9
11	Arizona	$7
12	Connecticut	$6
13	South Dakota	$6
14	Nevada	$6
15	Alaska	$6
16	Pennsylvania	$5
17	Iowa	$5
18	**Utah**	**$5**
19	Oregon	$4
20	North Dakota	$4

UTAH RANKS 17TH IN TBED SPENDING AS A PERCENTAGE OF STATE BUDGET

Rank	State	Percent of State Budget Spent on TBED Programs
1	Texas	4.60%
2	New York	1.05%
3	Michigan	0.42%
4	Kentucky	0.27%
5	New Jersey	0.25%
6	Ohio	0.25%
7	Maine	0.24%
8	Pennsylvania	0.21%
9	Oklahoma	0.20%
10	Wisconsin	0.20%
11	Iowa	0.20%
12	Colorado	0.19%
13	Arizona	0.13%
14	South Dakota	0.11%
15	Connecticut	0.11%
16	Delaware	0.10%
17	**Utah**	**0.09%**
18	Georgia	0.08%
19	Hawaii	0.08%
20	Nebraska	0.08%



The evidence is clear that there is a significant gap in the availability of capital for deep technology companies.

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*

CAPITAL MARKET GAPS

Deep technology is key to creating disruptive innovations, competitiveness, and sustainable economic growth for Utah's economy. However, there is substantial market failure in the financing of these technologies and their associated companies.

This market failure occurs in Utah due to several factors:

Utah receives a very small percentage of the national deal flow overall.[1] In fact, the Mountain West region receives less than three percent of the total venture capital invested annually.

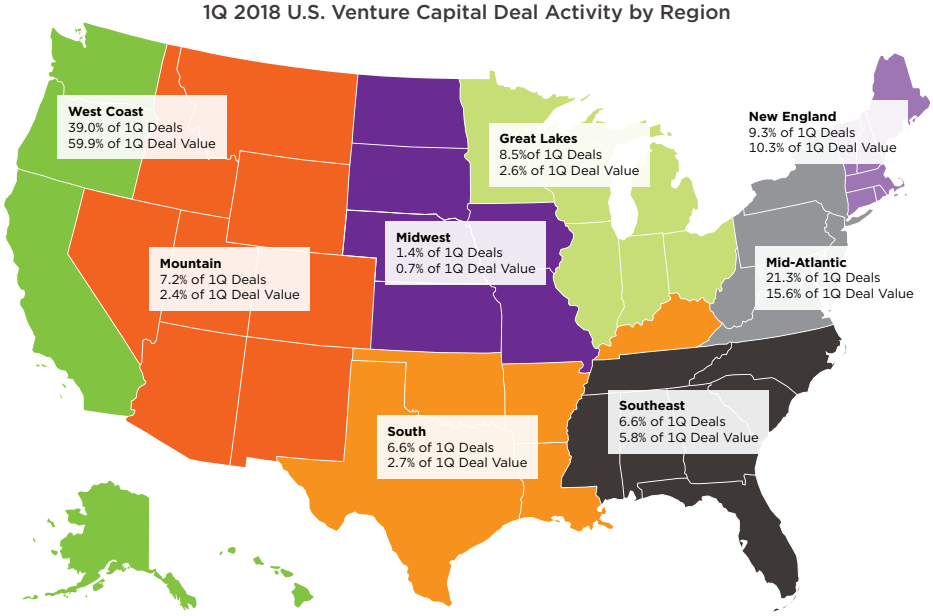
To compound these challenges, Utah deep-tech companies face a significant shortage of available risk and private capital within the state. **Roughly 90 percent of all deal flow money goes to IT and services companies.**

Deep technology is inherently riskier and more capital intensive when compared to other companies at similar stages of development.[2]

There is an inherent **knowledge gap between innovators and investors**. Due to the complexity of these technologies, investors are hindered from adequately assessing the technical and financial viability of these companies in their early stages, resulting in a **knowledge bottleneck that leads to underinvestment**.

The return on investment timelines for investment firms and deep technology are often misaligned.[3]

1Q 2018 U.S. Venture Capital Deal Activity by Region



The Mountain region generally receives a very small percentage of the total venture capital invested nationally.

[1] Source: Pitchbook Q1 2018 deal flow data

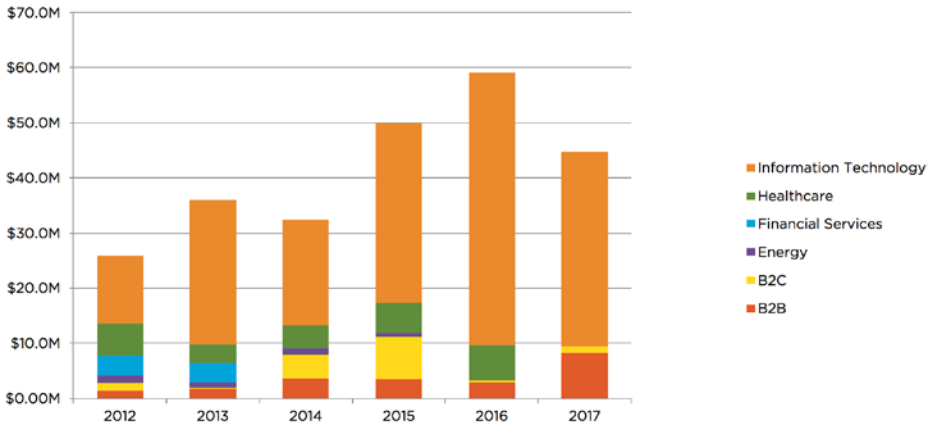
[2] Gigler, S., & McDonagh, B. (2018). Financing the Deep Tech Revolution: How investors assess risks in Key Enabling Technologies (KETs) (Tech.). Innovation Finance Advisory and European Investment Bank Advisory Services.

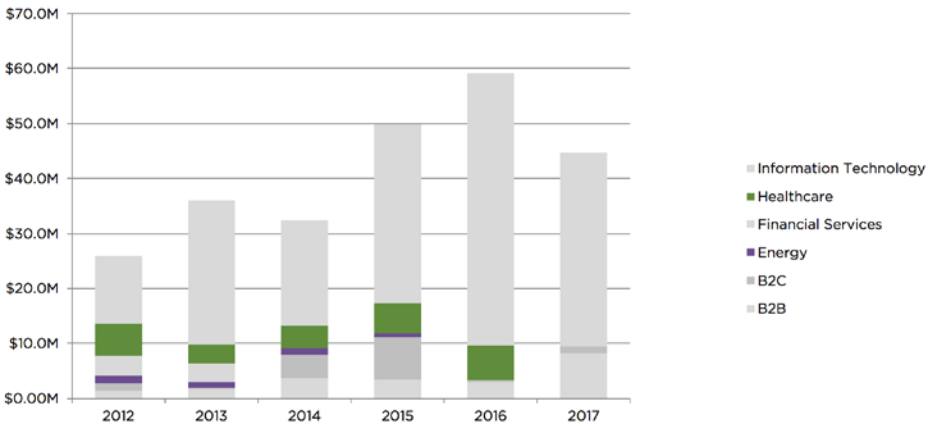
[3] Sopher, P. (2017). Early-stage venture capital for energy innovation (Working paper). International Energy Agency.

SEED FUNDING IN UTAH

Despite a growing network of investment firms in Utah, the majority of private capital funding is not available to Utah's deep technology startups and companies. In 2017, there were no private seed flow deals in either healthcare or energy, the two industries that have the potential to include deep technology sectors supported by USTAR.

Seed deals are typically the first private funding raised. Seed deals typically range from $300K to $2M.





▸ *The green and purple fields indicate sectors that have the potential to include deep technology companies.*

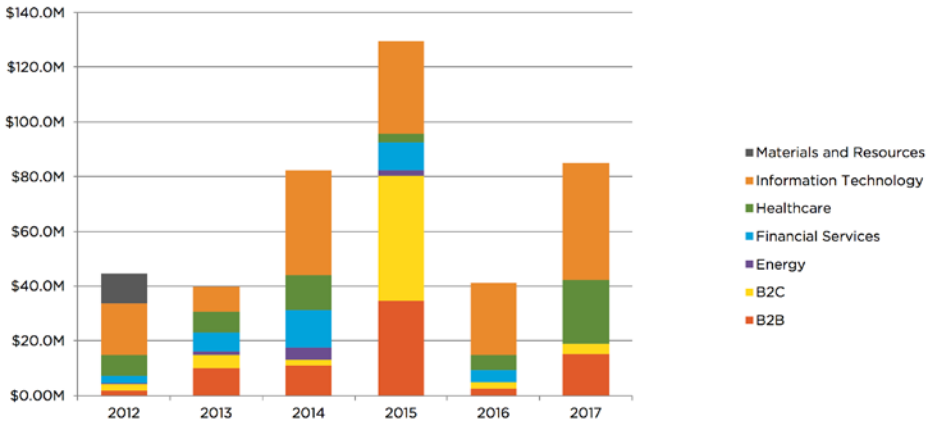
"I'm an inventor, an entrepreneur, and a taxpayer. I typically look at things and say private markets and entrepreneurs will do it better than government. But, in some areas of technology development, especially deep tech—e.g., aerospace, clean tech, biotech—the private markets aren't participating early on. If a state wants to attract that private investment, they are going to have to invest early on."

— Brigham Tomco, Chairman & CEO, Zylun Global and USTAR Governing Authority member

ANGEL FUNDING IN UTAH

Angel funding requires most technologies and companies to be significantly de-risked. In Utah, the majority of this is focused on software/IT and B2B/B2C companies.

Angel deals are still early stage, but require technology to be de-risked. Typical angel deals vary by sector between $1–10M.



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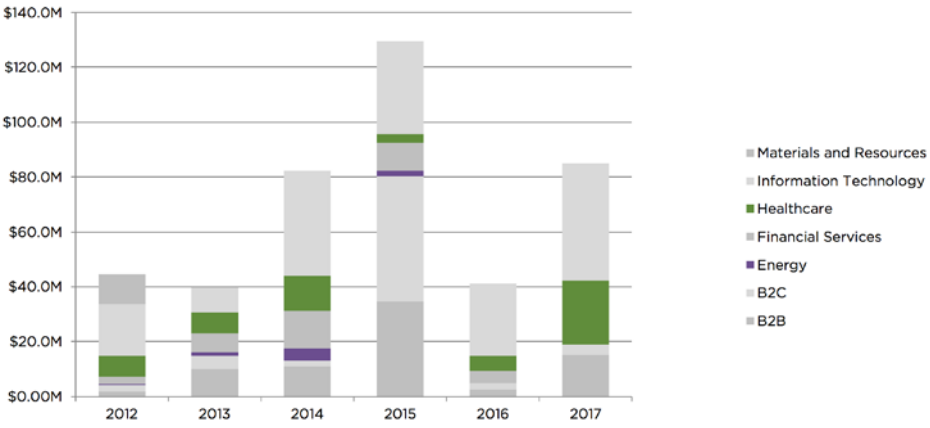


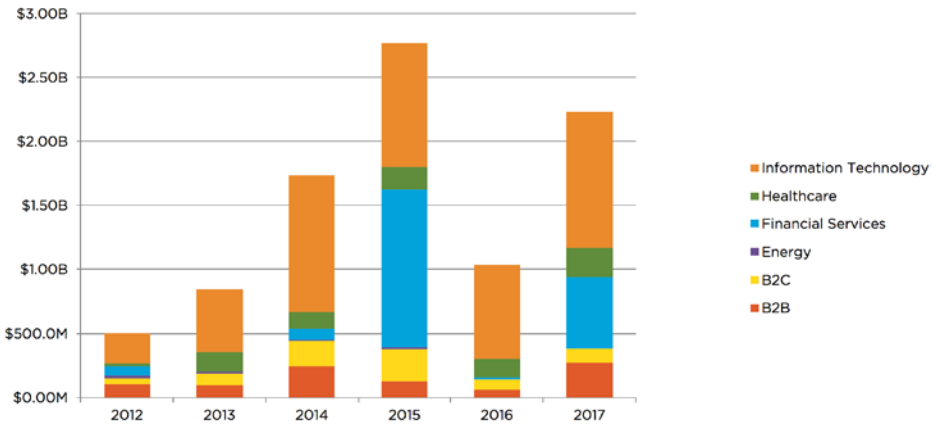
"You can't compare the business activity of a life sciences company trying to get to market with a software company. There needs be some type of commercialization validation to build trust among private investors before they will invest, and the capital to undertake this validation has to come from somewhere."

— Dan Wee, *T3S, a pharmaceutical manufacturing company*

VENTURE CAPITAL IN UTAH

While Utah has approximately 50 venture capital firms, companies in deep technology sectors still have limited access to capital. While the top seven Utah-based investors made 190 investments in Utah-based companies between 2012 and 2017,[1] only five of those investments were in deep technology industries supported by USTAR.

Utah VC deals in 2017 ranged from a median of $5M in healthcare to $280M in financial services.



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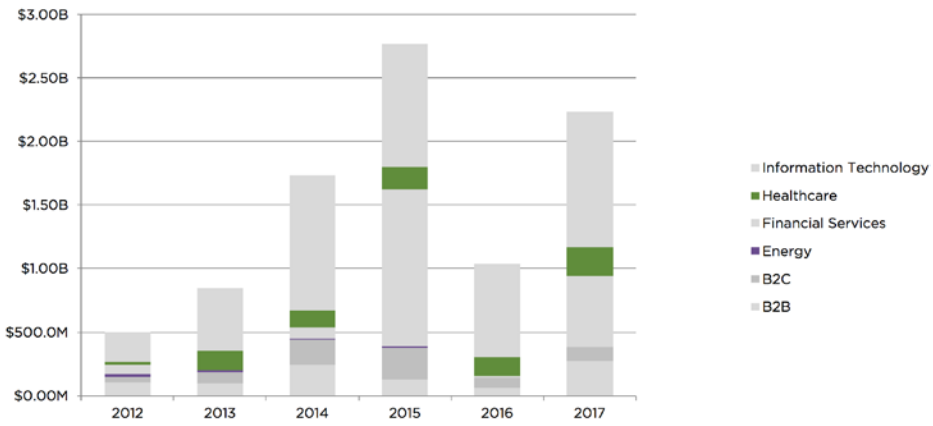


DEEP TECH COMPANY DEMAND FOR CAPITAL VERSUS LIMITED SUPPLY:
USTAR Program Data and Utah Angel and Seed Stage VC Data, 2016 and 2017

	Total Value	Total # of Deals	Avg Deal Size	Share of Deal Value Outside of IT/B2B/B2C	Share of Deals IT/B2B/B2C
USTAR TAP Awards	$10.6M	60	$176K	90.6%	91.7%
Angel	$92.6M	71	$1.2M	22.5%	36.8%
Seed VC	$98.3M	44	$2.2M	12.6%	18.2%

[1] Pitchbook. (2017, May 9). The top 7 investors in Utah-based startups. Retrieved from https://pitchbook.com/newsletter/the-top-7-investors-in-utah-based-startups-abK

ECONOMIC DIVERSIFICATION

Diversification is key to a healthy economy, in both economic prosperity and recession.

A diverse base of industries aids economies to sustain themselves during disruptive events, such as a recession. Diversity further functions as a catalyst of innovation, and produces a competitive advantage.[1]

As Utah's economy grows and evolves, USTAR's programs are designed to support increased diversification of the State's tech economy. In particular, USTAR fosters diversity within the technology economy by supporting the growth of Utah's deep tech industries.

WEATHERING RECESSION

Looking back at the Great Recession, it becomes increasingly evident that a diverse and dynamic economy is key to economic resiliency.

Deep technology industries, such as life sciences, can be better positioned to weather

USTAR is focused on a gap that is impeding deep tech startup activity and, in doing so, USTAR is advancing economic diversification in Utah.

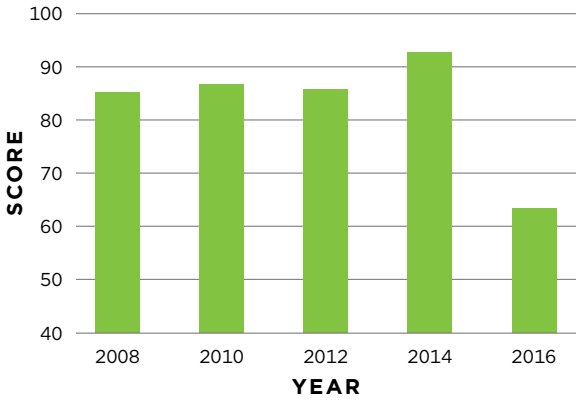
— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*

[1] DeVol, R., Lee, J., & Ratnatunga, M. (2016). 2016 State Technology and Science Index. Milken Institute.

Milken Institute: State Science and Technology Index

The Milken Report on diversity of investment. Decrease in diversity dropping Utah's score.

Rank	Average Score	Year
1	85.40	2008
1	86.80	2010
1	86.00	2012
1	92.89	2014
13	63.55	2016



a recession. McKinsey & Company found that after the 2008 economic crisis, healthcare was the least likely sector to be impacted by the downturn.[2] Additionally, despite the financial crisis, Ernst & Young found that the biotechnology industry reported solid financial performances in 2008.[3]

Utah's recovery from the Great Recession is a testament to this principle. Utah had one of the fastest recoveries, in large part due to the state's diverse economy. According to EDCUtah, "Because of our economic diversity, Utah is less impacted in times of recession and is able to rebound more quickly than the nation when economic turbulence hits."[4]

In the immediate years after the Recession, Utah was one of just seven states where advanced industries employed at least 10 percent or more of the workforce.[5] Furthermore, according to the Kem C. Gardner Policy Institute, professional, scientific and technical services industries was the second fastest growing sector in the state after the recession, accounting for 12.5 percent of the state's GDP from 2009-2017.[6]

LOOKING AHEAD

Recent trends indicate that Utah's tech economy could be becoming less diverse, which is why USTAR is more critical for Utah's long-term prosperity than ever before.

The Milken Institute's Technology Concentration and Dynamism Composite Index measures the diversity and health of a state's tech economy. Utah held the top ranking in this index for nearly a decade, but recently saw an alarming drop in competitive rankings.

In 2016, Utah fell from the top spot to 13th in just two years. The index measures the intensity and expansion of deep-tech businesses by state.[7] The dramatic decline may be attributable to a relative growth in Silicon Slopes compared to more modest growth in other science and technology sectors in the state.

[2] Jiang, B., Koller, T. M., & Williams, Z. D. (2009). Mapping decline and recovery across sectors. McKinsey & Company.

[3] Beyond borders: Global biotechnology report (2009). Ernst & Young.

[4] Economic Development Corporation of Utah. (n.d.). Research Weekly - Utah #1 in Economic Diversity. Retrieved from https://edcutah.org/news/2016/05/26/research-weekly-utah-1-economic-diversity

[5] Muro, M., Rothwell, J., Andes, S., Fikri, K., & Kulkarni, S. (2015). America's Advanced Industries: What They Are, Where They Are, and Why They Matter. Brookings.

[6] Downen, J. (2018, June 27). Utah's GDP Growth: A story of consistent recovery. Kem C. Gardner Policy Institute. Retrieved from http://gardner.utah.edu/utahs-gdp-growth-a-story-of-consistent-recovery/

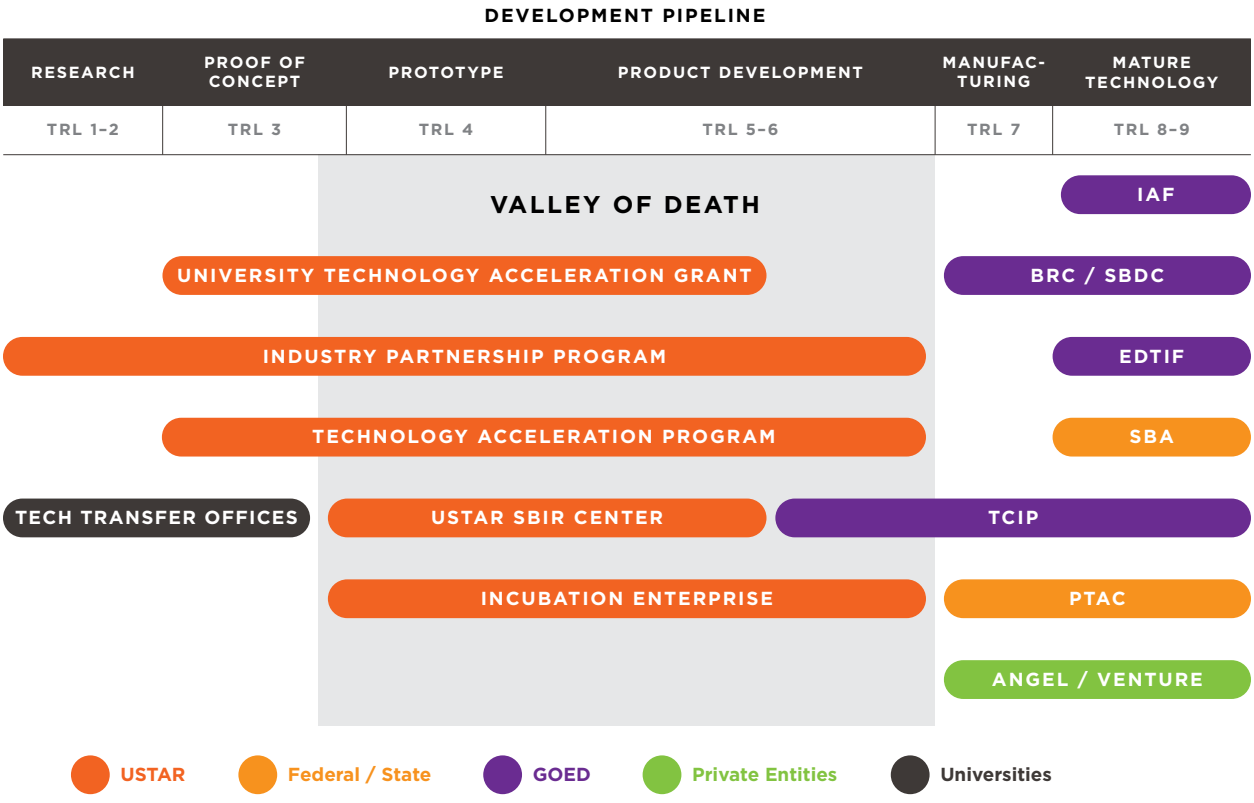
[7] Milken Institute

THE VALLEY OF DEATH

Typically, the development of deep technology, or technology that is unique and difficult to reproduce, is funded by a combination of public and private sources. The federal government spent over $147B in FY16 for research and development that was spread to universities, small businesses, and large corporations to develop technology.

However, as technologies develop into the prototype stage, federal funding is no longer available for development. Risk capital in the form of angel investment, venture funding, industrial funding, and institutional investment is only available to fund later stage manufacturing and company launch. These investors are typically risk averse and will not provide funding until the technological risk has been eliminated. This distribution of funding from public and private sources leaves a significant gap in the funding profile often referred to as the Valley of Death.

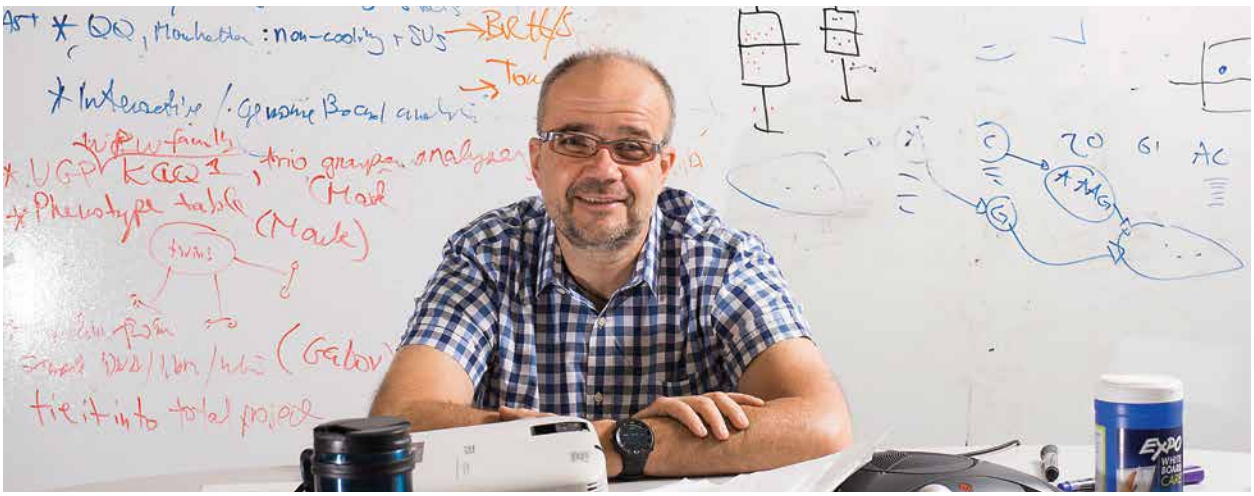
USTAR works to provide funding and services that allow early stage companies and researchers to bridge the valley of death, de-risking their technology and attracting private risk capital.



STRATEGIC QUESTIONS

Amid the discussion of SB239 in the 2018 legislative session, the Utah legislature requested an evaluation of USTAR's strategic importance and operational effectiveness since the initiative was reset with legislation passed in 2016 (SB166), which more closely aligned USTAR programs with original legislative intent.

This section delineates the questions posed by the Utah legislature, with responses provided by an independent third party assessment conducted by TEConomy Partners LLC.[1]



IS USTAR BENEFICIAL TO THE STATE AND SHOULD IT CONTINUE?

Based on the data and analysis presented in this section, **the answer is "yes."** USTAR is focused on a gap that is impeding deep tech startup activity and, in doing so, USTAR is advancing economic diversification in Utah.

USTAR program data indicates strong demand. From 2016-2017, USTAR received 352 proposals that achieved a minimum "fundable" score of 3 out of 5 via a peer review process. USTAR was only able to fund one of every six commercialization projects, and the $10.6 million in total TAP awards over this period represent only a ninth of total angel investment. However, 90.6% of USTAR funding went to deep tech companies, while only 22.5% of angel investment and 12.6% of seed investment went to companies in sectors outside of IT, B2B, and B2C software and services.

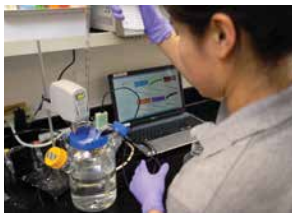
The demand for early-stage risk capital by Utah deep tech startups should be monitored over time to see if the current levels of TAP funding are sufficient. Is demand for TAP grants increasing or decreasing over time? What is the mix of companies applying? Are the same companies applying or is USTAR also seeing a good mix of first-time applicants?

[1] *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness: Response to Utah Code 63M-2-802(6)(b)*; TEConomy Partners, LLC; August 1, 2018.

WHAT HAS BEEN USTAR'S PERFORMANCE SINCE THE 2016 RESET?

It takes 5-10 years to be able to see momentum in the sales growth and trajectory of deep technology companies following a pivotal grant and series of investments early in a company's history. The jobs impact takes longer (10-15 years), since it is a lag indicator driven by rapid and sustained sales growth. With this caveat in mind, the performance of USTAR-funded companies and researchers, based on the two years of available data, has been positive, solid, and in line with expectations based on similar programs in other states. **Across all USTAR grant and entrepreneur services programs there is a noticeable increase in follow-on investment, sales, and new hires.** USTAR has also set up its performance tracking for new grant programs in a way that enables tracking by cohort. This is a best practice nationally for organizing data in a way that enables USTAR to analyze impact while controlling for factors, such as time period, technology sector, and stage of company.



"Across all USTAR grant and entrepreneur services programs there is a noticeable increase in follow-on investment, sales, and new hires."

ARE THERE CHANGES THAT SHOULD BE MADE TO USTAR'S CURRENT STRUCTURE OF PROGRAMS?

USTAR is two years into the implementation of its new programs since the 2016 legislative reset. **The evidence based on the performance of USTAR's programs, to date, and best practices from other states do not call for an immediate change to USTAR's current structure of programs.** However, it would be a natural progression to begin to study and discuss how other types of financing mechanisms might be a follow-on step. This really depends on where TAP companies find themselves following the completion of their grants. If TAP companies are able to find sufficient private sector investment or customers to continue to scale upon hitting their TAP grant milestones, then the market gap may not exist at these slightly later stages.

ARE USTAR'S PROGRAMS BEING RUN EFFECTIVELY AND EFFICIENTLY?

USTAR's competitive grant programs and technology entrepreneur support services are well run and effective as evidenced by the performance of companies that receive assistance and other accomplishments, such as the U.S. Air Force's collaboration with USTAR. Notable among USTAR's achievements is the implementation of its new grant programs since 2016, which are characterized by industry best practices in performing peer review for the selection of grant recipients and private sector rigor in monitoring and reviewing grant recipient progress toward commercialization outcomes. USTAR staff and the USTAR Governing Authority members who comprise the Commercialization Subcommittee work well together in executing these programs and making recommendations for action to the full board.

"In Utah, since USTAR is a leaner organization... ***there is a stronger case to move TCIP to USTAR than to move USTAR's programs to GOED*** if the state is looking to consolidate programs."

ARE THERE SIMILAR PROGRAMS THAT COULD PROVIDE SIMILAR BENEFITS AT LOWER COST?

Overall, the data suggests that USTAR is cost effective, with neither its total staff size, average salaries and benefits, or total personnel expenditures being high relative to peer organizations in other states. In fact, USTAR ranks last among the 10 total benchmark organizations for average compensation (salaries and benefit) per employee. There may be strategic reasons for considering a future 501c3 organizational structure if there is consensus that USTAR should evaluate models for investing in companies via equity. However, the benchmark data from other states do not support the idea that outsourcing USTAR program management to a nonprofit entity would be more cost effective than USTAR's current structure. In Utah, since USTAR is a leaner organization with a technology-based economic development mission and key staff who specialize in technology commercialization grant programs, **there is a stronger case to move TCIP to USTAR than to move USTAR's programs to GOED if the state is looking to consolidate programs.**

ARE THE REPORTING REQUIREMENTS EFFECTIVE AT MEASURING USTAR'S PERFORMANCE?

—

Yes. Overall, USTAR reporting requirements and impact data are effective at measuring the near-term, intermediate, and long-term performance of funded companies and projects. **The metrics were developed based on best practices in other states and are appropriate for USTAR's mix of program activities.** The one program for which adjustments could be considered is USTAR's Industry Partnership Program. Since this program seeks to incentivize innovation activity and industry-university collaboration by existing Utah companies, this evaluation recommends using IPP project commercialization milestones as short-term metrics, dropping the follow-on investment metric (since existing companies raise capital via debt or equity markets), and asking what percentage of a company's sales these new products represent. For the UTAG program, USTAR sees value in having a third party collect the impact data to enable USTAR staff to focus on the proposal review and program management aspects of the program.

YEAR IN REVIEW

"USTAR aims to support the diversification of the state's economy, attract private investment from outside the state, and support early-stage Utah companies in achieving the milestones needed to attract private investors and initial customers."

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*

ECONOMIC IMPACT & PERFORMANCE METRICS

As required per statute, USTAR contracted with a third-party, nonpartisan research organization, TEConomy Partners, LLC, to conduct an annual evaluation[1] of USTAR programs that support private sector companies.

The independent report focused on USTAR's role in Utah's long-term commitment to initiatives that support economic growth, industrial diversification, and creation of high-wage jobs. In particular, the report analyzed the need for government support in deep technology and science sectors and the efficiency of USTAR's programming and staff.

2017 PRIVATE SECTOR IMPACT[2]

130 FULL TIME JOB HIRES

76 PART TIME JOB HIRES

148 JOBS CREATED ABOVE COUNTY AVERAGE SALARY

206 TOTAL JOBS CREATED

$62.7M FOLLOW-ON INVESTMENT

$22.1M COMMERCIALIZED PRODUCT SALES

IMPACT SINCE 2016

$123.1M CUMULATIVE FOLLOW-ON INVESTMENT

$27.0M CUMULATIVE TOTAL SALES

424 CUMULATIVE TOTAL HIRES

TEConomy Partners, LLC, collects and verifies statutorily required data for USTAR and provides additional analysis of technology-based economic development (TBED) best practices. The firm is a global leader in research, analysis and strategy, specifically in innovation-based economic development. As an independent 3rd party, TEConomy surveys USTAR awardees who have received grants and services and compiles a report.

teconomypartners.com

[1] For report methodology and data sources, refer to page 81 of this report.

[2] TEConomy Partners, LLC (2018). Measuring the Private Sector Impact of USTAR-Supported Programs 2018.

NOTE: This data only includes private sector impact and does not include self-reported data from universities.

2020 PROJECTED PERFORMANCE METRICS

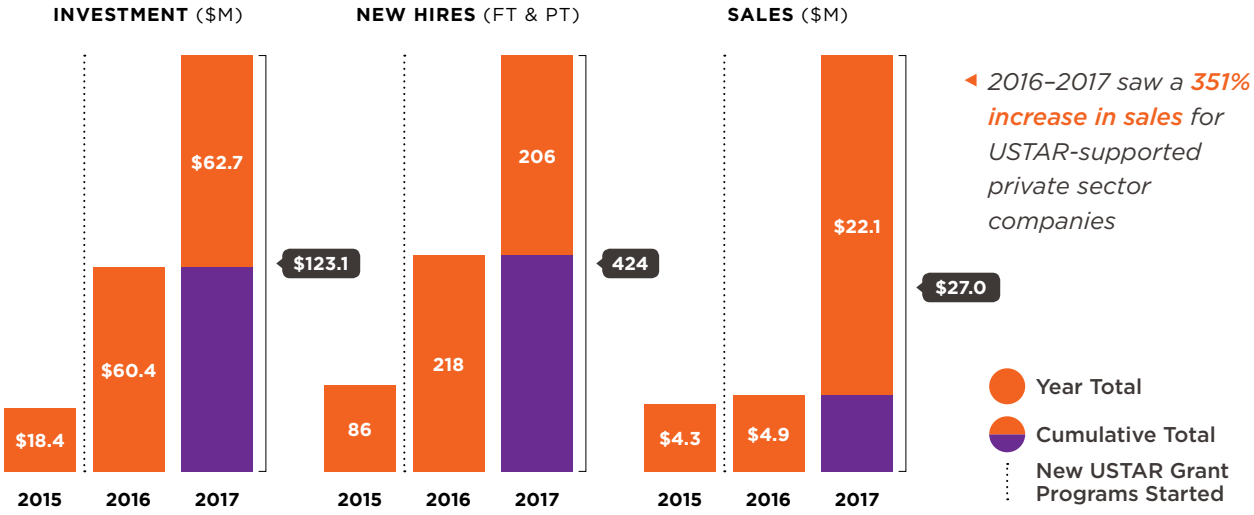
In 2015, SRI International wrote a prospectus outlining the five-year, projected direct impact of USTAR's programs.

This prospectus served as the guiding expected economic impact document for the Legislature's 2016 re-write of USTAR's statute, leading to the implementation of new, competitive, commercialization-oriented programs.

Over the past year, USTAR has continued to expand and strengthen its programs and services to meet these objectives.

In just two years, USTAR has already met or exceeded its five-year performance metrics.

	2016-2017 ACTUAL IMPACT DATA	2020 PROJECTED IMPACT DATA[3]
Follow-on Investment	**$123.1M**	$123.9M
Sales	**$27.0M**	$27.6M
Full-Time Jobs Created	**258**	200



USTAR-supported private sector companies have raised ***$123.1M in follow-on funding*** since 2016.

USTAR-supported private sector companies have created ***258 full-time and 166 part-time jobs*** since 2016.

USTAR-supported private sector companies have generated ***$27M in sales*** of commercialized products since 2016.

[3] SRI International (2015). 2015 USTAR Prospectus

INAUGURAL UTAH TECHNOLOGY INNOVATION SUMMIT

Keynote Speaker Mitt Romney

Utah's robust deep technology economy was highlighted in the inaugural Utah Technology Innovation Summit hosted by USTAR on June 6, 2018. The sold-out summit included keynotes from government leaders on technology innovation policy, experts participating in breakout sessions, and the presentation of the 31st Annual Governor's Medals for Science and Technology by Governor Gary R. Herbert.

Former Massachusetts governor Mitt Romney provided a keynote address, and Utah Lieutenant Governor Spencer J. Cox and Salt Lake County Mayor Ben McAdams participated in a discussion on innovation and economic development.

With over 350 in attendance, the Summit provided a platform for the discussion of innovation and technology-based economic development. Experts from across the country joined local experts on panels to discuss building effective policies and regulations around autonomous systems, securing funding and strategic partnerships for entrepreneurs, building effective governance for startup companies, and discussing the role of government in facilitating innovation.

This is the first technology innovation summit in Utah hosted by USTAR to explore economic development and commercial growth in the state through technology innovation. This year's success paves the way for future summits to bring thought leaders together to facilitate discussions in this important field.

The Governor's Medals for Science and Technology were awarded to:

Lifetime Achievement: Russell M. Nelson, M.D., Ph.D., world-renowned cardiothoracic surgeon, inventor, and educator

Academic/Research: Dana Carroll, Ph.D., Distinguished Professor in the Department of Biochemistry, University of Utah

K-12 Education: Tyson Grover, Science Curriculum Advisor, Davis School District

Industry: George Hansen, Chief Technology Officer, Conductive Composites

TECHNOLOGY ENTREPRENEUR SERVICES

USTAR's technology entrepreneur services encompass incubation spaces (which provide specialized equipment and lab space to startups) the USTAR SBIR Center, and satellite offices.

KEY ACCOMPLISHMENTS FOR THE YEAR INCLUDE:

Successful opening of the USTAR Innovation Center in Clearfield in November 2017.

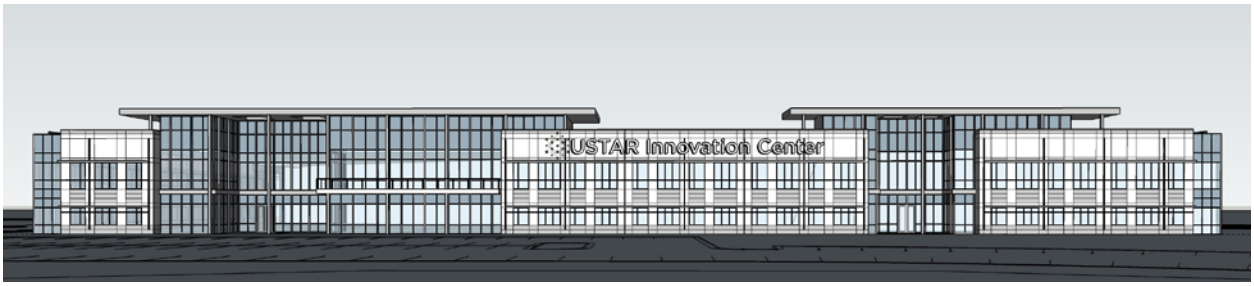
100 percent occupancy rate at BioInnovations Gateway.

U.S. Air Force plan to invest in the USTAR Innovation Center, expanding it to be part of the USAF Centers of Excellence.

A better than 25 percent win rate for companies that work with the USTAR SBIR Center compared to a 15 percent success rate nationally.[1]

[1] TEConomy Partners, LLC (2018). Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness: Response to Utah Code 63M-2-802(6)(b).


MAX LOAD



CENTER OF EXCELLENCE FOR COMPOSITES PLANNED FOR NORTHERN UTAH

USTAR has been in discussions with the United States Air Force sustainment community and Hill Air Force Base to bring a Center of Excellence for Composites to the USTAR Innovation Center in Clearfield.

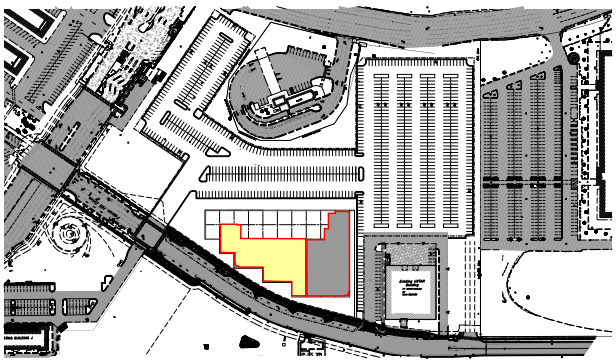
With a push for increased innovation by the Secretary of the Air Force, the sustainment community is working to develop innovation centers known as Advanced Technology and Training Centers (ATTCs), with current locations at Wright-Patterson Air Force Base in Ohio, and Robbins Air Force Base in Georgia. With the opening of the USTAR Innovation Center in Clearfield, Hill Air Force Base has been added to the list for the development of a center focused on advanced composites.

Each ATTC focuses specifically on a major sustainment challenge. The challenge at Hill will be composites. Sustainment in the Air Force comes with a multi-billion dollar budget. USTAR laid the ground work with Hill and the sustainment command over the last few years.

It is anticipated that USTAR will facilitate outreach to the community and that startup companies will be able to work alongside engineers from the base. It is expected that the USTAR Innovation Center will expand, and will include equipment provided by the U.S. Air Force. The completion of this project will be good for the ecosystem, good for Hill, and good for USTAR.

The USAF does not view the partnership as investing in a building. Rather, the USAF is investing in a collaboration with USTAR to support the innovation ecosystem around Hill Air Force Base, because USAF views USTAR's objectives and target technology sectors as aligning with its own strategic objectives.

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*



A STATEWIDE PROGRAM WITH GLOBAL REACH

Spurring economic growth and job creation, USTAR serves as a catalyst for technology development. USTAR provides services to companies across the state by providing early-stage technology firms with access to the capital, knowledge, and networks that foster innovation.

In leveraging USTAR's international network of peer reviewers and experts, USTAR clients and their supported-technologies have the potential for global reach.

STATEWIDE IMPACT

In addition to USTAR satellite offices that serve companies off the Wasatch Front, USTAR's competitive grant programs and SBIR assistance services are available statewide.

To raise awareness and access to USTAR programs, the organization participated in the 25k Jobs Initiative tour led by World Trade Center Utah and Lieutenant Governor Spencer J. Cox during summer and fall of 2017.

Over the past year, USTAR:

- Led outreach activities in all 25 counties located off the Wasatch Front
- Awarded grants to recipients in nine counties: Box Elder, Cache, Davis, Emery[1], Salt Lake, Uintah, Utah, Wasatch, and Washington
- Awarded its first University Technology Acceleration Grant (UTAG) to a Dixie State University professor

GLOBAL REACH

In FY2018, USTAR supported companies and staff participated in trade missions to Singapore, Vietnam, Israel, the United Kingdom, and Mexico. These governor-led trade missions enabled them to meet with potential investors, customers, and partners.

USTAR, in partnership with non-profit business incubator Church & State, also coordinated a trip to BioKorea in May 2018. The trip also received support from the Center for Technology and Venture Commercialization at the University of Utah, World Trade Center Utah, and the Economic Development Corporation of Utah.

The trip provided six early-stage life sciences companies and USTAR clients—iVeena Delivery Systems, Photorithm, Progenitor Life Sciences, Q Therapeutics, T3S Technologies, and TheraTarget—to meet with potential investors, network with strategic partners, and demonstrate their technologies to international customers.

As of July 2018, two of these companies are expected to negotiate funding rounds as a result of their participating in BioKorea.

Due to the success of USTAR's international outreach, the organization was invited to host a panel at Science Diplomacy 2018, a leading international event hosted by the American Association for the Advancement of Science (AAAS) Center for Science Diplomacy. The *Think Locally to Impact Globally: Science Diplomacy at the State Level* panel used USTAR as model and best practice for utilizing science and technology to build international relationships.

[1] TAP Grant recipient Conductive Composites is headquartered in Heber City, and also has manufacturing operations in Cleveland, Utah.

LEGISLATIVE CHANGES

Since its founding in in 2006, USTAR has undergone significant changes to ensure its mission aligns with the economic needs and objectives in the State of Utah. In its original form, USTAR was focused primarily on building research capacity at the University of Utah and Utah State University, but has since evolved to today's current reiteration, which is focused on providing technology-based economic development services statewide.

Most recently, USTAR has undergone key statute changes in 2016 and 2018.

2016: SB166

In 2015, SRI International conducted a third-party study on the efficacy of USTAR, writing a prospectus outlining the five-year, projected direct impact of USTAR's programs. This prospectus served as the foundation of SB166, which passed during the 2016 Utah legislative session, realigning USTAR's statute to match the original intent of the USTAR initiative.

SB166 pivoted USTAR to offer competitive grants to researchers and entrepreneurs statewide, expanding USTAR's support and impact.

2018: SB239

The 2018 Legislative session ended with the passage of SB239, once again modifying USTAR's statute. The bill seeks to address the ideological question of the role of government in supporting technology commercialization, practical questions regarding the structure of USTAR programs, and whether redundancies exist with other government programs.

The most notable change created by SB239 was the transfer of USTAR legacy programs—in particular the Principal Researchers at the University of Utah and Utah State University—to the universities, ending USTAR's role in the program. This also included the transfer of USTAR buildings on each respective campus.

"Since the 2016 legislative reset, USTAR program data indicate strong demand for USTAR grant programs and good investment and sales growth performance by USTAR companies."

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*

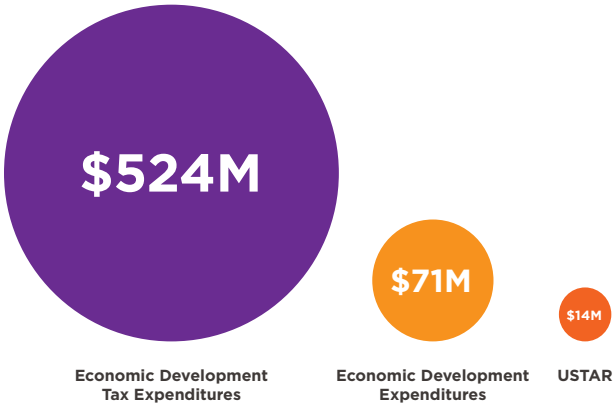
USTAR OPERATIONS & EFFICIENCY

Utah spends $71 million on economic development programs and another $524 million on economic development tax incentives, the majority of which go toward large or established companies.

However, Utah will spend just $14 million in FY19 to support the growth of new, home-grown, deep technology companies through USTAR.

USTAR's budget represents only 2.5% of current economic development expenditures, only .09% of the FY2019 state budget.

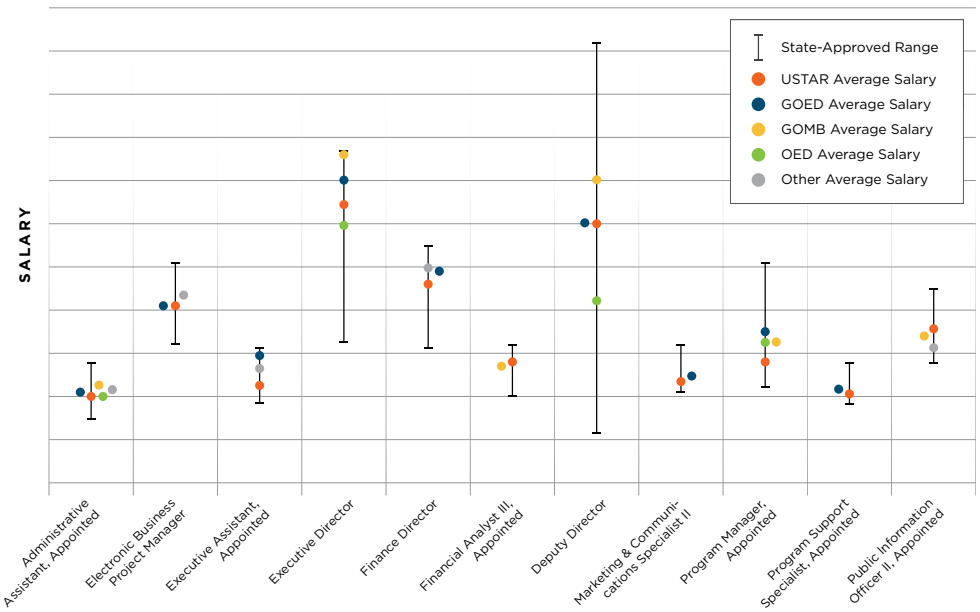
In the Business, Economic Development, and Labor Appropriations Subcommittee, of the Utah State Leglislature, pass-through expenditures (RFAs) were more than $20M in the final FY2019 budget.



In addition to its small budget, data suggests that USTAR operates a cost-effective and lean staff expenditure program. When benchmarked against peer organizations in the state, USTAR's total staff size, average salaries and benefits, and total personnel expenditures are average or below average.

USTAR's lean compensation is comparable to or lower than peer organizations including the Governor's Office of Management and Budget (GOMB), the Governor's Office of Economic Development (GOED), and the Governor's Office of Energy Development (OED).

SALARY COMPARISON



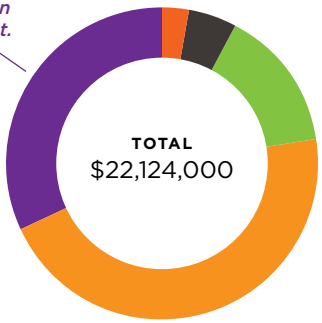
FY18 BUDGET

USTAR's total base budget for FY18 was $22.1M. Of this amount, roughly half, or $10.1M supported the competitive grant programs with these monies going to fund research at Utah companies and universities.

Approximately one-third of the budget, or $7.0M, supported principal researchers at the University of Utah and Utah State University. The remaining budget paid for support services for technology entrepreneurs (15%), administration (3%), and program management and compliance costs (5%). USTAR's goal is to keep administration and program management costs to a minimum to allow for the funding of technology development in the university setting and emerging companies to positively impact the state.

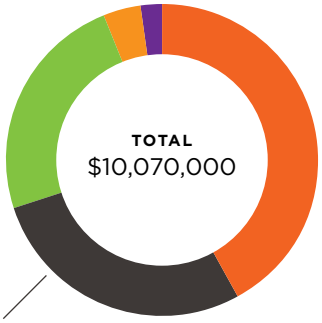
During the 2018 General Session, the Legislature passed S.B. 239, "Utah Science Technology and Research Initiative Amendments," which eliminated $6,519,000 in ongoing funding for USTAR supported principal researches. Additionally, The Legislature made the following budget changes to USTAR's FY19 base budget: Reduce University Technology Acceleration Grant — ($850,000) reduction of funding to the UTAG grant program; and USTAR Savings from Identified Cost Efficiencies — ($27,000) reduction of funding to USTAR Support Programs.

Funding for researchers eliminated in FY19 budget.



FY18 BUDGET

- **Administration** | 3% | $594,500
- **Program Management & Compliance** | 5% | $1,160,000
- **Technology Entrepreneur Services** | 15% | $3,280,500
- **Competitive Grants** | 46% | $10,070,000
- **University Principal Researchers** | 32% | $7,019,000

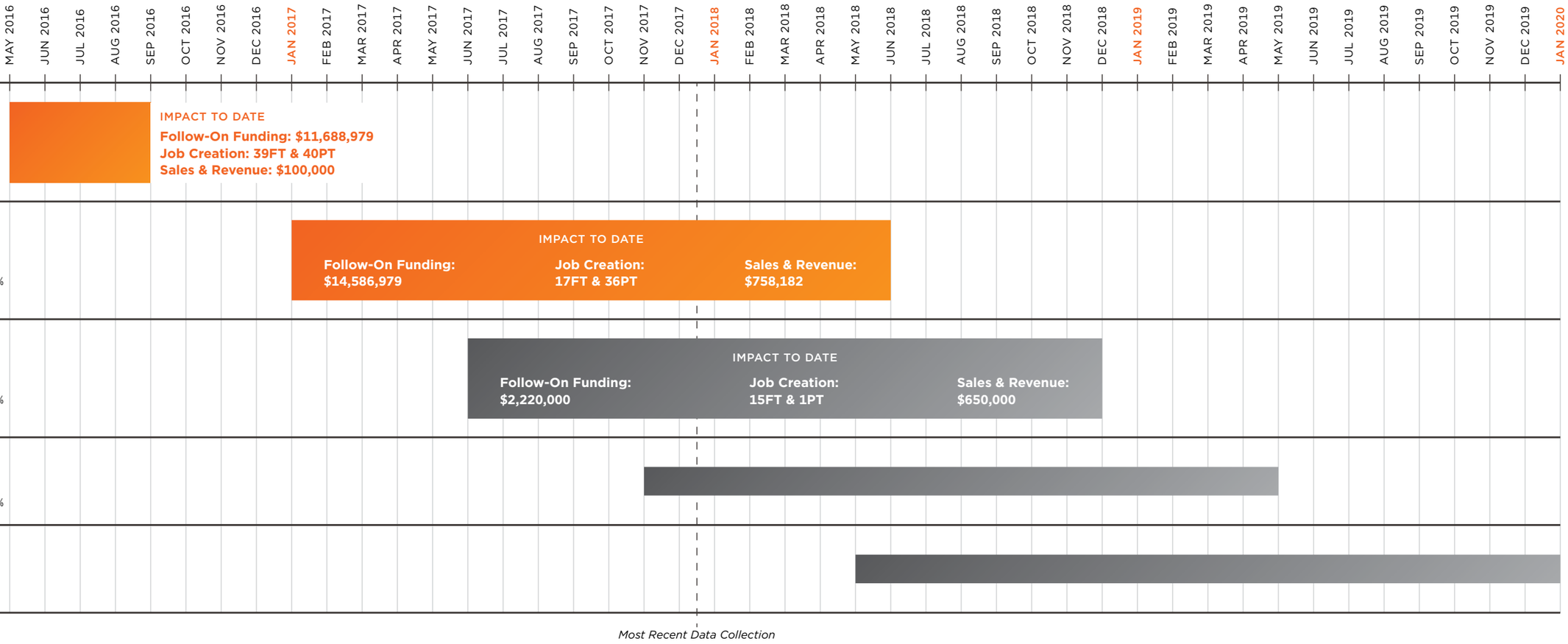


Funding for UTAG cut by $850,000 in FY19 budget.

COMPETITIVE GRANTS

- **Technology Acceleration Program** | 42% | $4,275,000
- **University Technology Acceleration Grant** | 28% | $2,850,000
- **Industry Partnership Program** | 24% | $2,375,000
- **Energy Research Triangle** | 4% | $380,000
- **Science & Technology Initiation Grant** | 2% | $190,000

TECHNOLOGY ACCELERATION PROGRAM (TAP)[1]



PILOT
Number of Grants: 12
Total Budget: $639,404
Total Expenditures: $635,004 | 99%

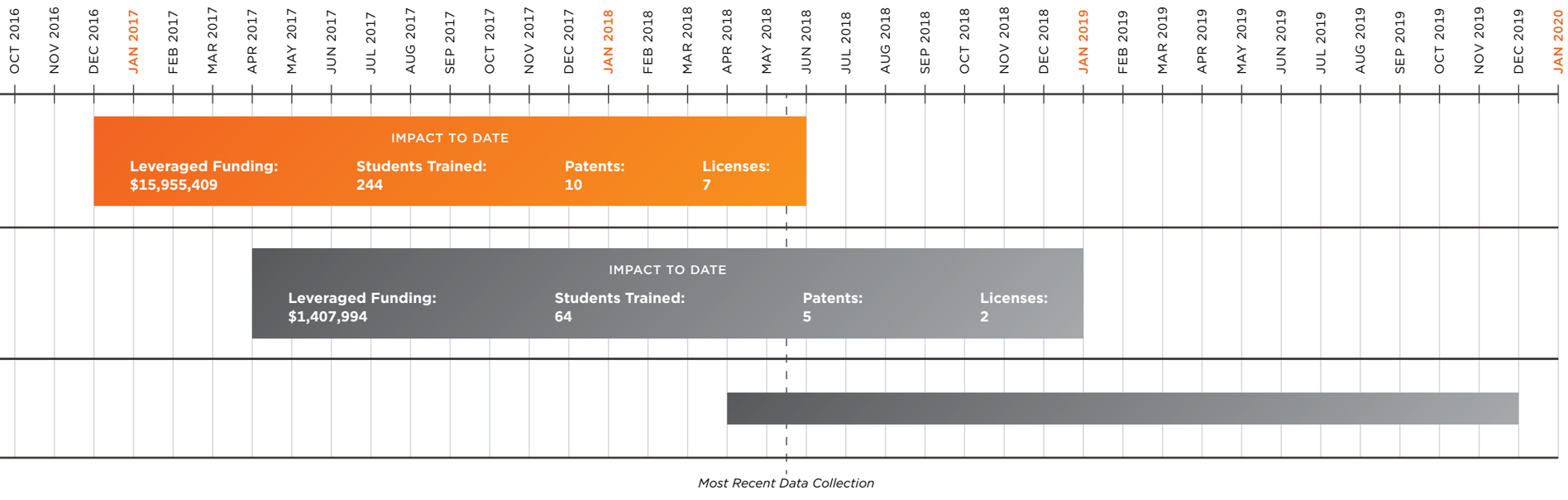
COHORT 1
Number of Grants: 26
Total Budget: $5,247,578
Total Expenditures: $5,073,532 | 97%

COHORT 2
Number of Grants: 7
Total Budget: $1,512,589
Total Expenditures: $1,312,294 | 87%

COHORT 3
Number of Grants: 15
Total Budget: $3,227,762
Total Expenditures: $1,411,141 | 44%

COHORT 4
Number of Grants: 13
Total Budget: $2,755,249
Total Expenditures: $94,630 | 3%

UNIVERSITY TECHNOLOGY ACCELERATION GRANT (UTAG)[2]



COHORT 1
Number of Grants: 20
Total Budget: $4,996,021
Total Expenditures: $3,786,546 | 76%

COHORT 2
Number of Grants: 7
Total Budget: $1,496,576
Total Expenditures: $551,347 | 37%

COHORT 3
Number of Grants: 7
Total Budget: $1,809,820
Total Expenditures: $29,361 | 2%

[1] Data independently collected and reviewed by TEConomy. For more information, refer to addendum.

[2] NOTE: UTAG data is self-reported by universities and has not been verified with an independent, third party such as TEConomy.

Complete

In Progress

USTAR PROGRAMS

“USTAR’s competitive grant programs and technology entrepreneur support services are well run and effective as evidenced by the performance of companies that receive assistance and other accomplishments, such as the U.S. Air Force’s collaboration with USTAR.”

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative’s Strategic Value and Operational Effectiveness, 2018*

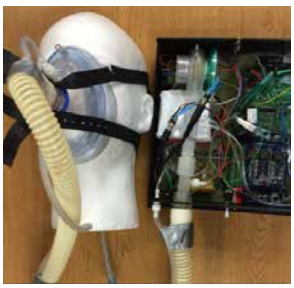
TECHNOLOGY ACCELERATION PROGRAM

USTAR's Technology Acceleration Program (TAP) provides competitive grants to early-stage companies to make them competitive for private capital. Grants can include research and development, proof of concept, product validation, and product development. TAP grants require specific, measurable milestones that must be met to receive funding. In addition to the award, TAP awardees receive non-material support, such as referral to USTAR's partner networks, to assist in achieving technical and business milestones with the goal of commercial success.

TAP projects are limited to a Technology Readiness Level (TRL)[1] of 3 to 5, with outcomes not to exceed 6. The TRL limitation allows successful TAP projects to be ready to compete for other private and public funding including the Technology Commercialization Innovation Program (TCIP) from the Governor's Office of Economic Development (GOED) which funds projects beyond TRL 6.

[1] For additional information on TRLs, refer to page 75 of this report.

FY18 TAP AWARDS



AccuBreath (MFM LLC) | Procedures that require mild to moderate sedation reduce interrupted breathing, but also help with patient comfort. This approach ensures the procedure is uninterrupted to get an accurate diagnosis or treatment.

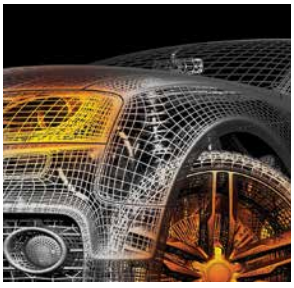
Sector: Life Science – Device
Location: Salt Lake City, UT

Brilliant Points Inc | There is an ever-increasing demand to address the physical limits for transfer of all forms of data over a computing network. This technology substantially improves data transfer rates without increased noise or interference. The direct impact on daily lives will increase computing, download, and streaming power.

Sector: Cybersystems
Location: Lehi, UT

Conductive Composites | This company is developing lightweight materials that provide high levels of conductivity and electromagnetic shielding for composite and advanced polymer materials including faraday cases that physically deny wireless and cellular signals.

Sector: Big Data & Cybersystems
Location: Heber City, UT & Cleveland, UT

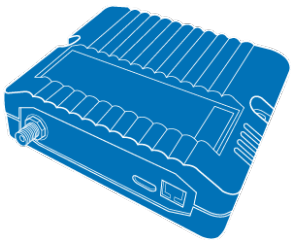


Coreform | This company develops high-end simulation tools that make a tighter connection between design and engineering. The highest demand for this technology is in the automotive and aerospace industries.

Sector: Aerospace
Location: Mapleton, UT

Cosmas Inc | This company is developing new material that converts waste to energy with applications in landfills, sewage plants, farm waste, as well as automotive emissions, petroleum refining, and gas-to-liquids industries. The result is completely carbon-neutral.

Sector: Energy & Clean Technology
Location: Springville, UT



Datawave | This technology creates industrial cellular gateways to create a way for "Internet of Things" devices to connect to the web cheaper, more quickly, and without clogging the airwaves.

Sector: Automation & Robotics
Location: Saratoga Springs, UT

Dragon Shale | This unique technology creates high-value petrochemicals from oil shale, all with minimal energy use and reduced environmental impact. The process separates the high value components to optimize final product value.

Sector: Energy & Clean Technology
Location: Vernal, UT

EDX Magnetics | Addressing the recycling markets, this company has developed a new metal sorting technology, Electro-Dynamic Eddy Current Sorting (EDX) which uses high frequency electro-magnets to separate non-ferrous metals and aluminum alloys.

Sector: Energy & Clean Technology
Location: Salt Lake City, UT

COMPANY SNAPSHOT

MAJELCO MEDICAL

Majelco Medical Inc., a University of Utah spin-out, is a medical device company developing breakthrough methods to measure blood loss during surgery.

The company is led by Annette MacIntyre, M.D FRCPC, a board-certified anesthesiologist with more than 30 years of clinical experience at hospitals in Canada and the United States. She founded the company in 2014 to develop technology for the improvement of patient care and treatment in the operating room.

PROJECT OUTCOMES

Through its USTAR TAP Grant, Majelco will:

- **Measure blood loss to *97 percent accuracy***
- **Lead to *higher precision* infusion and transfusion practices**
- ***Lower* patient and provider costs**
- ***Improve* quality of patient care**
- **Anticipate market entry in *Fall 2020***

PROBLEM

More than 10 million moderate blood loss surgeries—such as cardiac or liver operations—take place in the United States alone.

However, surgical blood loss measurement is still performed by simple, archaic, highly inaccurate, visual inspection. Inaccurate surgical blood loss assessment leads to over-infusion of intravenous fluids, expensive blood transfusions and other costly patient complications.

SOLUTION

Majelco's technology is the first real-time surgical blood loss monitoring measurement device. This USTAR TAP project will build and scale a 2nd prototype and test in a simulated environment, and allow the company to apply for intellectual property protection, and begin the regulatory process.

"...it is exceedingly difficult to find investors for early stage companies like Majelco Medical Inc. As a result, many of these companies with brilliant ideas simply fail. The funding that the USTAR TAP grants provide is absolutely essential for deserving, early-stage Utah companies to thrive and promote Utah's stellar reputation of technology and business promotion."

— Annette MacIntyre, MD, President and Founder, Majelo Medical Inc.

COMPANY SNAPSHOT

OxEon Energy is developing new technologies for energy production through ceramics materials. The company specializes in technologies that convert gas to liquid and other gas reforming techniques, which play a key role in addressing the world's energy related problems.

One of the original tenants of the USTAR Innovation Center, OxEon Energy has already grown in size to lease office and research space in North Salt Lake.

PROBLEM

As NASA prepares for human exploration on Mars, one of the biggest challenges is sustaining life, as the planet lacks oxygen. As oxygen cannot be created, it must be produced through chemical conversions of other elemental compounds and processed into breathable air.

SOLUTION

OxEon Energy's solid oxide electrolysis technology converts carbon dioxide to oxygen. The technology is designed to withstand extreme conditions that exist in space travel, including vibrations of the rocket launch and the landing impact, and also function in extreme temperatures ranging from -70°F to over 1472°C.

PROJECT OUTCOMES

OxEon Energy has:

- *Grown from three to 12 full-time* equivalent employees
- *Moved* from the Innovation Center to a 7,500 square-foot office and research space
- *Added ~$1 million* in salaries and equipment purchases into the local economy
- Signed contracts with the American Refining Group and the Jet Propulsion Laboratory
- Signed international licensing agreement, opening up the technology's use in Russia, Africa, the Middle East, South America, and Mexico
- *Won over $5 million in contracts*, including a multi-million dollar NASA contract

"The USTAR Innovation Center has been critical in providing initial office space and availability of product staging space in its high bay area. It is an excellent facility for startup companies, such as ours. We received access to equipment that we could not afford to buy on our own."

— Lyman Frost, CEO, OxEon Energy

Esplin Organic Solutions | With honey bee colony collapse as a national topic and agricultural catastrophe, this company plans to rescue the broods by providing an environmentally safe approach by creating a preventative, live vaccine for bees.

Sector: Life Science – Agriculture
Location: South Salt Lake, UT

GO Composites | As a stronger and lighter material compared to metals, composites offer unique benefits, but can be cost prohibitive. This company is completing process development for a new resin offering clean, low cost composites.

Sector: Energy & Clean Technology
Location: Brigham City, UT

IDbyDNA Inc | This software platform in the gene discovery space exploits unique tools to identify each microbe in a given sample through DNA. The technology is applicable to multiple fields including infectious agents, food waste, body fluid analysis, and environmental material.

Sector: Big Data
Location: Salt Lake City, UT

KDT Inc | Developing a platform to help clinicians rapidly determine the importance of individual DNA mutations for genetic diseases using a simple host organism to carry the gene. The intent of this approach is to create patient-specific treatment plans for specific diseases.

Sector: Life Science – General
Location: Murray, UT

Kosmo Technologies Inc | For sleep apnea, airway adjustments through a mouthgard are key to successful relief of patient symptoms. Kosmo has created a system that will define a set of parameters for an effective mouthgard in a few minutes cutting out the trial and error of current approaches.

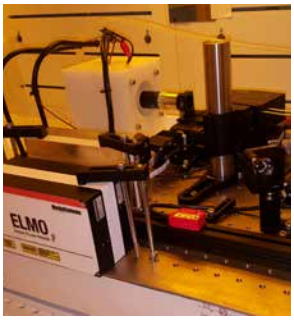
Sector: Life Science – Device
Location: Salt Lake City, UT

Majelco Medical Inc | Developing a disposable blood capturing device that precisely measures blood loss during surgery. Blood loss information to the surgical staff and the blood management teams will ensure accurate blood replacement for the patient and avoid complications from over-replacement.

Sector: Life Science – General
Location: Woodscross, UT

Nanoshell Company | This company is developing a rapid, continuous flow device incorporating specific binding for removal of toxins, contaminants and other noxious substances from blood. The removed substances could be useful as a therapy or as a diagnostic.

Sector: Life Science – General
Location: South Salt Lake, UT



Nielson Scientific LLC | Their process reduces prototyping for silicon chips and other nanostructures from six months to one day, reducing manufacturing costs, improving performance, and enabling completely new functionality for devices requiring precision manufacturing.

Sector: Automation & Robotics
Location: Lehi, UT

COMPANY SNAPSHOT

TURNER™ INNOVATIONS
RESEARCH & DEVELOPMENT LABS

Turner Innovations is an early-stage technology and product development company serving the medtech and life sciences, physical sciences, and security and defense industries.

Comprised of seasoned executives, the management team has a breadth of experience in product research, development, and distribution. Turner Innovation CEO and Founder Clark Turner, Ph.D., also founded Aribex, which was acquired by Fortune 500 company Danaher Corporation, a globally diversified technology conglomerate.

PROBLEM

A portable x-ray imaging device without plugs or cables that is sophisticated enough to be used in hospitals and durable enough for combat settings.

SOLUTION

The Smart-C is an x-ray imaging device that weighs just 17 pounds, is battery operated, and collapses and fits into a small carry-on bag. There are no plugs, cables or cords necessary. The device is comparable to standard clinic or hospital x-ray systems that weigh 400 pounds in image quality and function.

PROJECT OUTCOMES

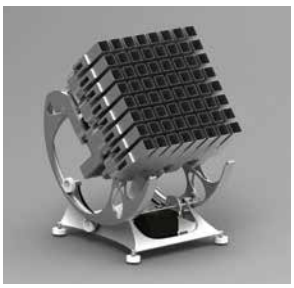
USTAR's support was instrumental in accelerating the time it took to prototype the device and to secure private equity.

The company:

- **Grew from two full-time to seven full-time equivalent employees**
- **Created new entity: Turner Imaging Systems**
- **FDA clearance expected in November 2018**
- **More than $4 million in follow-on funding**

"USTAR has been extremely helpful in developing our technology from a point where it was not interesting to private investors to a point where we're now able to attract outside equity investors."

— Clark Turner, *CEO and Founder, Turner Innovations*



Optisys | Using metal 3D printing, this company has achieved fabrication of a 3D printed antenna with improved communication performance and reduced weight, critical in telecommunications satellites.

Sector: Aerospace
Location: West Jordan, UT

PEEL Therapeutics | Targeting osteosarcoma, the most common and deadly bone tumor, this project is investigating delivery of natural cancer resistance proteins through a novel lipid nanoparticle delivery system.

Sector: Life Science – General
Location: Salt Lake City, UT

Photorithm | Elders living independently can be monitored to give family members assurances that they are safe. This webcam system will collect breath rate, heart rate and interpret facial appearance, and record and play back data.

Sector: Life Science – Device
Location: Smithfield, UT

Progenitor Life Science | An approach for precision treatment of cancer has been proven successful for several blood cancers. This company combines the precision of patient-specific treatment with an “off the shelf” source of cancer fighting cell therapy.

Sector: Life Science – General
Location: Salt Lake City, UT

RefloDx | Gastric reflux is a common condition but can be severe enough to cause injury of the lining of the throat and stomach. A better diagnostic has been created using ultrasound sensing and software algorithms.

Sector: Life Science – Device
Location: Clearfield, UT

Rogue Technologies | Accurately tracks total rounds spent from firearms using energy from the recoil. Ensures firearm reliability for military and law enforcement personnel while minimizing lifecycle costs of firearms and associated equipment.

Sector: Automation & Robotics
Location: Clearfield, UT

Rosivo | Tissue replacement has been a mainstay for cartilage and bone for many years. Now there is a company doing the same for trachea where patients are either born with malformed trachea or have experienced traumatic injury.

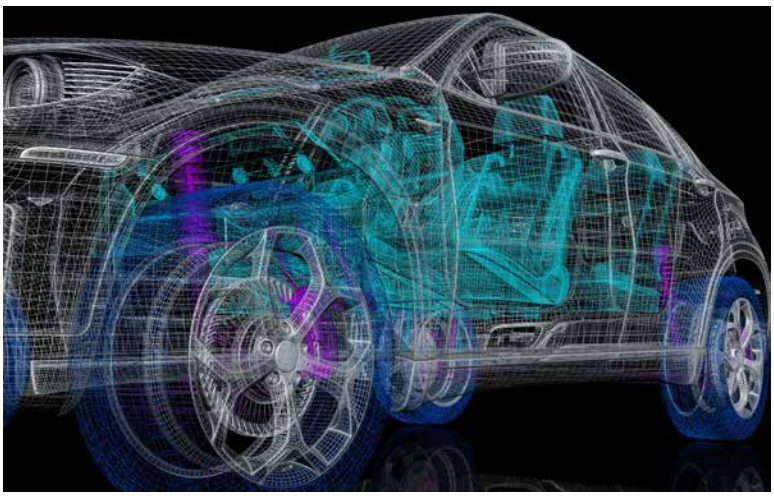
Sector: Life Science – Device
Location: South Salt Lake, UT

Scribe Data Science | With climate change wreaking havoc on coastal lands, weather data and prediction is in much greater demand. Scribe is transforming multiplex data collection suitable for weather forecasting that fills an economic gap.

Sector: Big Data & Cybersystems
Location: Salt Lake City, UT

Spectra Symbol

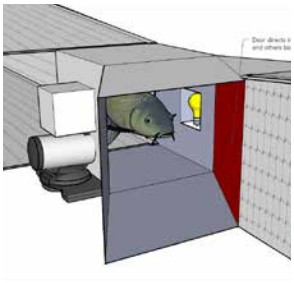
Rosivo



Coreform

Sustainable Energy Solutions

EDX Magnetics



Smart Vision Works | Addressing the issue of invasive fish, this project develops an object recognition algorithm to identify various species of fish in various underwater conditions and designs a fish holding and removal system.

Sector: Automation & Robotics
Location: Orem, UT

Spectra Symbol | Unprotected connection points in substations can result in power outages, and can heat up and destroy expensive equipment. This project develops wireless smart covers to protect and monitor critical electrical connection points in substations.

Sector: Automation & Robotics
Location: Salt Lake City, UT

Sustainable Energy Solutions | This company is developing a breakthrough natural gas treating technology that reduces contaminants, such as carbon dioxide, in natural gas, natural gas liquids, and liquefied natural gas, all while reducing costs and energy use.

Sector: Energy & Clean Technology
Location: Orem, UT

"In addition to USTAR's strong peer review process, the other factor that has contributed to the effectiveness of its grant programs is the caliber of its staff and its approach to program management."

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*

UNIVERSITY TECHNOLOGY ACCELERATION GRANT

USTAR's University Technology Acceleration Grant (UTAG) program supports research and development of technologies with commercial potential that need additional development before they can move out of the university environment. This funding addresses an innovation ecosystem gap between federal research dollars and risk capital investment.

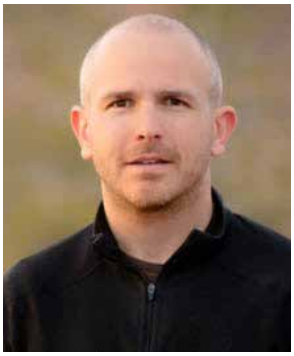
UTAG is available to individual researchers or ad-hoc teams employed by nonprofit Utah-based colleges or universities, to de-risk or advance the maturity of technology that has been developed in university labs. Projects funded through UTAG must have an identified market and commercialization path. Duration of projects cannot exceed 18 months and grant money is provided in the form of reimbursement of expenses.

According to self-reported university data, since 2016, UTAG researchers have received $17.4M in leveraged funding. The program also trained 308 students in a single year.

FY18 UTAG AWARDS

Scott Budge | Using a texel camera with a sensor and software that integrates with a drone, this project creates textured digital elevation maps that benefit agriculture, watersheds, and public safety.

Sector: Automation & Robotics
Utah State University



Rico Del Sesto | Biofilms are a collective of micro-organisms that adhere on body surfaces. Often disease causing, they are resistant to antibiotics because of the slimy glue they secrete. This researcher has a novel way to disrupt the film, administering a more effective treatment than traditional antibiotics.

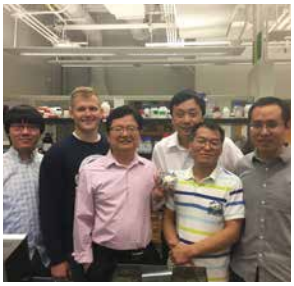
Sector: Life Science – General
Dixie State University

Ryan Looper | Glaucoma is a common disease that can impair one's vision. This research aims to exploit scientific understanding of a new disease target and validate a new drug to treat glaucoma.

Sector: Life Science – General
University of Utah

Silvana Martini | Shortening is a common ingredient in the food industry. This semi-solid performs well, yet is associated with negative health effects. This project investigates using ultrasound to create a semi-solid alternate ingredient without health concerns.

Sector: Life Science – Agriculture
Utah State University

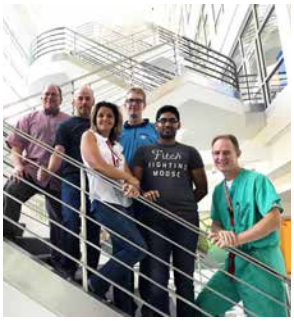


Yi Rao | This research is developing alternative clean energy sources, specifically competent and low-cost hydrogen fuel cells. These cells are pollution-free, and are up to two to three times more efficient than combustion technologies.

Sector: Energy & Clean Technology
Utah State University

Mostafa Sahraei-Ardakani | Weather forecasting information can effectively guide preventive measures during hurricanes. This project targets enhanced accuracy and fidelity in the weather forecast and structural analysis models to develop the preventive measures to mitigate power outages.

Sector: Automation & Robotics
University of Utah

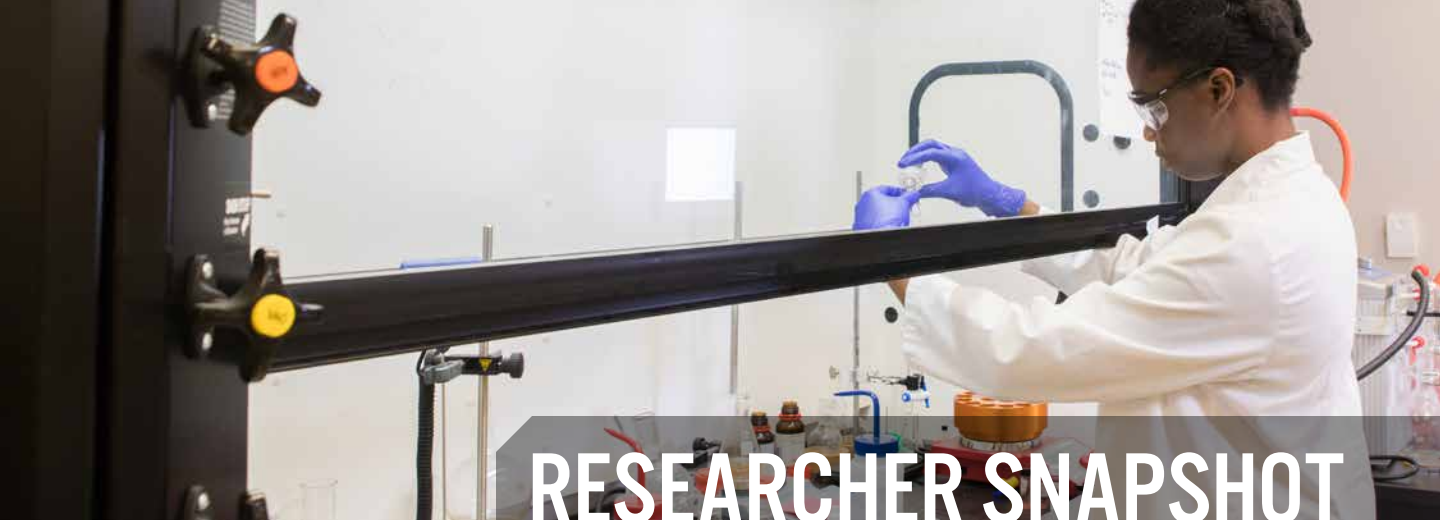


Christian Con Yost | Neutrophils are the yin and yang to killing microbial infections. Overactive neutrophils can damage sensitive tissue and enhance systemic infection (sepsis). This project aims to develop inhibitors to temper these overactive, yet critical, cells.

Sector: Life Science – General
University of Utah

A benefit of applied research products in the university setting is the number of students trained who become part of the near-term workforce.

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*



RESEARCHER SNAPSHOT

Rico Del Sesto, Ph.D.

DSU DIXIE STATE UNIVERSITY

Rico Del Sesto, Ph.D. was awarded a University Technology Acceleration Grant to research topical treatments for Methicillin-resistant staphylococcus aureus (MRSA), a bacterium that can cause infections throughout the body and is resistant to common antibiotics.

PROBLEM

Methicillin-resistant Staphylococcus aureus (MRSA) is a particularly difficult strain to treat because it is resistant to many commonly-used antibiotics. MRSA is acquired primarily at healthcare facilities or in community settings such as a gym.

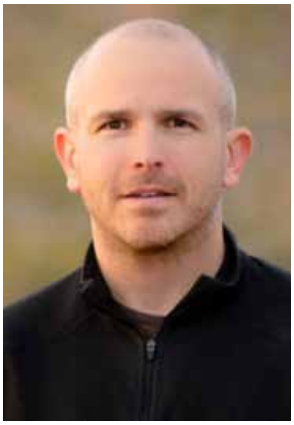
SOLUTION

Unlike traditional oral antibiotics, Del Sesto's topical treatment permeates skin layers to directly reach infections that are embedded within the skin. This disrupts the bacteria's protective biofilm, leading to direct antibiotics or antimicrobial delivery. As a result, this technology can treat MRSA more safely and effectively than traditional antibiotics.

PROJECT OUTCOMES

USTAR's support provides a significant bridge to get products from the research phase to a pre-clinical phase:

- **Bridging fundamental research to applied clinical studies**
- **Preliminary animal model studies**
- **Preparation for FDA-trials**
- **Potential licensing of technology and new startup business**



"With the state investing in projects like these, they can leverage already-existing, well-developed technologies that were initially funded elsewhere, and add that last gap of funding to bring the technology to fruition. It is a great opportunity for the state to capitalize on these marketable ideas through minimal investment with potentially huge returns through economic development."

— Rico Del Sesto, Ph.D., Assistant Professor, Dept. of Physical Science, Dixie State University

INDUSTRY PARTNERSHIP PROGRAM

The Industry Partnership Program (IPP) matches Utah-based private sector technology companies with university capacity to address specific technology gaps identified by the company partner. Open to companies with a substantial presence in Utah, the program addresses specific technical challenges that will result in positive economic impact for the state. USTAR assists in identifying an academic partner and facilitating the contracting process with the university. A joint scope of work is developed between the company and university researcher, and USTAR and the company jointly fund the research at the university.

The program address an innovation ecosystem gap by building networks between industry and academia that will give industry a market advantage, provide researchers insight into real world applications of their technology, and develop the next generation technical workforce.

FY18 IPP AWARDS

High Density Subdural Electrodes for Surgical Treatment of Epilepsy | Blackrock Microsystems & John Rolston, M.D., Ph.D., University of Utah

Epilepsy affects 3.4 million Americans, with one-third continuing to have seizures despite the best available medical therapies, and should be evaluated for epilepsy surgery. This project aims to reduce the risk of surgery and maximize the potential benefits.

Smart Construction Zone Analytics and Intelligence | Blyncsy & Xiaoyue Cathy Liu, Ph.D., University of Utah

Blyncsy is applying the company's sensor technology to address construction zone traffic. This project will provide suggested speeds for travelers based on collected traffic data, and will develop a software platform that integrates analytics to reduce congestion with cost savings.

Bioenergy and Waste Reduction from Municipal Reclaimed Water | WesTech (and CVWRF) & Ron Sims, Ph.D., Utah State University

This project supports a unique collaboration with the Central Valley Water Reclamation Facility and WesTech Engineering, Inc. to use algae to remove nitrogen and phosphorus for large-scale municipal wastewater treatment plants. The algae can then be harvested to create methane or fertilizer.

COMPANY SNAPSHOT

blyncsy™
MOVING FORWARD FASTER

Blyncsy combines the power of big data and GPS data to track individual habits, trends, and movements. The company's technology enables departments of transportation, cities and private entities to better understand how people move in an environment, such as a road construction project, to allow actionable and well-informed decisions.

PROBLEM

Construction zones cause congestion and traffic delays that are often unpredictable. Large variables affect commutes—such as weather conditions, traffic lights, accidents, speed limits, number of lanes, and construction—with no single source of collecting and analyzing data to assess traffic impact.

SOLUTION

Through USTAR's Industry Partnership Program (IPP), Blyncsy, in partnership with the University of Utah, is developing real time smart construction zone analytics and intelligence. This solution will provide government and other entities insight into travel routes and times on roadways.

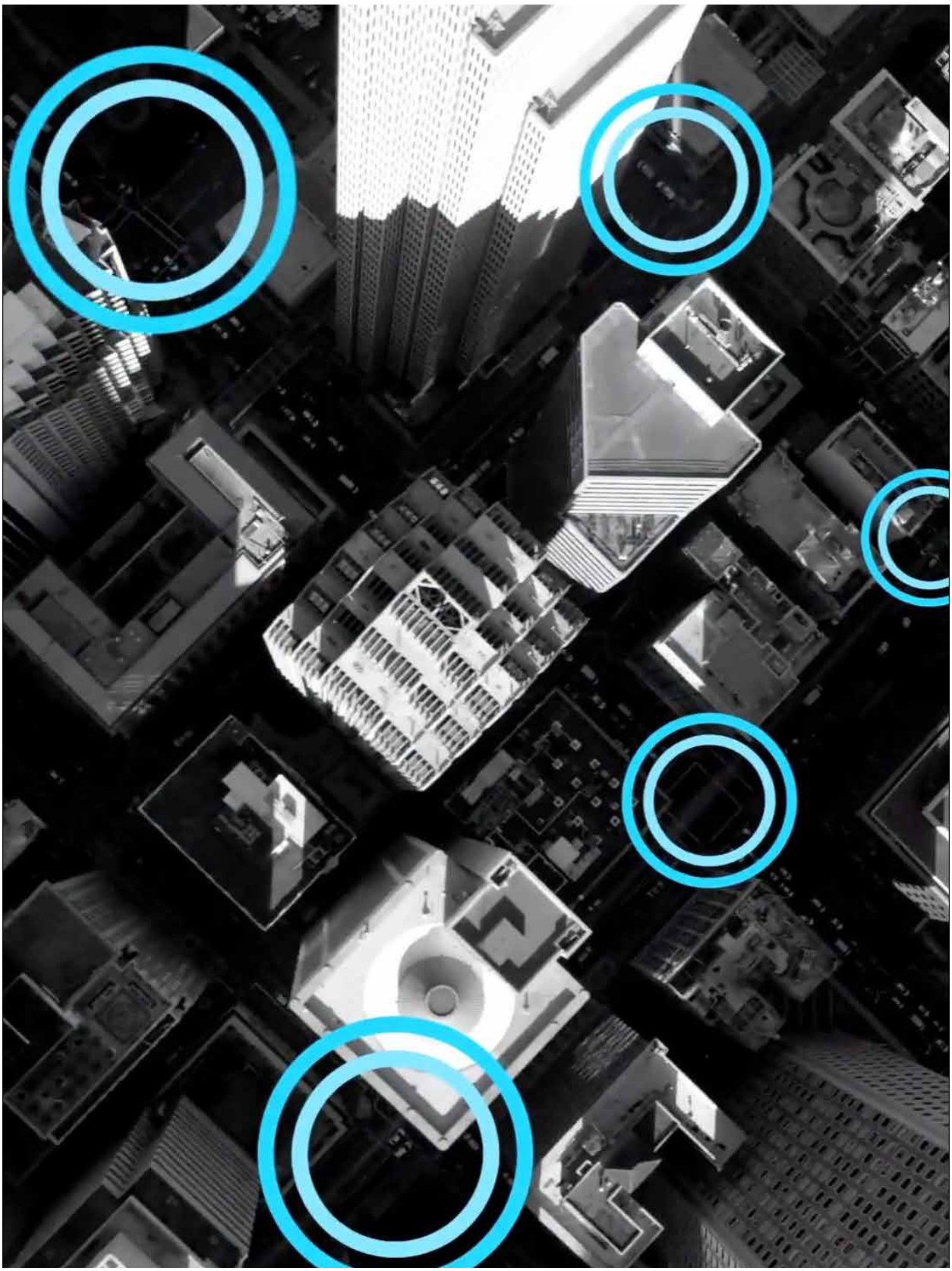
PROJECT OUTCOMES

This technology will potentially:

- **Enable better urban planning decisions for road development**
- **Reduce the impact of construction on daily commute times**
- **Create high-paying jobs and economic impact to the state**

"USTAR has really been a critical partner for us in helping us understand where to take our technology from a milestone perspective and providing us the resources and expertise to help us accomplish those goals."

— Mark Pitman, CEO, Blyncsy



For reporting on the Energy Research Triangle and the Science & Technology Initiation Grant, please see Addendum Four online at ustar.org/ustar-reports/2018.

TECHNOLOGY ENTREPRENEUR SERVICES

INCUBATION ENTERPRISE

USTAR offers deep science and tech companies with incubation and entrepreneurship services located across the state that are designed to develop innovative ideas into commercially viable technology.

USTAR INNOVATION CENTER

Completed in late 2017, the USTAR Innovation Center is located at Falcon Hill National Aerospace Research Park. The incubation space accelerates the development cycle for seed and early-stage science and technology companies in Utah, drastically reducing initial overhead costs for startups. The space helps to drive down costs and increase efficiency for prototyping, shortening the development cycle, which in turn makes companies ready for outside investment sooner than traditional lab spaces.

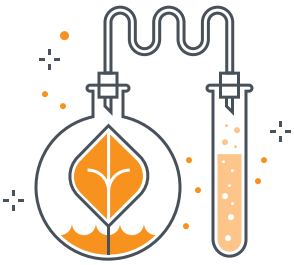
This high-tech incubator and prototype lab space is designed to meet the needs of the entrepreneurs and early-stage companies, as well as strategic partners, in the aerospace/defense, advanced materials, composites, and outdoor product sectors.

"The USTAR Innovation Center is open to startups, mature companies, Federal partners, and academic institutions. Drawing these different innovation actors together in the same prototyping space can create the serendipitous collisions and connections that seed new R&D collaboration and customer-supplier relationships."

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*

It is widely recognized that access to specialized equipment and labs can be prohibitively expensive and a barrier to entry for startup companies in advanced manufacturing and life sciences sectors. It is also recognized that there are positive indirect impacts created by shared physical space.

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*



BIOINNOVATIONS GATEWAY

BioInnovations Gateway (BiG) serves Utah's growing life science industry including emerging biotechnology, medical device, and pharmaceutical companies. BiG has a dual mission to: 1) give startup companies a competitive edge at a critical stage in their development by providing access to equipment, laboratory facilities, and technical resources, and 2) provide biotechnology and biomanufacturing students at Granite Technical Institute with advanced workforce training and networking opportunities via BiG's internship programs.

USTAR SBIR CENTER

The USTAR SBIR Center supports entrepreneurs in applying for and winning funds through one of the largest seed funds in the United States—the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs managed by the Small Business Administration (SBA). These federal grant programs provide $2.5 billion in funding each year to small businesses in an effort to support innovative research and development and help companies move towards commercialization.

The SBIR Center offers workshops, seminars and one-on-one consulting to assist Utah entrepreneurs and small businesses navigate the process to apply for and win these non-dilutive funds. The center provides services statewide, and has successfully worked with companies from Box Elder to Washington counties.

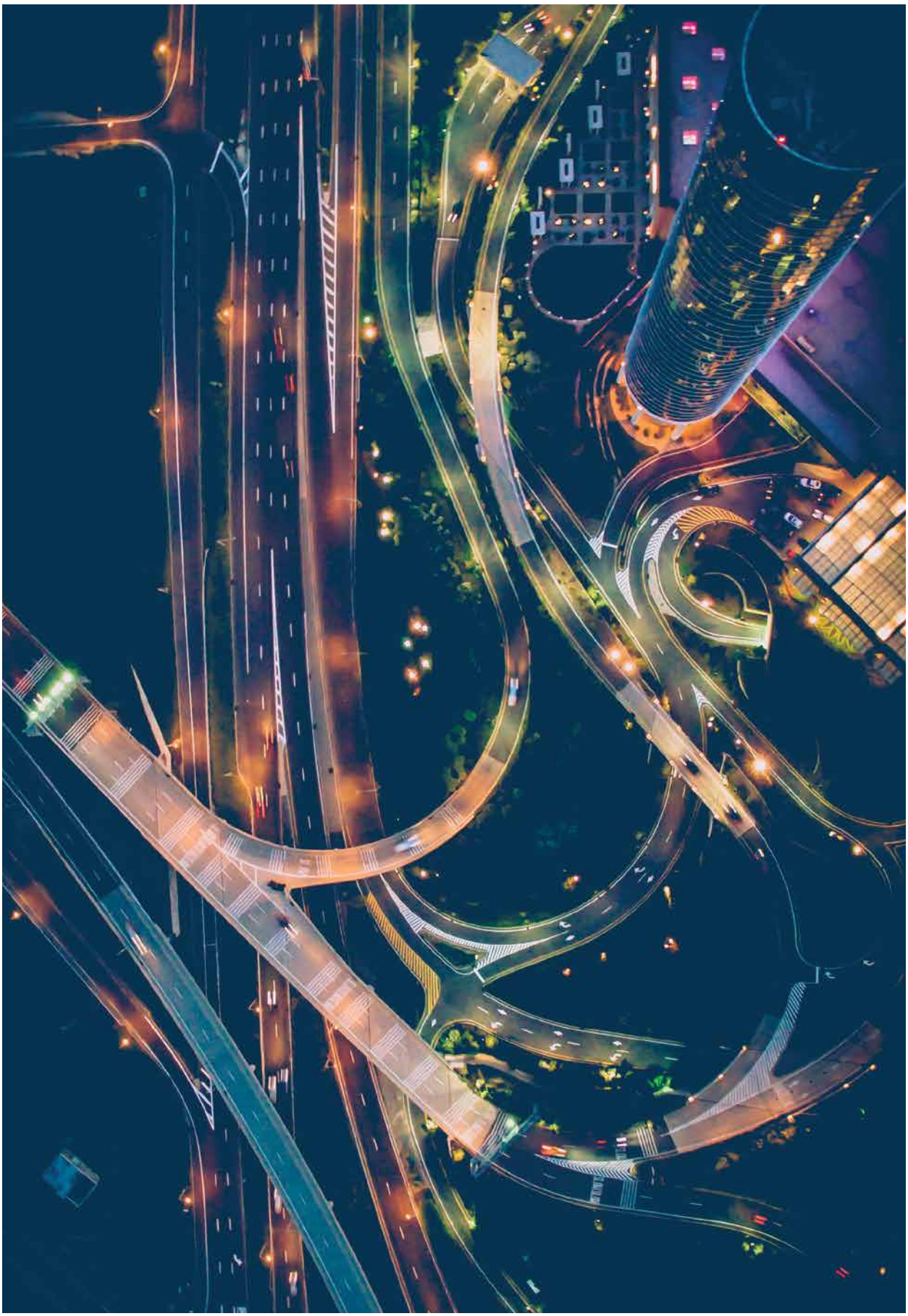
The win rate for companies that receive USTAR SBIR/STTR Assistance is 25% compared to the 15% success rate nationally for NSF SBIR Phase I grants and the 15.6% success rate for NIH SBIR Phase I grants.

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*

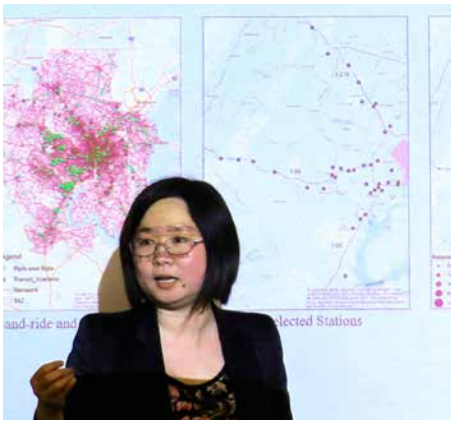
USTAR APPROACH

“USTAR is a lean, effective, and outcomes-driven organization.”

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative’s Strategic Value and Operational Effectiveness, 2018*



FOSTERING STRATEGIC ECONOMIC GROWTH



Researchers from around the world have found strong correlations and links between technology innovation and economic prosperity.[1] In today's globalized economy, the Group of Seven (G7) Academies of Science, in a joint statement note that investment in deep science and technology infrastructure, such as smart renewable energy grids and sustainable transport systems are required for inclusive, long-term economic growth.[2]

USTAR's approach to technology-based economic development utilizes a strategic approach that incorporates best practices from other innovation programs from across the country[3], designed to ensure competitive and efficient programing.

USTAR's success and effectiveness is attributable to an approach that relies on:[4]

- **Caliber of staff.** USTAR's staff is a mix of scientific and technical domain expertise, strong program management and community outreach skills, and prior academic, government lab, and industry work experience.
- **Strong peer review process.** USTAR's peer review process is unique compared to other economic development programs in Utah. USTAR's more than 200 reviewers include a mix of industry, government, and academia from 32 states and 11 countries. Additionally, more than 85 percent of reviewers are from out-of state to increase the objectivity and diversity of perspectives and to reduce conflicts of interest.
- **Engagement of Governing Authority members.** Many of USTAR's Governing Authority members bring strong private sector, deep technology, and startup experience and perspectives to USTAR programs.
- **Strategic, targeted sector development.** Unlike broader economic development programs, USTAR is focused only on "deep technology" startup companies in sectors characterized by large and growing global markets and identified as important to the state's economy.

A recent study by TEConomy Partners found that "USTAR's effectiveness is due to both the caliber of its staff, as well as the deep level of engagement by its Governing Authority members—many of whom bring private sector, deep technology, and startup experience. These members take their role in providing strategic direction and oversight of USTAR seriously and are focused on making USTAR additive to the ecosystem as a whole."

[1] West, D. M. (2011). Technology and the Innovation Economy. Brookings.

[2] New economic growth: The role of science, technology, innovation, and infrastructure. Joint Statement (May 2017). G7 Academies of Science.

[3] TEConomy Partners, LLC (2018). Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness: Response to Utah Code 63M-2-802(6)(b)

[4] TEConomy Partners, LLC (2018)

TARGETED SECTORS

AEROSPACE

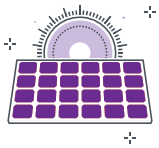
Aerospace is concerned with aeronautics and astronautics. Areas for research include, but are not limited to, innovative approaches in aerodynamics, advanced materials, engineering of aircraft and spacecraft, and the autonomous control of aircraft. This includes both manned and unmanned systems, “drones.”

AUTOMATION & ROBOTICS

Automation technology is the use of cutting-edge machinery in industrial applications to minimize human exertion. Robotics is the branch of automation that deals with the design, construction, operation and application of robots, along with the computer systems that maintain control and process information.

BIG DATA & CYBERSYSTEMS

Big Data describes data sets that are so large or complex that traditional data processing applications are inadequate. Analysis of data sets can find new relationships to gather information on topics such as business trends, crime patterns, genome sequences, complex physical environments, and more.



ENERGY & CLEANTECH

Energy and Clean Technology encompass a diverse range of products, services, and processes that harness renewable and nonrenewable materials and energy sources to dramatically reduce the use of natural resources, cut or eliminate emissions and waste, and provide options for efficient energy storage and usage.

LIFE SCIENCES

Life science is the study of living organisms from a cellular, molecular, or macroscopic perspective. This sector focuses on improving the quality and standard of life through applications including medical device development, biotechnology, pharmaceuticals, diagnostic, agriculture, genetics, and healthcare IT.

USTAR focuses on deep technology sectors that are overlooked by the venture capital markets in angel and seed stage investments.

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative’s Strategic Value and Operational Effectiveness, 2018*

TECHNOLOGY READINESS LEVELS

Technology Readiness Levels (TRL) are a widely-accepted method of measuring technology maturity and are used among several federal agencies including the National Aeronautics and Space Administration (NASA) and the Department of Defense. Their purpose is to estimate the maturity of a technology during the acquisition process and are scaled from 1 to 9 with 9 being the most mature. TRLs enable consistent, uniform discussions of technical maturity across different types of technologies.

1. ***Basic Principles Observed and Reported***
   Lowest level of technology readiness. Scientific research begins including paper studies of a technologies basic properties.

2. ***Technology Concept and/or Application Formulated***
   Invention begins. Once basic principles are observed, practical applications can be invented. Applications are speculative and there may be no proof to support the assumptions.

3. ***Analytical and Experimental Critical Function and/or Proof of Concept***
   Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology.

4. ***Component and/or Breadboard Validation in Laboratory Environment***
   Basic technological components are integrated to establish that they will work together. This is relatively "low fidelity" compared to the eventual system.

5. ***Component and/or Breadboard Validation in Relevant Environment***
   Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so it can be tested in a simulated environment.

6. ***System/Subsystem Model or Prototype Demonstration in a Relevant Environment***
   Representative model or prototype system, which is well beyond that of TRL 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness.

7. ***System Prototype Demonstration in an Operational Environment***
   Prototype near, or at, planned operational system. Represents a major step up from TRL 6, requiring demonstration of an actual system prototype in an operational environment such as an aircraft, vehicle or space.

8. ***Actual System Completed and Qualified Through Test and Demonstration***
   Technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development.

9. ***Actual System Proven Through Successful Mission Operations***
   Actual application of the technology in its final form and under mission conditions, such as those encountered in operational test and evaluation.

Source: Department of Defense (2010), Defense Acquisition Guidebook

GRANT PROCESS

USTAR's grant programs are defined in statute, detailed in admin rules, and executed using rigor and best practices.

1

Targeted Technology Sectors, Admin Rules & Budgets Set by Governing Authority

2

Open Competitive Grant Solicitations

3

Letter of Intent & Application Submission

4

Administrative Review for Eligibility & Completeness

5

Peer Review by 1 Business & 2 Technical Experts*

6

Governing Authority Subcommittee Reviews Top Proposals & Makes Recommendations

7

Full Governing Authority Votes & Approves Winning Proposals

8

Contracts Negotiated & Milestones Finalized

9

USTAR Technical Staff Consults with Grantees

10

Milestone Completion Assessed by USTAR Technical Staff

11

Grant Funds Dispersed Upon Milestone Completion

12

Impact Data & Metrics Collected by Third Party Assessor**

* All reviewers must complete a conflict of interest review.

** Per statute 63M-2-703(3)

—

USTAR HAS ASSEMBLED A CADRE OF MORE THAN 200 REVIEWERS FROM 32 STATES AND 11 NATIONS.

—

REVIEWS ARE COMPLETED BY AT LEAST TWO PH.D.-LEVEL TECHNICAL EXPERTS AND ONE BUSINESS/INDUSTRY EXPERT.

—

MORE THAN 85% OF USTAR REVIEWERS ARE OUT OF STATE TO REDUCE POTENTIAL CONFLICTS OF INTEREST.

—

ADDENDUM ONE

“It’s very important for Utah to be involved in technology-based economic development. Utah’s never had the mindset of ‘we’re going to be average or follow the crowd,’ especially in technology and economic development. We’ve always pushed to be a leader in those areas and I think a lot of the other states are doing it because they’ve seen what Utah’s done and the success that we have.”

— Brigham Tomco, Chairman & CEO, Zylun Global and USTAR Governing Authority member

ECONOMIC DEVELOPMENT OBJECTIVES

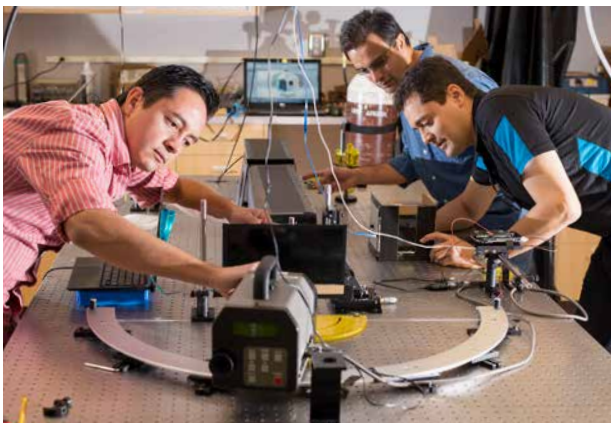
USTAR's Governing Authority adopted written economic development objectives per statute by adopting the economic impact projections provided by USTAR's independent assessor, SRI International, in 2015.

As outlined in the prospectus, these five-year projections provided an estimate of the economic impact of USTAR programs by 2020. The projections, detailed below, are based on the implementation of USTAR's competitive, commercialization-oriented programs that were implemented in FY2017.

	2020 PROJECTED IMPACT DATA	2016-2017 ACTUAL IMPACT DATA
Follow-on Investment	$123.9M	$123.1M
Sales	$27.3M	$27.0M
Full-Time Jobs Created	200	258

The methodology for development of these five year projections can be found in the USTAR Prospectus available at *www.ustar.org/ustar-strategydocs/2015-ustar-prospectus* in Table 6, page 13.

In just two years, USTAR has already met or exceeded its five-year performance metrics.

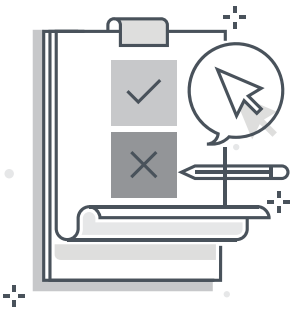


- *USTAR companies have created 258 full-time and 166 part-time jobs since 2016.*[1]
- *The average wage for full-time jobs created by USTAR companies is $87,005, 172% of the Salt Lake County average wage.*[1]
- *In 2017, 308 university students also received hands-on training in STEM-related fields by working on projects funded by USTAR grants.*[2]

[1] TEConomy

[2] This data is self-reported by universities and has not been verified by a third party such as TEConomy.

DATA COLLECTION & SURVEY METHODOLOGY



As a long-term investment in the Utah innovation ecosystem, measuring the impact of USTAR requires a long-term view. However, it is important to track metrics to ensure the USTAR investment is on target to achieve the intended results. The early indicators that USTAR is required to report include external funding and/or follow-on funding for specific technologies. Later stage indicators are tracked annually for a minimum of five years and include sales, revenue, jobs created, and wages for those jobs. In addition, the external funding data from the later-stage indicators are used as input variables to determine the contributions to the state tax base through the IMPLAN model. This is a commonly used economic model (see implan.com) that provides government programs an estimate of the impact of their programs.

USTAR is statutorily mandated to provide impact data, collected by an independent third party, on the impact on the Utah tax base of the companies who receive USTAR support. TEConomy Partners, LLC, who was selected through a competitive RFP process, surveys USTAR client companies that meet the statutory definition of private entity and the impact reporting criteria. The survey population includes companies that have (since FY2010 to the present) licensed technology developed by USTAR-supported faculty, been awarded USTAR grants, and/or received a minimum of 20 hours of technical or business assistance (via a USTAR satellite office, the USTAR SBIR Center, BioInnovations Gateway, Innovation Center in Clearfield, etc.) These categories are not mutually exclusive. Many early-stage technology companies pursue multiple avenues of support to bring new technologies to market.

Specific methodology for the survey and the survey instrument can be found on the USTAR website (ustar.org/ustar-reports/2018) as part of the annual impact study. The private entity survey is conducted for CY2017. The use of the calendar year, rather than fiscal year, for private entities is to align questions to the tax year for ease and accuracy of reporting by the private entities.

"Overall, USTAR reporting requirements and impact data are effective at measuring the near-term, intermediate, and long-term performance of funded companies and projects. The metrics were developed based on best practices in other states and are appropriate for USTAR's mix of program activities."

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*

USTAR GOVERNING AUTHORITY

Susan D. Opp
Chair
Senior Vice President,
Strategy and Technology,
L3 Technologies

Val Hale
Vice-Chair
Executive Director,
Utah Governor's Office of
Economic Development

David Damschen
Utah State Treasurer,
State of Utah

Theresa A. Foxley
President & CEO,
EDCUtah

Jennifer Hwu, Ph.D
President, CEO
& Co-Founder,
Innosys

Richard Kendell
Co-Chair of Education
First, Education Policy
Advisor to Prosperity 2020

Rich Lunsford
Corporate Vice President,
Cardiac Surgery Systems,
Edwards Lifesciences

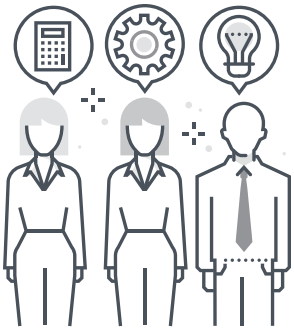
Derek Miller
President & CEO,
The Salt Lake Chamber

Brigham Tomco
Chairman & CEO,
Zylun Global

USTAR Governing Authority members carve out time from their positions within leading companies and organizations, because they view the USTAR Initiative as a positive and serious investment in the state's technology-based economy and ecosystem. They take their role in providing strategic direction and oversight to USTAR seriously.

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*

USTAR LEADERSHIP



Ivy Estabrooke, Ph.D.*
Executive Director,
State Science Advisor

Brian Somers
Managing
Director

Barbara Araneo, Ph.D.
Emerging Technology
Development Lead

Andrew Sweeney, Ph.D.
Emerging Technology
Development Lead

Lincoln Clark
Finance
Director

Mary Cardon
Director,
USTAR SBIR Center

Wayne Bradshaw
Director, USTAR Incubation
Enterprise

Linda Cabrales
Director, Communications
& Programs

Kristen Jensen
Senior Systems
Strategist

* Dr. Estabrooke left USTAR for the private sector in July 2018, but was leading the agency in FY18. Brian Somers is currently serving as both Managing Director and Interim Executive Director.

Talent drives good organizations, and one of the reasons that USTAR has been effective is that it has been able to attract talented staff who bring a mix of scientific and technical domain expertise, strong program management and community outreach skills, and prior academic, government lab, and industry work experience. These diverse backgrounds and skill sets align to the position requirements needed to run USTAR's competitive grant programs and technology entrepreneur service programs effectively.

— TEConomy, *Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness, 2018*

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Additional information was collected through a survey distributed to agencies in all 50 states. Responses were used to supplement information for the following states: Arizona, Iowa, Massachusetts, Nebraska, Oklahoma, Oregon, Pennsylvania, South Dakota, and Tennessee.

SUPPORTING ADDENDA

To view additional addenda, please visit USTAR's Resource Library at *ustar.org/ustar-reports/2018*.

ADDENDUM TWO
–
Measuring the Private Sector Impacts of USTARSupported Programs 2018

ADDENDUM THREE
–
Evaluation of Utah Science Technology and Research Initiative's Strategic Value and Operational Effectiveness: Response to Utah Code 63M-2-802(6)(b)

ADDENDUM FOUR
–
University & Legacy Programs

As the catalyst for science- and technology-based economic development in the state of Utah, USTAR is pleased to share this annual report. USTAR thanks the citizens of Utah, the Governor, and the Utah Legislature for their commitment to the science and technology researchers, entrepreneurs, and inventors in the state. USTAR will continue to monitor the progress and outcomes of the state's investment and report the results to the people of Utah.

ustar.org