

2013 annual report
TECHNOLOGY & VENTURE COMMERCIALIZATION





**TECHNOLOGY & VENTURE
COMMERCIALIZATION**

THE UNIVERSITY OF UTAH

WELCOME

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[MESSAGE FROM TVC'S EXECUTIVE DIRECTOR]

["THE STATE OF COMMERCIALIZATION": GOALS & CHALLENGES]

As an industry, university commercialization can be visualized as a building under construction. Despite a fairly long history, beginning in many cases in the 1960s, this industry is fairly immature, with only a few floors of the building completed. Industry leaders, such as the University of Utah (the U), have built more floors than others, but still not that many. I believe the "building" under construction has the potential to become one of the world's tallest buildings. But if this is true, it means we have a long way to go.

Next Phase: Our Plans for 2014

In 2014 our building efforts will focus on adding new levels to our building. Important objectives for TVC include the following:

- Continue to improve relationships between TVC and our faculty, students and postdocs
- Drive value into our startups through additional investments and stronger de-risking
- Involve outside stakeholders earlier and more intensively in decision making
- Generate increased resources, especially investment and management
- Continue to create processes and systems to facilitate data-driven decision making
- Organize and manage technologies more efficiently

We believe the return on investment from these activities could be very large. Of the over 5,500 invention disclosures TVC has received in the last 45 years, only 3.4% have produced revenue and of these, only 0.7% have returned more than \$1 million dollars to the U. While this exceeds the industry standard, this statistic certainly supports earlier assertions that we have only begun to scratch the surface of potential. It also shows that even very small improvements will have great impacts on future results.



BRYAN RITCHIE

Building the Upper Floors: Beyond 2014

Clearly, there are many small steps we can take to build additional floors. But how do we make large, more discontinuous changes for improvement that will add entire sections to our building? Although there are many potential obstacles to commercialization, two challenges are especially difficult: focus and scale. Ironically, either can be resolved by intensifying the other. But significant change will require both. Those universities that can resolve the two will move dramatically ahead in commercialization success.

Challenges

Focus. Most large research universities receive hundreds of disclosures each year from a wide range of disciplines. It is difficult to have the deep technical and market expertise within

the commercialization operation needed to make the best decisions for every disclosure. Put simply, the commercialization office is almost always "a mile wide and an inch deep." A solution to this problem is to focus on achieving the technical and market expertise in one or two areas and ignore the rest. Yet such a solution would result in abandoning service to the rest of the university.

Scale. At the same time, commercialization is resource intensive. Economics suggests that one of the best ways to maximize resource utilization is to increase scale wherever possible. Increasing scale presents a two-fold challenge. First, only the back half of the commercialization process scales well. Second, where scale is possible, initial fixed costs are high. To explain in more detail, the early part of the process—receiving disclosures, understanding technologies, and developing commercialization plans—



THE STATE OF COMMERCIALIZATION

The Ambulatory Care Center building during construction

requires intensive one-on-one relationships and interactions. Adding more disclosures requires more people to do the early evaluation work. But once in the system, a rigorous, stage-gated derisking system can add new technologies with only slight increases in marginal costs. But achievement of these scales in the back half of the process requires significant investment to acquire or build sufficient resources, quality disclosure rates and a mature entrepreneurial ecosystem. These three requirements are difficult for any one university to attain alone.

One Solution: Creating Virtuous Synergy Through a Hub for Commercialization

To solve both problems simultaneously will require a new structural relationship that extends beyond a single university, perhaps beyond a single community. Successful universities will partner with industry, entrepreneurs, and other universities to create economies of sufficiently large scale to facilitate increased focus and capacity across a wider range of technological and scientific fields. To accomplish this, universities must first decide where they fit in this new structure. For those who aspire to be a hub of commercialization, it will be necessary to invest in strong processes to derisk and develop new technologies. In addition, they must also invest in partnerships among universities, companies, and other organization, such as foundations, to develop sufficient ecosystem strength to both contribute to and benefit from the output of the hub. These "hubs" will emerge as a virtuous cycle formed from the synergies and economies gained from robust sourcing, derisking, investment, commercialization processes. To say it simply, more quality technologies will result in more resources, and more resources will result in higher quality technologies. The vortex of this dynamic will draw in more participants and strengthen the "hub" of commercialization.

The U has consciously embarked on the path to becoming one of these hubs. We are positioning ourselves as a thought leader in university commercialization. We are structuring processes and data to drive next-generation derisking, startup, and commercialization development. We

are nurturing university, company and investor partners who want to participate with us in this new environment.

Whatever the final solution to these two problems is, it will be the driver for innovation that propels the industry to new heights over the next 10 to 15 years. We believe time is of the essence in this venture and that higher returns will accrue to early movers.

Conclusion

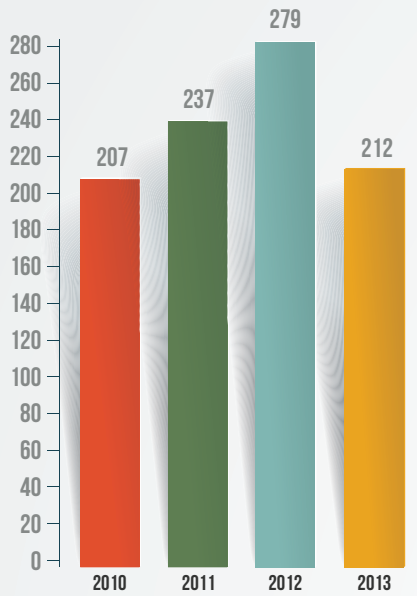
The U has become a much emulated standard for commercialization practices. We are working hard to build on this foundation, but there is still much left to do. Incremental improvement in consistent, quality customer service, increasing value in our startups, and developing deeper and more involved partnership relationships will be important objectives for us in 2014. It will also be important for us to begin to do the heavy lifting necessary to figure out the transformational innovation necessary to successfully move to the higher levels of commercialization. Success will require us to focus on building from the inside out. We hope to get the next 20 stories constructed on our building while also understanding the blueprint to get us to the top as quickly as possible.

As Thomas Edison said, "There is a better way to do things—find it." We aim to, both now and in the future.

Bryan K. Ritchie

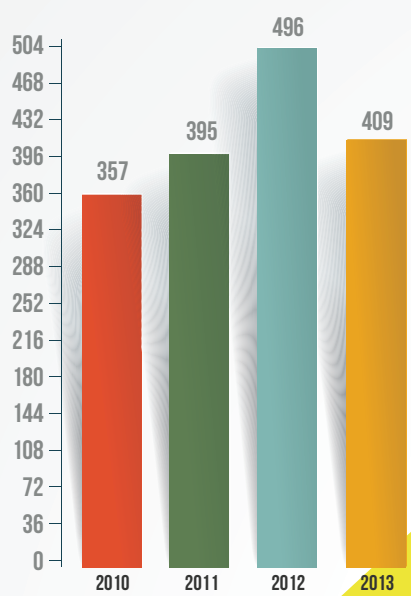
Executive Director, Technology & Venture Commercialization & Associate Vice President for Research—Commercialization

2013 BY THE NUMBERS



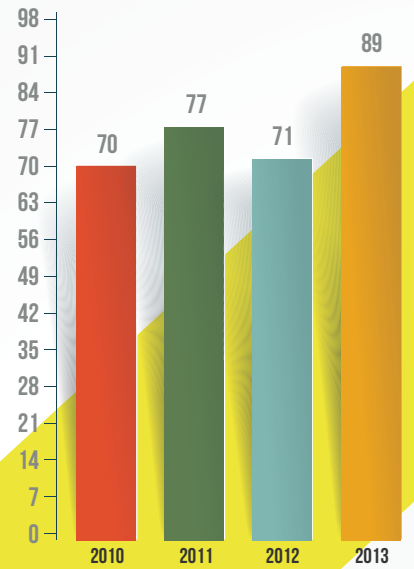
Disclosures

212



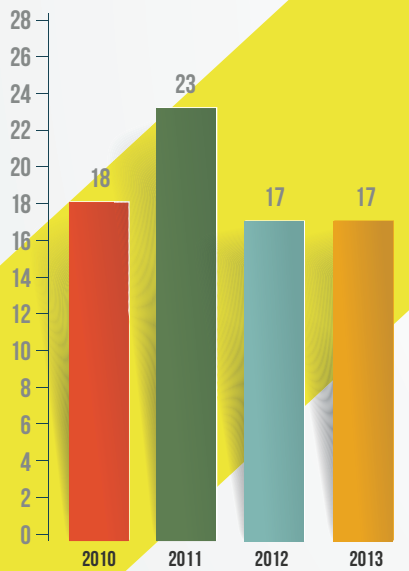
Inventors

409



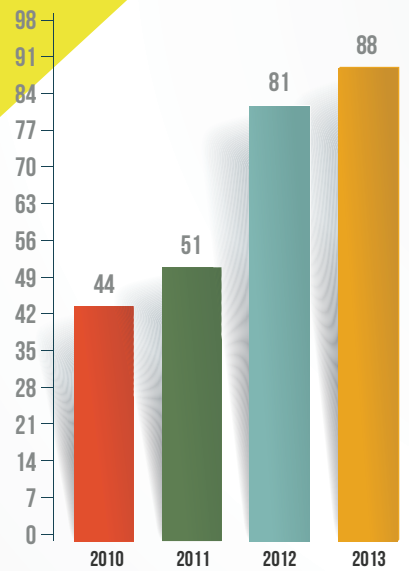
Licenses

89



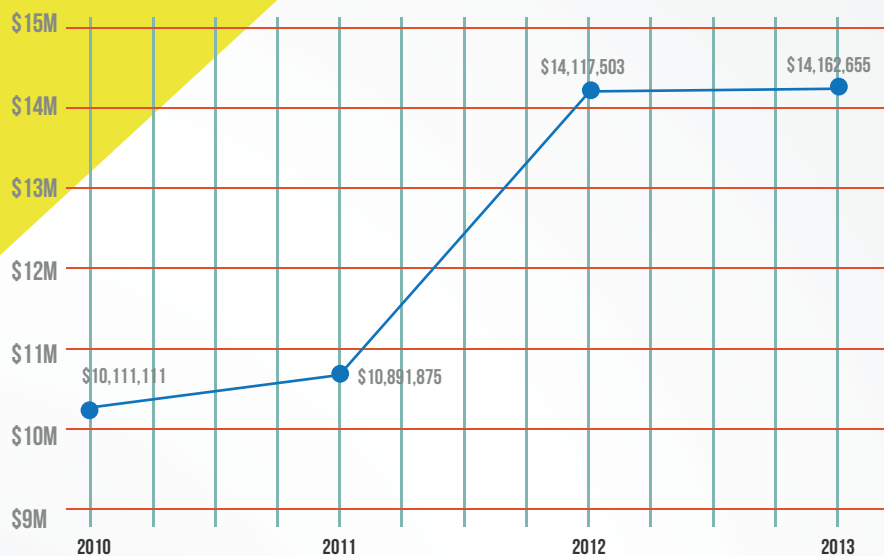
Startups

17



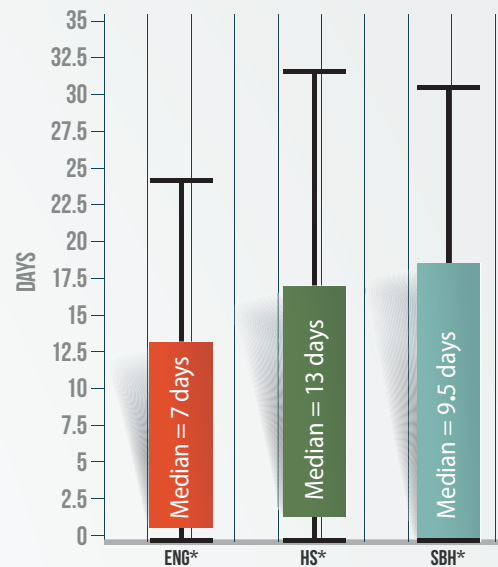
Patents

88



Commercial-Sponsored Research Revenue

\$14,162,655



TVC Response Time

TVC strives to meet with inventors within two weeks of invention disclosure.

*Eng = Engineering Team

*HS = Health Sciences Team

*SBH = Sciences, Biz & Humanities Team

33 ENGINE INVESTMENTS¹

\$394K IN ENGINE INVESTMENTS

\$12K = AVERAGE INVESTMENT

39 GOVERNMENT GRANTS²

\$6.35M IN GOVERNMENT GRANTS

Investments & Grants

¹ See pages 10-13 for a description of TVC's Engine.

² Includes federal SBIR and STTR grants as well as State of Utah TCIP grants secured for University of Utah startups and technologies.

INTRODUCTION

BUILDING UP: OPPORTUNITIES, ACCOMPLISHMENTS & GOALS



BUILDING UP TECHNOLOGY COMMERCIALIZATION

ABOUT TVC

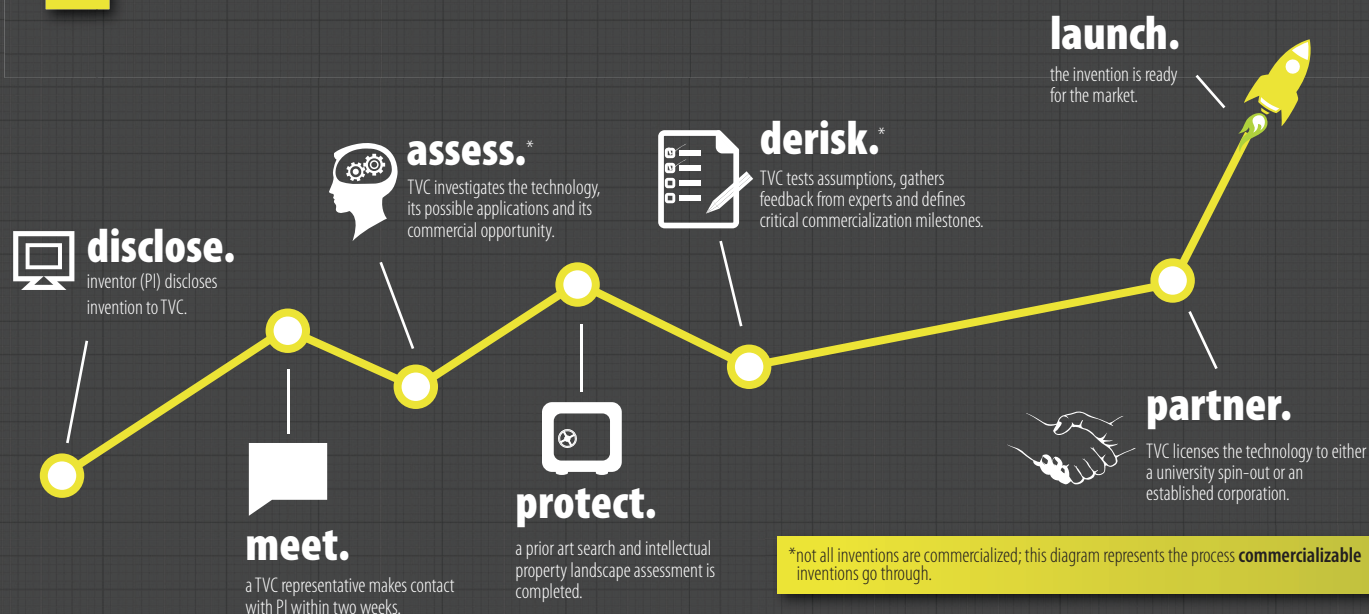
Technology & Venture Commercialization (TVC) at the U is dedicated to commercializing new technologies and inventions from discoveries made and developed at the U. We accomplish this by applying a stage-gated, milestone-driven process called “the Engine” that has as an end-goal of building value for inventors, the university and our community through licensing intellectual property, starting new ventures, building beneficial commercial partnerships, supporting our community and educating students.

TVC has been a part of the U since 1967 and has established a leading reputation in areas such as the formation of new companies, filing of patent applications, research sponsorship and gross license income. TVC is composed of specialists in licensing, business development, company startup and legal matters, all of whom are widely experienced in commercializing technologies across a broad array of fields including the health sciences, physical sciences, life sciences, engineering and information technology. We are responsible for managing all of the intellectual assets for the U, its medical centers and hospitals, Huntsman Cancer Institute and ARUP.

ADDING FLOORS

TVC is building up. Over the last 20 years the U has built a solid foundation for commercialization on faculty discovery, partnership relationships, startups, and new resource generation. In 2013 we added a number of new floors on this foundation. Some of the more important were:

the commercialization process



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The “Engine” process. Recognizing the difficulty of properly assessing early-stage technologies typically disclosed in a university environment, TVC created a stage-gated, milestone-driven process called the Engine—which is explained in detail in this report—to improve our ability to quickly, effectively and consistently assess new technologies.

Feedback from Peer Review

Drawing on the utility of the academic peer (expert)-reviewed process, TVC created three review panels, each of which relies on both internal and external experts to vet and enhance our commercialization efforts.



THE UNIVERSITY OF UTAH

OUR MISSION, VALUES & VISION



OUR MISSION

TVC's mission is to transform smart ideas into life-changing applications.

OUR VALUES

TVC operates according to the following values:

Trustworthy: Being loyal, accountable, honest and full of integrity

Relationships: Being open, striving to create win-win situations, being tolerant of failure, fostering teamwork, being accepting of criticism and being reasonable

Courageous: Making hard decisions, performing calculated risk taking, not being afraid to fail and striving to do the right thing

Fun: Incorporating fun activities into the organization's operations, taking enjoyment in

all we do, fostering relationships, finding time to laugh and reduce stress

Passion: Being driven, hard working, excited, persistent, focused, idea-loving and energetic

Creative: Being inspiring, innovative, open minded, positive and calculated in risk taking

Excellence: Exhibiting professionalism, aiming for effectiveness, striving for success, being timely, being precise and leading the way

OUR VISION

TVC will be recognized as one of the top ten hubs for commercialization by:

- Leading the world in disclosures, patents, licenses, and start-ups
- Leading the world in value formation
- Being a recognized center for education and thought leadership

Internal Investment Funding

As venture capital is moving further away from startups, TVC has allocated an additional \$500,000 to new startup and follow-on funding. These early-stage funds are being awarded through the Engine process with the help of our external and internal review committees. Over the last year, TVC invested over \$700,000 into the U's intellectual property.

Internal Restructuring

We created new cross-matrixed teams to work with faculty inventors to commercialize technologies. These teams are centered on academic disciplines: health sciences; engineering; and sciences, business and humanities. Each of these Business and Technology Development (BTD) teams is staffed with experts in licensing, startup creation, and commercial sponsored research.

This restructuring has increased the depth of our technology assessment process and allowed the specialized teams to review and discuss technologies together rather than as individual managers. It has also helped the teams to more quickly identify technologies with value and move them forward.

Customer Service

Each of our BTD teams created shared metrics of performance, which include responding to initial invention disclosures within two weeks and providing feedback to inventors on strategic direction within eight weeks of disclosure. We also disseminated a customer satisfaction survey to all faculty three times over the last 18 months. Improving our service, communication and outcomes is an on-going office-level focus that ultimately resulted in many of the changes discussed in this report.

Increased Number of Licenses

TVC completed 89 licenses this year, a record number for our office. This number reflects our increased ability to market faculty inventions and partner with new commercial partners.

Inventor Portal

We launched our new interactive, web-based portal that allows inventors to both disclose new technologies and follow the progress of their inventions in real time.

Higher Quality Startups

Using the Engine, we've identified a consistent set of criteria for improving the quality of our startups. Our focus is now less on the number of startups and more on the quality of the management, investment and structure of the startup. For example, the qualifications

of appropriate management have increased. Management must either be professional/entrepreneurial management, or if faculty, must have approval and signoff from deans and chairs for a plan to leave the university to manage the startup. All negotiations will take place with management only. These and other steps are part of a consistent approach to creating new ventures that will ensure startups are created on a solid foundation.

Name Change

This year we changed our name from the Technology Commercialization Office (TCO) to Technology & Venture Commercialization (TVC). We did this to better reflect our responsibilities, full range of activities, increased focus on internal and external partnerships and our commitment to improved customer/stakeholder service.

Becoming a Valued Business Partner

Commercializing smart ideas in a university setting requires partnership. Although

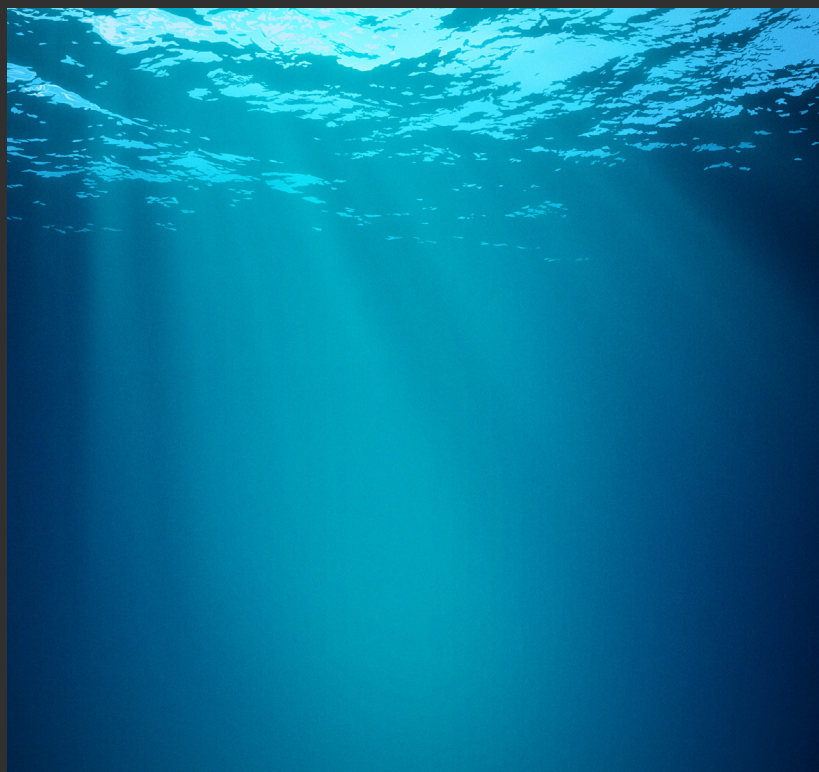
commercialization offices must manage, protect, and license intellectual property, these things alone are no longer enough to succeed. Taking ideas to market requires collaboration and unified direction. Following are strategies we are taking to foster this collaboration.

1. Internal Partnerships. For technologies at the university to be successfully commercialized, TVC needs feedback and regular communication with faculty inventors. To help foster this we expanded our outreach on campus this year by hosting two “Boot Camp” events where faculty were invited to learn what our organization does, who we are and the services we provide. We also hosted an Open House where faculty were invited to come to our offices and learn more about us. Furthermore, we instituted two new responsive standards for our BTD Teams that encouraged faculty/TVC communication: responding to initial invention disclosures within two weeks and providing feedback on strategic direction within eight weeks.

2. External Partnerships. The relationship with licensees in the tech transfer industry has

changed significantly. Partners are increasingly hesitant to make investments in early-stage technologies without assurances that these will have a good chance of becoming commercially viable. In response, TVC has focused on derisking, developing and adding value to university technologies by vetting them through “The Engine” (described in detail in this report), funding further development and attaching business models to them. These actions make technologies that would otherwise be unlicensable, licensable. As a corollary, we have made the strengthening of our relationships with our community of investors, entrepreneurs and industry partners a major aspect of our operations. Outside partners make up crucial aspects of our Engine committees as well as the external advisory committee that reviews TVC’s actions each quarter. Through collaboration, increased communication and trust we are fostering partnerships that we are confident will make taking technologies from initial disclosure to license smoother and more efficient.

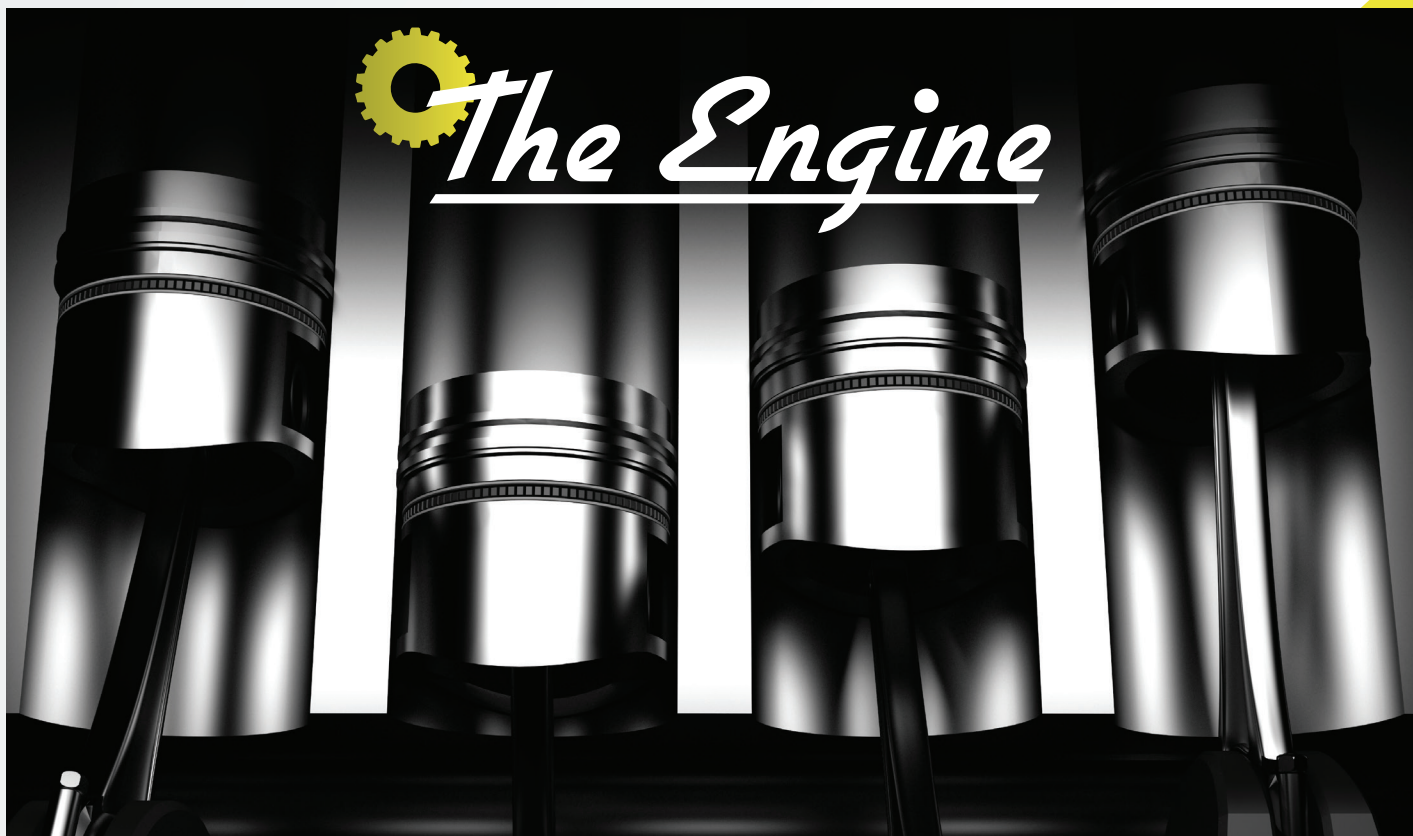
TRANSPARENCY



Over the past few years there was concern on campus that TVC was not transparent enough in its processes, actions and decisions. In an effort to make these more public we opened our doors and records wide this year by taking the following three steps:

1. We launched an Inventor Portal. This cloud-based Portal allows inventors to both disclose new technologies and follow the progress of these over time. Inventors need only to log into the Portal to check the status of their invention disclosures.
2. We send detailed quarterly reports to all colleges. These reports list invention disclosures, patents, revenue and licensing agreements by department and compare these over the previous three quarters.
3. We host events for faculty (eight last year). At each of these events faculty are invited to learn more about who we are, what we do, the services we provide and how they can work with us. This year hundreds of faculty from all of the U’s colleges attended at least one of our events. These outreaches will be an ongoing part of our outreach efforts.

WHAT WE DO: THE ENGINE



The Engine: An Overview

TVC takes U inventions, evaluates and de-risks them, and, where possible, turns them into viable commercial opportunities. This process is a documentation driven framework of discovery and validation, milestone identification, IP protection, the formation of marketing strategies, risk mitigation, resource allocation and accountability. We refer to this system as “The Engine.”

The Engine was developed as a method to apply finite university resources in such a way that the university’s investments are maximized. To ensure that we successfully commercialize technologies, we must devote a higher share of our resources to those technologies with the

highest commercial potential. Simply put, if all disclosed inventions received an equal amount of resources for development few, if any, would actually be commercialized due to the limited amount of resources available for such purposes. Instead, we must strategically identify those technologies with the largest market potential and invest the right amount of resources into them. The Engine ensures that only the exact amount of funding needed to move a technology to its next stage is allocated to that technology.

On a macro level, the Engine was created to address the challenge of answering critical commercialization questions about invention disclosures such as “What is the new idea?”, “What

is the opportunity for this new technology?” and “What will it take to effectively address this opportunity in the market?”

TVC has incorporated many of the latest entrepreneurial ideas and texts from thought leaders around the world into the Engine and molded them to work in a university setting.

The Engine is split into three stages to focus efforts on milestones that help de-risk, vet and develop university technologies. These stages are named after different engine sizes: the two-stroke, four-cylinder and the V8. Each engine size represents the level of resources, development and understanding of the market opportunity for the technology and the stage of that technology’s

business model. Each of the three stages has specific deliverables and objectives that must be met in order for a technology to move on to the next stage.

Although the Engine is a structured framework, it is also flexible. A technology can enter and exit the Engine at any time depending on the stage, external interest and licensing activities. The goal of the Engine is to have a team and a plan in place ready to raise the first round of professional investment for a new startup or for the technology to be licensed to an established company.

Stage One: The Two-Stroke

In order for a technology to enter the two-stroke stage of the Engine, a completed invention

Disclosure Form (IDF) must be submitted to TVC. The objective of the two-stroke stage is for the commercialization team, which includes the inventor and TVC, to be able to understand and articulate what the invention is, what are its possible products and what is its commercial opportunity. Generally, a prior art search and intellectual property landscape assessment is completed and a high-level market assessment is completed in this stage.

For a technology to pass into the four-cylinder stage an IP strategy for the technology must be developed and, together with the inventor, TVC must see that there is a reasonable market opportunity for the technology. If such a possibility does not exist, TVC will suggest changes to the invention to make it marketable or return it to the inventor.

Stage Two: The Four-Cylinder

The objective of the four-cylinder stage of the Engine is to identify stakeholders, or anyone who can influence the commercialization of the new invention, test assumptions, gather feedback and define critical commercialization milestones. In this stage TVC focuses on testing explicit and hidden assumptions and collecting actionable feedback from these stakeholders and ensuring that it spends its time and resources most effectively. The assumptions, feedback and critical findings from the market guide the commercialization effort and direct TVC's efforts as the technology pivots and iterates through the process.

Technologies in the four-cylinder stage are eligible to make a funding request through the Engine Committee meetings to get funds and resources that will help accomplish the next

development milestone in the commercialization strategy.

Internal and External Committees: Investors, the Community and TVC

When considering how to move forward with university inventions, TVC relies heavily on its internal and external committees. Every eight-weeks TVC assembles outside subject matter experts, seasoned entrepreneurs ("champions") and investors into Engine committee meetings. In these sessions, TVC representatives present new technologies to the committees who then speak critically to the commercial viability of the inventions and test assumptions the inventors and TVC have developed. If the investors in the committees see promise in a technology they may choose to invest in it while entrepreneurs may choose to work with a technology, form a startup around it and/or make crucial relationships with those investors present.

The Friday following the external committee meetings TVC assembles its internal committee meeting. This committee is composed of faculty experts, outside preferred investors, and TVC senior leadership and employees. The committee reviews the comments made by the external committees and then makes decisions on which technologies should be given funding to move to their next milestone and how much will be needed for this.

Stage Three: The V8 Stage

Technologies that enter the V8 stage are licensed to a startup or established company. The objective of the V8 stage is to assist licensees with the

necessary resources to begin executing on the technology's business and development plan. Possible management team members and potential investors or partners are engaged, and milestones are set by the licensee.

TVC assists where needed to help the licensee execute their commercialization strategy.

TVC'S PEER-EVALUATION PANELS

TVC's three external committees are a vital part of the four-cylinder phase of the Engine. The committees provide critical feedback on inventions, each from a different perspective: the invention community as a whole, faculty inventors and investors.

ENGINE COMMITTEES

The health sciences and engineering Engine committees are staffed by faculty, entrepreneurs, investors, subject matter experts and TVC employees. A primary purpose of the Engine Committees is for TVC to obtain the insights and perspectives of individuals from varied backgrounds. Select technologies are presented to the Engine Committees which, in turn, make recommendations to TVC regarding the commercial potential of these technologies.

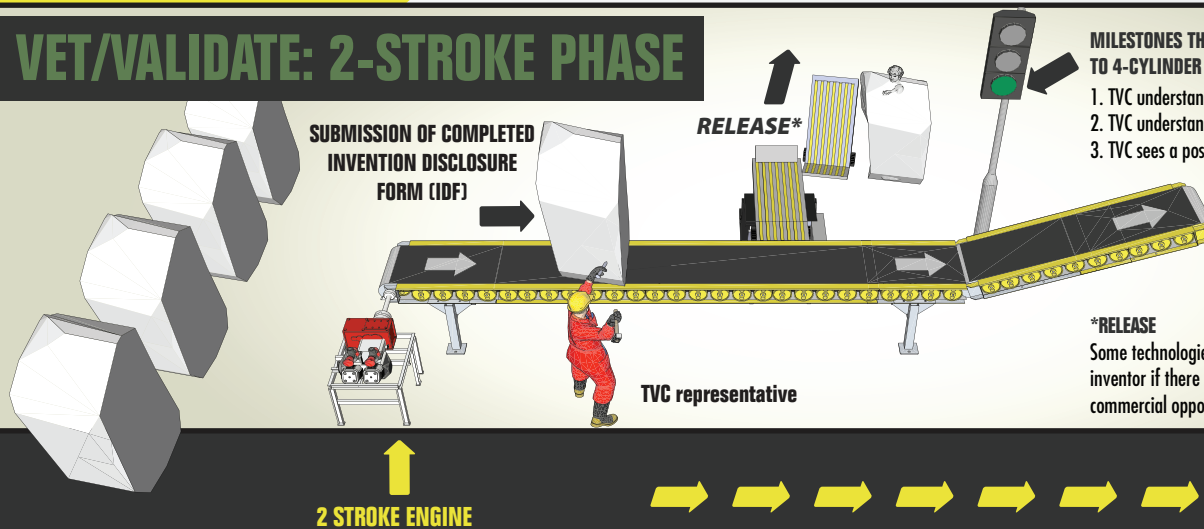
ENTREPRENEURIAL FACULTY SCHOLARS

One of the many useful functions EFS serves is its ability to harness the expertise of its many faculty members to review and speak to technologies disclosed to TVC. Led by Glenn Prestwich, Presidential Special Assistant for Faculty Entrepreneurs, EFS hosts eight Technology Peer Evaluation Panel (TPEP) meetings each year where faculty review select U technologies. Only faculty well versed in the academic disciplines from which the technologies under consideration originated are invited. TVC considers the technical evaluation of peer reviewers when making a business decision on how best to proceed with each technology disclosure.

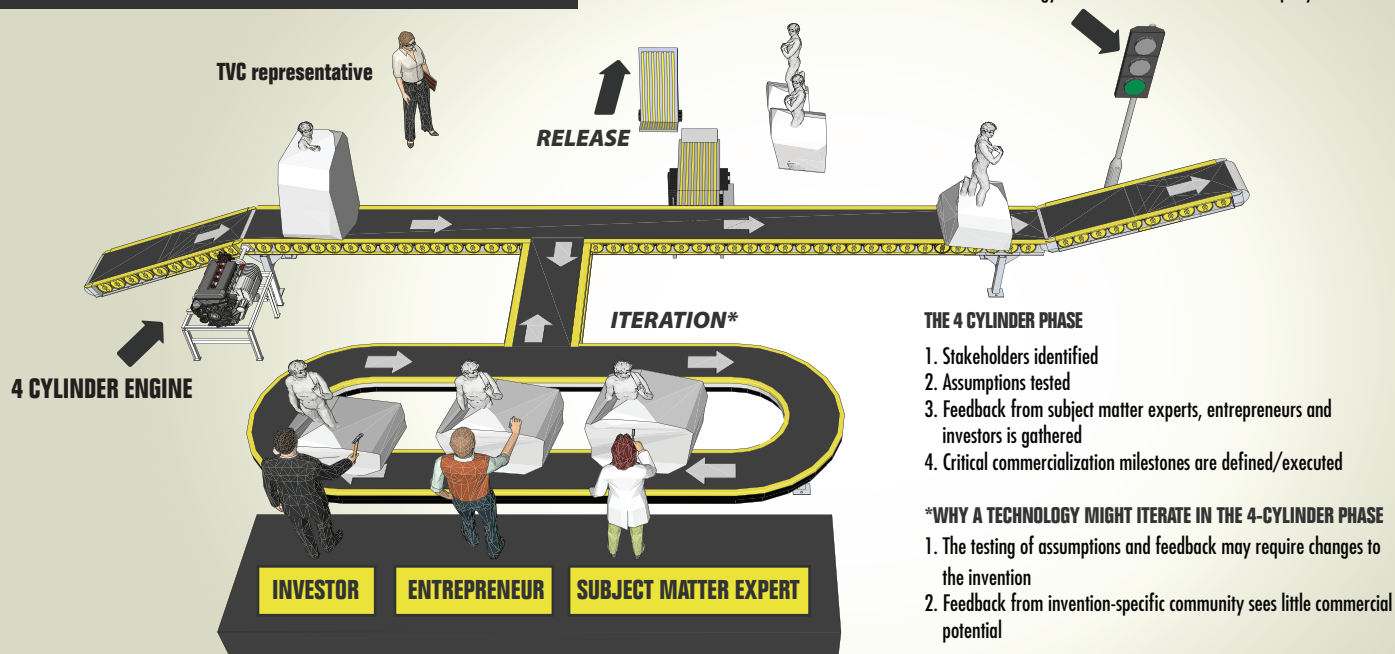
EXTERNAL INVESTORS COMMITTEE

The process by which inventions are transformed into commercially viable applications is often long, work-intensive and expensive. However, the more TVC develops and nurtures relationships with external investors the more successful we will be in successfully commercializing technologies for U faculty members. By incorporating the feedback of external investors regarding technologies disclosed to our office, we are better positioned to make informed decisions about which inventions are commercially promising, and thus deserve funding, and which ones are not.

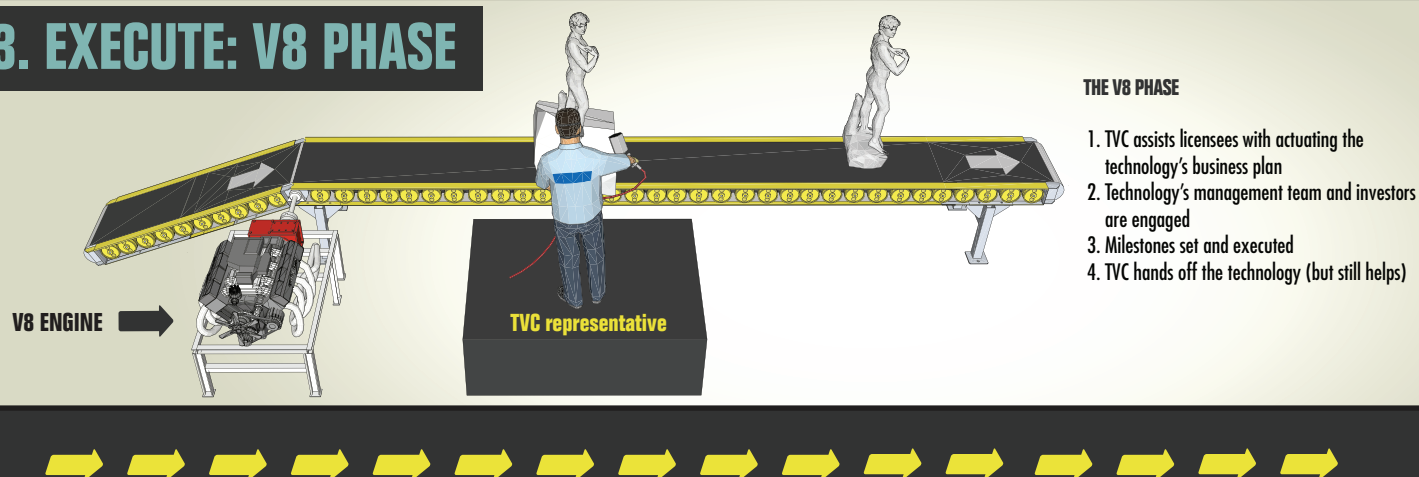
1. VET/VALIDATE: 2-STROKE PHASE



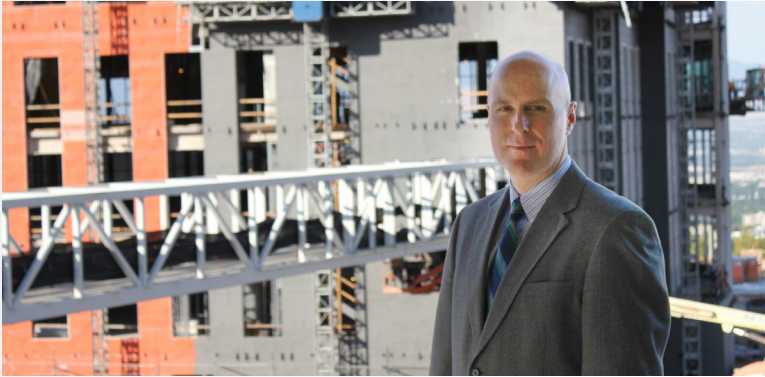
2. TEST: 4-CYLINDER PHASE



3. EXECUTE: V8 PHASE



TVC'S LEADERSHIP: BUILDING THE UPPER FLOORS OF COMMERCIALIZATION



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THE UNIVERSITY OF UTAH'S ECONOMIC IMPACT

WHY LICENSE TO A STARTUP



To help commercialize U technologies, in certain circumstances TVC creates startups from select technologies rather than seeking to license all of the U's technologies to established companies, as some tech transfer offices do.

A university startup is simply an additional commercialization approach to de-risking early stage university inventions. They do not replace other commercialization activities. Rather, they provide another arrow in the quiver available to TVC to commercialize U technologies. History has shown that startups can sometimes provide better returns, both in terms of revenue and commercial sponsored research than established companies.

After Technology & Venture Commercialization (TVC) familiarizes itself with a disclosed invention it determines: whether there is a market for the particular invention, whether the technology is incremental or disruptive to that market, whether IP protection is available, and what stage and milestones need to be met in order for the technology to be a viable commercial product. Based upon the information gathered, TVC assesses whether the invention should be a candidate for licensing to an established company or a start-up. In many cases, the technology is not advanced enough to be attractive to an established company and therefore a startup company may be the only path to acquire necessary gap funding, such as SBIR/STTR grants. In other instances, starting a company would garner the most value for the U. Startups often allow TVC to establish the

best management, funding and governing foundation possible in order for the invention to succeed commercially.

Possible Reasons for Licensing a Technology to a Startup:

There are many reasons why TVC might choose to license a technology to a startup. Following are the most important.

1. Platform technology. If a technology has the potential for producing multiple products or services (i.e., it is a platform technology) it is often considered a good candidate for a startup.

2. They add value. Companies that license technologies from universities increasingly demand that these technologies be vetted and derisked to a fairly advanced stage of development, if not ready for the market—criteria most technologies disclosed to the U do not meet. On the other hand, most disclosures are made very early, when the technology is nascent and underdefined. The process to transform them from their earliest stages of development into commercially viable products is long and costly. Startups are an additional method for technologies to secure on-going, translational funding that may not be available through any other means. Indeed, startups—not technologies—are eligible for SBIR and STTR grants, which are federal research and development awards. Thus, a university startup can be an alternative way to advance a technology that might otherwise not be licensed to an established company due to its lack of development. As such, forming a startup around a university technology is a way to add value to a technology. This, in turn, makes the technology more attractive for either future acquisition or investment by interested parties.

3. They allow for de-risking and assessment activities. Sometimes the market is either not

SBIR, STTR & TCIP COMMERCIALIZATION GRANTS FOR STARTUPS

The gap between an invention and its successful commercialization is often referred to as the “valley of death.” A great deal of time, money and developmental work is needed to bridge this valley. However, due to the relatively high rate of technology commercialization failure, the private sector is usually hesitant to fund the development of early stage technologies. Recognizing that many promising technologies would be left undeveloped without funding, governments have created research and development grants to help fill this gap. SBIR, STTR and TCIP commercialization grants are the most common grants awarded for this purpose.

SBIR GRANTS

Small Business Innovation Research (SBIR) grants are federal grants given to small businesses to engage in the research and development of promising early stage technologies with strong commercial potential. One of the eligibility requirements for receiving a SBIR grant is that the principal investigator (PI) is employed primarily by the small

business receiving the grant. SBIR Phase I grants normally do not exceed \$150,000 for six months and are highly competitive.

STTR GRANTS

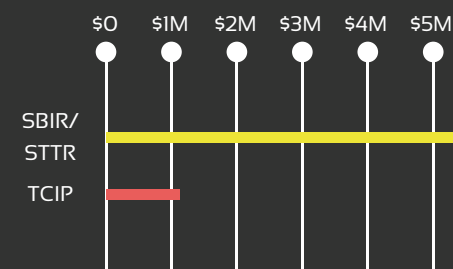
Although similar to SBIR grants, Small Business Technology Transfer Research (STTR) federal grants are awarded to small businesses for research and development projects conducted in cooperation with research institutions. As such, they are ideal for technologies emerging from universities. A minimum of 40% of the STTR project must be carried out by the small business while a minimum of 30% of the effort must be performed by the research institution. STTR Phase I grants normally do not exceed \$150,000 for one year and, like SBIR awards, are highly competitive.

TCIP GRANTS

The Technology Commercialization and Innovation Program (TCIP) are State of Utah funded grants designed to fund the research

and advancement of technologies developed in Utah that have strong commercial potential. These competitive grants require both a detailed application and a mandatory in-person presentation before a board assembled by the Governor’s Office of Economic Development (GOED). TCIP grants do not exceed \$40,000 for one year.

2013 SBIR, STTR & TCIP GRANTS



In 2013 TVC helped secure \$5,226,000 in SBIR/STTR grants for U technology startups and \$1,120,000 in TCIP grants.

ready for a technology or is unsure about its potential (i.e., no licensee can be recruited to commercialize the technology or potential customers have expressed interest pending future development). Forming a startup around a technology in such a situation gives that technology either time to mature or prove itself in the market.

4. They allow for additional investment. U startups are particularly attractive to angel and venture investor groups because investors can partner with TVC and the start-up and leverage resources that would not otherwise be available without the start-up in place. Thus, university startups open new avenues of funding for U technologies.

Possible Reasons for Licensing a Technology to an Established Company:

Just as there are multiple reasons why a technology might be licensed to a startup, there are many reasons why a technology

might be licensed to an established company. Following are the most important.

1. The established company is interested in licensing the technology. There are times when a particular technology fits in well with an established company’s product line or pipeline, or the technology is de-risked to a point where it is attractive to such companies. Technologies in such a situation benefit by being licensed at a fairly early stage and developed further by that company’s often considerable R&D efforts, network, market, distribution pipelines and expertise.

2. The technology is highly specific or incremental. A number of technologies disclosed to the U are highly specific or provide incremental improvements to existing technologies instead of being a disruptive or platform technology. Many of these technologies are not appropriate to form the basis for a start-up company as the potential market is not significant or existing companies

have a commanding presence in the market or blocking patents that would require licensing activities by the start-up that would suck up much of its existing cash-flow.

3. Development costs versus investment return. Sometimes only an established corporation will have the necessary internal economies of scale in place to ensure the technology is developed, marketed and supported appropriately.

In short, when it comes to deciding between licensing a technology to an established company or to a startup, TVC will gather appropriate market, IP, development, and other information and based on that determination, pursue the commercialization path that will give the technology the best possible foundation for success.

STARTUP PROFILE 01



A fluorescence microscopy image showing a cell with red and green fluorescent channels. The red channel highlights the cell's structure, while the green channel shows specific molecular localization. A white scale bar is positioned above the text '5 μm'.

5 μm

VUTARA

Vutara enables researchers to study the structures and processes of cells at the single molecule level by delivering the first ever super-resolution, single-molecule localization microscope with 3D capability. Single molecules involved in a myriad of cell processes are typically two orders of magnitude smaller than the resolving power of the best conventional optical microscopes, and so the details of structure, interaction, binding, trafficking, and so on, have remained largely invisible. Vutara's super-resolution microscope, the Vutara SR-200™, makes it possible at last to view that which has heretofore remained unseen.

Designed by Brian Bennett, the Vutara SR-200 has been a giant leap forward in the field of microscopy. "Super-resolution light microscopy bridges the gap between traditional light microscopy, which is limited due to diffraction, and electron microscopy, which is cumbersome and can't be used to view living specimens," says Richard Green, a business and technology development manager at TVC. "Vutara's SR-200 microscope utilizes advanced single-molecule localization techniques that enables single-acquisition super-resolution imaging of live specimens in multicolor and 3D."

"Research in many facets of molecular biology had gone about as far as it could go with existing imaging technology," said Stan Kanarowski, CEO of Vutara. "The Vutara SR-200 will open up many areas of research to exciting new discoveries. As a company, Vutara is determined to lead the super-resolution charge and provide researchers with the most advanced imaging tools and microscopes to enable next-generation research."

3D Imaging

The Vutara SR-200 achieves 3D images by using biplane technology. This technology is based upon a modified detection path that allows simultaneous detection from two axially separated object planes. The focal planes vary by ~500 nm, which produces two images that are optically different, thereby enabling the capture of 3D information in every image.

The benefit of 3D images is that they provide extent. Conventional 2D photos show us only how far to the left or the right a feature is. With biplane detection the z plane is added, allowing users to measure depth.

Imaging Live Cells

"Electron microscopes allow us to only see dead cells, like images frozen in time," said Professor Joerg Bewersdorf of Yale University, one of the inventors behind the Vutara SR-200. "Cells are, of course, dynamic; they perform myriad processes. Thus, the idea behind the SR-200 was to understand how cells work, not just what they look like."



JOERG BEWERSDORF & BRIAN BENNETT

Isolating Molecules

Another groundbreaking feature of the Vutara SR-200 is its single molecule localization abilities. Using selected lasers, the microscope allows users to switch a molecule on or off for precise viewing of the kind of molecules the user is interested in studying.

"The Vutara imaging technology far exceeds the currently available approaches and can be applied to a diverse set of biological questions, making it ideal for conducting truly next-generation research" said Bewersdorf.



VUTARA SR-200 MICROSCOPE

SALARIUS PHARMACEUTICALS

Until recently, most cancer research was directed at understanding, controlling or reversing genetic mutations in cancer development. While the field of epigenetics—the study of the development and maintenance of an organism via sets of chemical reactions that switch parts of the genome off and on at strategic times and locations—was already well researched, it has only been in recent years that a link between epigenetics and cancer has been made. “We have found that many cancers become tumors and promote the growth of the cancer by turning on certain genes and turning off suppressors,” says Professor Sunil Sharma, senior director of clinical research at the Huntsman Cancer Institute. “Epigenetics is the control mechanism that allows the cancer to do that.”

Sharma—already a leading epigenetic researcher—capitalized on this emerging understanding of the role of epigenetics in cancer and developed a potent compound that inhibits the expression of genes that promote cancer states in various cancers. Salarius Pharmaceuticals believes this compound will show remarkable clinical response and is in the process of bringing this molecule to a Phase I clinical trial.

SP-2528

Salarius' lead compound is SP-2528, a first-in-class selective and reversible LSD1 inhibitor with potency against Lysine-Specific Demethylase 1 (LSD1). The enzyme LSD1 turns on genes that promote cancer states and turns off genes that suppress cancer cells. LSD1 is overexpressed in Ewing's sarcoma, prostate, breast, small cell lung, bladder and neuroblastoma cancers. When LSD1 is inhibited, tumor suppression genes are awakened which, in turn, allows the body to turn off cancer promoting genes. "SP-2528 has not only demonstrated strong activity in vitro and in vivo, animal safety studies also show a remarkable lack of toxicity thus far," says Beth Drees, director of business and technology development at TVC. "This compound is a novel cancer therapeutic we believe shows great promise for treating various cancers."

Salarius' Next Steps

"We now have a clinical candidate and are preparing to be in clinic by 2014," says Jonathan Northrup, CEO of Salarius. "We believe this Phase I trial will show a remarkable response in Ewing's Sarcoma, the cancer we are targeting." Northrup and Sharma are so confident of SP-2528's efficacy, they believe the drug will be given a fast-track path by the FDA and allow it to develop far more quickly and cheaply than is common with most drugs. Northrup hopes the dramatic response they are expecting in their Phase I trial will attract the additional funding they will need to advance SP-2528 to Phase II and III trials.

The Center for Investigational Therapeutics

SP-2528 was developed at the Center for Investigational Therapeutics (CIT) at the Huntsman Cancer Institute. CIT, which is run by Sharma, takes a bench to bedside approach

to cancer and its treatment. In the laboratory CIT's scientists strive to find new cancer therapies while working with physicians in the clinical setting who, in turn, seek to develop safe dosages and regimens for patients. The end result of this work is designed to be a Phase I clinical trial.

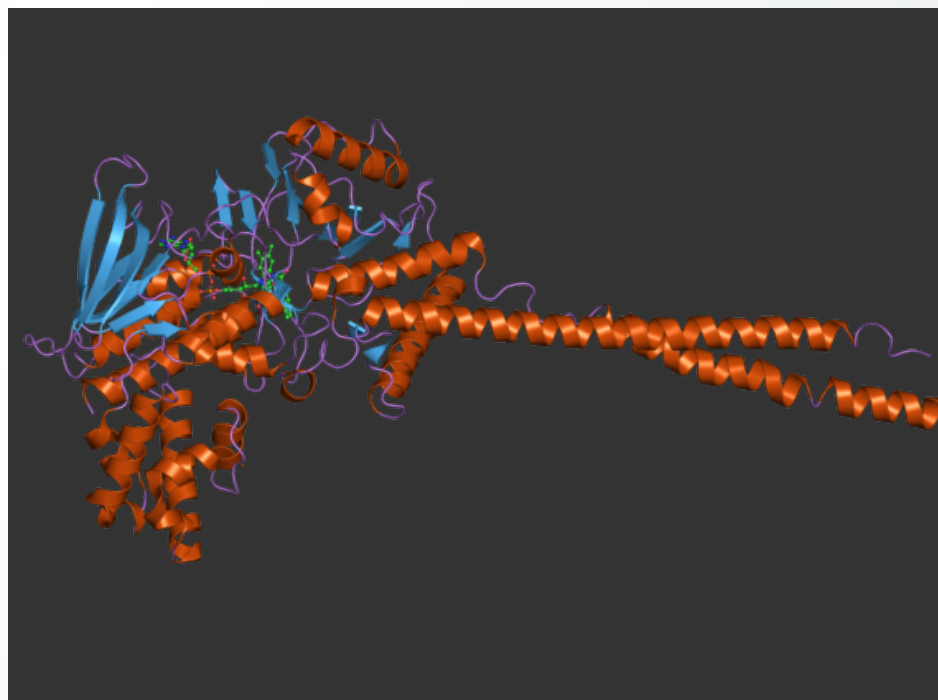
What sets CIT apart from other centers of its kind is its strong reliance on experts from around the U. "At the Center for Investigational Therapeutics we are coming together to solve breakthrough and unsolved problems," says Sharma. "Rather than approach cancer through one discipline, we bring together researchers from multiple backgrounds. We harness the energy and research of scientists on campus and together solve complex problems."

Sharma believes the likelihood of solving breakthrough problems is amplified when multiple disciplines are brought together through shared research interests. In recent years, CIT has worked closely with molecular biologists, cell adhesion specialists, crystallographers and



SUNIL SHARMA

hematologists. This approach, Sharma says, allows them to more quickly develop drugs that will ultimately produce more groundbreaking therapeutics such as SP-2528.



THE ENZYME LYSINE-SPECIFIC DEMETHYLASE 1 (LSD1)

STARTUP PROFILE 03

SOLAN PV

Solan is a private, early stage company formed to commercialize graphene based devices for a multitude of applications based on licensed technology developed by Feng Liu, professor and chair of the U's Materials Science and Engineering Department. Graphene is a one-atom thick layer of carbon atoms that many experts believe will transform electronic technology in coming decades. Unlike other materials, it is highly multifunctional, enabling the development of a myriad of devices and processes.

Solan recently completed the filing of 16 new patents and produced advanced graphene-based devices for applications including inductors, solar cells, photo-detectors, OLEDs and digital electronics.

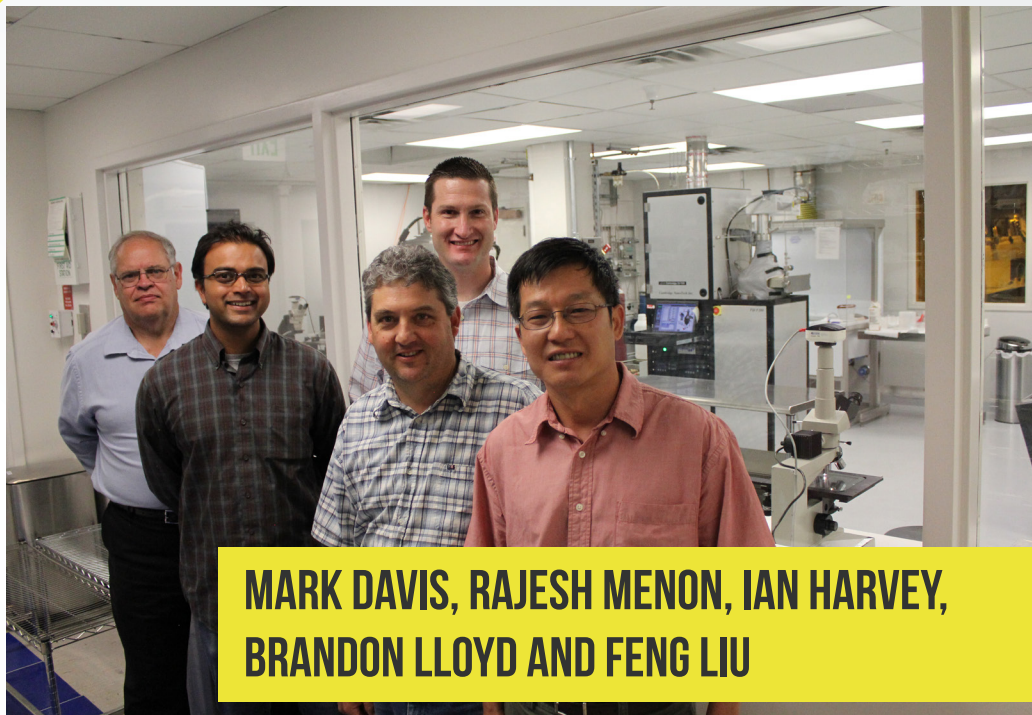
Solan's unique technological advances have been in the area of multi-functional graphene devices where multi-band gap and multilayer structures enable breakthrough applications. Solan's graphene nano-ribbon (GNR) technology allows multiple functions within a single, monoatomic graphene layer as well as multiple functions between stacked graphene layers. "The idea is that if you can cut graphene into ribbons, it will work like a semi-conductor," says Liu. "In other words, it's quantum confinement. If we can use a combination of bandgaps, we can get remarkably high efficiency, higher than anything currently being used."

Solan's devices capitalize on the unique properties of graphene and provide devices that significantly outperform conventional technologies. Solan has developed and applied intellectual property and applied research protocols that progress technology readiness levels and commercialization through balanced customer adoption criteria and efficient capital access.

Scaling Up Graphene

Solan believes its niche lies not only in its extensive intellectual property portfolio, but also in its ability to scale up the use of graphene for commercial use. "We took a look at the research surrounding graphene and realized that much of it is not as scaled up as many believe it is," says Brandon Lloyd, CEO and founder of Solan. "A lot of groundbreaking research has been done on graphene, but unless this work can be scaled up cost effectively, become repeatable and is done within the boundaries of the semiconducting industry, it's not likely to make it to market."

Understanding this, Solan is actively bridging the world of advanced graphene development, such as what takes place in Liu's lab, with



**MARK DAVIS, RAJESH MENON, IAN HARVEY,
BRANDON LLOYD AND FENG LIU**

the semiconducting industry. "The use of silicon in the semiconducting industry is well established. The path of least resistance for actually using graphene there is to use standard semiconductor manufacturing equipment and techniques," says Lloyd. "This will enable us to bring graphene-based devices to market in a reasonable period of time."

Adding to this, Mark Davis, chief technology officer for Solan says, "Solan is not a tool manufacturer. Rather, through a process, we are making graphene functional at a largescale volume for other companies to use. In other words, our processes will allow graphene to be scaled up. We anticipate employment of our innovative, cost effective, repeatable manufacturing methodologies soon."

As further validation of its technology, Solan recently received the results of a technology assessment study by Battelle International, the world's largest independent research and develop organization. Battelle found that Solan's technology has the potential to be foundational for the development of a multitude of graphene devices.

Advanced Photodetection

The first scalable prototype Solan anticipates completing is one based on advanced photodetection. Because graphene is up to

ten times more receptive to light than silicon (it absorbs light over a broad wavelength range), it is ideal for employment in photonic applications. Liu explains, however, that to harness this receptivity, multi-band gap and multilayer structures must be engineered and that this must be done in such a way that the process is scalable. Because nearly all of his work and intellectual property lies in the use of such structures and processes, Solan is well positioned to develop repeatable processes that will enable the development of graphene-based advanced photodetection devices.

Moving Forward

"Graphene is very much in the place plastics was prior to World War Two," says James Thompson, a business and technology development manager at TVC. "Researchers understood plastic's potential—as it had actually been developed many years prior to this time period—they just didn't have a method for mass producing it. It took advances in manufacturing techniques to actually make plastics reproducible on a wide scale before its use exploded. Solan understands that this is precisely where graphene is today and that those who can scale it up will reap the rewards. That is why their focus on commercializing Dr. Liu's work has great potential for both the U and Solan."

ENGAGING OUR COLLEAGUES

TVC'S OUTREACH TO FACULTY

Faculty invention disclosures are often the culmination of years of rigorous research and hard work. In recognition of this, TVC has increased its interactions with faculty to keep them fully abreast of the status of their invention disclosure(s) and to educate them on avenues for funding, securing intellectual property and how commercialization works. The following steps have been implemented at TVC to more effectively engage our colleagues.

Two week meeting times. Once an invention disclosure is submitted to TVC we make every effort to meet with the inventor within two weeks. The purpose of this

meeting is for the inventor to get to know her manager and their team and for TVC to ask any questions regarding the invention we might have.

Eight week meeting times. TVC uses the first eight weeks after an invention's disclosure to fully understand it, its possible products and its commercial opportunity. We also perform a prior art search and intellectual property landscape assessment. Using this information, we develop an initial strategic plan for the invention and discuss it with the inventor within eight weeks of disclosure.

Inventor portal. We listened to faculty requests and are excited to announce that this year we switched to a completely online invention disclosure process. All inventions disclosed to our organization must now be submitted online. This new system will reduce paperwork, allow users to monitor their invention disclosure(s) in real time and interact with TVC in a more efficient and transparent manner.

Quarterly reports. In an effort to be more transparent and to keep faculty abreast of our activities, TVC now sends quarterly reports to all colleges on campus. Each report details invention

disclosures, patents, startup companies, revenue and license agreements by department.

Peer-reviewed technologies. Interdisciplinary peer-collaboration is becoming as important in commercialization as it is for publication and grant review. Recognizing that complex problems are rarely solved by a single field, academics are increasingly collaborating across disciplines to find breakthrough solutions to intricate problems. Harnessing this synergy, TVC has greatly increased its reliance on faculty from various fields to review and vet technologies disclosed to our office.

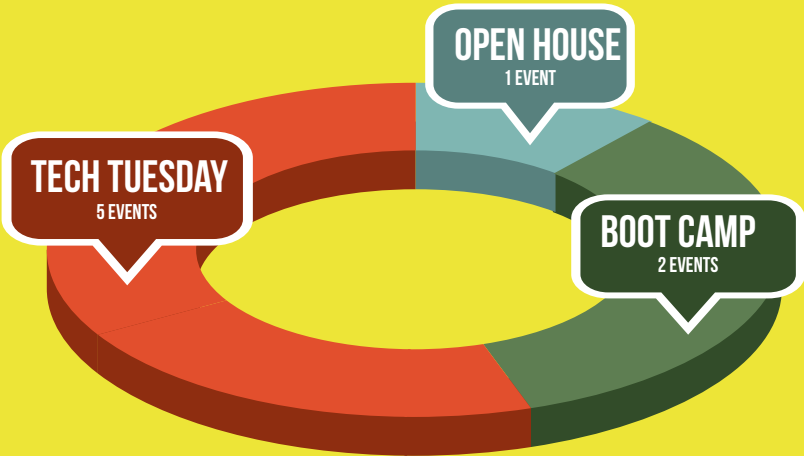


ZACH MILES PRESENTING TO FACULTY



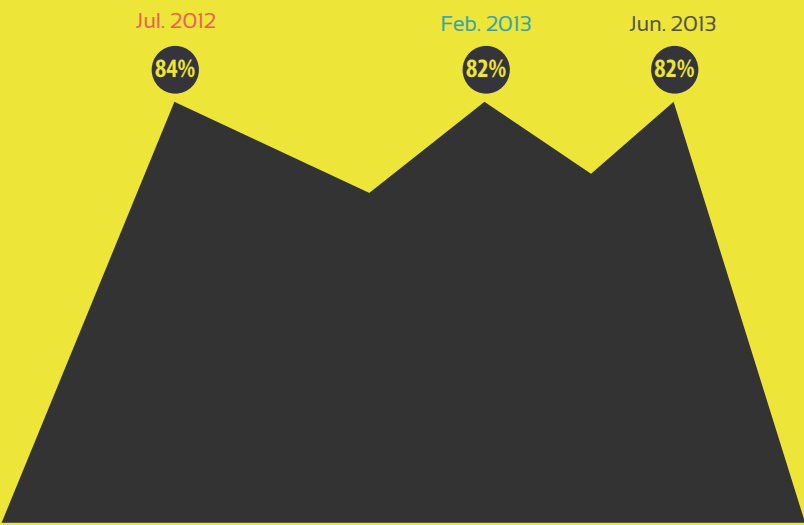
NETWORKING AT TECH TUESDAY

FACULTY OUTREACH EVENTS



- Tech Tuesday is an exclusive networking event that is by invitation only and features guest speakers, inventors and entrepreneurs.
- At TVC's Faculty Open House attendees are invited to TVC's office to learn about funding, patenting, licensing and what we do.
- At TVC's Boot Camp events we discuss what our office does, who we are, how to disclose an invention and the services we provide.

CUSTOMER SATISFACTION SURVEY



An average of 250 faculty members responded to our customer satisfaction survey each time it was disseminated. Our overall customer satisfaction score stayed relatively constant throughout the year, averaging 82.67%. Although not scientific, the survey was nonetheless taken very seriously by TVC and resulted in a number of important changes. We have an office-level goal of raising our overall customer satisfaction scores even higher for 2014.

NASSIR F. MARROUCHE

"With lower National Institutes of Health (NIH) funding, it's more important than ever for researchers at the U to work with TVC," says Nassir Marrouche, M.D., founder of the U's Comprehensive Arrhythmia Research & Management Center (CARMA). "Faculty need to be aware of the excellent capabilities TVC has in securing alternative sources of funding for their work. TVC has been an integral partner in the work we have done here at CARMA."

And that work is nothing short of revolutionizing the way atrial fibrillation (afib) is diagnosed and treated. Marrouche and the CARMA team established the Utah Classification System as the new way to individualize the treatment of atrial fibrillation and other arrhythmias. This system stages the atrial fibrillation disease based on the amount of tissue injury within the heart.

Prior to Marrouche's work, the only way to diagnose and manage cardiac arrhythmia was through electrocardiograms (EKGs). "The problem with EKGs is the lack of possibility to individualize treatment and diagnoses of cardiac arrhythmia," says Marrouche. "EKGs function as the one size fits all concept. Every human heart is unique, so we needed a more individualized reading and monitoring of heart tissue behavior in patients diagnosed with arrhythmias.

In conjunction with the U's Scientific, Computing and Imaging Institute (SCI) and University Center for Advanced Radiological Imaging (UCAIR), Marrouche's team pioneered the use of Magnetic Resonance Imaging (MRI) in the creation of 3D images of the heart.

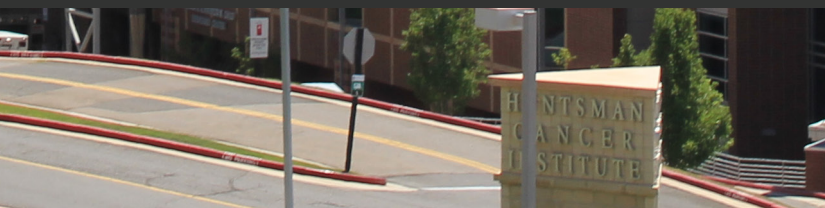
The cardiac MRI acquisition process, known as delayed-enhancement magnetic resonance imaging (DE-MRI), involves using gadolinium as a contrast agent that binds to damaged heart tissue. The contrast of the gadolinium allows the MRI machine to acquire images that are processed by Marrek protocols, which were developed by the CARMA Center. In the Marrek specific software processing and acquisition platform, cardiac tissue images are created in 3D, allowing clinicians to quantify cardiac fibrotic/disease tissue. This led to establishing the Utah Classification System that is based on the severity of the cardiac fibrotic/disease tissue.

The Utah Classification System will help individualize the treatment of arrhythmia and specifically atrial fibrillation, similar to how staging is done for cancer patients. Research conducted over the last seven years at CARMA confirm that the more severe the Utah stage, the less likely certain treatments will result in a cure or positive outcome. If, for example, a patient is diagnosed with Utah Stage 1, they will have an above 80% cure rate via ablation (an afib treatment where heart tissue is burned to eliminate rogue electrical signals). If, however, a patient is diagnosed with Utah Stage 4, the cure rate drops to below 25%. This staging allows clinicians to understand the probability of ablation success for each patient. Using this process will prevent ablations that would be unsuccessful. "We believe that pre-ablation MRI screening will result in significant cost savings for health systems, upwards of around \$3,600 per person, per year," says James Thompson, a business and technology development manager at TVC.

Marrek, a 2008 University of Utah startup, was formed to bring Dr. Marrouche's process to health care markets and establish this system as the new standard of care for the treatment of fibrosis. "It's not just that we would like to have our process as a standard tool in all medical centers in the world, but more that it's needed," says Marrouche. "The future of afib treatment is in screening, and that is what the Marrek software platform offers." Marrek's technology will continue to improve clinical care by providing more thorough diagnosis that can be used to personalize each patient's clinical care. These best practices will result in the elimination of unnecessary procedures and the reduction medical cost.

Marrouche has also worked with the TVC to establish Arapeen Medical. Arapeen will be taking the core concepts of MRI and ultrasound technologies to focus on renal ablation therapies for patients in persistent hypertension. This will be the only available non-invasive method to treat high blood pressure.

Marrouche says that neither the Utah Classification System, nor Marrek, nor Arapeen Medical would be as far advanced today if it weren't for TVC. "I realized early on that TVC is unlike most other tech transfer offices in the world," explains Marrouche. "They are basically a venture capital team at the university level. Their quick response time is unheard of in academia. Moreover, their team from the leadership down is highly motivated to commercialize inventions. They are very powerful at moving concepts and early-stage inventions forward and executing on plans quickly."





BALA AMBATI

After completing his MD at 17—making him the Guinness World Record holder for the world's youngest doctor—Dr. Bala Ambati can now point to an accomplishment just as impressive: he is the primary discoverer of a key regulatory protein that keeps the cornea clear of blood vessels, an important disclosure that may have promising commercial applications.

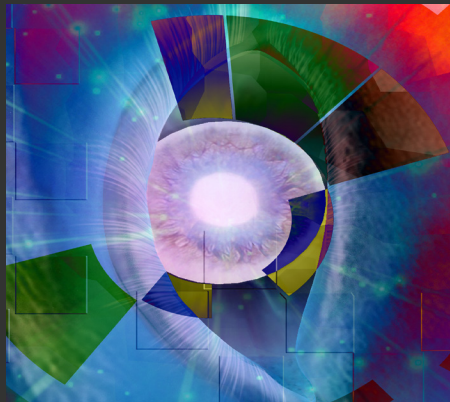
The dysregulated growth of blood vessels in the eye, or angiogenic eye disease, is one of the most common causes of vision loss and blindness worldwide and is associated with age-related macular degeneration, diabetic retinopathy, neovascular glaucoma and corneal neovascularization. It is estimated that up to 10 million Americans suffer from one of these angiogenic eye diseases, with incidences expected to double in the next 20 years.

In recent years, Ambati identified a protein involved in growth factor signaling as a key regulator of angiogenesis—the creation of new blood vessels—in the eye. “While this was certainly an important discovery in itself,” says Ambati, “I view research as being a means to an end. Because I regularly see patients who are negatively impacted by this condition, clinical outputs are very important to me. Accordingly, it was essential for me to move forward with this discovery and begin the process of translating it into the treatment of patients.”

Towards this goal, further research was done on animal models. Results showed that the expression of this protein suppresses angiogenesis in mouse and monkey models of corneal blindness, thus providing evidence that modulation of protein levels in the eye

is a viable therapeutic strategy for preserving vision.

Available anti-angiogenic therapies are biologic agents that are administered by injection into the eye. For maximum efficacy, monthly injections are required, but compliance for many patients is low due to discomfort. By contrast, in Ambati's experiments, the animal models received standard, intravenous



injections—not ocular ones—containing targeted nanoparticles designed to stimulate protein expression.

This promising new gene therapy is being closely followed and shepherded by TVC representatives. “Dr. Ambati's approach represents a novel and possibly highly efficacious new gene therapy for the treatment of age-related macular degeneration,” says Beth Drees, Director of Business and Technology development at TVC. “If results on human models show the kind of response the animal models did, Dr. Ambati's therapy

should serve as a superior alternative over anti-angiogenic therapies on the market today.”

Advice for Researchers

Ambati says his desire to translate discoveries into treatments is an increasingly common attitude found amongst health sciences faculty. “Most researchers today are no longer content to stop at discovery,” argues Ambati. “The reason why so many of us are in medicine is to make an impact, not just to publish. Going to clinic, whether researchers realize it or not, is commercialization. If you want to see your research result in better outcomes for patients, you will likely undergo the commercialization process.”

Because of this, Ambati offers the following advice to faculty experiencing the commercialization process for the first time: “All inventors have a decision to make regarding how much they should be involved in the post disclosure process,” he says. “I actually recommend significant involvement as no one knows your invention better than you. Successful commercialization requires effort—possibly distraction—and, above all, commitment from the inventor.”

Moreover, Ambati recommends that prior to disclosure inventors reach out to TVC. “Cultivate a good relationship with a few people at TVC and establish an open channel. They have great advice about when to disclose, how to disclose, how to obtain commercialization grants and other very important items of information for researchers.”

ENTREPRENEURIAL FACULTY SCHOLARS

With over 5,500 invention disclosures and 100 spin offs, the U has accumulated a deep reservoir of faculty commercialization expertise. Entrepreneurial Faculty Scholars (EFS) was created to utilize this expertise in the advancement of entrepreneurial activity at the U.

In 2007, EFS had 12 members. Today, faculty membership has grown to over 100. Members come from all 13 of the U's colleges and schools. As the first of its kind, the program has also served as a model for similar groups in many other universities.

EFS serves three primary functions.

First, EFS harnesses the prowess of those faculty with a history of successful commercialization to advise other faculty and student entrepreneurs seeking either to learn more about technology commercialization or are new to the process. For example, faculty embarking on a commercial endeavor for the first time may meet with seasoned faculty inventors in EFS to learn more about the process, how best to work with TVC, investors and entrepreneurs. Faculty may also learn if their fundamental research is right for the commercialization path or how to go about "translating" their research to such a purpose.

Second, EFS brings faculty together from all of the U's academic disciplines to create a community of entrepreneurs who collectively create a synergistic effect of high-quality invention disclosure and technology



GLENN PRESTWICH

Professor, Inventor & Presidential Special Assistant for Faculty Entrepreneurs

commercialization on campus. By networking and connecting with one another, faculty entrepreneurs are able to create vital connections, draw from the experiences of others and advise each other when on the commercialization path.

Third, EFS utilizes many veteran inventors at the U to vet technologies disclosed to TVC. Each quarter, EFS hosts a luncheon at TVC where recently disclosed technologies are presented to a panel of faculty inventors with backgrounds relevant to these technologies. Faculty from various disciplines are invited to this Technology Peer

Evaluation Panel (TPEP) to ensure the technologies are approached from multiple angles. The insights and perspectives given are influential in the shaping of the commercialization paths of the technologies under consideration.

"Faculty are data-driven and need to understand who is evaluating their technology and how the process works," says Prestwich. "However, even though maximum transparency is necessary, it is not sufficient for compliance and satisfaction. Faculty must know that other faculty with the right expertise and background are providing peer reviewer feedback for technical decisions – not unlike

what faculty already face with editorial boards and grant review study sections. To this end, we have established the Technology Peer Evaluation Panel (TPEP) program, which I offered to lead, to assure faculty that proper care and attention was paid to new and existing invention disclosures."

EFS members meet regularly to network and discuss all aspects of the commercialization process. They encourage faculty to engage in this important and ongoing program that enriches entrepreneurship at the U.

Meet the
Entrepreneurial Faculty Scholars

To reach EFS, or to learn more about the program, visit:
www.techventures.utah.edu/efs.

INDUSTRY PARTNERSHIPS AND OUTREACH

COMMERCIAL-SPONSORED RESEARCH



The Commercial Sponsored Research (CSR) team at the U works to match faculty research projects with potential corporate sponsors.

“Sponsored Research allows faculty members to work with companies to seek solutions to real world problems,” says Eric Paulsen, director of partnership development at TVC. “It also allows them to find additional sources of support for their labs, and to create opportunities for additional partnership that benefit both the University and the broader community.”

As one of TVC’s funding options, the CSR team works with faculty to develop targeted proposals for corporate sponsors, handles all pre-award administration, and negotiates research awards. In this process, they nurture effective and lasting partnerships between faculty, sponsors and TVC by linking the highly specialized knowledge and innovative talent the U has to offer with the research needs of sponsors.

Why Do Commercially Sponsored Research?

In 2013, TVC’s CSR team facilitated over \$14 million in sponsored research contracts. This is welcome news for researchers because federal funding for research has decreased over the last five years, making the process substantially more competitive. At the same time, companies have cut costs by reducing internal research and development and instead relying on external sources of innovation, particularly research universities. As a Tier 1 research institution, the expertise and facilities of the U make it a natural home for this type of translational innovation.

CSR is also an opportunity for faculty to fund research that students can gain experience in and a method for faculty to acquire expertise in applied research.

The Process

CSR projects come from multiple sources: company-initiated, proposal-initiated or licensee-initiated. Once a project has been

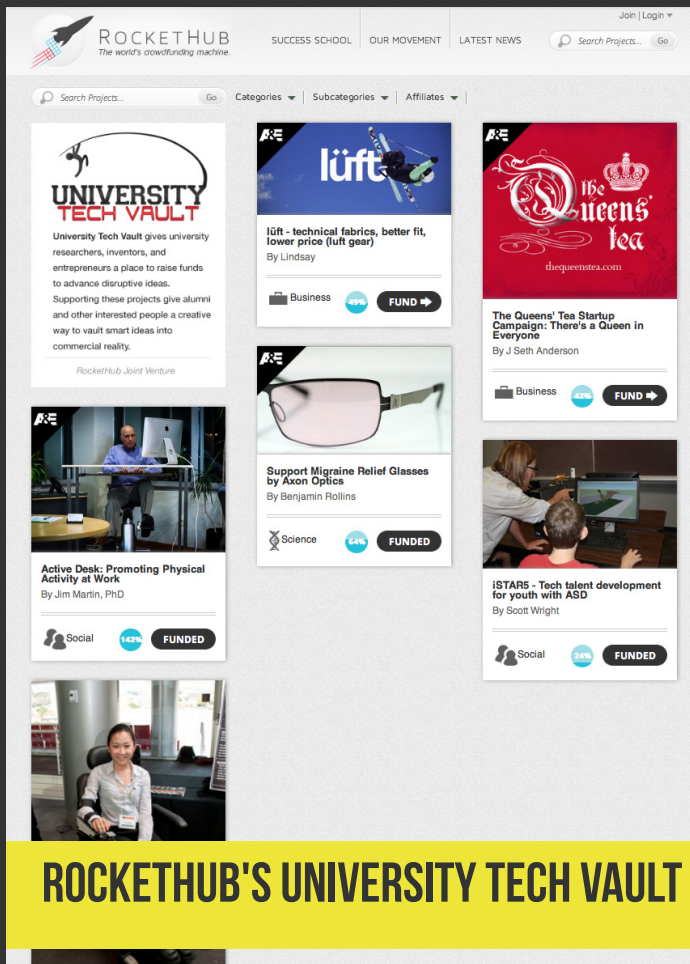
identified, it must be submitted to the Office of Sponsored Projects (OSP) via eProposal. After that a sponsored research agreement is drawn up that contains a research plan, detailed budget and certificates of assurance.

TVC facilitates sponsor identification, proposal development and submission, and contract negotiation. The CSR team also works closely with OSP and is responsible for IP terms in all sponsored projects. OSP has primary responsibility for project management and accounting, and has signing authority for contracts.

CSR invites you to explore the benefits of working with them. Whether you are looking to expand your current research portfolio, or want to get a new idea off the ground, they can help. They are equipped to advertise your expertise and facilities to industry, repurpose grant proposals for industry project proposals, identify sponsors and negotiate contracts.

Visit: www.tvc.utah.edu/tco/csr.php

CROWD FUNDING



ROCKETHUB'S UNIVERSITY TECH VAULT

While projects such as independent films, small online businesses, charity projects or novel devices have tended to dominate the crowd funding space, the use of this new funding source is rapidly being employed by universities, with the U being one of the first to do so.

Crowdfunding draws small investments/donations from a large number of people for a specific technology or project. As part of the pitch, representatives make a promotional video and offer funders some sort of reward for their donation, usually on a web based platform.

TVC, in partnership with one of the three major crowdfunding sites, RocketHub, has pioneered the

use of crowdfunding for U faculty inventions through the launch of "The University Tech Vault" (UTV). This crowd funding web portal is tailored to funding university science and technology innovations. While UTV features select U technologies, it is not exclusive to the U; the site is open to any university seeking to crowdfund their early-stage innovations and start-ups.

Why TVC is Using Crowd Funding

Potential licensees are becoming increasingly hesitant to license technologies from universities without significant development of these technologies. While SBIR, STTR, TCIP grants and microgrants are vital methods

for bringing such technologies to a commercial state, the highly competitive nature of the process for obtaining these grants necessarily means some worthy technologies will not receive gap funding. Crowdfunding is not only a promising, additional funding mechanism for technologies to help supplement what these grants cannot provide, it is also a vital method for TVC to obtain market feedback on the technologies we market.

"Because TVC deals primarily with early-stage technologies, there is quite a bit of vetting and development that must go on before our new technologies are ready for the market," says Taylor Bench, TVC's director of economic development. "Crowdfunding allows universities to leverage the power of the crowd to not only get funding for projects, but also to get information that is just as important as the funding: market feedback."

Getting that crowd input, he adds, is "amazingly helpful in the development of early-stage technologies." Bench says crowdfunding thus represents "a

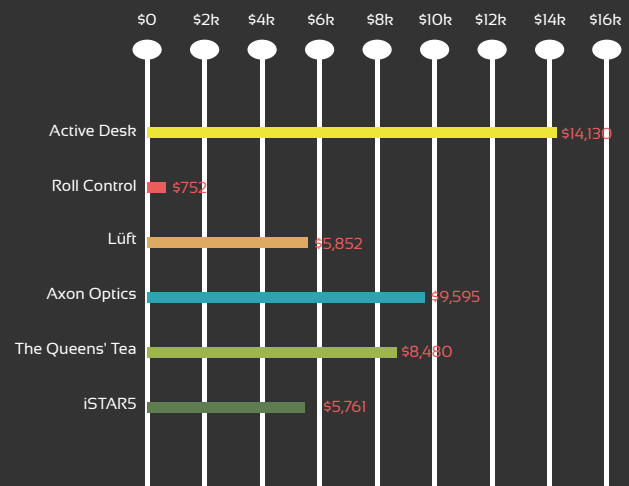
way to get both funding and that critical feedback and information from stakeholders and potential customers of the technology."

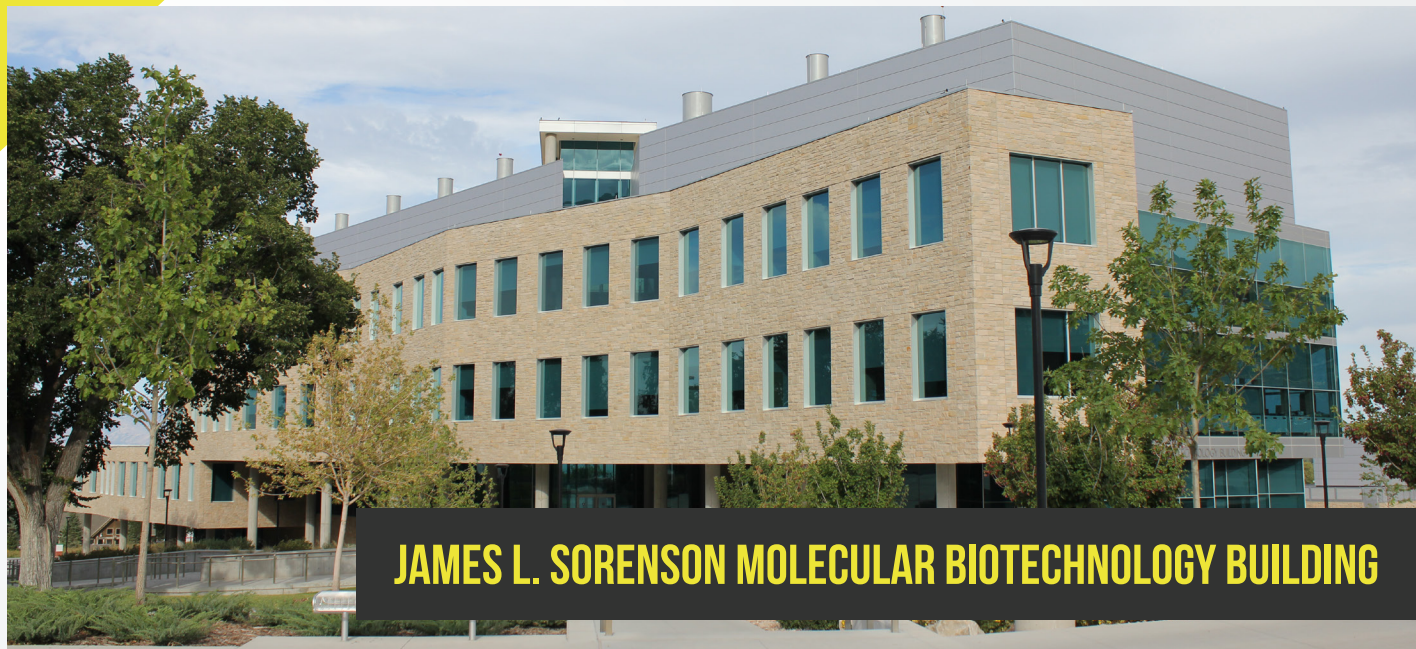
TVC's Beta Year

Six U technologies were earmarked for UTV in 2013. \$44,000 was raised by crowd funders for their development. "We are realizing that only certain inventions fit this model," says Matt Gardner, a business development associate at TVC. "Technologies that are community-driven in the sense that they speak strongly or spark interest within a select group of people are the best fit for crowdfunding."

Bench and Gardner are optimistic about the future of crowdfunding at the U. "Given what we have learned and where we believe crowd funding is headed, this new source of funding for university technologies looks bright," says Gardner. "In the coming years we will be expanding the number of technologies we will post on UTV and believe it will become a viable, alternative source of funding for U technologies."

TVC'S 2013 CROWD FUNDING CAMPAIGNS





JAMES L. SORENSON MOLECULAR BIOTECHNOLOGY BUILDING

The Utah Science Technology and Research initiative (USTAR) is a long-term, state-funded investment to strengthen Utah's "knowledge economy." This revolutionary initiative invests in world-class innovation teams and research facilities at the U and Utah State University (USU) to create novel technologies that are subsequently commercialized through new business ventures.

To ensure this growth, USTAR was formed in March 2006 to leverage the proven successes of state universities by providing funds to help recruit talented research teams, build state-of-the-art research facilities, and assist in commercialization processes. The objective of USTAR is to stimulate additional technology-based start-up firms, and significantly increase technology commercialization, high-paying job opportunities, and business activity in Utah which will produce an associated expansion of the tax base. The USTAR initiative draws from best

practices of other states such as Georgia, Pennsylvania, and Arizona, and is structured with three main elements.

operates outreach teams across the state to help entrepreneurs and existing companies commercialize new technology

companies, and the university's Energy & Geoscience Institute has more than 60 supporting industry partners. USU's commercialization office routinely solicits industry feedback on its USTAR efforts as well.

"One of the things that Utah is well-known for is the entrepreneurial nature of our people," says Ted McAleer, USTAR Executive Director. "We have a lot of start-up companies, and a lot of new ideas being generated in Utah. USTAR is like a fuel additive that makes a strong engine run faster."



First, USTAR provides funding that accelerates the ability of the U and USU to recruit world-class researchers, specifically into high-growth focus areas such as energy and biomedical innovations. Second, the initiative enabled the construction of two state-of-the-art interdisciplinary research and development facilities at the U and USU campuses. Third, USTAR

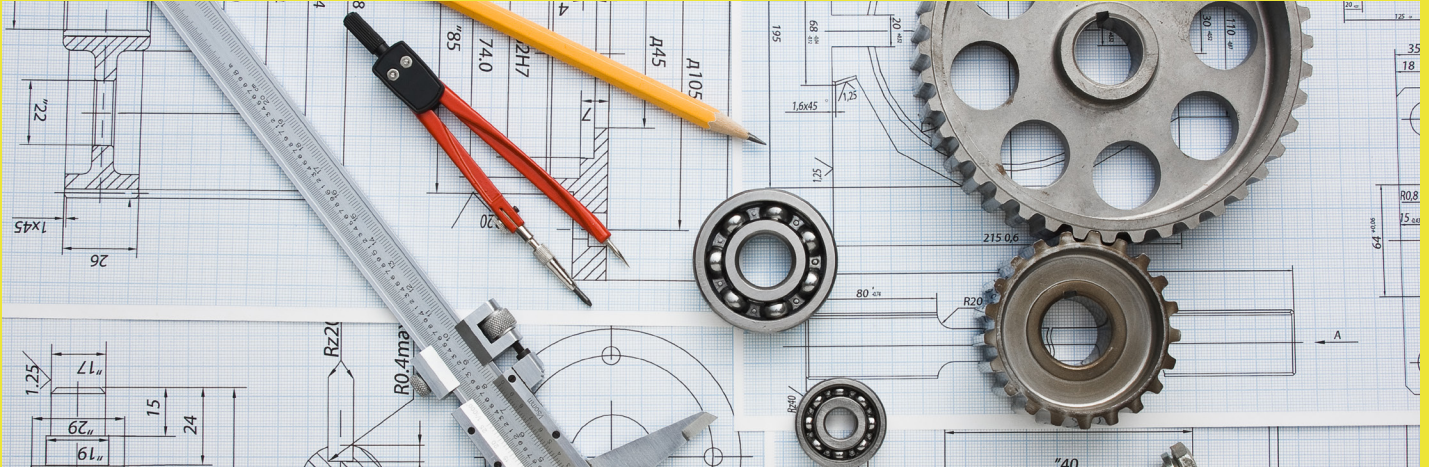
and access the resources available at higher education institutions.

Collaboration is the heart of the USTAR program. Not only between the various disciplines represented by researchers and faculty, but between the academic and business worlds as well. The U Nanofab, for example, works on a regular basis with more than 40

It is the collaboration and focus on innovation between the universities around Utah and the industry partners that has come together as part of the USTAR program. And it is this combination of facilities, human capital and entrepreneurial nature that sets Utah apart from other states.

STARTUP COMPANIES

Over 150 companies have been launched from U technologies in the last ten years, and more than 230 since 1970. These diverse companies range from the fine arts to pharmaceutical chemistry. The following companies are some of the newest created at the U:



Active Desk



Founded: 2013

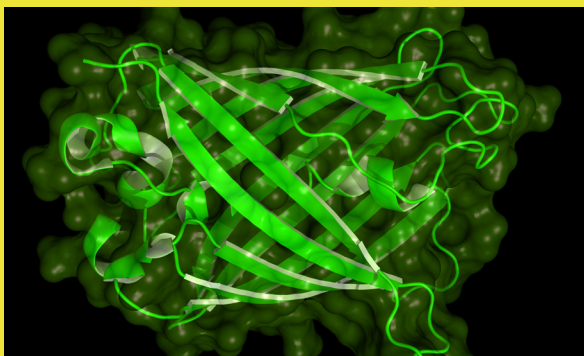
Originating Department: Exercise And Sport Science

Industry: Employee Health Benefits, Office Equipment

Inventor: James Martin

Active Desk is an integrated recumbent exercise bike and desk with refined ergonomics for easy computer operation. Active Desk facilitates physical activity throughout the workday and thus improves physical and psychological health.

Applied Biosensors



Founded: 2013

Originating Department: Electrical & Computer Engineering

Industry: Diagnostics

Inventor: Prashant Tathireddy

Applied Biosensors is aspiring to be the world's leader in the 'continuous biomarker monitoring' industry with a revolutionary technology that is simple yet robust. 'Smart' hydrogels on an array of micro transducers constitute a standard sensing platform that will be supplied to multiple markets starting with ones that have low regulatory barriers.

STARTUP PROFILES



Arapeen Medical

Founded: 2013

Originating Department: CARMA

Industry: Diagnostics, Radiology

Inventor: Nassir Marrouche

Arapeen Medical is pioneering the use of magnetic resonance guided focused ultrasound in renal sympathetic nerve ablation in the non-invasive treatment of hypertension.



ASHA Vision

Founded: 2013

Originating Department: Ophthalmology/
Moran Eye Institute

Industry: Therapeutics

Inventor: David Krizaj

Treatment and management of intraocular pressure associated with Glaucoma through the use of novel compounds which do not require intraocular injection but can be administered through the use of eye-drops.



Avani Corporation

Founded: 2013

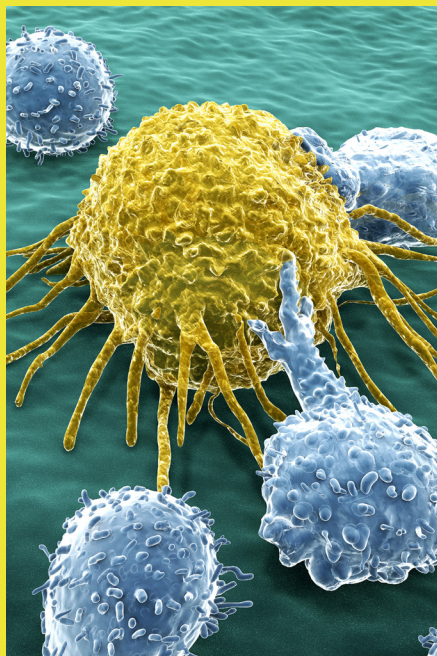
Originating Department: Atmospheric
Sciences

Industry: Atmospheric Sciences

Inventor: John Horel

Researchers at the U developed software to link environmental data obtained from over 30,000 observing locations around the country. The U, through the MesoWest program, aggregates these diverse data sets, performs quality control on them, and makes it available to a variety of users. Avani Corporation is a newly founded company through partnership with the U and Weatherflow, Inc. to market this highly valuable information for diverse commercial applications.

STARTUP PROFILES



CIRJ

Founded: 2012

Originating Department: Bioengineering, Pharmaceuticals and Pharmaceutical Chemistry

Industry: Therapeutics

Inventors: Natasha Rapoport, You Han Bae

CIRJ, Inc. is developing novel approaches to targeting solid tumors, using novel polymer-based nanotherapeutic particles for direct and specific delivery of anti-cancer drugs to the tumor microenvironment.



Curza Global

Founded: 2013

Originating Department: Orthopedics and Chemistry

Industry: Medicine/Chemistry

Inventors: Dustin Williams, Ryan Looper

Curza Global is partnered with the U to develop novel antimicrobial agents with wide industrial utility, including medical, agricultural, and environmental applications.



Molecular Cloud

Founded: 2013

Originating Department: TVC

Industry: Tech Transfer

Inventor: Zach Miles

Provides equity management services to academic institutions including execution of certain preemption rights and associated tax benefits, and alternative resource engagement with start-up companies.

STARTUP PROFILES



Navigen Endo-Shield Business Unit

Founded: 2012

Originating Department: Ophthalmology and Mechanical Engineering

Industry: Ophthalmology

Inventors: Balamurali Ambati, Bruce Gale

Endo-Shield is developing a specialized disposable contact lens, designed for use in cataract surgery, to shield the cornea from potential injury and cell loss and lead to better surgical outcomes.



Ore to Metal Technologies

Founded: 2013

Originating Department: Metallurgical Engineering

Industry: Mineral Processing Industry

Inventor: Raj Rajamani

Ore to Metal Technologies provides technology-based services to the mineral processing industry. They offer an array of software and consulting services to optimize AG/SAG mill operations and are proud to distribute MillSoft, a mill modeling tool developed by U professor Raj Rajamani.



Proactive Memory Services Inc. (PAMS)

Founded: 2009

Originating Department: Neurology

Industry: Healthcare

Inventor: Norman Foster

Proactive Memory Services is developing a tablet computer and smartphone application to help Alzheimer's patients and their families manage the disease, in partnership with the U's Center for Alzheimer's Care, Imaging, and Research (CACIR).

STARTUP PROFILES



Resolution Applications

Founded: 2013

Originating Department: University
Information Technology/Administrative
Computing Services

Industry: Computer Science

Inventor: Jeremy Uffens

Resolution Applications was formed to commercialize the FAR suite, a series of web-based software modules developed to enable universities and colleges to conduct consolidated reporting on faculty activity and collaboration.



SimplicityMD Solutions

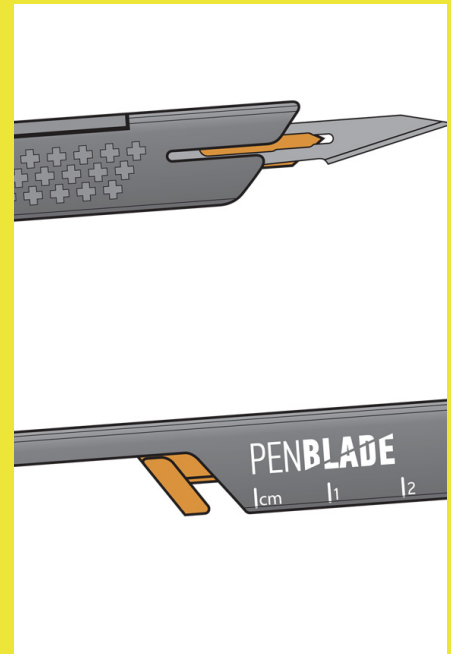
Founded: 2013

Originating Department: Internal Medicine

Industry: Medical Devices

Inventor: Branden D. Rosenhan

SimplicityMD Solutions is developing simple class I medical devices that improve health care while reducing cost. They are currently in the product development stage of designing a chest tube securement device and a securement device for an internal jugular catheter.



Simplicity Sharps

Founded: 2013

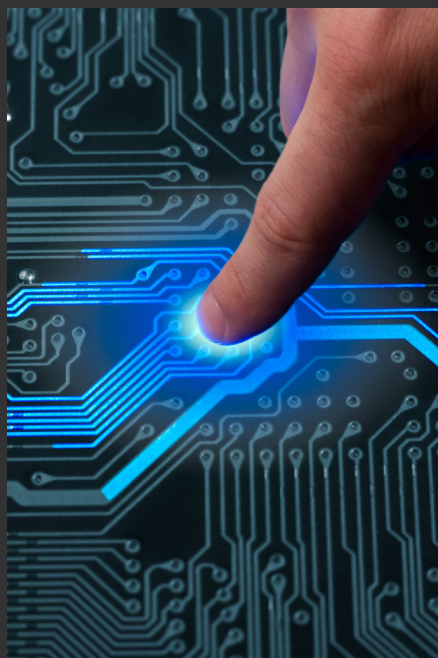
Originating Department: Internal Medicine

Industry: Medical Devices

Inventor: Branden D. Rosenhan

Simplicity Sharps is a medical device company developing the first truly safe safety scalpel. They are designing, manufacturing, and marketing this safety scalpel that is intuitive and easy to use and reduces health care costs while reducing injuries.

STARTUP PROFILES



University Innovation Services

Founded: 2013

Originating Department: SCI Institute

Industry: Software

Inventor: Greg Jones

University Innovation Services' product is WIN, a peer-to-peer software-as-service platform with a unique "no barriers" structure that allows users and resources to connect in a user-defined environment, either through member groups, by subscribing to specific labs, or by individual exploration of resources listed on the network.



Verus Mobile Security

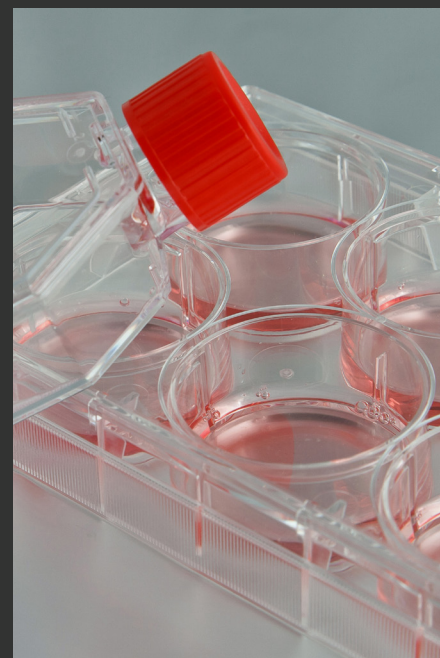
Founded: 2013

Originating Department: Anesthesiology

Industry: Healthcare, Government, Defense, Inventory Management, Utilities

Inventor: Kevin Wethington

Verus Mobile Security, LLC offers a mobile phone authentication software solution that makes mobile access to secure databases both more secure and more convenient.



Vettore

Founded: 2012

Originating Department: Biochemistry

Industry: Therapeutics

Inventor: Jared Rutter

Vettore is focused on the development of therapeutics targeting key regulators of cellular metabolism and homeostasis, with the goal of producing significant new treatment options for a number of diseases, including cancer, type 2 diabetes, and neurological disorders.

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