

Annual Report on the Texas Ignition Fund to The U. T. System Board of Regents

The **Texas Ignition Fund (TIF)** is a **proof-of-concept (POC)** grant program designed to stimulate commercialization activities at U. T. System institutions by providing grants up to **\$50,000** for the development and maturation of research discoveries into marketable intellectual property. In December 2007 the U. T. System Board of Regents authorized one-time funding of **\$2 million** for creation of the TIF, to be administered by the U. T. System Office of Research and Technology Transfer (RTT).

The **TIF program addresses a crucial funding gap** and reinforces the many other elements of the innovation ecosystem that define a culture of commercialization at U. T. System institutions. Well-documented evidence of the success of mature POC funding programs across the country, including U. T. M. D. Anderson Office of Technology Discovery's fund, suggests that the TIF program will continue to leverage other funding sources and commercialization benefits over many years, long after awards are funded (see Appendix I).

TIF awards to date total **\$1.154 million**, leaving **\$846,000** available. RTT intends to announce the Round 4 proposal deadline for this spring, with Round 5 to follow in the summer. *These two competitive rounds will likely utilize the balance of TIF funds.*

In addition to summarizing the first year of the TIF program activities, this report discusses the following recommended next steps:

- Pursue opportunities to **sustain POC funding** by replenishing TIF funds and empowering U. T. System institutions and other Texas public universities to manage their own POC funds.
 - **Increase mentoring activities** to support emerging technologies.
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TIF Program Summary

Figure 1ⁱ provides a timeline of the three competitive rounds of the TIF program to date, launched with the first proposal deadline on February 15, 2008. The application form and instructions are presented in Appendix II, and Appendix III provides synopses of funded TIF awards.

Table 1ⁱⁱ outlines the first year of activity for each U. T. institution, summarized as follows:

- RTT received **61 proposals from 13 institutions** (4 were resubmissions).
- TIF funded **27 projects at 11 institutions** (4 awards were for multi-institution collaborations).
- Academic institutions received approximately 59%, health institutions 41% of TIF awards.

Meaningful aggregate performance data are not yet available, with only two projects having completed milestones to date and one final report submitted. Technology transfer officers, however, report that U. T. researchers who have never presented invention disclosures are coming forward in response to the TIF opportunity; and independent reviewers commend the **high quality of proposals** and increasingly offer external mentorship to awardees. Other concrete evidence of the TIF's effectiveness includes:

- One funded TIF project at U. T. Austin has already resulted in an **algae-based biofuels spinoff company**ⁱⁱⁱ with DARPA funding.
- **21 other TIF projects** indicate potential or plans to commercialize research discoveries with startups.
- TIF awardees report a total of **\$4.6 million in prior funding** from other sources.
- U. T. institutions have received **\$1.64 million in Emerging Technology Fund (TIF) incentive funds** from research superiority grants, to be used for POC funding and capacity building^{iv};
- ETF research superiority proposals in the pipeline by U. T. institutions will increase incentive funds to **total more than \$2.0 million** over the next year.

TIF Process and Governance: RTT staff vetted the TIF application form and instructions (Appendix II) with commercialization officers at the institutions, and developed the TIF contract with the Office of General Counsel (OGC) and sponsored program staff input. To ensure that TIF funding would be allocated equitably, each institution was limited during the first two rounds of the program to receive a maximum of five TIF awards.

Technology transfer officers at each institution communicate with their researchers and implement vetting procedures to sign and submit the best TIF proposals to RTT. Authorized sponsored program officials also review and sign TIF applications and a letter of support from external community or industry professionals must accompany each application.

RTT staff members recruit and coordinate input from independent reviewers who volunteer significant time to evaluate and recommend funding decisions for TIF proposals. Reviewers include individuals who may be interested in the outcome of the projects, such as venture capitalists, ETF representatives, lawyers, and consultants. Senior RTT staff review each proposal, compile reviewer findings, and recommend funding decisions to the Ignition Fund Advisory Board (IFAB), consisting of the following members:

Dr. Kenneth Shine, EVC Health Affairs

Mr. Arjun Sanga, AVC Technology Transfer

Dr. David Prior, EVC Academic Affairs

Ms. Cathy Swain, AVC Commercial Development

Dr. Keith McDowell, VC Research & Tech Transfer

Program Evaluation Metrics: TIF awardees must submit a report upon completion of project milestones. This allows RTT to measure the impact of the TIF program over time. Since funding of initial awards late June 2008, only two projects have completed milestones. Reporting requirements include a technical and financial report, as well as evidence of performance based on the following metrics:

- Amount of external funding received (research grants, angel and/or venture capital investments)
- Protection of intellectual property (patent applications/issuances, copyright applications/registrations)
- Commercialization activities (licenses/options executed; startup companies formed; income generated from royalties, milestones, upfront payments, equity and other instruments)

Lessons Learned

During the review process, four categories have emerged that characterize TIF proposals that have not received funding:

1. **Basic research:** not far enough along for proof-of-concept leading to commercialization.
2. **Too advanced:** ready for ETF or private investment in existing company or product.
3. **“Boutique”** or “lifestyle”: product opportunity, does not warrant institutional investment.
4. **Resubmit** with modifications (e.g. more clarity regarding commercial opportunity).

Lessons learned from the first year of the TIF program include mandates to:

- **Sustain POC funding** and find ways to support promising new technologies (notably drug development projects) that need more seed funding than the \$50K offered by the TIF.
- Expand **mentoring** activities, including the network of external reviewers, angel investors, and recommendations of ways to coordinate alumni outreach.
- Increase initiatives to help projects that are ready for ETF or private investment.
- Think globally to optimize the potential impact of breakthrough U. T. discoveries.

Sustain POC Funding

RTT’s longer term goal is to perpetuate the TIF program at approximately its current pace, meanwhile empowering U. T. System institutions and other Texas public universities to manage their own POC funds. RTT staff are pursuing three avenues for alternative funding.

1. **ETF Incentive Funds:**^{iv} RTT staff advocated successfully for retroactive incentive funds from ETF equal to 5% of all research superiority awards, and **six U. T. institutions have received a total of \$1.64 million**. Several institutions are using these ETF funds to create their own POC grant programs, while others are using incentive funds to build commercialization capacity in other ways. More incentive funds are expected from ETF research superiority proposals that are in the pipeline.
2. **Matching Grants:** RTT staff initiated a collaboration with other Texas public university systems to prepare a **proposal to replenish POC funds** already expended and/or available at individual institutions. Five Texas public university systems spent **\$9.2 million** last year (\$24 million over the past five years, including the TIF but excluding ETF incentive funds) to support activities related to

proof-of-concept. Funding sources include royalties, private donations, overhead funds, and proceeds from the sale of stock in university spinoffs.

Nearly \$8 million more is identified to match future outside funding; however, *shrinking private donations and discretionary funds, and pressures to reduce spending threaten the feasibility of future POC funding by Texas public university systems.*

Possible sources for matching funds include the **ETF, foundations, alumni and private donors**. The collaborative proposal will offer funding alternatives at the institution level, pro-rating matches to individual institutions equitably and implementing governance that is acceptable to matching sources.

3. **Cancer Research Funds:** CPRIT commercialization committee members have identified the need to allocate a portion of **cancer research funds** for POC activities to help commercialize cancer research discoveries. They are developing details of how such a program would work, with particular consideration for the long term and high cost of drug development activities.

Mentoring

Successful POC programs typically incorporate hands-on mentoring services. Mentoring activities at U. T. System institutions for faculty and graduate students who are attempting to commercialize their discoveries include services ranging from virtual incubation of startup companies in campus facilities to a new Entrepreneur-in-Residence program at U. T. Austin and formal incubators with mature programs that also serve the broader community.

More support is needed to mentor emerging technology developers. In addition to engaging external professionals with diverse backgrounds to review TIF proposals, RTT has embarked on several initiatives:

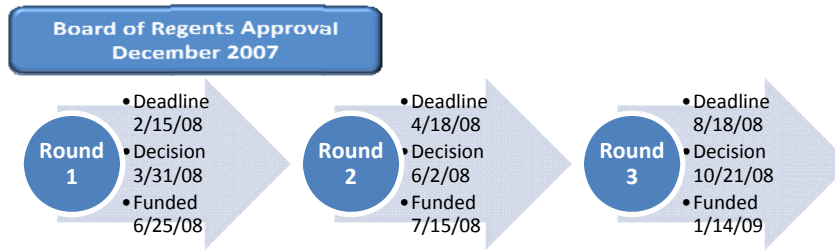
- Hosted a meeting for directors of incubator activities at U. T. institutions to exchange ideas and increase awareness and collaborations (e.g. rapid response manufacturing and prototyping capabilities at UTPA and UTEP are used by other U. T. institutions for new product development).
- Hosted a brainstorming strategy session, with senior leaders from U. T. institutions representing technology transfer, new venture creation, incubation, mentoring, and entrepreneurship training.
- Offered faculty entrepreneurship training (*Ideas on Fire! Life Sciences* co-piloted by RTT staff and UTMDACC, with taped lectures and downloadable iPod files available on the [RTT web site](#)).

RTT staff refers TIF projects that are ready for ETF and/or private funding to state Regional Centers for Innovation and Commercialization (RCIC's) for mentoring and assistance; however, more effort is needed to follow up in this regard. RTT staff has also embarked on initiatives to expand the role of business schools at U. T. institutions in commercialization:

- Last May UTD's Institute for Innovation & Entrepreneurship, in collaboration with the Rice Alliance, hosted a meeting to discuss formation of a Texas association of entrepreneurship centers, institutes and training programs. Representatives from seventeen Texas higher education institutions, the Office of the Governor's ETF staff, the U. T. System, and the North Texas RCIC agreed to form the Texas University Network for Innovation & Entrepreneurship and elected seven directors, five of whom are affiliated with U. T. institutions across the state.
- In January 2009 U. T. Tyler hosted Jerome Smith, a U. T. alumnus and a representative from MIT Deshpande Center's alumni-based mentoring program, to present and discuss the structure of MIT's program with representatives from UTT, UTA, UTD, North Texas RCIC, and members of the community. Mr. Smith has offered to make presentations in other Texas cities and to help organize alumni mentoring programs.

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i **Figure 1. Timeline of TIF Program**



ii **Table 1: Cumulative TIF Activity**

UT Institution	# Proposals	# Awards	Award Amount (\$000's)	% of Total Awards
UTA	9	6	250	22%
UTAUS ^{1,2}	10	6	225	19%
UTB	-	-	0	0%
UTD	4	2	100	9%
UTEP ¹	5	2	60	5%
UTPA	3	1	50	4%
UTPB	-	-	0	0%
UTSA ²	1	0	0	0%
UTT	1	-	0	0%
Subtotal	33	17	685	59%
Academic				
UTSWMC ²	5	3	110	10%
UTMB	7	3	150	13%
UTHSC-H	6	1	50	4%
UTHSC-SA ²	6	2	75	6%
UTMDACC	3	2	35	3%
UTHSC-T	1	1	50	4%
Subtotal	28	12	469	41%
Health				
TOTAL²	61	28	1,154	100%
Balance Available:			\$ 846	

¹Two awards (\$10k each) approved in Round 1 have not been funded: One UTEP award is pending negotiation; one UTAUS awardee resubmitted in Round 3 but was not approved for \$50K requested in funding.

²Collaborations not counted twice in Total Awards.

iii One funded TIF project has already resulted in a startup company:

Drs. Hebner and Werst at **U. T. Austin** have developed a manufacturing method for **algae-based biofuels** that decreases the production cost by a factor of two to ten. Commercialization activities included presentations to industrial groups and more than six venture capital firms, the development of a business plan, patent filings of two provisional patents, and the formation of a new startup company. The investigators formed a joint company with Houston-based Organic Fuels to form a new company called **Organic Fuels Algae Technology**. The company will continue the development of marketable process products needed in the production of algae-based biodiesel. DARPA will fund the project in order to quickly develop bio-based jet fuel.

iv Six U. T. Universities have applied a total of **\$1.64 million in ETF 5% incentive funds** as follows:

- **U. T. Arlington [\$125K]** is using ETF incentive funding to establish the “Maverick Matchstick Fund” for **patent filing loans** to faculty/staff/student start-ups for technologies developed with internal funding, and that are either not protected or have only “in-house” provisional patent application protection. The goal is to attract additional funding from other sources with a strong patent application in place. Inventors apply for Matchstick awards in a competitive process based on promise of the commercialization “team” and marketability.

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- **U. T. Austin’s [\$400K]** Office of Technology Commercialization [OTC] is creating two new programs, matching ETF incentive funds with U. T. System funds to support the expansion:
 - The New Ventures operating unit has hired “**entrepreneurs in residence**” [EIR’s] to identify and develop new business opportunities from promising technologies.
 - **\$200,000 of the ETF incentive funds** will launch the **Longhorn Startup Program** to encourage U. T. Austin faculty to qualify for ETF awards by granting \$100K to be applied toward relevant technology development by two companies using U. T. Austin technologies that are approved by the RCIC for further consideration of ETF funding.
 - **U. T. Dallas [\$350K]** has created a new Office of Technology Commercialization (OTC), led by a seasoned venture capitalist and entrepreneur. The ETF incentive funds allow the new OTC to augment the traditional licensing model with an infrastructure and culture that support both U. T. Dallas and the emerging research enterprise at U. T. Tyler. OTC actively engages inventors and external stakeholders and focuses on pro-active start-up facilitation to maximize the potential for commercializing the university’s technologies.
 - **U. T. Tyler [\$188K]** has hired one professional staff member to manage IP for the VP Research, and is contracting with U. T. Dallas to support commercialization opportunities.
 - **U. T. Health Science Center at Houston’s** Office of Technology Management [**\$375K**] is allocating ETF incentive funds to the existing **New Venture Development Fund** and **Pioneer Fund** to help establish new portfolio companies and/or to translate discoveries with strong commercial potential into a stage where patent or copyright protection can be actively pursued. Both funds were started with royalties and proceeds from the sale of equity in portfolio companies.
 - **U. T. San Antonio [\$176K]** is funding the new **Roadrunner Proof of Concept (POCrr)** grant award program with ETF incentive funds, accepting applications through STTM from any UTSA faculty member. A minimum of two awards will be directed to ETF-supported ICS faculty.

APPENDIX I

Proof-of-Concept Funding: Bridging the Innovation Ecosystem

Proof-of-Concept Funding: Bridging the Innovation Ecosystem

Rationale

Continuous funding throughout the innovation sequence (see *Figure 1*) is a critical challenge to technology commercialization effortsⁱ. In the U.S., the federal government makes a substantial contribution to economic competitiveness by supporting basic research. Corporate entities also support a small percentage of the basic research conducted at universities, while private investors mainly invest in later-stage product opportunities with proven concepts and working prototypes.

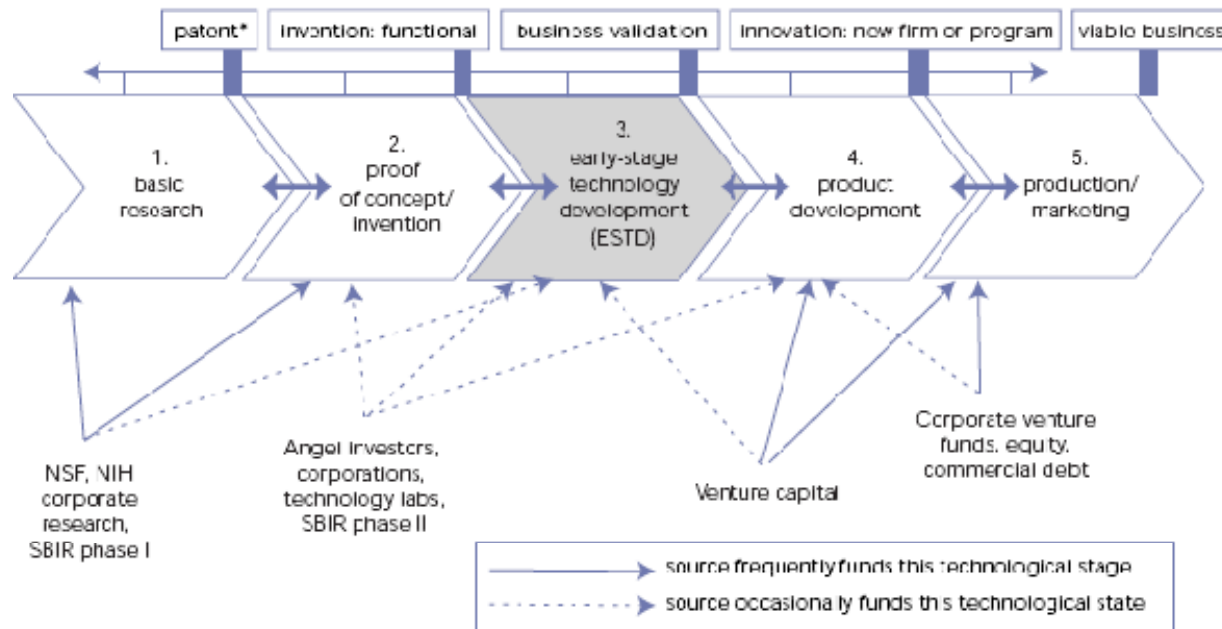


Figure 1. Sequential model of technology development and fundingⁱⁱ

In the current economic climate, investors are taking less risk, amplifying the gap in funding between basic research and marketable products. The challenge is to bridge these two established funding streams. This financing gap, or technology “Valley of Death” must be conquered to establish “proof-of-concept” (POC) of the invention and attract venture capital investors (see *Figure 2*).

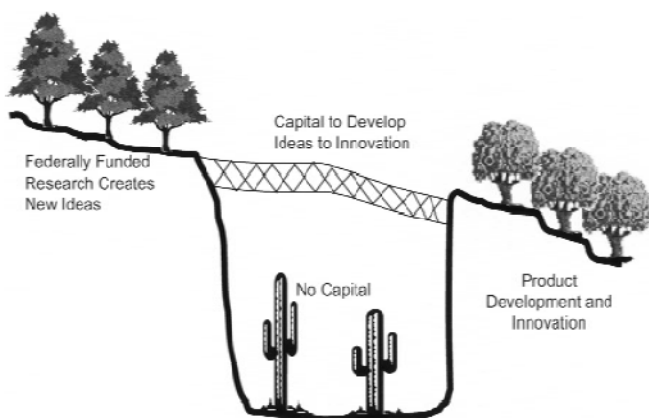


Figure 2.ⁱ Proof of concept funding mechanisms help technologies cross the Valley of Death.

Bridging the Valley of Death with POC funding helps ensure that new discoveries and life-changing technologies are not delayed or abandoned, but find their competitive place in the market.

POC funds currently exist as a critical, yet fragmented and situational funding stream. For example, five Texas public university systems spent \$9.2 million of institutional funds last year (\$24 million over the past five years) for POC and early stage technology development (ESTD), and have set aside \$6 million more in future funding for this purpose (See Appendix A). Sources of these funds have included royalties, private donations, overhead funds, and proceeds of sale of stock in university spinoffs.

Shrinking private donations and discretionary funds, and pressures to reduce spending, however, threaten the feasibility of public university-based POC funding in the future.

Significance

Funding POC projects enable universities to develop well-defined, promising discoveries into marketable products through activities such as prototype development, product testing, and analysis of business and market opportunities. Additionally, moving new technologies across this significant funding gap reduces the risk for potential investors, licensees, and entrepreneurs. Unfortunately, without expanded resources for POC work, funded projects risk abandonment or delay in the time to market. This could result in the possibility that promising projects with the potential to diversify the Texas economy and change lives globally could be passed entirely.

Short-term Benefits. Additional funding for POC projects has direct economic benefits to the local region. According to the AASCUⁱⁱⁱ, every \$28,000 spent in basic research generates one job. POC activities lead to commercial results and thus are likely to create more jobs in a shorter timeframe than basic research. So applying this conservative metric in the Texas example implies that ***\$24 million spent by Texas public universities for commercialization activities have generated at least 855 jobs over the past five years, and matching funds would multiply that benefit.***

Long-term Benefits. Benefits for POC funding extend beyond short-term financial rewards and job creation. A commitment to POC funding further demonstrates the partnership between the local entity and higher education toward economic development and commercialization goals. By filling a crucial funding gap in the innovation ecosystem, this relationship attracts additional businesses to partner with that state's entities. The innovation ecosystem ensures that when future discoveries emerge from universities, existing partnerships will help turn concepts into products.

Model POC Programs

Formal POC funds have a proven high yield for success, and recommendations for a POC funding model are based on a close review of state-financed programs, combined with essential elements of proven mature university programs. The U. T. System's Texas Ignition Fund, described briefly later in this section, is a new university-funded program that was launched in 2008. **Examples of states that partner successfully with public universities** to finance POC funds are:

Massachusetts^{iv}: ***"The Massachusetts Technology Transfer Center (MTTC) was created in 2004*** as a program in the Massachusetts Economic Stimulus Bill. Its goal is to support technology transfer activities from public and private research institutions to companies in Massachusetts. To achieve this goal, the Center works with technology transfer offices at Massachusetts research institutions; faculty, researchers, and students who have commercially promising ideas; and companies across the Commonwealth. ...The Center offers mini-grants to support "proof of concept" research or consulting assistance to move technologies closer to market readiness. These grants will initially be in the \$5,000 to \$25,000 range...

Maryland^v: ***"The Maryland Technology Development Corporation (TEDCO),*** an independent entity, was established by the Maryland General Assembly in 1998 to facilitate the transfer and commercialization of technology from Maryland's research universities and federal labs into the marketplace and to assist in the creation and growth of technology-based businesses in all regions of the State...

"TEDCO's role is to be Maryland's leading source of funding for seed capital and entrepreneurial business assistance for the development, transfer and commercialization of technology.

The results of TEDCO's seed-stage funding strategy are substantial. Over 100 Maryland Technology Transfer Fund (MTTF) companies have completed their projects, With TEDCO's support these companies have collectively raised downstream funding from venture and angel investors, government grants (e.g. NIH,

SBIR), private placements, product sales, etc., for a **leverage of the State’s investments through TEDCO of over \$32 to \$1...**”

Some programs that illustrate the use of the funds managed by TEDCO are footnoted.^{viii} Of particular note is the **University Technology Development Fund (UTDF)**, that “...provides up to \$50,000 for proof-of-concept studies or patent extension research on Maryland university-owned technologies to demonstrate their ability to meet identified market needs. The objective is to make the technologies more attractive to licensees preferably based in Maryland.”

Colorado^{vi}: “**The Bioscience Discovery Evaluation Grant Program (BDEGP)** was created by the Colorado legislature to foster development of the industry in Colorado, supporting both new business development and quality jobs for Coloradans. Grants have been available to develop technologies coming out of Colorado’s non-profit, research institutions over the last two years. In 2008, the program continues to support technology transfer at qualified research institutions, but now grants can be made directly to companies developing these new technologies.

“**Proof-of-Concept grants up to \$150,000 under the BDEGP** support bioscience discoveries that will likely lead to development of new products, services, businesses and employment in the bioscience industry in Colorado. Grants will be accessible to Offices of Technology Transfer (OTT) affiliated with qualified Research Institutions in order to enhance the commercial potential of bioscience research projects that focus on life sciences, engineering, material sciences computer sciences, photonics, or nanotechnology. (First grant cycle deadline was November 15, 2008.)

“The Early-Stage Bioscience Company grants up to \$250,000 under the BDEGP are intended to spur economic development and help new companies born out of Colorado research institutions to succeed in developing new technologies, business structures, and product development. Grants will be accessible to qualified companies whose technology is licensed from a qualified Research Institution, to support commercialization of therapeutic or diagnostic products, devices, or instruments to improve human health; bioscience technologies that improve agriculture; or biofuels. To be eligible for the Early-Stage Company grants a bioscience company must be headquartered in Colorado and have a license to commercialize technology from one of Colorado’s universities or research institutions.”

Well-documented results of **three mature university POC programs** described below, administered by the University of Texas M. D. Anderson Cancer Center Office of Technology Discovery, the Deshpande Center at the MIT School of Engineering, and the von Liebig Center at the University of California at San Diego, also demonstrate remarkable returns on investment that occur with POC program funding (see Table 1).

Table 1. Activity Summary of Three Mature University POC Programs

	UTMDACC OTD	MIT Deshpande Center	UTSD von Liebig Center
Year program began	2003	2002	2001
Maximum awards	\$200K	\$250K	\$75K
# proposals received	50	400	200
# projects funded/year	5	10	10
Total # projects funded	31	80	70
Total investment to date	\$2M	\$9M	\$4M

From these three programs, over 180 projects have been moved closer to marketable products in preparation for additional funding by external investors. Without this gap funding, only a small proportion of these projects would exist today. For example, cancer diagnostics, devices, and therapies might not be available for manufacturing and testing; alternative energy devices, biosensors, drug delivery devices, disease monitoring systems, improvements to electronic products, information monitoring methods, and highway warning systems might still be ideas instead of products.

The University of Texas M. D. Anderson Cancer Center's Office of Technology Discovery (OTD) established a program for POC gap funding in 2003, seeded originally by a grant to the institution. Figure 3 shows how OTD has assisted projects through this system over the past six years.

OTD staff consult with faculty to help them through the discovery, development, and commercialization process for technologies. OTD works with potential entrepreneurs to develop milestones, timelines, and budgets related to commercialization. When a project is ready to apply for funding, a 32-member Technology Review Committee reviews proposals during a monthly meeting and makes funding recommendations to an executive management team.

OTD has discussed inventions with almost 1,500 faculty, linking inventors to appropriate resources to move ideas along the discovery pipeline. Over six years, UTMDACC invested almost \$2 million in 31 projects, with an average investment of \$66,000 in each technology. In the past three years, the program boasts a four-fold financial return through increased licensing income, SBIR/STTR funding, sponsored research agreements, external grants, and external investments from venture capital firms and angel investors (see *Table 2*).

Figure 3. Deal flow in the past 6 years at UTMDACC's OTD

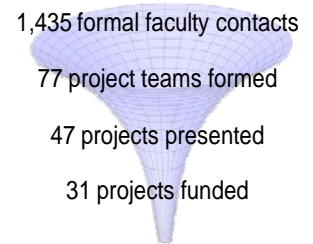


Table 2. Value Creation by UTMDACC OTD's POC Funding Program

Source	Amount
License Income (license, option, fees)	\$ 860,000
SBIR's, STTR's	\$ 240,000
Sponsored Research Agreements (SRAs)	\$ 250,000
Research grants	\$ 973,000
Money saved directly by UTMDACC	\$ 1,000,000
Outside investments (angels, venture capital)	\$ 2,500,000
Total Return on Investment	\$ 5,823,000

Source: UTMDACC Office of Technology Discovery

Short-term financial benefits are enhanced by increases in start-up companies, invention disclosures, patent applications, signed licenses/options, publications and presentations (see *Table 3*). Long-term benefits are expected to be much greater.

Table 3. Outcomes of POC Funding from UTMDACC's OTD

New invention disclosures as result of funding	14
Patents filed as result of funding	9
Licenses/Options signed	14/6
Licenses currently in negotiation	3
Startup companies formed / in formation	5/4
Entrepreneurship courses organized and hosted	5
Publications (incl. abstracts)	57

Source: UTMDACC Office of Technology Discovery

Massachusetts Institute of Technology formed the Deshpande Center for Technological Innovation^{vii} in 2002 through an initial \$17.5 million donation, with continued support from private gifts. The Center has a two-prong grant program for Ignition grants of \$50,000 and Innovation Program grants for up to \$250,000. The program releases two calls for proposals per year and receives approximately 70 proposals, of which 10 proposals are funded per year. Funding decisions are made by a committee of internal and external reviewers pulled from the Catalyst Program, which is completely volunteer-based, involving experienced entrepreneurs to provide advisory services to Center staff and grant recipients.

Since 2002, the Center has received over 400 proposals and funded 80 projects for a total of \$9 million in grants and an average investment of \$100,000 per project. The Center has interacted with over 200 faculty and students and involved 100 volunteers in the Catalyst Program. Over five years, grant recipients have formed 18 startups, issued one license, and raised over \$140 million in outside financing.

To complement the grants programs, the Deshpande Center also hosts an educational track called Innovation Teams, or the iTeams program, open to all MIT graduate students and always filled to capacity. Six grant recipients are chosen to work with iTeams to develop commercialization plans.

University of California San Diego created the von Liebig Center for Entrepreneurism and Technology Advancement^{viii} in 2001 with an initial \$10 million gift. The Center's seed grant program provides awards up to \$75,000 for commercialization purposes. As of January 2007, the Center has received more than 200 proposals, typically funding 10 to 12 projects per year. In total, the Center has invested more than \$3.8 million in seed grants and advisory services to over 70 projects.

A review panel of 5 to 8 members with technical and business expertise reviews the proposals and offers a funding recommendation to Center staff who make final funding decisions. Grantees are assigned an advisor, who is a paid staff member of the Center, to develop a commercialization plan with necessary milestones and corresponding budget. Funding is released for the completion of the first milestone and subsequent funding is contingent upon the completion of additional milestones. The von Liebig Center's grant program investments have directly resulted in 22 license agreements, 16 startups, and \$78 million in capital raised.

The University of Texas System established the Texas Ignition Fund (TIF) after evaluating the success of POC programs around the U.S., including MDACC's fund, MIT Deshpande Center's ignition grants, and other university-based programs. The TIF awarded its first grant in 2008 from a \$2 million fund authorized by the U. T. System Board of Regents.

The TIF program provides POC grants up to \$50,000 to the 15 University of Texas institutions. Proposals are vetted internally at the U. T. institutions prior to submission to U. T. System's Office of Research and Technology Transfer (RTT). External review panelists and senior RTT staff offer recommendations for funding to the Ignition Fund Advisory Board (IFAB), which has final approval authority.

As of this writing, the TIF program has received 61 proposals from 13 institutions; 27 projects have been funded for a total of \$1.2 million; TIF awardees have received \$4.6 million in prior funding from other sources; and two TIF projects report completed milestones, one resulting in a startup company.

State-University Partnership POC Matching Grant Program

A state-university partnership to fund POC activities especially makes sense in Texas because of the culture of commercialization and collaboration that has evolved. The Texas innovation ecosystem's broad-based support for this culture encompasses the ETF, Regional Centers for Innovation and Collaboration (RCICs), Life Sciences Institute, Cancer Research Fund, U. T. System's TIF program, incubators, mentoring and entrepreneurship training programs, angel networks, community and industry support, and many other elements.

Based on a review of established state-funded and university-based POC programs, and on recent experience with the TIF, RTT has outlined the following key elements for a State-University Partnership POC Matching Grant Program to be developed in Texas:

- The POC match program would grant funds to each university or system that spent or has committed institutional funds for POC projects.
- Matching grants would be prorated to each institution's relative share of aggregate expenditures on and commitments to POC activities; each institution or system would establish a fund from the prorated award that would be used exclusively to fund POC activities.

- A local fund advisory board (FAB) consisting of senior executives of the institution (e.g., the Chief Technology Transfer Officer, the Chief Research Officer, the Chief Officer of Technology Discovery, and the Chief Officer of Venture Development) would have final approval authority for project grants.
- Incubators, business schools, entrepreneurship training programs, RCIC's, angel investors, venture capitalists, and others would be important collaborators and mentors.
- An external review panel (ERP), consisting of independent scientific experts and independent entrepreneurs or venture capitalists, would evaluate the technology's scientific merit and potential market application and recommend specific proposals for funding.
- Proposal reviews would be coordinated at least twice a year, including receipt and distribution of proposals to the FAB and ERP; funding decisions would be announced by the chief technology transfer officer at the institution and the institution would expedite documentation and transfer of funds.
- Each grantee would submit a final technical and financial report upon completion of all milestones, and a subsequent annual report to provide the funding program with the following information:
 - Amount of external funding received (extramural research grant awards, angel and/or venture capital investments)
 - Protection of intellectual property (patent applications, patents issued, copyright applications and registrations)
- Commercialization activities (number of licenses executed; number of startup companies formed; income generated from royalties, milestones, upfront payments, equity and other instruments)

Notes

¹ Branscomb, L., & Auerswald, P. (2002, November). *Between invention and innovation: An analysis of funding for early-stage technology development*. Advanced Technology Program, National Institute for Standards and Technology (NIST), U.S. Department of Commerce Report, NIST GCR 02-841. Available online at: <http://www.atp.nist.gov/eao/gcr02-841/gcr02-841.pdf>.

¹ Branscomb, L., & Auerswald, P. (2002, November). *supra n. i.*

Note: The region corresponding to early-stage technology development is shaded in gray. The boxes at the top indicate milestones in the development of a science-based innovation. The arrows across the top of, and in between, the five stages represented in this sequential model are intended to suggest the many complex ways in which the stages interrelated. Multiple exit options are available to technology entrepreneurs at different stages in this branching sequence of events. *A more complete model would address the fact that patents occur throughout the process.

¹ Hurely, D. (2008, October). *Tapping state college research and development capacity in support of state economic development*. American Association of State Colleges and Universities. Available online at: <http://www.aascu.org/media/pm/pdf/pmoct08.pdf>

¹ <http://www.bu.edu/otd/awards/ignition/index.html>

¹The following programs are funded by the Maryland Technology Development Corporation. More information can be found at <http://www.marylandtedco.org/tedcoprograms/utdf.cfm>

- **Applied Research Development Project (ARDP):** The ARDP awards funding to Maryland's Historically Black Colleges, Universities, and minority serving institutions (Bowie State University, Coppin State University, Morgan State University, Sojourner-Douglass College, and the University of Maryland Eastern Shore) to increase research capacity by meeting the biotechnological needs of the U.S. Army while providing collaborate opportunities for Maryland minority-owned businesses.
- **Fort Detrick Technology Transfer Initiative (FDTTI):** FDTTI provides a U.S. small business up to \$50,000 for transfer of medical technology related to the U.S. Army Medical Research and Materiel Command. Both spin-in and spin-out projects are eligible. Funds are to be used to defray direct costs of further developing an early-stage technology.
- **Incubator Development Fund:** This fund is a loan program designed to support the capital needs of developing a new incubator facility or renovating an existing facility. The funding leverages other private and public investment.
- **Incubator Feasibility Study Grant Program:** The Incubator Feasibility Study Grant Program is designed to assist higher education institutions and local economic development organizations in creating and expanding technology business incubators. The grant funds are used to hire a consultant to complete a feasibility study for a technology incubator. TEDCO provides matching grant dollars up to \$30,000 per study.
- **Intensive Business Assistance Program:** This program promotes the growth of technology companies in the State of Maryland through support of business incubators. Each of the 19 technology incubators receives an annual grant, based on a Scope of Work, to provide targeted business assistance services to their tenants and affiliates.
- **Maryland Minority R&D Initiative (MMRDI):** MMRDI is specifically intended to empower minority entrepreneurs to more effectively compete for the highly selective Small Business Innovative Research and Small Business Technology Transfer (SBIR/STTR) federal grant awards. MMRDI provides assistance in the form of proposal reviews, access to and an understanding of the SBIR/STTR process, and business counseling.
- **Maryland Stem Cell Research Fund (MSCRF):** MSCRF provides a variety of grant programs for human stem cell research in the State of Maryland, including: Investigator-Initiated Grants, Exploratory Grants, and Post-Doctoral Fellowships. Maryland-based organizations of all types are eligible for the grants. Such organizations include public and private, for-profit and

nonprofit, universities, colleges, research institutes, companies, medical centers and others. Funding of \$55,000 to \$500,000 a year is available. For more information please go to www.mscref.org.

- **Maryland Technology Transfer Fund (MTTF):** MTTF provides up to \$75,000 as a reimbursable award for initiation of technology transfer projects that involve collaboration between a Maryland company and any federal laboratory or academic research institution in Maryland. Funds are to be used to defray direct costs of further developing early-stage technology.
- **Rural Business Innovation Initiative (RBI):** The RBI program supports technology-based companies in rural Maryland. The program provides intensive business and technical assistance to help companies advance to the next level. Companies may receive a maximum of \$10,000 of assistance provided by industry experts.
- **TechStart Program (TSP):** TSP provides up to \$15,000 to further evaluate the feasibility of a technology from a Maryland university or federal lab to be the basis of a startup company. The feasibility team must include the principal investigator, entrepreneur, and tech transfer manager. Funds are to be used for tasks critical to determining the viability of a new company formed around the spin-out technology.
- **University Technology Development Fund (UTDF):** The UTDF provides up to \$50,000 for proof-of-concept studies or patent extension research on Maryland university-owned technologies to demonstrate their ability to meet identified market needs. The objective is to make the technologies more attractive to licensees preferably based in Maryland.
- **Working Capital Loan Fund (WCLF):** WCLF is designed to provide loans to incubation-stage, technology-related companies in Maryland. The maximum loan is \$50,000, with low interest rates and flexible terms, and includes a quick turn-around from application to a decision. Funds can be used to assist a company with expansion, market entry, staffing or other working capital needs. ”

¹ <http://www.cobioscience.com/hb1001info.php>

¹ Information obtained from The Deshpande Center website accessed February 2, 2009 at <http://web.mit.edu/deshpandecenter/about.html>

¹ <http://www.vonliebig.ucsd.edu/>

APPENDIX II

Texas Ignition Fund

Application Form and Instructions to Applicants

**NON-CONFIDENTIAL
TEXAS IGNITION FUND (TIF)
GRANT APPLICATION**

Is this a resubmission of a previous TIF proposal? <input type="checkbox"/> Yes <input type="checkbox"/> No
--

Date: _____ **Amount Requested:** _____ **U. T. System Institution(s):** _____

Inventor/Principal Investigator(s): _____ **Titles:** _____

(College/Department) _____ **Proposal Title [max 5 key words]:** _____

AUTHORIZED SIGNATURES:

<u>TYPE</u>			
<u>NAME</u>	<u>TITLE</u>	<u>SIGN</u>	<u>Date:</u>
	Responsible University Official, Sponsored Programs		

<u>TYPE</u>			
<u>NAME</u>	<u>TITLE</u>	<u>SIGN</u>	<u>Date:</u>
	Chief Technology Transfer Officer		

**You may attach one additional page to complete this first page of the TIF Grant Application. Please do not exceed two (2) pages.*

BRIEF Synopsis: _____

Market Application(s): _____

Potential for Commercialization:

- | | |
|--|--|
| <input type="checkbox"/> Startup: U. T. Company* | <input type="checkbox"/> License to existing independent company |
| <input type="checkbox"/> Startup: Independent Company* | <input type="checkbox"/> Don't know |
| | <input type="checkbox"/> Other (describe) _____ |

* U. T. Faculty CEO or Independent CEO

Industry Cluster(s) (Check up to two):

- | | |
|---|---|
| <input type="checkbox"/> Advanced Technologies and Manufacturing | <input type="checkbox"/> Software Technology/ Wireless |
| <input type="checkbox"/> Aerospace and Defense | <input type="checkbox"/> Micro-electrical-mechanical systems (MEMS) |
| <input type="checkbox"/> Biotechnology and Life Sciences | <input type="checkbox"/> Nanotechnology |
| <input type="checkbox"/> Energy | <input type="checkbox"/> Semiconductor |
| <input type="checkbox"/> Information and Computer Technology | <input type="checkbox"/> Other (describe) _____ |
| <input type="checkbox"/> Petroleum Refining and Chemical Products | |

Technological Significance: _____

Intellectual Property (title(s) & university identifier(s); technology must be available for licensing): _____

Value Added [Why do you need TIF funds?]: _____

Have you contacted your RCIC re: possible ETF Funding? Yes No

If Yes, what feedback did you receive? _____

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TEXAS IGNITION FUND (TIF)
GRANT APPLICATION**

Please describe other funding that has supported or will support development of this technology:

Source	Amount (\$000's)
1.	\$
2.	\$
3.	\$
	Total \$

Milestones, Timelines, Costs, Budget Justification

Milestones**	Completion Date [xx/xx/xxxx]	Estimated Cost	Budget Justification
1.		\$	
2.		\$	
3.		\$	
	Total	\$	

** Milestones are defined as specific measurable outcomes/deliverables from the project (e.g. prototype design/ fabrication/ testing, market research, business plan).

*Please attach more detailed background information, commercial market potential, and methods of study, **not to exceed five (5) pages** with this portion of the application. RTT and/or IFAB reviewers may request additional information.*

*Please submit complete applications with authorized signatures in PDF file format (**maximum length seven (7) pages including application form**), plus the letter(s) of support, **electronically to: RTT at RTT@utsystem.edu**.*

Commercial/Market Potential:

Background:

Methods of Study:

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TEXAS IGNITION FUND (TIF)
GRANT APPLICATION
Instructions**

Overview:

The Texas Ignition Fund (TIF), a \$2.0M grant program, was approved by the U. T. System Board of Regents in December 2007 and is designed to stimulate commercialization of research discoveries at the 15 U. T. institutions by providing very early stage grants for the development and maturation of those discoveries into marketable intellectual property (IP), in particular to help bridge the gap between discovery and invention.

Governance:

The Ignition Fund Advisory Board (IFAB) will govern the TIF grant program. The IFAB will have final approval authority for all TIF grants and will review and assess performance of the overall TIF program annually. The IFAB is composed of the Executive Vice Chancellor for Academic Affairs, Executive Vice Chancellor for Health Affairs, Vice Chancellor for Research and Technology Transfer, Associate Vice Chancellor for Technology Transfer, and Assistant Vice Chancellor for Commercial Development.

In addition to serving on the IFAB, senior executives in the System Office of Research and Technology Transfer (RTT) will administer the TIF as follows:

- a. Select from a pool of experts, TIF Review Panelists (TRP) who will be individually charged with reviewing and recommending specific proposals for TIF funding. The TRP will be composed of independent experts designated by the IFAB in the relevant field of inquiry.
- b. Coordinate TIF proposal reviews by the IFAB every quarter while funds are available, including receipt and distribution of proposals to IFAB and TRP.
- c. Promptly notify applicants of IFAB's decisions to fund or not fund proposals.
- d. Expedite documentation and the transfer of grant funds.
- e. Monitor compliance with grant requirements and track TIF performance annually.

Goals:

Each U. T. Institution may request, through its executive in charge of technology transfer, up to \$50K per application to accelerate the commercial development of a technology created at that institution and owned by the Board of Regents. TIF goals are to:

- a. Support a culture to promote innovation, translation and commercialization of new ideas and technologies on the campuses of the 15 University of Texas institutions.
- b. Nurture viable technologies to avoid abandonment due to a lack of commitment or seed capital.
- c. Create a robust infrastructure for developing discoveries arising out of U. T. System research, to support validation of discoveries, external mentorship and commercialization.

Review Criteria and Application Checklist:

Successful proposals must be responsive to the above goals and meet the requirements listed below. (Please refer also to the metrics RTT will track (page 3) to assess TIF performance over time.) Grants will be awarded on a competitive basis with an emphasis on commercial potential, subject to the IFAB review process that will include assessments by the two selected TRP.

1. The executive in charge of technology transfer at the institution must approve and sign the proposal.

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Texas Ignition Fund (TIF) Grant Application Instructions

2. The Responsible University Official or Authorized University Official in the sponsored grant and contract office at the institution must sign the proposal and may transmit the proposal upon approval by the executive in charge of technology transfer.
3. The stated purpose of the project must be “Proof of Concept” leading to a commercial application. Preference will be given to proposals with potential to result in formation of a new startup company. Proposals to simply advance research of an idea will not be funded.
4. Business and capital community contact(s) must be documented (institutions, industry partners, successful entrepreneurs, angel and venture investors). For example, a letter(s) confirming that contact has been made and awareness of the project is established could satisfy this requirement.
5. All TIF proposals will be treated as “Non-confidential” and should be submitted in the form of the TIF Grant Application provided with these instructions, not to exceed seven (7) pages in total length including the background information and the front page application form. Please provide documentation of business and community contacts separately.
6. Expenditures of TIF grant funds must be for eligible costs as outlined below. A detailed line item budget is not required; however, applicants must estimate and provide a brief budget justification.
7. Proposed milestones must be measurable outcomes that may be achieved within one year or less.
8. The “brief synopsis” and “market application” sections of the application (page 1 of the grant application) should be written in layperson language appropriate for press releases to the general public.

Eligible Costs:

Requests will be considered for amounts up to \$50K. System institutions should make good faith efforts to contribute to the costs for intellectual property protection of the technology, depending upon the resources available. Patent costs may be funded only in an extreme need-based determination. Grant funds should be used to advance the commercial development of a discovery or invention. No indirect costs are allowed. Thus, funds may be spent for the following:

- a. Direct costs of supplies, equipment, instrument use fees, and other necessary and allowable expenses required to demonstrate “proof of concept,” “reduction to practice,” or prototype product development.
- b. As appropriate, personnel costs (undergraduate and graduate students, post doctoral fellows, technicians or other research staff) required to demonstrate “proof of concept,” “reduction to practice,” or prototype product development or business plan development.
- c. As appropriate, business plan costs (marketing survey, feasibility).
- d. In limited circumstances the IFAB may consider grants up to \$100K to include salary support for faculty to commit time and effort to start their own company, to company formation by external management teams, or to conduct research to achieve “proof of concept” or “reduction to practice” of a specific discovery.

Process:

A faculty member or researcher must collaborate with the technology transfer officer(s) at his/her institution, and each institution must implement a review process to screen faculty proposals.

1. Technology transfer officers at each System institution will evaluate intellectual property (IP) disclosed by faculty for its potential to be commercialized through the formation of a startup company. Intellectual property related to the proposal must be available for licensing.

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Texas Ignition Fund (TIF) Grant Application Instructions

2. The Responsible University Official or Authorized University Official in the sponsored grant and contract office at the institution will sign and submit a qualifying faculty proposal, approved and signed by the technology transfer officer at the institution, to RTT for competitive review.
3. Submissions must be received by RTT at rtt@utsystem.edu with authorized signatures, electronically in PDF file format using the Non-Confidential TIF Grant Application form, at least six (6) weeks in advance of an IFAB decision deadline in order to be reviewed by IFAB members and assigned TRP members.
4. The IFAB will review and select applications for approval and funding every quarter when funds are available to ensure timely consideration of proposals from System institutions.
5. TRPs selected by RTT will review and assess scientific merit and potential commercial market applications of technologies.
6. RTT Staff will promptly communicate to applicants whether or not the IFAB approves their respective proposals. Grantee institutions must execute a contract with U. T. System and establish an appropriate account to receive the grant funds.
7. Upon receipt of the executed contract, account information, and other documentation as required, RTT will promptly authorize the transfer of approved grant funds to specific institution(s) to be expended in compliance with the terms of the contract, following normal grant administration and compliance procedures.
8. All funding accounts will be closed with the completion of the final milestone. The contract ends with RTT's acceptance of the financial and technical reports.

Intellectual Property Ownership:

The University of Texas System Board of Regents will retain ownership of IP generated from TIF grants.

Compliance, Reporting and Performance Assessment:

RTT will review and assess overall performance of the TIF program on a six-month fiscal year schedule. **Grantees will notify RTT of the completion of each milestone via email to RTT@utsystem.edu.** Grantees are required to submit to RTT, within 60 days after completion of all milestones, a financial report accounting for expenditure of the funds and within 30 days a technical report documenting achievement of milestones in compliance with contract terms, as well as evidence of the following metrics:

- 1. Commercialization activities**
 - Licenses executed
 - Startup companies formed
 - Income generated from royalties, milestones, upfront payments, equity and other instruments.
- 2. Protection of intellectual property**
 - Patent, copyright, and trademark applications
 - Patents issued
 - Copyrights and trademarks registered
- 3. Amount of external funding received**
 - Extramural research and other types of grant awards (e.g. SBIR,STTR)
 - Angel and venture capital investments
 - Texas Emerging Technology Fund (TETF) awards

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*Texas Ignition Fund (TIF)
Grant Application Instructions*

Application Materials:

1. A TIF Grant Application form is available in Word document file format. A complete application (maximum length of seven (7) pages) must be submitted to RTT at rtt@utsystem.edu with authorized signatures, electronically in PDF file format.
2. Documentation of business and community contacts must accompany this application.

APPENDIX III

Texas Ignition Fund

Synopses of Funded Projects as of March 2009

Texas Ignition Fund AWARD SYNOPSES

Institution(s)	Proposal Title	Principal Investigator(s)	Synopsis
UTA/ UTSWMC	BEST™ GERD Batteryless Endoluminal Sensing Telemeter for Gastro Refluxed Detection	UTA: Chiao, J.C. UTSWMC: Tang, Shou-Jiang; Spechler, Stuart; Tibbals, H. Fred	<p>Researchers at UT Arlington and UT Southwestern Medical Center have developed a sensor to aid in the diagnosis of Gastroesophageal Reflux Disease (GERD). This device is unique because it is wireless and does not rely on battery power, making it more portable, accurate, reliable, and comfortable for patients. Thus, use of the device allows diagnosis and targeted treatment of GERD and helps prevent gastroesophageal cancer.</p> <p>\$50K in TIF funding will: (1) accelerate product refinement to decrease the sensor's size and develop the manufacturing process; (2) enable the research program to meet FDA approval requirements with live animal tests, biocompatibility tests, and human clinical trials; and (3) support development of a business plan for a new start-up company.</p>
UTA	Universal & Cost- Effective Surface Texture on Solar Cells	Tao, Meng; Zhou, Weidong	<p>Researchers at UT Arlington have developed a surface texture which may be safely and easily applied to solar cells (Omni-AR™) that improves the energy efficiency and cost-effectiveness of solar cells.</p> <p>\$50K in TIF funds will be used to perfect a manufacturing process and develop a prototype for application of the Omni-AR™ surface to commercial solar cells, to gather data to convince solar cell manufacturers (ZT Solar's customers) to incorporate this coating into their existing production processes.</p>
UTA	Liquefaction of TX Lignite to Low-Cost Heavy Crude Oil	Billo, R.E.; Dennis, B.H.; Priest, J.	<p>Researchers at UT Arlington have developed a new liquefaction process that directly converts lignite to heavy crude using a minimum amount of time, expense and processing. The conversion requires less hydrogen than traditional liquefaction processes, thus producing less greenhouse gas. Materials and processing costs are estimated at only \$25 per barrel, suggesting that a profitable refining operation could be supported. Texas has an abundance of lignite that can potentially be converted to heavy crude, and American oil refineries are fully capable of refining and upgrading such liquids into low-cost light fuels such as gasoline, diesel and chemicals, as well as pitches and cokes.</p> <p>\$25K in TIF funds will be used to develop objective experimental evidence that lignite coal can be successfully converted to low-cost heavy crude oil which could be further refined. The outcome will be data on cost, quality and feasibility of this direct liquefaction process and a final proposal for the Jewett Texas FutureGen bidding team.</p>
UT AUS	Algae Bio-Fuel Extraction Process	Hebner, Robert	<p>The UT Center for Electro Mechanics (CEM) has developed a breakthrough application for the extraction of lipids from algae, the highest potential source of biofuel with yields that are orders of magnitude higher than the best performing plant crops. The UT innovation is the first key enabling technology that can allow an algae-based biofuel to compete with crude production. This extraction technology has the potential to capture a significant share of the quickly emerging algae biofuels market.</p> <p>\$50K in TIF funds will be used to demonstrate the scaling up of the technology from batch to continuous processing, a key "market-readiness" milestone.</p>

UT AUS	Next Generation Photovoltaics	Holliday, B.J.; Jones, R.A.; Cowley, A.H.	<p>Dr. Holliday and his team at UT Austin have developed a novel method for seeding the growth of semiconductor nanoparticles into a conducting polymer matrix, enabling the creation of new photoconductive materials that can be used in solar cells and other electronic devices. This technology will enable thin film organic materials to operate as efficiently as poly-crystalline silicon devices, while substantially reducing the cost to manufacture solar cells.</p> <p>\$50K in TIF funds will be used to continue testing of these materials in a pilot scale system, further validating the technical capabilities of this new material.</p>
UT AUS/ UTHSCSA	Power Gen for Medical Devices	Chen, Shaochen	<p>UT Austin, UT Health Science Center San Antonio, and UT San Antonio research teams have built an innovative system to power medical devices. This medical breakthrough will be compatible with commercial devices already on the market, and it has the potential to virtually eliminate concerns around the eventual need to replace a medical device battery due to limited charge, including the multiple risks and medical costs. This discovery is likely to have a profound impact, given that the number of Americans who require medical devices in the targeted market segment is expected to double from 5 million to 10 million in the next five years as the “Baby Boomer” population ages.</p> <p>\$50K in TIF Funds will be used for prototype design, fabrication, and testing.</p>
UT AUS	Chem Production by Targetron Manipulation	Ellington, Andrew; Lambowitz, Alan	<p>Group II self-splicing introns (Targetrons) enable the disruption and modification of individual genes and on the development of different applications. metabolic pathways. The technology will be used to develop and improve industrial processes involving metabolism, such as the production of amino acids by fermentation. Its versatile and facile manipulation of many different bacterial genomes or production systems opens a broad range of commercial opportunities in the pharmaceutical and specialty chemical industries. The issued and pending patents claiming the Targetron technology are exclusively licensed to InGex, LLC by UT Austin and Ohio State University where Dr. Alan Lambowitz has served as the principal investigator. InGex, LLC plans to sublicense the technology to a number of spin-off companies based in Texas, with each company focusing on the development of different applications.</p> <p>\$10K in TIF Funds will help launch the first spin-off, Targetronics, to focus on improving the production of several amino acids that are important components of a multi-billion dollar market that is growing at 7% annually.</p>
<div style="border: 1px solid black; padding: 5px;"> <p><i>This project has not been funded; the PIs resubmitted a request to increase the award amount to \$50,000 in Round 3 and the request was not approved.</i></p> </div>			
UTMB	Smart IV Pump for Fluid Resuscitation	Kramer, George C.	<p>Researchers at the U T Medical Branch have invented a small, lightweight and low cost IV pump that precisely monitors and controls the amount of fluid released to a patient to ensure that errors in over-resuscitation do not occur. The “smart pump” has the potential to open a new market for emergency fluid therapy for pre-hospital care and in emergency departments.</p> <p>\$50K in TIF funds with UTMB matching funds will be used to develop and test a prototype pump, build on the PI’s partnerships with engineering and medical device expertise with Texas companies, and form a new start-up company.</p>

UTMB	Dry Powder Pulmonary Drug Delivery	Kraft, ER; Enkhbaatar, P. MD, Ph.D.	<p>Researchers at the UT Medical Branch have improved on the pulmonary drug delivery for the treatment of asthma, chronic obstructive pulmonary disorder (COPD), diabetes, cardiac arrest and toxic gas exposure. The technology converts dry powder drugs into an aerosol form, which improves drug dosage upper limits, drug clumping, and administration device size. Devices produced using this technology will be used to launch a line of products that deliver aerosol formulation for several drugs.</p> <p>\$50K in TIF Funds: This technology will be used as a platform for a UTMB start-up and upon the completion of a successful prototype, this technology will be leveraged by the start-up to develop joint ventures with drug delivery and pharmaceutical companies.</p>
UTEP	Rapid Manufacturing of Integrated Sys w/Embedded Elec Devices	Wicker, Ryan	<p>Researchers at UT El Paso use Layered Manufacturing (LM) to improve the manufacturing process for multi-material 3D electronic devices by adding integrated sensors, actuators, power sources and some wireless communication capabilities. This process can improve defense and space systems, sensors, printable displays, RFIDs, photovoltaics, computer memory, and consumer electronics such as cell phones, MP3 players, GPS devices, flash drives, etc.</p> <p>\$10K in TIF Funds will be used to further refine and test the product and apply for ETF funding of a start-up company.</p>
UTMDACC	<i>in situ</i> protein production using high-throughput micro-electroporation device	Cooper, Laurence J.N.	<p>Researchers at UT M. D. Anderson Cancer Center have developed a new therapeutic platform for widespread application of genetically manipulated cells. The target market focuses on rare diseases with high treatment costs. Combining bioengineering with cell and gene therapies allows the researcher to "deliver cells as drugs" and commercialize cell-based immunotherapeutics.</p> <p>\$25K in TIF funds will be used for consultant expenses for a new start-up company.</p>
UTMDACC	Final Pre-IND studies of ALIIS -- Pulmotect	Dickey, Burton	<p>Researchers at UT M. D. Anderson Cancer Center have developed a drug that stimulates the immune response and protects against specific infections. The Aerosolized Lung Innate Immune Stimulant (ALIIS) protects against pneumonia for patients whose immune systems are compromised and could be a significant defense against a bio-terror attack or epidemic.</p> <p>\$10K in TIF funds will be used to complete pre-clinical trials necessary to meet FDA requirements, and as a bridge grant to the TETF.</p>
UTSWMC	Integrated Patient Bed System	DiMaio, Michael	<p>Researchers at UT Southwestern Medical Center have developed an integrated patient bed system, or "Smart Bed" that will enable self-contained, fully portable products to provide maximum care, safety and comfort to severely injured or ill patients. Necessary services and therapeutic protocols are digitally administered according to physician instructions. Wireless communications and data management allow remote/virtual control and operation. The Smart Bed is expected to be well suited for use in hospitals, remote care and long term care market segments.</p> <p>\$25K in TIF funds will be used to prepare for the creation of a prototype system and seek venture funding for a start-up company.</p>

UTSWMC	Xanapath	Garner, Harold PhD	<p>Researchers at UT Southwestern Medical Center have developed a microscope based on hyper-spectral imaging that enables simultaneous testing for many cancer types, including breast, lung, and colon. It can lead to better diagnosis by testing multiple pathologies at once.</p> <p>\$10K in TIF funds will be used to develop a commercial-like prototype and diagnostic kit and demonstrate that the imaging system works for its first target disease market – pathological analysis of breast cancer. A business plan will also be completed for the start-up company, Xanapath.</p>
UTA	Prosthetic Skin	Çelik-Butler, Zeynep; Butler, Donald P.	<p>Researchers at UTA have developed prosthetic skin that can be used to improve the sense of touch in upper limb prosthetics while maintaining a compact size that does not interfere with precise motion control of the prosthetic limb. The invention would have a significant impact on the mobility and independence of consumers.</p> <p>The \$50K TIF grant will be used to design, build and field-test a prototype of prosthetic skin.</p>
UT AUS	Fibrillar Hyaluronic Acid Hydrogels as Engineered Skin Substitutes	Schmidt, Christine, Ph.D.	<p>The treatment of diabetic foot ulcers, chronic leg ulcers, and burns provide a market for engineered skin substitutes. A novel “crystal templating” technique has been invented to create a human skin substitute that also promotes the patient’s natural healing abilities. This is a platform technology for creating unique materials for a number of different applications such as tissue engineering, drug delivery, and membrane separation.</p> <p>The \$50K TIF grant will be used to manufacture a prototype of the engineered skin, test the adhesive and promote healthy skin regeneration over the skin substitute.</p>
UTEP	Novel Tyrosine Kinase Inhibitor for Prevention of Organ Transplant Rejection	Kirken, Robert	<p>There is a critical need for improved immunosuppressive treatments to effectively prevent the rejection of transplanted organs. Researchers at UTEP have discovered and developed a novel inhibitor for the prevention of organ or tissue rejection following transplantation. This unique therapeutic agent may also help reduce the minor side effects and toxicities that are associated with currently available drugs.</p> <p>The \$50K TIF grant will be used to manufacture and test the prototype treatment.</p>
UTSWMC	Vacuolar ATPase Inhibitor Palmerolide as a Novel Anticancer Agent	De Brabander, Jef K., MD	<p>Researchers at UTSWMC have developed a treatment for solid cancerous tumors that has less severe side-effects and is more effective than existing drugs. The drug treatment is particularly useful for cancers that are resistant to radiation and chemotherapy.</p> <p>\$50K in TIF funds will be used for preliminary preclinical evaluation of the drug therapy.</p>
UTHSCT	Single Chain Urokinase (scuPA) for Prevention of Pleural Loculation	Idell, Steven	<p>UTHSCT researchers have developed the first ever drug treatment for scarring that can occur around the lungs of children and adults as a result of pneumonia. This drug treatment would reduce the incidence of surgery that is currently the standard of care. As a result, this technology would reduce medical costs and the rate of illness that often develops after surgery.</p> <p>\$50K in TIF funds will be used toward the manufacture of the drug therapy needed for toxicology testing required prior to a Phase I/II clinical trial.</p>

UTA	Prototype Sensor Network w/Ultra Energy Efficiency for Long Term Monitoring Applications	Yonghe Liu	<p>UT Arlington researchers have developed a revolutionary wireless sensor system that can achieve 5-10 times higher energy efficiency than existing ones. The new technology directly addresses the long-term monitoring requirements for many applications, such as environmental and industrial monitoring, hazardous agent detection, telemedicine and agricultural monitoring.</p> <p>\$50K in TIF Funds will be used to develop and test the prototype and prepare a business plan for commercialization.</p>
UTA	Nanoporous Membrane Blood Oxygenator	Cheng-Jen Chuong; R.C. Eberhart	<p>Respiratory support devices that improve oxygen and carbon dioxide exchange assist patients awaiting lung transplantation and those suffering from chronic obstructive pulmonary disease. UT Arlington and UT Southwestern researchers have partnered to design a revolutionary oxygenator that mimics the features of the natural lung, made possible with nanotechnology fabrication technologies uniquely available at UT Arlington. The result is improved efficiency and a reduction of side effects of current respiratory support devices.</p> <p>\$50K in TIF Funds will be used to develop, test and refine the prototype oxygenator.</p>
UTAUS	Ultrafast Laser Scalpel with Imaging	Adela Ben-Yakar	<p>Researchers at UT Austin have developed a miniature medical device important for diagnostic imaging. This revolutionary device allows diagnosis and removal of small skin cancer lesions during a single out-patient procedure. The result is a substantial reduction in the number of patient visits and the amount of wait-time before diagnosis.</p> <p>\$50K in TIF Funds will be used to design, fabricate and refine the prototype technology to establish proof-of-concept.</p>
UTD	StoneMag: Kidney Stone Magnetic Retrieval System	Bruce Gnade, Jeffery Cadeddu, Margaret Pearle (Collab w/ UTSWMC)	<p>The StoneMag System is expected to enable, for the first time, a surgeon to effectively and rapidly retrieve all stone fragments from a kidney, significantly reducing operation time, treatment costs and the morbidity of stone recurrences.</p> <p>\$50K in TIF Funds will be used to further refine the technology.</p>
UTD	Optical motion tracker for MRI data alignment	Duncan MacFarlane	<p>UT Dallas researchers have developed technology that accounts for patient movement during Magnetic Resonance Imaging (MRI). Correcting for these movements improves the precision of images and resulting diagnoses.</p> <p>\$50K in TIF Funds will be used to define and construct a prototype for MRI patient motion tracking. The prototype will then be used to test the market for a start-up company to design and deliver useful accessories for MRI researchers.</p>
UTPA	Multi-Level Superfine Fiber Creation	Karen Lozano	<p>A simplified nanomanufacturing process and a prototype research scale device have been developed to enhance research production of a variety of nanofibers resulting in lower nanofiber costs, higher yield, and increased processing safety.</p> <p>\$50K in TIF Funds will be used to establish proof of concept, product reliability and testing, and business plan including market entry strategies and long term sustainability.</p>

UTMB	Needle-Electrode Anchor System	Gottumukkala S. Raju	<p>Researchers at UT Medical Branch have developed a novel device for performing tissue sutures in the colon. Specifically, the technology comprises an electrode-needle that facilitates cutting through thick tissue and delivers anchors through the tissue for performing an approximation. The device fits through the small channel of an endoscope. This technology overcomes the difficulty in closing resections in colon tissue and can be extended to use in other gastrointestinal tissues, following the removal of cancerous tumors. \$50K in TIF Funds will be used for a short and intense product development effort to achieve proof of concept for operability and safety.</p>
UTHSCSA	Fluidics Based Organ Preservation Device (FOPD)	Leonid Bunegin	<p>Researchers at the UT Health Science Center at San Antonio have firmly established proof of concept of a prototype technology that is used to transport organs between donor and transplant sites. The technology is useful in preserving all solid organs as well as soft tissues. The Fluidics Based Organ Preservation Device reduces costs for production and marketing and may improve transplant outcomes when compared to existing technology. \$49,893 in TIF Funds will be used to complete critical experiments necessary for FDA approval of the device, leading to serious investor interest.</p>
UTHSCH	Guide View: Personal Expert Assistant	M. Sriram Iyengar	<p>GuideView is a novel interactive software that helps users perform complex tasks easily and correctly use step-by-step instructions in a rich format containing text, audio, images, and video animation. It supports multiple languages and runs on various devices, such as cell phones, personal digital assistants, and personal computers. \$49,500 in TIF Funds will be used to produce and refine the first commercializable version of the technology from the current prototype.</p>