

THE UNIVERSITY of TENNESSEE

# UT RESEARCH FOUNDATION

**2013 Annual Report** Reporting information for the fiscal year of July 1, 2012 - June 30, 2013



# From The President



I am proud to present this report on success and activities of the University of Tennessee Research Foundation for fiscal year 2013.

It's been 24 months since I joined UTRF, and I want to express my appreciation for this opportunity to lead technology commercialization at UT. I am especially thankful to the UT Board of Trustees and all of our stakeholders, and I look forward to continued engagement with our community of researchers and innovators.

I also want to personally express my gratitude to Dr. Dick R. Gourley, who came out of retirement to serve as Interim President of UTRF from January 2012 to May 2013.

In June of 2011, the groundwork was put into place and a plan established to invigorate and re-establish the technology commercialization function at UT. In this plan, three major themes were outlined in order to move UTRF forward.

The first piece of this plan was to stabilize the organization. This included 1) hiring experienced management and additional licensing associates; 2) defining the right metrics for success; 3) developing partnerships for entrepreneurship; and 4) evaluating the budget in order to ensure we had the proper resources in places for success. I am happy to report that as of May of 2013, this phase of UTRF's strategic plan was completed.

Today, we operate with a total of 18 full time employees. Of these, seven employees are dedicated licensing associates charged with cradle-to-grave management of intellectual property disclosed to UTRF. We continue to build on our partnerships with the entrepreneurial resources across the state. From the Anderson Center for Entrepreneurship and Innovation in UT's College of Business, to Launch Tennessee, Life Science Tennessee, the TNInvestco's, regional accelerator networks and angel investor groups, UTRF is now considered a strong source of deal flow for these organizations. We have been resourced financially to continue our growth and feel confident in having adequate funding to meet our goals.

Growth is the next phase of UTRF's strategy. Through new initiatives such as the Tennessee Venture Challenge, the Drug Discovery Support Program, student internship programs in Knoxville and Memphis, and many other efforts, UTRF is energizing commercialization across the UT system. We are already seeing early results, such as record high numbers of invention disclosures and new licenses in 2013, following an all-time high in new startups in 2012.

Finally, UTRF is constantly seeking operational improvements to maximize our return on investment and to provide the best service possible to the faculty, students, and staff of the University of Tennessee. This starts with a metric-driven approach that allows us to continuously measure our progress against our peers and the top technology transfer organizations. We are also investing in improved IT tools that will allow UTRF's staff to operate more efficiently. For instance, we can now upload marketing abstracts to the web directly from our internal database, and compliance letters are

generated automatically for licensees owing UTRF payments and progress reports.

Other than personnel costs, the single biggest UTRF expense is devoted to obtaining patents, so maximizing each dollar of the patent budget is important to overall efficiency. In Knoxville, we are starting to draft provisional applications internally, and both offices have reduced their reliance on outside firms for handling some routine fees and payments. Between new efficiencies and an increased patent budget in 2014, I believe that UTRF is building a robust IP portfolio that will generate significant dividends in the future.

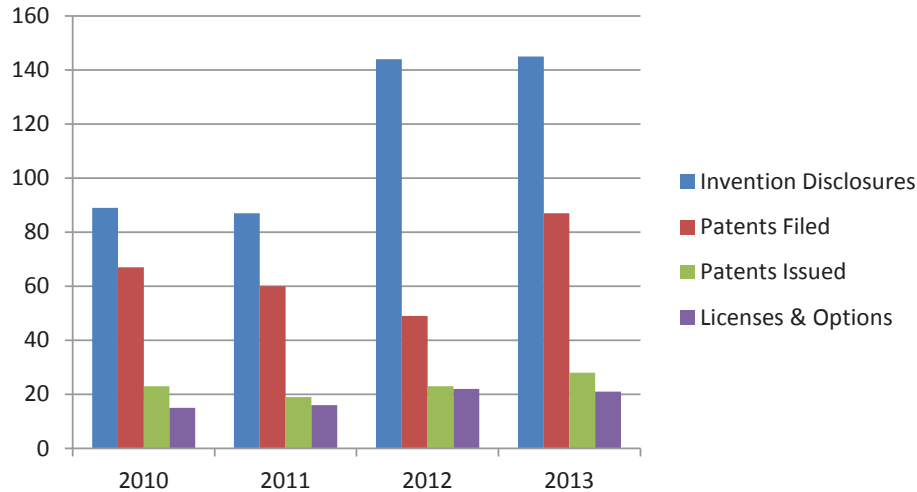
Why do we do this? To solve hard problems. It is the University's responsibility to create solutions for big problems in medicine, energy and environment, with the goal of bettering the human conditions for the residents of our state, the country and people around the world. But solving a problem without bringing that solution to the public is hardly better than not solving the problem at all. By working together with the support of a strong UTRF staff, accomplished researchers across the state, and UT leadership who understand the importance of technology commercialization, UTRF will bring more UT discoveries to market than ever before. In this annual report we have highlighted just a few of the amazing innovations that were born out of UT research, and I know that there are many more still to come.

Sincerely,

A handwritten signature in black ink, appearing to read "Dick Gourley". The signature is fluid and cursive, with a long, sweeping underline that extends to the right.

# By the Numbers

## Historical Performance



## FY 13 Financials

REVENUES	2012	2013
UT - UTRF Budget Allocation	\$ 1,856,452	\$ 2,095,148
Patent Recovery Costs	\$ 248,584	\$ 199,166
License & Royalties	\$ 1,159,110	\$ 788,607
Contractual Income & Interest	\$ 392,767	\$ 255,663
<b>Net Revenue</b>	<b>\$ 3,656,913</b>	<b>\$ 3,338,854</b>

EXPENSES	2012	2013
Personnel	\$ 1,155,593	\$ 1,443,708
Productivity/Operations	\$ 812,309	\$ 541,990
Protection	\$ 495,727	\$ 615,836
Royalty Distributions	\$ 650,198	\$ 419,879
<b>Expenses</b>	<b>\$ 3,113,827</b>	<b>\$ 3,021,413</b>

## FY 13 Performance

Campus	Inventions Disclosures	License/Options	Patents Filed	Patents Issued	Revenue	Startups Formed
Chattanooga	2	0	0	0	\$ -	0
Institute of Ag	40	8	18	3	\$ 274,552	0
Knoxville	68	9	27	12	\$ 345,931	3
Martin	2	0	0	0	\$ -	0
Memphis	28	3	37	12	\$ 383,545	1
Memphis - MDO	2	1	4	0	\$ -	0
UTSI	3	0	1	1	\$ -	0
	<b>145</b>	<b>21</b>	<b>87</b>	<b>28</b>	<b>\$ 1,004,028</b>	<b>4</b>

## Maturation Funding

Renukadevi Patil	Novel compounds to treat cancer
Monica Jablonski	Nanoparticles to provide extended release drug delivery in the eye for the treatment of glaucoma
Yu Liu	Portable hand rehabilitation device
Randall J. Nelson Tayebeh Pourmotabbed	Novel DNAzyme as a new therapy to treat cancer
Jun Lin	Natural feed products to enhance the productivity and sustainability of food animals without the use of antibiotic growth promoters
Karen Tobias	Novel mechanical device to quickly secure bandages, dressings, or pressure wraps over large wounds.
Bonnie Ownley Nicole Labbe Kimberley Gwinn Doris D'Souza, Naima Moustaid-Moussa	Higher-value added products created from biofuel production waste
Darren Baker	A rapid method to fabricate commercial-quality carbon nanofibers from biomass

## UTRF Subsidiary Companies



Cherokee Farm Development Corporation (CFDC) continues to actively identify and pursue companies for Cherokee Farm Innovation Campus. CFDC held its annual Board of Directors meeting in September and reviewed the latest prospect list. Cliff Hawks, President and CEO, informed the board that there are several companies expressing interest in the Innovation Campus, and they are now beginning to share space needs and timelines.

The board is currently considering opportunities with credit tenants that would allow for the second building project on the campus to begin.

Cherokee Farm Innovation Campus will be meeting with new prospects at the Society for the Advancement of Material and Process Engineering conference, October 21 - 24. Cherokee Farm will also have a presence at the Defense Manufacturing Conference in December as well as the CompositesWorld Conference to be hosted this year in Knoxville.



TennEra, LLC is the former Genera Energy LLC, with Genera Energy, Inc having spun out to pursue its bio-mass supply business while maintaining its name. TennEra remains a for-profit, wholly owned subsidiary of UTRF which will continue to serve as a commercialization vehicle for UT research related to bio-based technologies. TennEra's assets include the cellulosic ethanol biorefinery operated in partnership with DuPont Celulosic Ethanol, and the Biomass Innovation Park operated by Genera Energy, Inc, both located in Vonore, Tenn.

TennEra's business focus is on developing a front-end chemical process for the separation of non-food renewable energy crops, such as switchgrass, in order to create high purity streams of cellulose, sugars, and lignin. Once the streams are cleanly separated, TennEra's technology is then applied to developing marketable high-value opportunities for each of these components in various bio-based industries. Particularly important to TennEra's mission is the follow on development of lignin-based, lower cost carbon fiber and composite materials in order to maximize value from the lignin. The relative absence of value for the lignin, which comprises 20-25% of most crops, has been a long standing weakness in current biorefinery economic models. TennEra is collaborating with multiple University departments, including the Center for Renewable Carbon, the Department of Civil Engineering, and the UT Space Institute with plans to successfully leverage the research into the private sector as a single technology package.

## UTRF News & Events

### 5-1-13 UTHSC RESEARCHER EDWARD CHAUM FEATURED IN AUTM BETTER WORLD REPORT

Pressing public health problems rarely have easy and affordable solutions. In the case of diabetic retinopathy — a complication of diabetes mellitus that can lead to blindness — a myriad factors, from too many patients and too few health care providers to the cost and accessibility of routine care, keep millions of diabetics from getting an annual eye exam to screen for the disease.

### 1-11-13 UTRF INTERNS LEARN VALUABLE SKILLS WHILE AIDING TECHNOLOGY TRANSFER AT UT

Law students CeCe Ging and Stephanie Prager are enhancing their education at UT Knoxville by being part of the discovery process. They have spent a year learning about and helping in technology transfer as interns at the UT Research Foundation.

### 1-8-13 LAUNCH TENNESSEE NAMES ENTREPRENEUR AND INVESTOR CHARLIE BROCK AS PRESIDENT AND CEO

Launch Tennessee, a public-private partnership focused on supporting the creation and development of high-growth companies in Tennessee, announced Charlie Brock as the organization's new President and Chief Executive Officer and Stuart McWhorter as the organization's new Vice-Chair.

### 12-17-12 UT HEALTH SCIENCE CENTER RESEARCHERS RECOGNIZED AT ANNUAL INNOVATION AWARDS

The University of Tennessee Research Foundation honored UT Health Science Center researchers Friday for their work in developing or commercializing novel compounds, treatments, medical devices and research tools that have the potential to transform the lives of people in Tennessee and throughout the world.

# UTRF News & Events

## 11-28-12 UT RESEARCH FOUNDATION AWARDS MATURATION FUNDING FOR EIGHT INVENTIONS

The UT Research Foundation is awarding \$120,000 to eight teams of inventors. Each team receives \$15,000 to further develop their technology.

## 10-12-12 UTRF HOSTED "OPEN HOUSE" FOR GRADUATE SCHOOL OF MEDICINE

Patrick Reynolds, Ph.D, a licensing associate with UTRF, will be available one day each month to answer questions related to IP, patenting, and other research issues.

## 9-18-12 FALL ENTREPRENEURIAL WORKSHOP SERIES BEGINS 9/20

The University of Tennessee Research Foundation, in partnership with the Anderson Center for Entrepreneurship and Innovation, is hosting an entrepreneurial workshop series focusing on legal and business information and the skill sets needed to launch and grow successful technology-based companies.

## 9-11-12 UT RECEIVES NSF AWARD TO COMMERCIALIZE DISCOVERY

Jimmy Mays at UT will receive \$600,000 over two years from the National Science Foundation through its "Partnerships for Innovation" program to commercialize and optimize Mays' newfound "superelastomers." This is UT's first NSF award focused on commercialization of research, and it is the Anderson Center's first NSF award.

## 8-30-12 UT RESEARCH FOUNDATION HELPS FACULTY START BUSINESSES

Over the last fiscal year the University of Tennessee Research Foundation has helped establish nine startup companies based on technology developed by university faculty. The number of startups is double the previous year and an indication that the program is meeting its goal of promoting and commercializing technology licensed from across the UT system.

## OPHTHALMOLOGISTS DEPLOY SYSTEM TO HELP THOUSANDS OF LOW-INCOME PATIENTS GET SCREENED FOR DIABETES

Dr. Edward Chaum, the University of Tennessee Health Science Center's Plough Foundation Professor of Ophthalmology, is one of about 25,000 ophthalmologists in the United States. That number pales in comparison to the more than 25 million diabetics in the United States - a number that is growing rapidly and is expected to exceed 100 million within a few decades. Each diabetic patient should be screened annually for signs of retinopathy, an eye disease that Chaum can effectively treat if caught early. However, far too many diabetic patients never make it into his office before their vision loss is irreversible.

It might seem like the answer is to simply train more ophthalmologists, but inspired by technology he saw during a trip to the Oak Ridge National Laboratory, Chaum is promoting a different vision. First, creating a solution that takes the screening to the patients instead of forcing more diabetics into ophthalmologists' offices. Second, making that solution affordable through technology.

Using a combination of federal and private grants, he and his ORNL collaborator, Ken Tobin Jr., Ph.D, developed the initial prototypes of a system that utilized off-the-shelf cameras and custom software to capture and characterize images of patients' retinas. A significant milestone came in 2007 when the Plough Foundation of Memphis and the Delta Health Alliance worked with Chaum and Tobin to fund the deployment of 11 cameras for real-world testing. To date, thousands of low-income patients have been screened, both validating the screening platform and improving the health of the vulnerable patient population. After years of refine-



**HubbleTelemedical**  
Real-Time Retinal Analysis

ment, the current system is one that can be deployed into nearly any medical environment (primary care office, walk-in clinic, even mobile health units), providing an accurate diagnoses in just a few minutes.

Chaum and Tobin had been working with UTRF and the technology transfer office at ORNL throughout the project, but after the initial camera deployments showed clinical success, they decided that they wanted to be the ones to lead the commercialization of the new technology. Thus, a new company, Hubble Telemedical, was founded and the inventors set off on a journey of entrepreneurship.

Hubble has attracted venture funding from MB Venture Partners in Memphis, hired experienced CEO Chuck Witkowski, built an experienced board of directors, launched commercial operations in multiple states, and screened thousands of patients. The company also recently received a Phase II SBIR award from the U.S. Department of Agriculture to develop additional informatics-based methods to improve the management of diabetics in rural health disparity communities.

Armed with a scalable, effective health care delivery model, Hubble is improving patient outcomes by allowing specialty eye exams in convenient, non-specialty settings. The company expects to continue its rapid growth in the US and is eyeing international opportunities for its platform.



## UTRF STARTUP QUIRE PIVOTS, CLOSES VENTURE ROUND

Quire is a Memphis-based startup that began as a collaboration between UT Health Science Center Associate Professor Ramin Homayouni, Ph.D. (Homayouni is now at the University of Memphis), UT Knoxville (UTK) Professor Mike Berry, Ph.D, and UTK graduate student Kevin Heinrich, Ph.D. Quire's business model is centered around a unique software that enables healthcare providers to use unstructured text in electronic medical record (EMR) systems to proactively manage patients at both the individual and population levels. Quire-enabled decisions give providers the information needed to direct resources to those patients that face the greatest health risks and are most likely to end up in the emergency room or admitted to the hospital.

In recent years in the United States, moving medical records from paper files to electronic databases was heralded as a means of helping doctors improve diagnosis and treatment, increase patient safety, and control healthcare costs. Although much progress has been made, doctors and hospitals have also realized that achieving these goals is far more challenging than anyone initially understood.

One challenge is that EMRs, while excellent tools for capturing transactions and providing information to the providers at the point of care, are ill-equipped to support the outcomes-based reimbursement models currently dominating the conversation about how healthcare is paid for in the U.S. Success with outcomes-based payment models requires providers to take a proactive approach to managing their patient populations. To do so means utilizing all the data in the EMR, not just the diagnosis and billing codes that invariably present an incomplete picture of a patient. The "real story" about the patients - the nuances of health - are captured in the unstructured text found in doctors' notes.

At the individual level, Quire's software allows a doctor to utilize all of the available medical record data to truly understand a patient's condition. At the population level, Quire's software can identify the highest-risk individuals from a group of patients, allowing for cost-effective preventative health measures to be taken. Importantly, Quire's software integrates seamlessly into existing EMR platforms, leveraging the EMR investments that doctors and hospitals have already made.



The past year has been one of stupendous growth and progress for Quire, led by CEO Brad Silver. The company established pilot programs with several medical practices and hospitals, hired Dr. Joe Ketcherside, former chief medical information officer at Methodist Le Bonheur Healthcare, and recently completed its A-round venture funding.

"As healthcare providers transform their organizations to outcomes-based care models, Quire's capabilities are viewed as essential to fully understanding the risks and opportunities existing in the patient population. Quire is truly in the right place at the right time," said Silver.

## UTRF ROLLS OUT DRUG DISCOVERY SUPPORT PROGRAM

When developing a new drug, researchers begin by identifying a novel biologically active chemical compound. However, in order for a new compound to function as a drug, the compound needs to be more than just biologically active. The array of chemical characteristics that determine the suitability of a new chemical for pharmaceutical development are called "drugability".

Pharmaceutical companies have recognized that many drug failures are due to these unwanted properties rather than as a result of poor biological efficacy. Consequently, scientists at pharmaceutical companies are now utilizing drugability assays early in the drug dis-

covery process to reduce the time and money spent on compounds having undesirable drugability characteristics.

When UTRF markets a new drug candidate, we are effectively selling the notion that our compound is better than what a company currently has or those offered by other universities. But if the competition has data showing good drugability on their compound while UTRF has no such data, our marketing efforts will not be effective.

As a result, UTRF has recently rolled out the UTRF Drug Discovery Support Program. The goal of the program is to add commercial

value to UT technologies by acquiring early stage drugability data on biologically active compounds, thereby lowering the risk for potential licensees and increasing the probability that a compound identified at UT will be further developed. UT researchers can nominate novel biologically active compounds that have been identified in their laboratories for the program. Utilizing contract research organizations, UT Research Foundation will have select compounds tested in a variety of drugability assays at no cost to the researcher. The Drug Discovery Support Program will provide UT researchers and potential licensees with valuable data.

# About UTRF

UTRF provides services to the University of Tennessee, helping it fulfill its mission to become a national leader in research, discovery and innovation.

The mission of UTRF is to encourage innovation, enhance research, and facilitate economic development by commercializing intellectual property created from within the University of Tennessee system.

UTRF's strategic intent is to increase our revenue and assets; enhance the research enterprise at the University of Tennessee; and be a driver of economic development in the State of Tennessee.

## Strategic Goals

1. Be a recognized leader in technology commercialization and technology-based economic growth.
2. Build trust and confidence in the technology commercialization system and achieve a high level of satisfaction for services and outcomes.
3. Achieve sustainable financial success and a return on deployed public and private resources by creating value.
4. Reach and sustain excellence in technology commercialization, continuous improvements and the highest level of performance in technology management practices, startup company business development and research park recruitment and incubation services.
5. Enhance and support research and instruction; expand educational opportunities for undergraduate, graduate, professional students and faculty to experience and participate in the technology commercialization and entrepreneurial processes.

## How Royalties Are Divided

Income from licensing UTRF inventions is distributed to the following groups according to the University of Tennessee policy:

- First \$5,000 of gross income is paid to the inventors
- 40% of net income paid to the inventors
- 30% to UTRF
- 15% to inventor's department
- 15% to inventor's campus

## UTRF Staff

David Washburn, MBA, CLP	President & CEO
Richard Magid, Ph.D	Vice President
Maha Krishnamurthy, Ph.D, MBA	Licensing Associate
Lakita Cavin, J.D., Ph.D	Licensing Associate
Nghia Chiem, Ph.D	Licensing Associate
Janet Rablowsky, Ph.D	Licensing Associate
Patrick Reynolds, Ph.D	Licensing Associate
Mary Ann Warwick Russell, J.D.	Senior Staff Attorney
Jarret Abramson, MS, J.D.	Senior Staff Attorney
Samantha Jeffers	Director of Accounting
Teresa Cooper	Accounting Assistant
Jeanie Snider	Senior Admin Coordinator
Cynthia Brown	Senior Admin Coordinator
Kimberly Hood	Marketing Manager
Susan McCue	Patent Coordinator
Pamela Howell	Business Incubator Coordinator

## Board of Directors

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- » **George Cates**, Director CEO (Retired), Mid-America Apartments
- » **Taylor Eighmy, Ph.D**, Director Vice Chancellor of Research and Engagement, UTK
- » **Murray Deal, Director** (Chair) Executive Vice President, Eastman Chemical Company
- » **David Washburn, MBA, CLP**, Director President & CEO, UTRF
- » **Don Stansberry Jr., J.D.**, Of Counsel, Stansberry, Petroff, Marcum & Blakely
- » **Frank Kinser**
- » **James Roberto, Ph.D.**, Director Associate Lab Director, Science and Technology Partnerships at Oak Ridge National Laboratory
- » **Karl Schledwitz**, Director Chairman & CEO, Monogram Food Solutions
- » **Leslie Wisner-Lynch**, Director Co-Founder, BioTN Foundation

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