

# ADVANCING INNOVATION AND ENTREPRENEURSHIP

THE UNIVERSITY OF TOLEDO  
**ANNUAL REPORT ON TECHNOLOGY TRANSFER**  
Fiscal Year 2011

# TECHNOLOGY TRANSFER



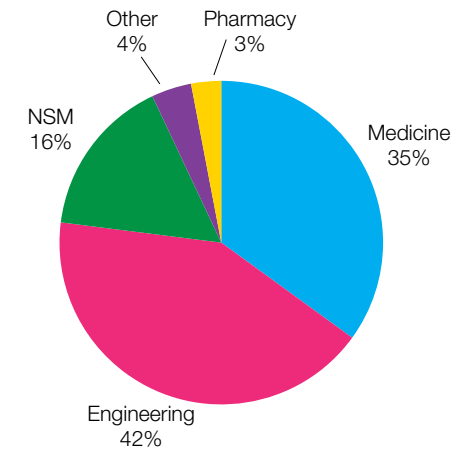
**The University of Toledo technology transfer group is committed to developing and fostering relationships with industry to transfer UT discoveries and innovations to the marketplace. The tech transfer team works with faculty, staff and students when they develop a platform technology that can serve as the basis of a successful university spin-off business. In addition, the team is available to assist faculty, staff and students with:**

- Completion and submission of invention disclosure forms
- Assessment of commercial potential of intellectual property
- Confidentiality agreements
- Material transfer agreements
- Industry sponsored research agreements
- Inter-institutional agreements
- Memoranda of understanding
- Protection of intellectual property
- Marketing intellectual property
- Licensing intellectual property

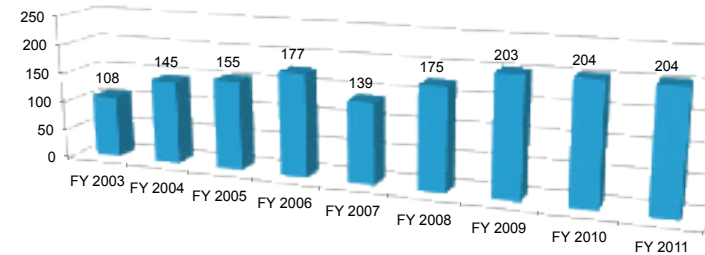
We are pleased to report that UT's technology transfer group had one of its best years in FY 2011 and continues to be nationally ranked in key performance criteria. The University entered into 16 new license agreements. UT also licensed intellectual property to two new start-up businesses. Based upon national data among peer institutions with up to \$125 million in research expenditures (UT's \$66M +/- 100%), UT ranks in the top 10 in the number of new invention disclosures, licenses yielding income, number of licenses executed, and number of start-ups. Last year, the University collected \$1.2M in licensing revenues and now has over \$5.5M in equity. Notable is that UT's 13 start-up businesses have shared in excess of \$85M in venture funding and have created more than 100 new positions. Currently, UT has 167 issued patents and 450 pending patents.

The technology transfer group is playing a critical role in UT's exciting new "Lab-to-Launch" initiative, a program which partners with the Regional Growth Partnership and UT's Innovation Enterprises (IE) to accelerate the transfer of basic research into the marketplace. By integrating and coordinating with the RGP, IE, and Rocket Ventures, Ltd., we have created a system and process that identifies, enables and sustains promising high-tech businesses that will diversify and enhance regional economic development with the purposeful intent to bring acclaim and recognition to our faculty, students and the institution. The Lab-to-Launch system strengthens and reaffirms The University of Toledo's goal and commitment to improve the human condition.

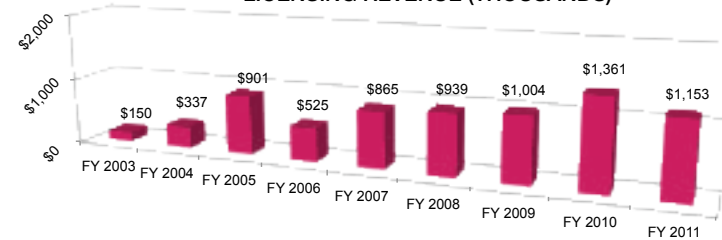
INVENTION DISLOSURES BY COLLEGE



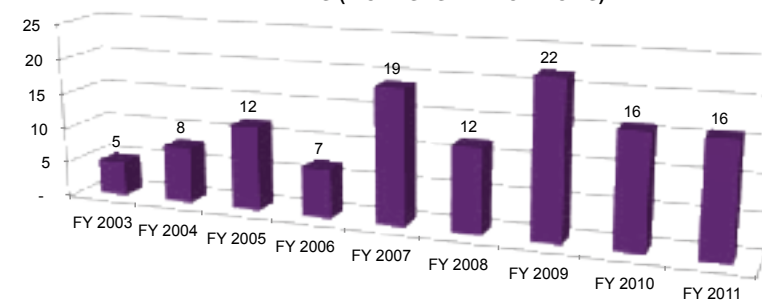
INDUSTRY SPONSORED RESEARCH, MATERIAL TRANSFER AND CONFIDENTIALITY AGREEMENTS



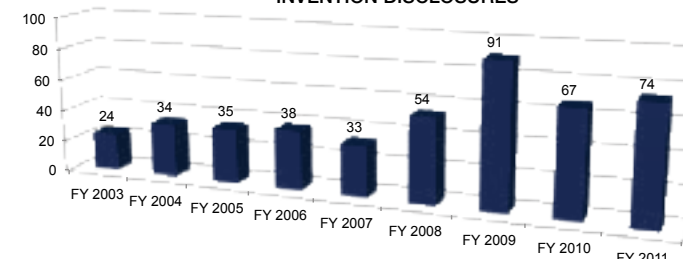
LICENSING REVENUE (THOUSANDS)



DEALS (LICENSES AND OPTIONS)



INVENTION DISLOSURES



## Inventors



The University would like to recognize the following inventors' contributions in promoting the progress of science through designation as an inventor on one or more patent grants. Names in **gold** are inventors who contributed to patents that were issued in fiscal year 2011.

**Mamoun Alhamadsheh**

Richard Andaloro  
 Donald Angelbeck  
 Bernard Arulanandam  
 Ragheb Assaly  
 Bradley AusterMiller  
 Kenneth Bachmann  
 James Baril  
 Gloria Borgstahl  
 Michael Brattain  
 Renee Buchanan  
 Jeffrey Burnham  
 James Byers  
 Brent Cameron  
 Yang Cao  
 Keming Chen  
 Xia Chen

**Jiqi Cheng**

Garry Cole  
 Alvin Compaan  
 Erin Crawford  
 Julian Davies  
 Robert Deck  
 Laurent Deloux  
 Jeffery DeMuth

**Xunming Deng**

David Dick  
 John Dignam  
 Philip Dunbar  
 Graham Durant  
 Sylvain Dutremez  
 Paul Erhardt  
 Ervin Faulmann  
 Ronald Fournier  
 Peter Fraleigh  
 James Fry  
 Kuan-Chen Fu  
 James Gano  
 Greta Garbo  
 Dean Giolando  
 Vijay Goel

Peter Goldblatt  
 Stephen Goldman  
 Bing Gong  
 Anne Graves  
 Akhlesh Gupta

Jiwan Gupta  
 George Hageage  
 James Hampton  
 Gregory Haselhuhn  
 Judy Hendricks  
 James Horner  
 Wayne Hoss  
 Richard Hudson  
 Chiung-Yu Hung  
 James Huttner  
 Clara Jackson  
 John Jaegly  
 Douglas Jambard-Sweet  
 Jerzy Jankun  
 Ralph Jansen  
 Victor Karpov  
 Stamatios Kartalopoulos

**Peter Kascak**

Rick Keck  
 Amin Khan  
 Roger King  
 Jon Kirchoff  
 Thoe Kirkland III  
 Rita Klein  
 Wieslaw Klis  
 Charles Knight  
 Steven Kramer  
 Kenneth Kropp  
 Frederick Kurtz  
 Harold Lee  
 Aklilu Lemma  
 Marc Levine  
 Xianbo Liao  
 Jeffrey Lovelace

**Jian-Yu Lu**

Edward Lumsdaine  
 Xianda Ma  
 Konstantin Makhrtatchev  
 Maurice Manning  
 William Messer Jr.  
 Dennis Metzger  
 Alan Morgan  
 Naser Mostaghel  
 Durgesh Nadkarni  
 Ganapathy Naganathan  
 Terry Ng

Babatunde Ojo  
 Danny Pincivero  
 Henry Povolny  
 Kent Price  
 Demetrios Raftopoulos  
 Walajapet Rajeswaran  
 Glenn Reimer  
 William Roll  
 Yann Roussillon  
 Sairam Rudrabhatla  
 Jeffrey Sabin  
 Murray Saffran  
 Jeffrey Sarver  
 Connie Schall  
 Padmanabhan Sekher  
 Steven Selman  
 Kalpathi Seshan

**Joseph Shapiro**

Diana Shvydka  
 Henry Simon  
 Dimitris Skalkos  
 Ewa Skrzypczak-Jankun  
 James Slama  
 Clifford Smith  
 Edward Snell  
 Morris Srebnik  
 Sujatha Srinivasan  
 Thomas Stuart  
 Verner Swanson  
 Sridhar Thirupathi

**Liyanaaratchinge Tillekeratne**

James Trempe  
 Stefan Uhlenbrock  
 Sasidhar Varanasi  
 Yu Wang  
 David Weaver  
 James Willey

**Liwei Xu**

Jianmin Xue  
 Qicheng Yang  
 Zhong Ye  
 Jieh-Juen Yu  
 Quilin Yu  
 Bin Zheng  
 Donald Zrudsky

## Start-up Activity

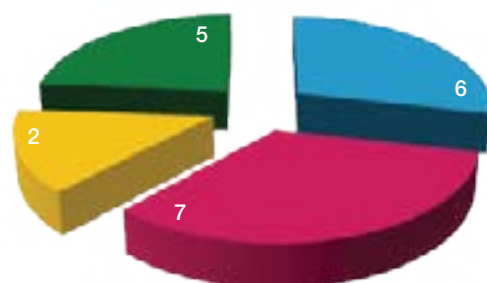
The University has initiated a “Lab-to-Launch” system to encourage and enable faculty start-up businesses, which can contribute to UT’s regional economic development. With the assistance of The University of Toledo Innovation Enterprises (IE) and other University and regional economic development organizations, principally the Regional Growth Partnership and Rocket Ventures, Ltd. (RV) a system to recognize, assist and fund technologies with high commercialization potential has evolved. The tech transfer group works closely with faculty inventors to consult about opportunities that offer economic development potential and, with IE, provides proof-of-concept funding. After the company is created, the RV provides start-up and enhanced business management consulting and funding. If the business opportunity qualifies, both the RV and IE can provide additional funding up to a combined total of \$1.25M. The process is tightly coordinated and orchestrated to move the highest potential business opportunities from the lab bench to a commercial launch as quickly and efficiently as possible.

### New Ventures

**AccuGenomics, LLC** provides gene expression tests that accurately diagnose, monitor and direct cancer treatment. Its technologies generate comprehensive test results, ensuring confidence in clinical decisions.

**Excellent Energy Solutions** is developing a flywheel that may be used for distributed or centralized energy management. Recent enabling technological advances under joint development by ExEnSo, NASA and UT will be combined into this proprietary flywheel energy storage system.

CUMULATIVE START-UPS BY COLLEGE



■ Medicine  
 ■ Engineering  
 ■ Pharmacy  
 ■ NSM

### Schneider and Morse Group – April 2001

#### Roy Schnieder and Dennis Morse

A company focused on developing computer-based educational tools for animal anatomy and dissection.

### Mithridion – January 2002

#### Wayne Hoss and Bill Messer

Emerging biotech company focused on the discovery and commercialization of treatments for neurological and psychiatric diseases

### The Turning Point, LLC – June 2005

#### Vijay Goel, Danny Pincivero, John Jaegly and David Dick

Manufacturing and marketing company that produces state-of-the-art golf exercise and therapeutic devices

### Xunlight Corp. – January 2006

#### Xunming Deng

Manufacturing and marketing company that develops low-cost, thin-film, silicon-based photovoltaic products and manufacturing equipment for high-throughput production of flexible and lightweight photovoltaic modules

### Spinal Designs – May 2006

#### Ashok Biyani

Marketing firm that provides products and services to orthopaedic surgeons

### Freedom Meditech – December 2006

#### Brent Cameron

Developmental stage medical device company focused on non-invasive blood glucose testing for diabetics

### SuGanit Systems – March 2007

#### Sasidhar Varanasi, Connie Schall, Jared Anderson, Patricia Relue and Glen Lipscomb

Start-up company involved in research and development of renewable and clean energy with a focus in ethanol production from biomass

### ADS Biotechnology, Ltd. – January 2008

#### Joseph Shapiro, David Dignam and Ragheb Asslay

Developing a revolutionary approach for treating threatening clinical conditions. ADS Biotechnology’s primary product, pegylated albumin, is a therapeutic, colloid-type blood volume expander agent that is superior to human serum albumin.

### Xunlight Solar-26 – December 2008

#### AI Compaan

Start-up company developing CdTe thin-film photovoltaics on polyimide substrates

### Green Energy Systems by Total Compliance – February 2009

#### Abdul-Majeed Azad

Start-up company dedicated to commercializing technology for removing carbon monoxide, organic compounds and unburned hydrocarbons from the stream of combustion devices and/or spray booths

### Acense, LLC – April 2009

#### Abdul-Majeed Azad

Start-up company involved in developing and testing sensors focused on early fault warning for oil-immersed electrical equipment

### Gamma Spine, Inc. – March 2010

#### Vijay Goel

Through mathematical testing, Gamma Spine has developed a posterior lumbar disk replacement with a novel design. Once inserted during surgery, the device can be contracted and expanded, allowing surgery to be completed with less risk for “spinal nerve root” damage.

## Invention Disclosures

### College of Medicine and Life Sciences

#### Anesthesiology

##### Ali Hassan

H Tube

Emboli Holder Catheter

X-ray protection suit

##### Ali Hassan, Antonio Chiricolo

UT tube

#### Biochemistry and Cancer Biology

##### Stephan Patrick

XPF-ERCC1: A therapeutic target for cancer treatment

High-throughput screen for inhibitors of the XPF-ERCC1 complex

##### Maria Anna J. Westerink, Deepak Malhotra,

##### Christopher J. Cooper

Immunoneutralization of cardiotoxic steroids in chronic renal failure

##### Maria Anna J. Westerink

Fluorescent labeling & B cell phenotyping pneumococcal polysaccharide specific B cells

##### William Maltese, Jean H. Overmeyer,

##### Michael W. Robinson

Drug-like molecules that induce methuosis

##### William Maltese

A hyaluronan complex for delivery of MOMIPP to human cells

#### Family Medicine

##### Murthy Gokula

Anti-biofilm urinary catheter

#### Medical Microbiology and Immunology

##### Akira Takashima, Hironori Matsushima, Shuo Geng

Gr-DC, a hybrid leukocyte population exhibiting dual phenotype and functionality of both granulocytes and dendritic cells

#### Neurosciences

##### Joshua Park

Repurposing of the atypical antidepressant, Tianeptine, as a novel drug for neuroblastoma

Gats-based intervention of Alzheimer’s Disease and amyotrophic lateral sclerosis

#### Medicine

##### Michael Haarstad, Steve Bohinc

Novel mechanisms for protein protection in pathologies mediated by free intracellular iron

##### Joseph I. Shapiro

Gene therapy with heme oxygenase 1 for obesity

Immunoneutralization of cardiotoxic steroids in chronic renal failure

##### Khew-Voon Chin

A portable system for detection of food adulteration

##### Christopher J. Cooper

Minimally invasive thrombectomy device

##### Angela Johnson, Juan Montoya, Kavita Shah

American Association of Medical Students in Clinical Service Education

##### Kristopher R. Brickman, Angela Johnson,

##### Juan Montoya

Scribe Program

#### Orthopaedic Surgery

##### Ashok Biyani

Expandable corpectomy device

#### Pathology

##### Kenneth Hensley

Repurposing of the atypical antidepressant, Tianeptine, as a novel drug for neuroblastoma

Gats-based intervention of Alzheimer’s Disease and amyotrophic lateral sclerosis

#### Physiology and Pharmacology

##### Zi-Jian Xie

Immunoneutralization of cardiotoxic steroids in chronic renal failure

CFP-cav-1

##### Sonia M. Najjar

Liver-specific inactivation of Ceacam1 (LSACC1) transgenic mouse

Liver-specific Ceacam1 rescue mouse (Cc1-/-xliver+)

Global Ceacam2 knock-out mouse

##### Nader Abraham, Luca Vanella, Komal Sodhi

Gene therapy with heme oxygenase 1 for obesity

##### Guillermo Vazquez

Kidney specific TRPC3 knockout mouse

#### Radiation Oncology

##### Ishmael Parsai, Nicholas Sperling

Software package for using a spiral phantom to do IMRT QA

### College of Engineering

#### BioEngineering

##### Vijay Goel

SMA expandable/collapsible intervertebral cage Automated spine testing system

##### Vijay Goel, David Dick

Core muscle strengthening

##### Darcy Wagner

Synthesis of calcium phosphate nanowhiskers

##### Vijay Goel, Huan Zhou

Deposition of bone-like apatite coating on PEEK implants

##### Huan Zhou

Deposition of PLA/PLGA - CaP coating loaded with drug/protein/gene via electrospraying for bone tissue regeneration

Fabrication of net shaped implants via electrospraying

Deposition of PLA/PLGA - CaP coating via electrospraying for implant application

PLA powders production from PLA pellets

A low temperature and versatile synthesis process to produce yttrium phosphate using sacrificing calcium phosphate complex template

##### Matt Harris

An alternative method for applying stress to collagen gel constructs

##### Sabrina DiFilippo, Amanda Szalkowski

Cervical dilation measurement device

#### Chemical and Environmental Engineering

##### Glenn Lipscomb

Thermal energy conversion to electricity

##### Dong-Shik Kim

Gats-based intervention of Alzheimer’s Disease and amyotrophic lateral sclerosis

Anti-biofilm urinary catheter

##### Sasidhar Varanasi, Balakrishna Maddi,

##### Sridhar Viamajala

Thermal fractionation of biomass of non-lignocellulosic origin for multiple high-quality biofuels

##### Abdul-Majeed Azad, Robert H. Kinner

Solid-state sensor for acetylene gas in transformer oil (addendum)

Energy harvesting device

#### Civil Engineering

##### Youngwoo Seo

Anti-biofilm urinary catheter

#### Electrical Engineering and Computer Science

##### Rashmi Jha, Branden Long,

##### Jorhan Ordosgiotti

Nanoelectronic memristor device with dilute magnetic semiconductors and related fabrication

##### Aaron Bloomfield

Battery core heater

##### Krishna Shenai, Krushal Shah

Smart DC micro-grid for efficient utilization of distributed renewable energy

##### Christopher Schissler, Dominic Armenio,

##### Johnnie Bush, Garland Parker

Disabled enabler

##### Devinder Kaur, Praneeth Nelapati

A novel signals of opportunity (SOP) System with two mobile receivers

#### Engineering Technology

##### Ryan Riesterer, Corey S. Miller, Kurtis Staup,

##### Nicholas Harvey

Gas tank guillotine

#### Mechanical, Industrial and Manufacturing Engineering

##### James Hogg, Kevin Cygan, Shaun Schnipke

Hydraulic anti-pursuit device

##### Mohammad Elahinia, Cory Chapman

SMA expandable/collapsible intervertebral cage

##### Mohammad Elahinia, Andrew Puffer

Minimally invasive thrombectomy device

##### Mohammad Elahinia, Jason Walker

Ankle-foot orthosis that utilizes a shape memory alloy torsional actuator for correcting foot drop

##### Clint Damman, Andy Stechschulte, Curt Rieman,

##### Benjamin Botjer

Truck bed winch

##### Kory Johnson, David Knoll, William Sparks,

##### Keith Church, Bradley Ehle

Electrically powered bottle jack to raise and support heavy applications

# Contacts

**Michael Schueller, Brian Jeffries, Jeff Krohn, Matt Marquis**

Adjustable safety rail assembly

**Sarit Bhaduri**

Synthesis of calcium phosphate nanowhiskers

Deposition of bone-like apatite coating on PEEK implants

Deposition of PLA/PLGA - CaP coating loaded with drug/protein/gene via electrospraying for bone tissue regeneration

Fabrication of net shaped implants via electrospraying

Deposition of PLA/PLGA - CaP coating via electrospraying for implant application

PLA powders production from PLA pellets

A low temperature and versatile synthesis process to produce yttrium phosphate using sacrificing calcium phosphate complex template

**Jacob Heath**

Radial supported airless tire

**Ralph Pawlik**

Force limiting device

**Ben Ebihara**

Methods for superconducting wire insulation, coil winding and shaping, and coil pack assembly

**College of Natural Sciences and Mathematics****Biology****Emily Potter**

Interactive fast food service evaluator

**Chemistry****Ronald Viola**

Enzyme replacement therapy for the treatment of canavan disease

**Donald Ronning**

E. coli plasmid DNA that produces the recombinant MTA/SAH nucleosidase from Helicobacter pylori

**Donald R. Ronning, James Franco**

Repurposing Zafirlukast for treating mycobacterial infections

Assay to identify inhibitors of mycobacterial encoded Lsr2 proteins and DNA complexation

**Mathematics****Henry C. Wente**

Exotic capillary tubes

**Physics and Astronomy****Xunming Deng**

Hybrid chemical vapor deposition process combining hot-wire cvd and plasma-enhanced cvd

Photovoltaic device design

**Qi Hua Fan, Xunming Deng, Guofu Hou, Changyong Chen**

Graded p-layer for thin film silicon based solar cells

**Victor Karpov, Marco Nardone**

Electric field induced nucleation: alternative pathways to metallic hydrogen

**Anthony Vasko, Randall J. Ellingson, Michael Heben**

Grid contact structure for solar cell modules to screen shunts

**Henry J. Simon**

Fabry perot laser cavity improvement

**College of Pharmacy and Pharmaceutical Sciences Pharmacology****William S. Messer**

Muscarinic agonists as enhancers of working memory and cognitive flexibility

**Medicinal and Biological Chemistry****Paul W. Erhardt, Rahul S. Khupse, Amarjit Luniwal**

Process for preparing isoflavene analogs by using an intramolecular wittig reaction

**Center for Drug Design and Development****Paul W. Erhardt**

Drug-like molecules that induce methuosis

**Other****Facilities and Construction****Charles I. Lehnert**

Inline conical induction fan

**Michael Green**

Energy savings fume hood airflow reduction

**UT Learning Collaborative****Angela Paprocki, Annette Howard,****Richard Suttles, Andrew Gates, Forrest Glensy, Saketh Bharadwaja**

Assistive/Adaptive Virtual Lab

**Information Technology****Aaron Flynn, Joshua Spencer**

Assistive/Adaptive Virtual Lab

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**Sandra Rhoades**

IP Administrator  
Phone: 419.530.6224  
E-mail: sandy.rhoades@utoledo.edu

**The mission of UT Technology Transfer is to:**

1. Provide accessible, responsive, competent, timely and professional patenting and licensing services to UT, its faculty and staff.
2. Serve as an efficient and effective conduit for the licensing of promising UT technologies to industry to promote their entry into the commercial marketplace to:
  - Attract and retain the highest quality faculty and students
  - Increase and expand UT's research enterprise
  - Create and reinforce commercial relationships
  - Generate institutional acclaim and recognition
  - Provide an additional revenue stream
3. Support and encourage local economic development by licensing locally to start-up companies, by favoring licenses to faculty start-up companies, and by encouraging and supporting faculty start-up activities.
4. Serve as a resource for information about patents and licensing and to encourage recognition that such matters have become meaningful and valuable aspects of academic life and education.
5. Encourage greater integration and increased sponsored research activity between academia and industry to improve the flow of innovative university technologies to the public marketplace.