



ADVANCING INNOVATION AND ENTREPRENEURSHIP

THE UNIVERSITY OF TOLEDO
OFFICE OF RESEARCH AND INNOVATION
ANNUAL REPORT ON TECHNOLOGY TRANSFER
Fiscal Year 2010

TECHNOLOGY TRANSFER



Technology Transfer is the process of transferring discoveries and innovations resulting from university research to the commercial sector and forming and successfully developing university spin-off businesses.

We are pleased to present this report on the University's Technology Transfer efforts and progress in FY2010. Faculty, staff and student participation continued to build on the momentum that began with the merger in FY2006. This report details some of the highlights from FY2010 that would not have occurred without strong support from the University's faculty, staff and student body.

We are very proud to report a 36 percent increase in licensing revenue. The UT community continued to submit a significantly higher number of invention disclosures per \$10M in research expenditures in comparison to national averages. Additionally, the number of new license agreements per \$10M of research expenditures was significantly higher than national averages.

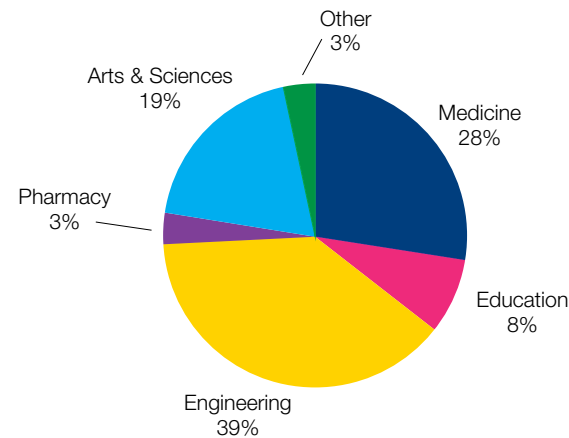
According to The Association of University Technology Managers, one start-up venture should result from every \$100M in research expenditures. This year, the University's technology contributed to the formation of two new ventures. The University now has 18 active spin-off businesses that have generated in excess of \$80M in follow-on funding and have created 135-plus local technology positions.

Building on its success as reported by Innovation Associates in 2008, when it was documented that UT was ranking sixth nationally in licensing and seventh in creating start-up businesses, when research expenditures were normalized, new FY2009 data from The Association of University Technology Managers show continuing success and improvements. Among universities with up to \$125M in research expenditures (UT's \$66M plus 100%), The University of Toledo ranked:

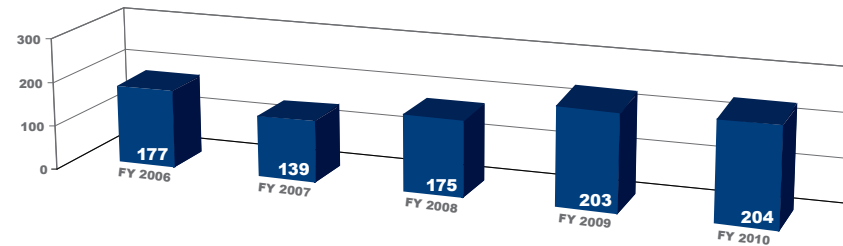
- Third in the number of invention disclosures
- Third in the number of licenses and options yielding income
- Fourth in the number of licenses and options executed
- Fourth (tied) in the number of start-up companies formed
- Seventh in the number of new patents filed
- 14th in gross income received

We look forward to continuing to work closely with the faculty, staff and students on innovative and entrepreneurial ideas. We believe that the faculty's continued participation will increase the University's statewide and national profile as an innovation system that produces new discoveries, products and/or services that will benefit the citizens of the state of Ohio and the nation.

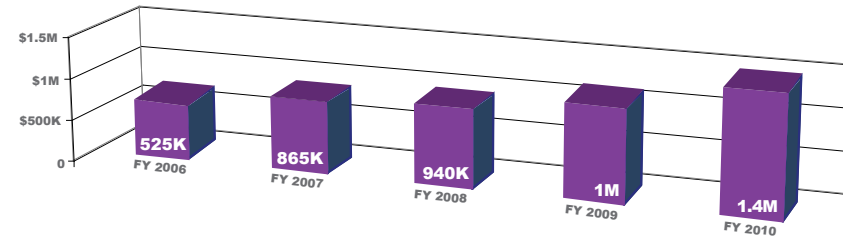
INVENTION DISLOSURES BY COLLEGE



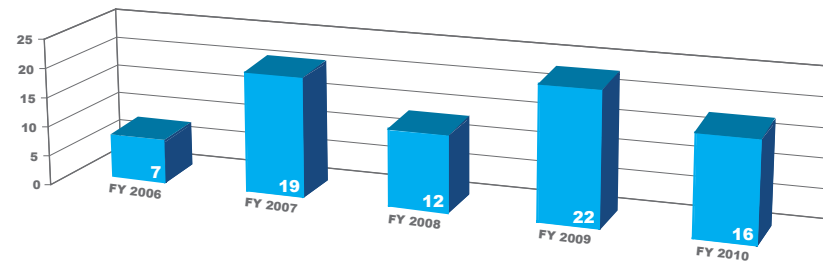
INDUSTRY SPONSORED RESEARCH, MATERIAL TRANSFER AND CONFIDENTIALITY AGREEMENTS



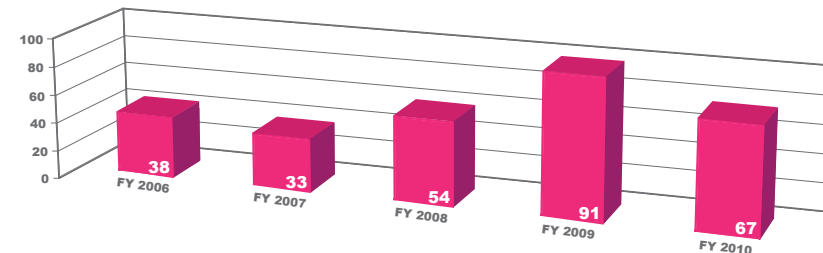
LICENSING REVENUE



DEALS (LICENSES AND OPTIONS)



INVENTION DISLOSURES



Inventors

The University would like to recognize the following University inventors' contributions in promoting the progress of science through designation as an inventor on one or more patent grants. Names in **red** are new additions to the list for fiscal year 2010.

- | | | |
|----------------------|-------------------------|-------------------------------|
| Richard Andaloro | George Hageage | Danny Pincivero |
| Donald Angelbeck | James Hampton | Henry Povolny |
| Bernard Arulanandam | Gregory Haselhuhn | Kent Price |
| Ragheb Assaly | Judy Hendricks | Demetrios Raftopoulos |
| Bradley Austermiller | James Horner | Walajapet Rajeswaran |
| Kenneth Bachmann | Wayne Hoss | Glenn Reimer |
| James Baril | Richard Hudson | William Roll |
| Gloria Borgstahl | Chiung-Yu Hung | Yann Roussillon |
| Michael Brattain | James Huttner | Sairam Rudrabhatla |
| Renee Buchanan | Clara Jackson | Jeffrey Sabin |
| Jeffrey Burnham | John Jaegly | Murray Saffran |
| James Byers | Douglas Jambard-Sweet | Jeffrey Sarver |
| Brent Cameron | Jerzy Jankun | Connie Schall |
| Yang Cao | Ralph Jansen | Padmanabhan Sekher |
| Keming Chen | Victor Karpov | Steven Selman |
| Xia Chen | Stamatios Kartalopoulos | Kalpathi Seshan |
| Garry Cole | Peter Kascak | Joseph Shapiro |
| Alvin Compaan | Rick Keck | Diana Shvydka |
| Erin Crawford | Amin Khan | Henry Simon |
| Julian Davies | Roger King | Dimitris Skalkos |
| Robert Deck | Jon Kirchhoff | Ewa Skrzypczak-Jankun |
| Laurent Deloux | Thoe Kirkland III | James Slama |
| Jeffery DeMuth | Rita Klein | Clifford Smith |
| Xunming Deng | Wieslaw Klis | Edward Snell |
| David Dick | Charles Knight | Morris Srebnik |
| John Dignam | Steven Kramer | Sujatha Srinivasan |
| Philip Dunbar | Kenneth Kropp | Thomas Stuart |
| Graham Durant | Frederick Kurtz | Verner Swanson |
| Sylvain Dutremez | Harold Lee | Sridhar Thirupathi |
| Paul Erhardt | Akliu Lemma | Liyanaaratchinge Tillekeratne |
| Ervin Faulmann | Marc Levine | James Trempe |
| Ronald Fournier | Xianbo Liao | Stefan Uhlenbrock |
| Peter Fraleigh | Jeffrey Lovelace | Sasidhar Varanasi |
| James Fry | Edward Lumsdaine | Yu Wang |
| Kuan-Chen Fu | Xianda Ma | David Weaver |
| James Gano | Konstantin Makhrtchev | James Willey |
| Greta Garbo | Maurice Manning | Jianmin Xue |
| Dean Giolando | William Messer Jr. | Qicheng Yang |
| Vijay Goel | Dennis Metzger | Zhong Ye |
| Peter Goldblatt | Alan Morgan | Jieh-Juen Yu |
| Stephen Goldman | Naser Mostaghel | Quilin Yu |
| Bing Gong | Durgesh Nadkarni | Bin Zheng |
| Anne Graves | Ganapathy Naganathan | Donald Zrudsky |
| Akhlesh Gupta | Terry Ng | |
| Jiwan Gupta | Babatunde Ojo | |

Start-up Activity

The University has initiated a “Lab-to-Launch” system to encourage and enable faculty start-up businesses, which can contribute to regional economic development. With the assistance of Innovation Enterprises (IE) and other University and regional economic development organizations, principally the Regional Growth Partnership and Rocket Ventures (RGP), a system to recognize, assist and fund technologies with high commercialization potential has evolved. The Tech Transfer group works closely with the faculty inventors to consult with opportunities that offer economic development potential and, with IE, provides proof-of-concept funding. Later as the company is created, the RGP provides start-up and enhanced business management consulting and funding. If the business opportunity qualifies, both the RGP 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

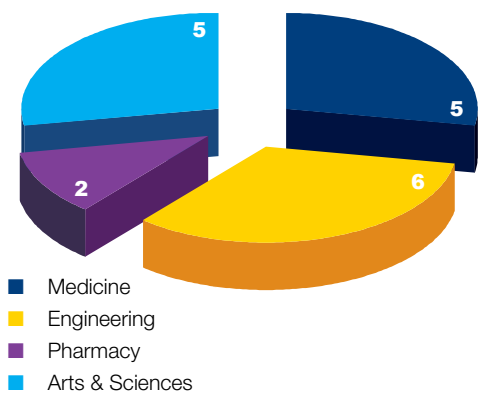


NuMe Health is a biotechnology company focused on medical foods for the special dietary requirements associated with major chronic diseases including cancer, obesity and diabetes. The lead product will address the special nutritional requirements for breast cancer patients, particularly the growing population of breast survivors.



Gamma Spine is creating a posterior lumbar disk replacement with a novel design. Through mathematical testing, the company has created a device that can be contracted and expanded during surgery so there is less risk for spinal nerve root damage.

CUMULATIVE START-UPS BY COLLEGE



Gene Express Jim Willey June 1998

A genomics biotech company providing gene assays to assist pharmaceutical and biotech companies with drug development and expression analysis.

Schneider & Morse Group Roy Schneider and Dennis Morse April 2001

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

Mithridion Wayne Hoss and Bill Messer January 2002

An emerging biotech company focused on the discovery and commercialization of treatments for neurological and psychiatric diseases.

Innovative Thin Films, Ltd. Dean Giolando March 2004

A company focused on providing thin-film solutions to problems associated with the photovoltaic industry such as scratching, soiling and reflection.

Hi-Genomics Stephen Goldman and Sairam Rudrabhatla April 2004

A virtual company with technologies in tissue culture and genetic transformation that couple high output, rapid, genotype independent regeneration to high-frequency DNA transfer using either agrobacterium or biolistic transformation.

The Turning Point Vijay Goel, Danny Pincivero, John Jaegly and David Dick June 2005

A manufacturing and marketing firm that produces a state-of-the-art golf exercise and therapeutic device.

Xunlight Xunming Deng January 2006

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

Spinal Designs Ashok Biyani May 2006

A marketing firm that provides products and services to orthopedic surgeons.

Freedom Meditech Brent Cameron December 2006

A developmental stage medical device company focused on the non-invasive blood glucose testing for diabetics.

Suganit Systems Sasidhar Varanasi, Connie Schall, Jared Anderson and Patricia Relue March 2007

A start-up company involved in the research and development of renewable and clean energy with a focus on ethanol production from biomass.

ADS Biotechnology, Joseph Shapiro, David Dignam and Ragheb Assaly January 2008

Revolutionary approach for the treatment of threatening clinical conditions. The company's primary product, pegylated albumin, is a therapeutic colloid-type blood volume expander agent that is superior to human serum albumin.

Esclapeus Biopharmaceuticals KV Chin May 2008

Start-up focused on developing a small molecule intervention for obesity, one of the most serious public health risks in the U.S. and worldwide.

Innovative Water Technologies Dean Giolando May 2008

The company is developing a flash evaporation spray technology for the purification and/or desalination of water.

Xunlight Solar-26 Al Compaan December 2008

A start-up developing CdTe thin-film photovoltaics on polyimide substrates.

Green Systems by Total Compliance Abdul-Majeed Azad February 2009

Start-up planning to commercialize technology for the removal of carbon monoxide, organic compounds and unburned hydrocarbons from the stream of combustion devices and/or spray booths.

Acense, LLC Abdul-Majeed Azad April 2009

Start-up company that is developing gas sensor technology.

Invention Disclosures

Defne Apul, Gene Miller

- Inexpensive sampler for road runoff collection

Sarit Bhaduri, Joseph G. Lawrence, Ahmed H. Touny, Andrew D. Jones

- PLA halloysite nanocomposite fibers for implant applications

Sarit Bhaduri, Joseph G. Lawrence, Ahmed H. Touny

- Biodegradable PLA halloysite nanocomposites for storage applications

Terry P. Bigioni

- Bicontinuous absorber layers for nanoparticle solar cells

Ashok Biyani, Brian Blessinger, Phillip Blessinger, Nathan Blessinger

- Incisionless adjustable length orthopaedic device

Ashok Biyani

- Vertebral needle for cement injection

Ashok Biyani

- Additional embodiments of modified pedicle screw tip for one step percutaneous insertion

Catherine L. Buchanan

- Method to evaluate plants and soils to optimize conditions for phytoremediation

Brent D. Cameron, Anthony Webb

- Iris-based noninvasive ocular glucose sensor

Eileen M. Carr

- UThink

Khew-Voon Chin

- Ionophore antibiotic derivative with anti-adipogenic potential for obesity treatment

Raja Chowdhury

- Arsenic transforming microorganism that uses Fe+3, So4/As as an electron acceptor

Alvin D. Compaan, Victor V. Plotnikov

- CdS back buffer layer for ultra-thin CdTe solar cells

Charlene M. Czerniak, Gregory Stone

- Mobile Assessment, Analysis and Remediation System (MAARS)

Constantine K. Demetropoulos, Michael J. Wiater

- Novel glenoid component design

Constantine K. Demetropoulos, Craig R. Morgan

- Load sensing cervical distraction device

Constantine K. Demetropoulos, Theodore J. Fisher

- Application of novel lighting technique to surgical instrumentation

Constantine K. Demetropoulos

- Pure moment testing system

Isabel Escobar, Tilak Gullinkala

- A green engineering method of modifying ultrafiltration membranes for fouling prevention using enzymes for free radical development

Qi Hua Fan, Xianbo Liao, Yang Cao, Guofu Hou, Xunming Deng

- Methods to make back reflectors for high performance and high yield thin-film solar cells

Florian C. Feucht

- Personal identification icon

Kyle Gehle, Chad Varner, Timothy Woodward, Jordan Bonczek, Anthony Merritt

- One man hook-up

Vijay Goel, David Kirschman

- Semicrystalline polymer surgical implant utilizing selective amorphous flexural zones

Henry E. Heffner

- Novel improvement to the Auditory Brainstem Response (ABR) audiometry for estimating behavioral pure-tone thresholds

Mohammed Hefzy, Mehdi Pourazady, Nungester Marc, Kevin Brasher, Derek Hetrick

- Two-piece detachable wheel

Kenneth Hensley

- Composition and use of glutathione-lanthonine (gLan) for neurodisease

Kenneth Hensley

- Novel compound and treatment of Alzheimer's disease

Terry D. Hinds, Craig R. Ryerson

- Primerfinder.com

Terry D. Hinds

- Protein phosphatase 5 as a fulcrum of lipolysis and lipogenesis

Duane 'Ray' Hixon

- Method and system for the efficient calculation of unsteady processes on arbitrary space-time domains

Jerzy Jankun, Ewa Skrzypczak-Jankun

- Theaflavin digallate inactivates plasminogen activator inhibitor (PAI-1)

Christopher Kaiser, John Mills

- Non-hard wired trailer lights

Virginia Keil, Noela Houghton, William Weber

- Electronic Assessment System (Project EAS)

Kevin Kucera, Brian Szabo, Bobbi J. Vaughan, Brock Clagg, Sherry J. Andrews, Eric Eitniear

- Enhanced Search Power (ESP)

Ashok Kumar, Kaushik K. Shandilya

- CatchCAN: A device to capture particulate matter from an engine exhaust

Douglas Leaman, Boren Lin

- ZNF33 knockout mouse

Calvin Li

- Proton exchange membrane fuel cells with porous interdigitated cathode flow channels

Calvin Li

- Micconano modulated porous structure nucleate boiling

Yun-Ming Lin

- A new process for producing optically pure beta-lactones from aldehydes

Yun-Ming Lin

- Modified procedure for the synthesis of stereochemically well-defined bifunctional catalysts

Yun-Ming Lin

- Co(III)-derived LA*-LB* Bifunctional catalysts with unique chemical compositions

Glenn Lipscomb, Sasidhar Varanasi

- Liquid recovery and purification in biomass pretreatment processes

Xiangxin Liu, Alvin D. Compaan, Naba Raj Paudel

- Fabrication of a light diffusion layer in thin-film solar cells

Edith Mensah-Osman

- Menin - new central player in metabolic and energy homeostasis

Biao Brian Ou

- Curvature function in the computer recognition of handwriting

Jason Owens

- Three channel pulse controller and solid-state relay

Ishmale Parsai, Mohammad Elahinia

- Nitinol organ positioner to prevent damage to healthy tissue during radiation oncology applications

Casey Pirnstill, Michael Brow, Brad Guthrie, Michael Schmidt

- Superior Helmet Attenuating Gel (S.H.A.G.) Liner

Contacts

Matthew Pollzzie, Clinton Sanders, Eric Schroeder, Amanda Eacareno

- Decompress for less (Home lumbar traction system)

Brent D. Rapp, Brian D. Metzger, Lisa M. Majewski, Matthew S. Dusseau, Daniel A. Gust, Brady Vallade

- The trench bench

Jonathan Rios

- Electronic medical record

Youssef Sari

- Methods of inhibiting alcoholism and alcohol dependence

Adam Schlachter, Alex Fitzthum, Lauraen Brett, Kristen Attard,

Preety Dev

- Liquid Knight

Rebecca Schneider, Virginia Keil, Noela Haughton

- Scaffolded electronic learning and educational community of teachers (Project SELECT)

Roy Schneider

- Digital stethoscope

Gursel Serpen

- Wireless computing networks for massively parallel and distributed real-time computing

James T. Slama

- APD-HPD, a potent and specific inhibitor of poly (ADP-ribose) glycohydrolase

Stanslaw M. Stepkowski, Whenhao Chen, Yoshihiro Miyahara

- Generation of large number of stable CD4+CD25+Foxp3+ regulatory T cells

Steven Sucheck, Rommel Talan

- Method and composition for forming difficult peptides and peptide conjugates

Akira Takashima, Masaaki Miyazawa

- An invitro assay for detection of contact allergens by measuring reactive oxygen production

Sasidhar Varanasi, Patricia A. Relue, Li Bin

- New strategies based on aldose-ketose transformation for separation and/or chemical conversion of C6 and C5 sugars from lignocellulosic biomass hydrolyzate

Kristopher Wieland, Xiangxin Liu

- Nanodipole solar cell

James C. Willey, Lindsey Pierce, Erin Crawford, Carol Stepien

- Improved diagnostic test for viral hemorrhagic septicemia (VHS)

Zi-Jian Xie, Shuyi Si, Zhongbing Zhang, Joseph I. Shapiro

- Identification of a new class of Na/K-ATPase ligands

Zi-Jian Xie, Zhichuan Li

- Na/K-ATPase a1 as a prognostic, diagnostic marker and therapeutic target for cancers

Zi-Jian Xie, Yiliang Chen, Haojie Wang

- The cholesterol-interacting motif within the N-terminus of Na/K-ATPase a1 subunit as a target or potential therapeutic intervention of cholesterol-associated metabolic disorders

Zi-Jian Xie, Zhichuan Li, Qiqi Ye

- The peptide derived from the second cytosolic domain of Na/K-ATPase a1 subunit as a potential cardiotonic steroid (CTS) antagonist



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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.