



# 2011

Technology Transfer Impact  
UNIVERSITY OF MICHIGAN

# tech transfer impact

We take pride in reporting on our activities and performance for this past fiscal year.

In Fiscal Year 2011 (FY11), we recorded 322 new inventions, representing a continuing stream of high-quality discoveries from our talented researchers. We completed 101 new agreements with businesses, marking the first time our agreements have exceeded the “century mark.” We assisted in the creation of 11 new high-potential start-up ventures, leveraging the expertise and resources of our Venture Center. We also launched our Venture Accelerator, co-located with our offices at the North Campus Research Complex (NCRC). The Venture Accelerator offers promising U-M start-ups state-of-the-art lab and office space with convenient access to Venture Center funding, talent and connections. Our licensing revenues for FY11 totaled \$15.6 million, enabling further investments in research and commercialization activities.

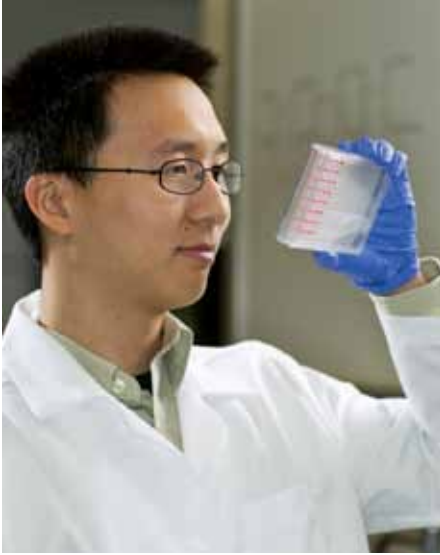
This report describes the impact of tech transfer with stories that illustrate the University’s contributions to our economic vitality and quality of life. We’re proud of our role in using the technology, talent and resources of this great University to benefit the people in our community, our state and beyond.



Executive Director | U-M Tech Transfer



The executive team of U-M Tech Transfer (from left): Rick Brandon, Doug Hockstad, Rich Chylla, Ken Nisbet, Robin Rasor, Jim O’Connell



"Innovation and entrepreneurship are essential to our regional and national economies. With \$1.24 billion in annual research, the University is playing a leadership role in technology transfer and engagement with our business and venture partners."

—Stephen R. Forrest | U-M Vice President for Research



## U-M Tech Transfer

about | U-M Tech Transfer consists of professionals who, working with U-M researchers, provide technology assessment, protection and marketing to license technologies to commercial partners. Our team includes the staff of our Venture Center: business formation professionals who accelerate promising start-up venture ideas. We also have legal advisers, marketing professionals and administrative resources to enhance our capabilities and engagement with our business and venture partners.

### why do tech transfer?

- + To increase the likelihood that new discoveries will provide tangible benefits to the general public.
- + To help create a venue that attracts, develops and retains the very best students, faculty and researchers.
- + To improve the flow of research dollars and resources to the academic community.
- + To enrich the educational experience through student internship programs and other hands-on learning activities.
- + To leverage business partnerships to stimulate regional and national economic development.
- + To enhance the reputation and stature of the University.

# performance

- + An invention every day
- + Two agreements per week
- + A new start-up launched every five weeks

## 2011 START-UP CLASS

**Ambiq Micro**  
ultra-low-power microprocessors

**Ascentage Pharma Group**  
therapeutics targeting breast cancer

**CAMLA**  
joint venture with Cambridge University  
for English language assessment

**ChemXlerate**  
tools to identify crystalline forms of  
active pharmaceutical ingredients

**CSquared Innovations**  
advanced battery cathode  
manufacturing technology

**EFSolutions**  
static electrical field measurement device

**Fusion Coolant**  
replacement for machining cutting  
fluid with CO<sub>2</sub> emulsion

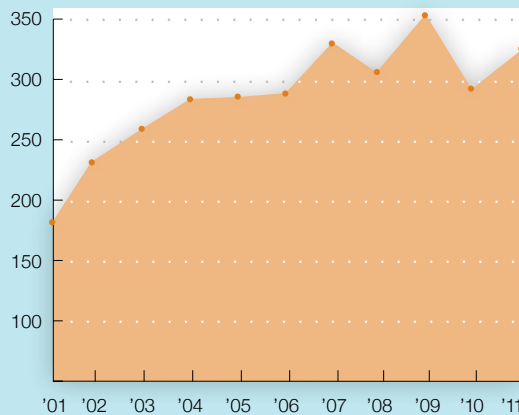
**JBR Pharma**  
selective threonine/serine kinase inhibitors

**Life Magnetics**  
rapid cell culturing using magnetic spheres

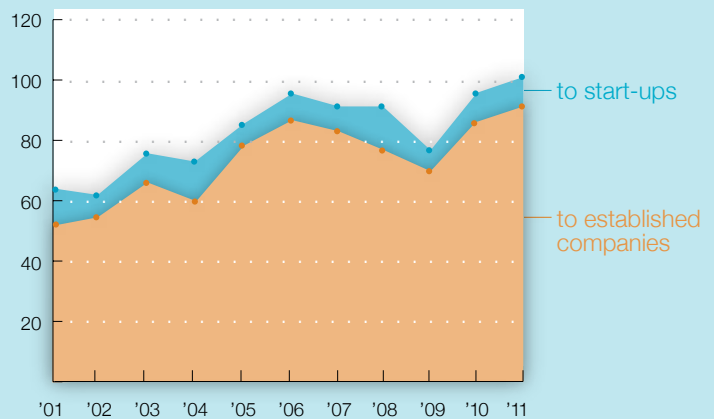
**Nymirum**  
RNA screening drug research tool

**Photolitec**  
photosensitizing compounds used  
in photodynamic cancer therapy

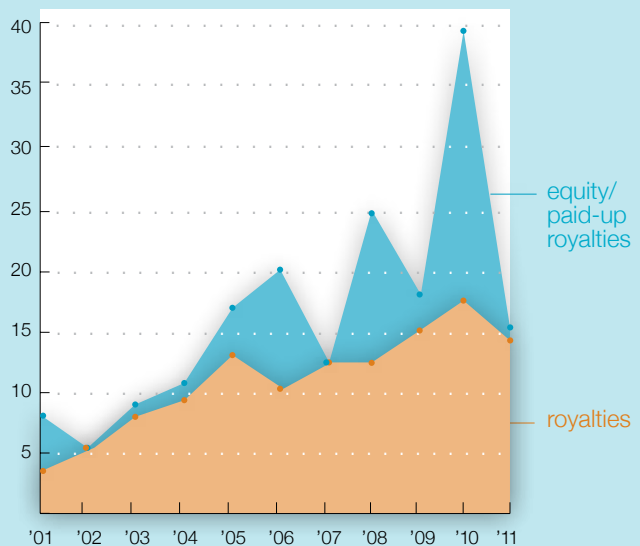
INVENTION REPORTS FY11=322



LICENSE AGREEMENTS FY11=101



LICENSE REVENUE (in millions) FY11=\$15.6M



# market impact



POWERED BY  
MICHIGAN TECHNOLOGY

For information on emerging market opportunities, see “Available Technologies” at [techtransfer.umich.edu](http://techtransfer.umich.edu) or call us at 734.763.0614.

University of Michigan technology continues to have a substantial impact in the marketplace, generating benefits from research discoveries for the University, our community and society. Some examples of U-M technologies making an impact include:

## Nasal Spray Flu Vaccine

The FluMist® nasal spray flu vaccine produced by MedImmune has had over 40 million “needle-free” doses administered to date, providing effective protection for those seeking an alternative to the traditional flu shot.

## Protecting Vital Data Networks

Arbor Networks is a leader in network monitoring and security solutions, protecting businesses and institutions from security threats and disruptions to their vital data networks.

## Better Health Decisions

HealthMedia, a J&J company, assists over one million people annually to make better health decisions through digital health coaching products and services, lowering health care costs and improving our quality of life.

## Bladeless LASIK Surgery

The Intralase™ FS laser technology from Abbott Medical Optics is an integral component of “Bladeless” LASIK eye surgery, a procedure administered to more than one million people annually.

## Enhanced Anti-Wrinkle Lotion®

Amway’s ARTISTRY® anti-wrinkle firming serum uses a patented U-M technology that reduces the side effects of retinol for minimizing the appearance of wrinkles.

## Enhanced Prostate Cancer Screening

Gen-Probe is developing diagnostic tests licensed from U-M that identify specific genetic translocations that promise to provide a more effective screening for prostate cancer, the leading type of cancer in men in the United States.

## Gaucher Disease Therapy

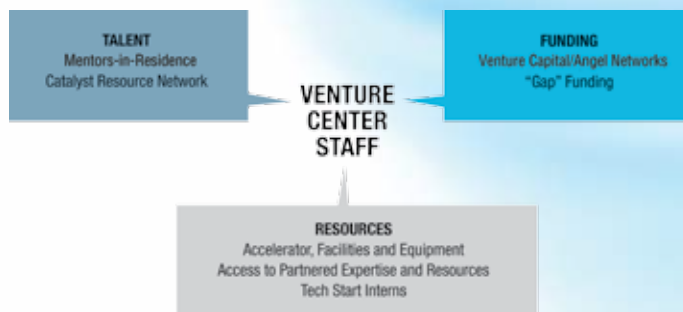
Genzyme Corporation is developing an oral therapy for Gaucher disease based on a compound developed and licensed from the University. Gaucher disease is a rare genetic disorder that occurs in 1 out of 50,000 live births.





## connecting entrepreneurs and venture partners to U-M start-up opportunities

THE U-M VENTURE CENTER acts as the one-stop “hub” for entrepreneurs and venture firms interested in new U-M start-up opportunities. The Venture Center uses a core staff of venture creation specialists, teaming with other licensing, marketing and legal specialists from U-M Tech Transfer, to help create high-growth start-ups based on U-M technology. The Venture Center uses additional talent, funding and resources to develop technology opportunities with the potential to be attractive venture investments and drive the economic vitality of our region.



**Catalyst Resource Network** Talent resources are identified with the use of Catalyst, a networking tool to engage and classify individuals. Catalyst also makes use of our extensive alumni connections and relationships.

The Mentors-in-Residence (MiR) program employs seasoned entrepreneurs who are “embedded” within U-M Tech Transfer for one-year rotations to provide assistance with business plan assessment, project planning and venture creation. MiR specialists offer hands-on business formation assistance, providing connections and guidance to emerging U-M start-ups.

**Funding** Given the challenges inherent in early-stage research-based ventures, the Venture Center addresses the key commercialization issues impacting market success with the use of internal U-M Tech Transfer “gap” funds, matched with MIIE state funds, and translational research and pre-seed awards from university, community and state partners.



2011 Mentors-in-Residence

Laura Schrader, CEO of the U-M three-dimensional cell culture start-up 3D Biomatrix with Jim O'Connell (at left), director of the Venture Center, and Jack Ball, Venture Center Mentor-in-Residence in the start-up's lab space in the Venture Accelerator.



**The Venture Accelerator** One of the newest resources of the Venture Center is the Venture Accelerator. Launched in January 2011, the Venture Accelerator offers world-class lab and office space for later stage U-M start-up projects adjacent to the talent and business services of the Venture Center. The space includes 16,000 square feet of lab and office facilities and equipment located on U-M's NCRC campus.

Using the Venture Center process, U-M Tech Transfer has averaged 10 start-up ventures annually, within the top ten of all universities, with a focus on creating venture quality investment opportunities. U-M start-ups have benefited from investments from premiere regional and national venture firms, with over \$900 million invested in the last 10 years. Several have been acquired by world-class industry leaders such as Johnson & Johnson, Becton Dickinson, Medtronic and Danaher Corporation, enhancing their growth and contributing to the entrepreneurial community of Michigan.



Ribbon cutting at the launch of the Venture Accelerator. Shown from left to right are College of Engineering Dean David Munson, Medical School Dean James Wooliscroft, NCRC Executive Director David Canter, VP and General Counsel Suellyn Scarnecchia, Executive VP for Medical Affairs Ora Pescovitz, U-M President Mary Sue Coleman, VP for Research Stephen Forrest, Provost Phil Hanlon and Executive Director U-M Tech Transfer Ken Nisbet.

# making a material difference in coatings

CSQUARED INNOVATIONS, LLC

Pravansu Mohanty  
Professor of Mechanical  
Engineering, University of  
Michigan-Dearborn



In 2009, U-M Dearborn Engineering Professor Pravansu Mohanty and his research team developed a breakthrough

plasma deposition technology—a manufacturing process used to apply coatings on everything from jet turbines and non-stick cookware to storage batteries and solar cells. The new high-speed material deposition approach not only slashes costs and produces more uniform coatings, but also enables the fabrication of functional nanoscale coatings for advanced applications such as solid state lithium-ion batteries and light-emitting sensors.

Mohanty is a firm believer in what he calls the concept-to-component philosophy of research. As he notes, “My Edisonian belief is that innovation should ideally lead to a product, which will in turn generate revenue, which can then be used to fund more innovative research.”

True to his philosophy, Mohanty contacted U-M Tech Transfer to explore his options. By the summer of 2010, he had launched CSquared Innovations and was in the process of hiring a CEO, setting up a commercial fabrication facility in Farmington Hills and carving out office space in Tech Transfer’s new Venture Accelerator. This year, the fast-growing company received the Michigan Clean Energy Prize, the Accelerate Michigan Next Gen Manufacturing Award and a Small Business Technology Transfer grant, adding over \$200,000 to fuel further development.

“U-M Tech Transfer played an important role in shaping our business model,” Mohanty says. “They helped us identify several near-term markets to target immediately, while we expanded our platform capability.”

Founder Pravansu Mohanty (at left) describes the unique advantages of the plasma deposition technology at U-M’s Celebrate Invention 2010.







Compendia Bioscience markets its vast database of oncology information to fuel cancer research. CEO Daniel Rhodes (center) leads a staff discussion at the start-up's Ann Arbor office.

## speeding the development of cancer treatments

**COMPENDIA BIOSCIENCE, INC.**  
Daniel Rhodes  
Founder and CEO

When it launched from U-M in 2006, Compendia Bioscience had one mission: market its OncoMine™ database. Developed by U-M Medical School Professor Arul Chinnaiyan and then-graduate student Daniel Rhodes, the DNA microarray database made vast amounts of oncology data readily available to research scientists, enabling them to quickly locate cancer targets and key biomarkers.

But like its database, Compendia has evolved in response to market needs. Today, the company is helping the world's largest pharmaceutical companies develop promising new drugs and identify those patients most likely to benefit from the therapies.

“Early on, we found that serving up the data wasn't enough, that large pharmas needed help in the practical application of genomics and informatics,” says Rhodes, now Compendia's CEO. “So we changed our model from software-only to technology licensing plus expert services consulting.”

Currently, Compendia is working with the world's top 20 pharma companies across dozens of drug development programs. With a new product, Oncopredictor™, the company screens compounds against 240 cell line models, finds the underlying genomic fingerprint and, based on that information, predicts which disease subsets will be sensitive to the drugs. These data enable pharma companies and their clients to engage in targeted, cost-effective clinical trials, shorten their time to market and, in some cases, increase the scope of their explorations.

Looking ahead, Rhodes sees a time when his company's technology and expertise will be used to provide patients with personalized treatment predictions based on their unique genomic profiles. For now, though, Compendia is focused on building its staff, increasing its revenues and securing its goal of being the industry's first choice for cancer genomics and informatics.



With LectureTools, a laptop becomes a personalized learning console that enables students and instructors to interact in real-time. Professor Perry Samson (at left) and his team have forged alliances with publishers to create truly smart e-textbooks, seamlessly integrated with the LectureTools software.

## making large classes feel small

### LECTURETOOLS, INC.

Perry Samson

Arthur Thurnau Professor

Atmospheric, Oceanic, and Space Sciences  
College of Engineering

How do you create an active, responsive learning environment in a large classroom setting? That was the challenge confronting Perry Samson in his Extreme Weather class, which typically enrolls over 200 undergraduates. As he explains, “Large introductory courses can be very impersonal. I was looking for an alternative model that would raise the bar, encourage critical thinking and enable students to learn more by making large classes feel small.”

In 2005, Samson and fellow Engineering Professor Ben van der Pluijm pursued that “alternative model” with the help of a grant from the National Science Foundation. The end result was a software program for hand-held devices that enabled students to ask complex, image-based questions in real-time.

The following year, Samson used student and faculty feedback to develop a more functional iteration for laptops. Two years later, he rolled out a Web 2.0 version known as LectureTools™—a dynamic program that enables students to respond to quizzes, rank topics according to their difficulty, synchronize their notes with lecture slides, access podcasts, submit questions and receive immediate answers

from teaching assistants. An analytics component allowed instructors to check attendance and monitor participation in class activities.



By 2010, LectureTools had instructors registered at more than 100 colleges globally. Working with U-M Tech Transfer, LectureTools, Inc. officially launched in September 2011 with ten employees.

“U-M Tech Transfer business advisors provided excellent guidance about how to move forward at every phase,” Samson says. “This kind of entrepreneurship is good for the economy, good for the city and good for the students.”

# setting a course for cleaner seas

## VARIABLE BUOYANCY SHIP TECHNOLOGY

Geoffrey Uttmark  
Entrepreneur and Principal  
Ship Shares LLC



From zebra mussels to Asian carp to sea lampreys, invasive species are fouling waterways and destroying marine ecosystems around the world. The culprit is contaminated ballast water, as much as 100,000 tons at a time, off-loaded by

ships as they enter port. It is estimated that the health and economic costs of marine biofouling exceed \$120 billion annually.

In 2004, U-M Professor of Naval Architecture Michael Parsons devised an innovative solution to the problem. With funding from the National Oceanic and Atmospheric Administration and the Great Lakes Maritime Research Institute, Parsons developed a design for a ballast-free vessel.

In essence, his variable buoyancy ship (VBS) technology enables a ship to reach its ballast draft without taking on permanent ballast water. This is achieved by installing trunks that can be opened to the sea to reduce buoyancy, then closed off and pumped out when the ship arrives at her load port. Since only local water is used in the ballast trunks, the danger of accidentally releasing non-indigenous aquatic species into sensitive eco-systems is eliminated.

For five years, the VBS technology sat in dry-dock. Then, in 2010, Tech Transfer was approached by marine industry consultant and U-M Naval Architecture alumnus Geoffrey Uttmark, who had read of the VBS technology in a trade journal. His goal was to commercialize the technology in collaboration with American and international shipbuilders.

In 2010, Uttmark founded Ship Shares LLC with the mission of launching environmentally sound technologies that can transform the shipping industry. U-M Tech Transfer specialists provided assistance and connected him with a potential shipbuilding partner in Europe.

Uttmark hopes and expects that within two years the first of many ballast-free vessels will be sailing the seas—just in time for the flood of new worldwide ballast water retention regulations that are now being finalized.

Entrepreneur and U-M naval architecture grad Geoffrey Uttmark plans to build full-scale demonstration models in partnership with American and European shipbuilders. Below Uttmark is seen with TechStart student interns Jonathan Hodge and Zach Hughbanks, who were instrumental in launching the company.





Hakan Oral (at left) says “There’s a huge amount of satisfaction in knowing that you helped develop a technology and brought it to market, and that, as a result of these efforts, patients are now benefiting.”

## stopping strokes before they happen

**HAKAN ORAL**  
Professor of Internal Medicine  
University of Michigan Medical School

Atrial fibrillation (AF), a form of cardiac arrhythmia, is the leading cause of stroke. This happens when blood clots, having been formed in the atrium as a result of AF, break loose and travel to the brain. For the past 20 years, doctors have used catheter ablation to address AF. During this process, a catheter, fed through a blood vessel, is guided to the section of the heart responsible for the arrhythmia. Unfortunately, this procedure requires a great deal of training and allows for only one section of the heart’s defective electrical pathway to be treated at a time. A new technology developed at U-M is addressing these issues.

In 2002, Professor of Internal Medicine Hakan Oral began working with Professor Fred Morady on novel approaches to cardiac ablation intended to improve efficiency, efficacy and safety. The result was a portfolio of technologies that formed the basis of the start-up company Ablation Frontiers.

According to Oral, he and Morady hadn’t set out to launch a company. “Things unfolded over time as we worked with Tech Transfer,” said Oral. “Through their coaching and connections, the idea of starting a company became more attractive.”

Ablation Frontiers grew quickly with the infusion of funding from a variety of sources. Within several years, the company had developed three-dimensional arrays, outfitted with multiple electrodes that could monitor and ablate tissue simultaneously. In 2009, Ablation Frontiers was acquired by Medtronic, and now has additional resources to extend its potential.

Oral, who is presently working on three projects that could develop into start-ups, notes that the culture at the University of Michigan has changed considerably over the past decade. “The environment,” says Oral, “has never been better for faculty who want to pursue their entrepreneurial dreams.”



# engaging advisory talent

The U-M Tech Transfer National Advisory Board plays a key role in providing advice and encouraging new initiatives. The board includes representatives from industry, the venture and entrepreneurial communities, government, peer tech transfer offices and economic development organizations. Past projects have included the creation of Ann Arbor SPARK, the Catalyst talent initiatives and guidance for the new Venture Accelerator at the NCRC.



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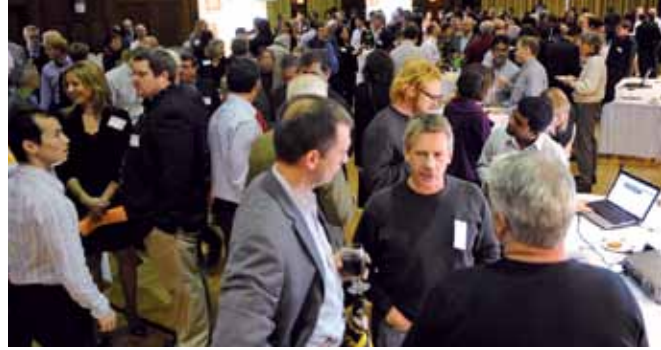
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# partnerships for economic development



Partnered activities to showcase innovation and entrepreneurship provide resources and encouragement to promote economic development.



**Ann Arbor SPARK** | Ann Arbor SPARK provides service to entrepreneurs, businesses and individuals to develop and expand economic opportunity throughout the greater Ann Arbor region. SPARK has extensive working relationships with the University, partnering on business attraction, workforce development and venture creation. Many emerging start-up ventures benefit from SPARK services, including access to pre-seed funds, talent recruitment and facility expansion. Members of our staff hold board and committee positions within Ann Arbor SPARK and we also collaborate on numerous initiatives and events that enhance Ann Arbor's entrepreneurial ecosystem.



**MEDC** | The Michigan Economic Development Corporation (MEDC) is a public-private partnership providing resources to promote economic growth for the state of Michigan. A few examples include:

- + Venture Michigan Fund—a fund for venture capital firms that invest in Michigan-based early-stage companies
- + Michigan Pre-Seed Fund—provides pre-venture capital to develop emerging start-ups into viable funding opportunities
- + MUCI/MIIE Funds—matching gap funding by universities that address the key commercialization issues of promising technologies and venture opportunities



**University Research Corridor** | The University Research Corridor (URC) is an alliance among the University of Michigan, Wayne State University and Michigan State University to transform, strengthen and diversify the state's economy. The URC promotes partnering activities within research, business engagement and technology opportunities.

contact us!



The entire team of U-M Tech Transfer is ready to introduce you to your next big opportunity. Contact us at 734.763.0614 or [www.techtransfer.umich.edu](http://www.techtransfer.umich.edu)

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