Highlights of AUTM's

U.S. Licensing Activity Survey FY2015

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Association of University Technology Managers® Advancing Discoveries for a Better World®



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25 YEARS OF PROGRESS

For 25 years, the Association of University Technology Managers (AUTM) has implemented its annual Licensing Activity Survey to highlight the public value of technology transfer, including the ongoing benefits of the 1980 Bayh-Dole Act, dubbed "innovation's golden goose" by The Economist.¹

Every year, universities around the globe develop inventions that have real-world, often life-changing, applications. These innovations are licensed by university technology transfer offices to companies for commercialization and are the genesis of thousands of new companies, resulting in both benefits to society and solid economic wins.

Over the past 25 years, research faculty, students and staff have reported more than 380,000 innovations to their technology transfer offices, filed more than 206,000 new patent applications, and were issued more than 84,000 US patents. These innovations were licensed to thousands of companies, including nearly 11,000 startups. Research institutions shared in the success of their startups, earning more than \$1 billion in equity, much of which was reinvested for future research. Licensed technologies led to the introduction of more than 10,000 new products to the market for consumer and business use.

¹*The Economist*, Technology Quarterly: Innovation's golden goose. December 12, 2002: www.economist.com/node/1476653







DISCLOSURES

1991

1997

Gross Reported Licensing Income

2003

REPORTING YEAR

2009



ACADEMIC RESEARCH FUELING GROWTH

This year's survey of more than 200 academic institutions and hospitals across the nation shows research institutions are fueling the growth of new technologies with substantial increases in licensing agreements, invention disclosures, patent applications and the creation of startups.

"A strong, robust patent system incents investment in the ideas and research that fuel our innovation economy."

~ AUTM President David Winwood

U.S. Licensing Activity Survey FY2015 Highlights — an overview of the complete fiscal year 2015 report — offer a glimpse into the current state of the technology transfer field. (The comprehensive AUTM U.S. Licensing Activity Survey FY2015 report will be published later this year.) These Highlights also offer stories that illustrate the larger impact of technology transfer as measured by products that improve our quality of life and increase the competitiveness and productivity of our global society.

The 2015 survey reveals impressive year-to-year gains in the number of licenses and options executed (up 15 percent) and the number of new patent applications filed (up 14.7 percent) — clear indicators of the high levels of innovation taking place within these research institutions.

Academic-based research boosts local, national and global economies. Jobs are created by startups, product sales for companies and the evolution of new industries. Academic-based research also creates jobs directly through the hiring of principal investigators, research teams and support staff.



Percent Increase Over 2014

University Research and Development



RESEARCH FUNDING

Federal research funding continues to be the primary fuel for innovation ecosystems throughout the United States. Research institutions continue to expand partnerships with industry at a faster rate than funding from other sources, including federal sources.



²Biotechnology Industry Organization: The Economic Contribution of University/Nonprofit Inventions in the United States: 1996-2013; March 2015.

³The Contribution of Public Sector Research to the Discovery of New Drugs and Vaccines", Ashley Stevens, Jonathan Jensen, Katrine Wyller, Patrick Kilgore, Sabarni Chatterjee, and Mark Rohrbaugh, New England Journal of Medicine. 634:6 535-541, February 10, 2011



BetterWorld Project

Helping Newborns Breathe Easier

Rice University

Each year, millions of babies are born struggling to breathe.

Premature babies who lack fully developed lungs and infants struggling with severe respiratory illness often need the help of a machine that keeps the lungs inflated called a bubble continuous positive airway pressure (CPAP) machine. While the life-saving device is widely available in developed nations, its price tag of more than \$6,000 puts it out of the reach of many low-resource facilities.

That's changing, thanks to a low-cost bubble CPAP developed by Rice University bioengineering students working to address the healthcare needs of many developing nations with more cost-effective technologies.

"It's not unusual for undergraduates to have good ideas about how to change the world," says Yousif Shamoo, Vice Provost for Research at Rice University's Office of Research. "A lot of times good ideas don't go anywhere because there's not a network or framework to bring them to market. The role that technology transfer has is to give them the opportunity and the ability to get the technology out there."

In 2014, Rice University licensed the technology to a 3rd Stone Design subsidiary, structuring the agreement to facilitate entry into low-resourced markets.

Their efforts have paid off. With a price of \$800 per unit, the life-saving CPAP technology is now available in many developing countries. For babies with low birth weight and sepsis, survival rates have more than tripled after treatment with the device, saving thousands of lives.

DISCLOSURES

Although much academic research remains focused on the timely dissemination of findings in peerreviewed scientific journals, a substantial portion of research findings result in technologies that offer commercial promise. Filing patents on these discoveries protects the university's intellectual property, encourages new research within the institution, and the adoption of new technologies in the marketplace. Moreover, patents offer protection to companies that invest substantial resources and time — 5 to 10 years or more — to develop the technology into commercially viable products.

The receipt of an invention disclosure is just the beginning of the collaboration between inventors and technology transfer professionals. In this sense, a disclosure is the raw material needed to generate patented products and economic benefits. Invention disclosures are an important indicator of the level of innovation and generally trend in line with research and development expenditures.



PATENTS

The patent system is intended to encourage the dissemination of knowledge and information to the public by granting authors and inventors limited monopolies on their inventions and works. With research institutions continuing to invest in intellectual property protections, the economic incentive for entrepreneurs and companies to invest in new technologies continues to grow.





BetterWorld Project

Labor of Love Boston College

Jim Gips, a computer science professor at Boston College, was looking for his next project when he landed on the idea of controlling computers with the mind. Using electrooculography (EOG), Jim and his team developed a device using electrical signals within the eye to control the position of a cursor on a computer screen.

With funding from the college, Gips' team developed software that allows users to compose messages or play simplistic video games — all by shifting their gaze. When the invention, dubbed EagleEyes, caught the attention of a national TV show and producers asked what more the device could do, Gips suggested the possibility of assisting the severely disabled.

After a successful trial, Gips and his colleagues placed an EagleEyes device in a classroom at the college's school for children with severe disabilities. Soon, families from around the world were asking for their own devices to use at home.

"The technology transfer office enabled this to happen," says Gips, who calls the project a labor of love for everyone involved.

Within a month of learning about EagleEyes, the non-profit Opportunity Foundation of America (OFOA) signed an exclusive license agreement to provide manufacturing, distribution and training for EagleEyes.

"It's a profound [thing] for people who've had no control over their environment," said OFOA Executive Director and Founder Debbie Inkley. "It's incredible, because the user is doing something for the very first time in their life on their own."

Since 2004, OFOA has placed 285 EagleEyes systems in schools and homes in the United States, Canada and Ireland. For \$800 — basically what it costs to manufacture the device — EagleEyes changes lives.

Creating Products and Services

LICENSING

Technology transfer offices play an indispensable role in facilitating one of the most critical components of a robust innovation ecosystem: strong collaborations between academia and industry. When a license agreement is signed, it marks the beginning of a long-term relationship between a research institution and its industry partner.

Data derived from the FY2015 survey reflect healthy increases in partnership metrics:



"When universities and businesses collaborate to advance discoveries, they become a powerful engine for innovation and economic growth."

~ AUTM President David Winwood

CREATING COMPANIES AND PRODUCTS

Startup companies can be an effective mechanism for transferring nascent technology from the university research environment to the marketplace. In FY2015, the 1,012 new companies born of technology transfer activities represent an 11.3 percent increase over the prior year, with an average of 2.7 new companies created per day. More than 72 percent of these companies operate in the same state where the original research took place, creating thousands of new jobs for the home state economy.

The increase in new companies is promising, but what about their long-term prospects? The data indicate that startups derived from technology transfer activities show admirable staying power. The 5,057 startups still in business at year-end represent a healthy 7.8 percent increase over the previous year.





BetterWorld Project

Clean Eating Washington State University

Food companies have been scrambling to meet growing consumer demand for packaged and ready-to-eat foods that are closer to fresh. Juming Tang, PhD, a leading food engineer at Washington State University, has developed a new sterilization method called microwave-assisted thermal sterilization (MATS[™]), which allows food companies to meet consumer demand for high-quality, additive-free packaged food.

Conventional food processing vacuum packs the food in a can or pouch and places it in a pressurized cooker at temperatures above 250 degrees for up to an hour. The process removes pathogens from the food, making it safe to eat up to a year later, but it also causes significant damage to the flavor, texture, color and nutritional content of food.

"WSU has been a terrific partner," says 915 Labs CEO Mike Locatis. "There's a tremendous push to see more activity in the transfer of federally funded research to improve the supply chain of ideas. There are incredible lessons to be learned from technology transfer."

Microwave sterilization with MATS is a radically different approach: packaged food is immersed in pressurized hot water and simultaneously heated with microwaves which eliminates pathogens and spoilage microorganisms in 5 to 8 minutes.

Tang received \$20 million in research support from the U.S. Army and a consortium of food companies, including Kraft Foods, Hormel and General Mills. WSU patented the design and in 2009 MATS became the first and only microwave sterilization technique accepted by the U.S. Food and Drug Administration (FDA).

In 2014, a startup company called 915 Labs acquired the worldwide license to MATS and a companion technology for microwave pasteurization and is now selling the food processing systems around the globe.

BetterWorld Project

Seeing More Means Hearing More





As the father of a child with recurring ear infections, Ryan Shelton felt the frustration that many parents experience because inner ear problems are so difficult to diagnose and treat. But unlike most parents, Shelton had a doctorate in biomedical optics and imaging and was doing postdoctoral research at the Biophotonics Imaging Laboratory at the University of Illinois.

Together, he and Stephen Boppart, M.D., Ph.D., went to work developing an imaging tool that would allow physicians to directly visualize the middle ear. The team employed an imaging technology called optical coherence tomography (OCT), which uses near-infrared light waves to create three-dimensional views of the inner ear. The technology is similar to ultrasound but instead of sound waves, OCT shines light through the eardrum and collects the light reflections that bounce off the structures within the middle ear.

Although a desktop-sized OCT machine is the gold standard for examining the retina, Shelton and Boppart built a hand-held OCT device for the ear called the ClearView otoscope. Utilizing the full range of technology transfer resoruces offered by the University of Illinois — from patent filing and licensing agreements to startup support — the researchers established the startup company PhotoniCare Inc to market their new device.

"Starting a company in the University of Illinois ecosystem, and particularly in Urbana-Champaign, continues to be a really terrific experience," says Shelton. "Support through affordable resources, access to expertise and mentorship and top-notch facilities is exactly what early-stage companies need."

PhotoniCare has quickly moved the technology from bench to bedside, equipping physicians with its ClearView otoscope and conducting a National Institutes of Health-supported clinical trial with the device at Children's National Health System in Washington, DC.



ABOUT THE SURVEY

AUTM invited 308 U.S. institutions (including universities and colleges, hospitals and research institutions, national laboratories and third-party technology investment firms) to participate in the FY2015 U.S. Survey. AUTM received 202 completed surveys, for a response rate of 65 percent. Respondents for 2015 included 169 universities, 31 hospitals and research institutions, one third-party technology investment firm and one national laboratory. The numbers from these institutions reflect the significant role played by technology transfer in today's innovation economy.

Most of the data collected in this survey is also available in AUTM's Statistics Analysis for Technology Transfer (STATT) database. To access this searchable database of 25 years of academic licensing data, visit www.autm.net/statt.



ABOUT AUTM

The Association of University Technology Managers is a nonprofit organization dedicated to bringing research to life by supporting and enhancing the global academic technology transfer profession through education, professional development, partnering and advocacy. AUTM's more than 3,200 members represent managers of intellectual property from more than 350 universities, research institutions and teaching hospitals around the world as well as numerous businesses and government organizations.



A Better World by Bringing Research to Life



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