Over the past several years, the Office of Technology Management (OTM) has been focused on delivering the highest level of customer service in order to drive a culture of innovation throughout the University. In the past year, this strategy was memorialized with the establishment of a new mission statement:

**By pairing cutting edge research from Washington University labs with expertise and exceptional service, OTM creates a pipeline of opportunities that benefit society.**

Throughout this year, OTM has used this mission statement as the driver behind many of the department’s initiatives and goals.

In order to enhance its pipeline of opportunities, the department has made greater efforts in engaging faculty and staff throughout the University in technology transfer. These efforts have already yielded results. In the past fiscal year, the department set new records for new invention disclosures and patent filings, both of which represented significant increases over FY16. Later in this report, we present the ways in which we’ve grown these numbers, including a focused emphasis on faculty outreach, as well as hiring OTM’s first-ever internal patent agent to help streamline the patent filing process.

The University created more licensing relationships than ever before, finalizing 108 for-fee agreements in FY17, another record statistic for OTM. Between new and existing agreements, the University and its inventors received $16.9 million in revenue. Our faculty have also continued to show interest in pursuing commercialization via entrepreneurship, with a record eight startup companies formed during the past fiscal year. In total, 13 companies have been formed by University faculty over the last three years (FY17-FY15), representing a 37% increase over the previous three fiscal years (FY14-FY12).

OTM has also made investments in finding partners for University IP by expanded its marketing internship program. This program provides OTM with trained individuals that can develop the materials, strategies, and business leads necessary to identify and pursue potential licensees. Not only does this internship program provide OTM with a vital resource, it also provides students with valuable experience at the intersection of business, science and technology.

As Director, I am proud of everything our office accomplished in FY17. I am also excited to begin a new fiscal year with achievable goals that will further enhance OTM for its customers. I want to thank the leadership at Washington University for its support of the improvements OTM has made, as well as the Committee for Technology Transfer, who have provided advice and critical feedback in regards to our processes.

If you have any questions or suggestions, please reach out or stop by the office and let us know!

Sincerely,

Nichole Mercier, PhD
OTM Managing Director
A COMMITMENT TO OUTREACH

When FY16 ended, OTM made a simple commitment: make customer service a focal point of the office. Though simple on its face, this commitment meant changing our philosophy while defining new outreach strategies to engage faculty, students, and staff. In FY17, this new approach resulted with OTM receiving the most invention disclosures from University inventors in a given fiscal year.

To deliver on this commitment, the OTM licensing team expanded to eight full-time staff members, adding two mid-level positions and one junior position. Each of our licensing professionals has been aligned with specific departments throughout all campuses of the University to create a clear point of contact for University innovators. Our licensing team has spent more time creating relationships with faculty and department chairs, allowing OTM to better assist with technology assessments, patent-related issues, and other general questions.

Additionally, OTM has diversified its engagement within departments and centers. Examples include:

- A new partnership between OTM and the Mallinckrodt Institute of Radiology. In concert with Dr. Samuel Achilefu and his innovation team, OTM has been helping to plan a series of events centered on technology transfer and innovation. This joint effort will culminate in FY18 with a panel discussion on commercialization of imaging and therapeutic agents, featuring entrepreneurs-in-residence (EIRs), patent counsel, and industry professionals.

- Working with Dean Aaron Bobick in the School of Engineering (SEAS), OTM has focused on increased outreach within the school’s individual departments. OTM has defined metrics that can be used to better analyze participation of individuals within SEAS, as well as propose new directions for engagement. Dean Bobick’s enthusiasm for technology transfer has created a trickle-down effect that resulted in a 12% increase in Engineering faculty disclosures in FY17.

- In February 2017, due to OTM’s efforts, Washington University became the first academic institution in the Midwest to join Pfizer’s Centers for Therapeutic Innovation (CTI) collaborative network. Through the relationship with Pfizer CTI, the University increases the likelihood of commercializing new therapeutic technologies.

- OTM continues to support existing partnerships that provide resources to faculty inventors. Working in tandem with the Skandalaris Center for Interdisciplinary Innovation and Entrepreneurship, the LEAP program engages and trains Washington University faculty and student teams towards commercial development of their technology or product. OTM plays an active role in LEAP, which provides education and funding to University inventors, while also increasing the value proposition for existing IP assets.

ENTERPRISEING FACULTY

Dr. Shantanu Chakrabarty submitted four inventions to OTM during FY17, as his work in the University’s Adaptive Integrated Microsystems (AIM) Laboratory continues to show strong commercial potential.

The computational performance that occurs within Internet of Things (IoT) devices, smartphones, desktop computers, and cloud-based systems is increasingly limited by high power consumption. This is true for both low-power and high-power computational functions such as artificial intelligence (AI), computer systems with the ability to perform tasks that normally require human intelligence. Dr. Chakrabarty’s technologies address these power-performance challenges by maintaining computational performance while reducing energy usage.

Dr. Chakrabarty is an alumnus of the National Academy of Engineering’s “Frontiers of Engineering” program, and has received numerous awards including the National Science Foundation CAREER Award in 2010.

Dr. Sergej Djuranovic disclosed three inventions to OTM in FY17, two of which have already been exclusively licensed or optioned to a commercial partner.

In March 2017, St. Louis-based Canopy Biosciences signed an exclusive license for intellectual property based around a novel technology for gene editing, developed by Dr. Djuranovic and Rachel Green of Johns Hopkins University. Canopy has since used the technology to bring its TUNRTM Flexible Gene Editing system to market, allowing researchers unprecedented control over gene expression.

While this technology can decrease the expression of a particular gene, Dr. Djuranovic has also invented ways to increase gene expression. This research can be further used to generate new disease models, or for the production of medicines. Studying disease models aids understanding of how a disease develops before testing potential treatment approaches.
INCREASING PATENT DEMAND

OTM is proud of the recognition received for its increase in patent filings. In June 2017, Washington University was ranked 49th of the Top 100 Worldwide Universities Granted U.S. Utility Patents by the National Academy of Inventors (NAI). The ranking showed a significant year-to-year increase with the University listed at No. 88 in the prior year.

OTM is finding creative mechanisms to increase its capacity to file new IP on the increasing number of disclosures seen by the office. In FY17, OTM hired its first patent agent to work in-house on provisional patent applications. OTM will utilize the assets of the patent agent in conjunction with its stable of external law firms for its patent prosecution needs. Analysis of this approach showed that the OTM could realize significant savings, as well as retain a resource within the office in the area of intellectual property. In the first six-month period, OTM demonstrated these savings, investing in 34 patent applications written and submitted through the patent agent position.

OTM seeks to streamline patent costs associated with the University's external law firms. In the past, individual negotiations took place between OTM and external law firms for each and every patent application request. This approach was not only time consuming but also did not enable the University to benefit from its patent prosecution volume. OTM negotiated a fixed pricing model this past fiscal year for all patent prosecution activities across all law firms. Not only has this approach streamlined the process, but it has resulted in a lower average cost of patent prosecution.

These departmental changes, combined with a number of other vendor and procedural changes, have resulted in meaningfully more IP for the University. Specifically, over the past five years, the University's patent filings have increased by a dramatic 42% while patent spending has only increased by 11%. This is even more remarkable when one considers the fact that the cost of OTM's legal service provided (on an hourly basis) has resulted in meaningfully more IP for the University. Specifically, over the past five years, the University's patent filings have increased by a dramatic 42% while patent spending has only increased by 11%. This is even more remarkable when one considers the fact that the cost of OTM's legal service provided (on an hourly basis) has increased by an estimated 25% over the past three years.

DRIVING DIVERSITY

Women in Innovation & Technology

OTM is committed to increase the engagement of all potential innovators through invention disclosure and patent filings activity, and in particular continues to work with female investigators who have historically, not been as active as their male counterparts in the area of technology commercialization. With this in mind, OTM created the Women in Innovation and Technology (WIT) program to provide female faculty and post-doctoral researchers at Washington University with an understanding of commercializing academic findings and building their commercialization networks. WIT is designed to introduce participants to a number of entrepreneurial support organizations in the St. Louis area, along with opportunities to grow commercialization networks. Now in its fifth year, WIT enjoyed its largest-ever turnout in FY17. Below are summaries of each event that was hosted over the past year.

Celebratory Luncheon
November 1, 2016

The WIT series kicked off last fall with a celebratory luncheon that honored all female faculty members who either disclosed an invention or filed a patent in 2016. Nancy Tye-Murray, Professor of Otolaryngology at Washington University, spoke to the group regarding her experience in launching cEAR, a startup company that assists hearing loss patients. Nichole Mercier also discussed the gender gap in technology transfer and OTM’s efforts to close that gap.

Educational Symposium
February 28, 2017

A one-day symposium was held earlier this year to educate attendees on technology transfer, and the benefits of engaging OTM. The symposium, which was open to both University members and external participants, included keynote speaker Gini Deshpande of NuMedii, Inc., as well as breakout sessions that discussed both introductory and advanced topics of technology and innovation. A panel discussion, elevator pitch session, and networking time rounded out the event.

Networking Breakfasts
April 11–12, 2017

A pair of networking breakfasts were hosted this spring to continue the dialogue regarding female inventorship. A breakfast was offered both at the School of Medicine campus as well as Danforth campus, with faculty, students, and staff all encouraged to attend. These events provided an opportunity for OTM staff to answer questions regarding technology transfer and innovation, while attendees were able to grow their networks and meet fellow University members.
More disclosures and more patent filings means that OTM now has a larger arsenal of innovations with which it can market. But with increased time and energy spent on increasing and protecting innovations, the OTM needed to ensure that it still had ample time to market these technologies. To ensure that this was done, the OTM has identified new and creative ways that it can more effectively market and license its technologies. One such effort was an enhancement to the Marketing Internship Program. This program was launched in the last fiscal year. In the past fiscal year, OTM grew to program to its current level which invoices as many as six marketing interns working in the office simultaneously. These interns work to develop marketing materials for technologies while also identifying potential industry partners. During the year, these interns marketed over 100 technologies to nearly three thousand unique individuals. This has led to increased exposure for University IP a record number of license agreements for the second straight year.

The Marketing Internship Program has also provided Washington University students, PhDs, and post-docs with experience that extends beyond the lab and into the commercial sector. In the last fiscal year, OTM saw a number of former interns translate these internships into full-time positions at OTM, the National Institutes of Health (NIH), and biopharmaceutical companies and universities around the United States.

Another way in which more Washington University technology is being licensing is through OTM’s new non-negotiable agreement model. This approach removes the timely negotiation process for copyrights and software that are executed in high-quantity over the course of the year. In the 2017 fiscal year, 46 agreements were executed under this new approach. That represents 42% of all of the agreements that OTM executed for the year enabling the OTM to focus its time on other value-added activities.

The OTM executed a record 108 for-fee license agreements in fiscal year 2017. This is the second straight year that OTM has executed a record number of agreement and represents a 134% increase in deal activity over a five-year period.

ATM Cardiac Diagnostics / R. Martin Arthur, Scott Marrus, Jason Trobaugh (Engineering)
Non-Invasive Cardiac Evaluation (NICE) Software combines data such as ultrasound images, electrical activity, and anatomical data to inform clinicians about a patient’s heart health.

AVVl Biotech / Herbert Virgin, Dan Barouch, Scott Handley, Rachel Presti, Larissa Thackray, Guoyan Zhao, David Wang (Medicine – Pathology and Immunology, Infectious Disease)
AVVl Biotech is focused on developing of novel recombinant adenoviruses that can be used to express promising vaccine antigens.

CalPACT / Lihong Wang (Engineering)
CalPACT is working to provide imaging systems based on Lihong Wang’s photoacoustic computed tomography (PACT) technology. This imaging modality provides information about anatomy and physiology in a non-ionizing way, making it ideal for screening or longitudinal studies.

DxGPS / Victor Song, Ze-Zhong Ye (Medicine - Radiology)
Known as Diffusion MRI Histology (D-Histo), this imaging technique quantitatively differentiates inflammation from solid tumors, heart and nerve injury.

Encodia / Rob Mitra, Tom Cohen, Justin Melendez, James Havranek, Ben Borgo, Lee Tessler, Donald Elbert (Medicine– Genetics, Biochemistry & Engineering)
Encodia is developing next-generation protein sequencing technology that would allow for the simultaneous sequencing and quantification of many proteins from complex mixtures (ex. isolated from a tumor cell).

Precision Virologics / David Curiel, Igor Dmitriev (Medicine – Radiation Oncology)
Precision Virologics’ adenovirus vaccines provide a new approach to the expanding threat of emerging infectious diseases, such as Zika and Dengue.
PierianDx

In May 2014, PierianDx was formed to commercialize a bioinformatics tool known as the Clinical Genomicist Workstation (CGW). CGW allows for the generation of reports on a patient’s sequencing data, describing the clinical significance of mutations involved in cancer and other potential diseases. It was founded by Rakesh Nagarajan, former Director of Bioinformatics Core at the Washington University School of Medicine and lead inventor of CGW, and local entrepreneur Ted Briscoe. The CGW technology continues to serve an under-addressed need in the market for quality data analysis, as well as interpretation and reporting for next-generation sequencing (NGS) results in the clinical environment.

This market is growing rapidly and is expected to reach nearly 870 million patients worldwide by 2020. The company closed on a $14.25M Series A funding round in December 2015, and last October, PierianDx acquired Tute Genomics, providing the company with access to Tute’s ANNOVAR software (cloud-based sequencing software).

Summer Infant

Shortly after birth, swaddling is a method of wrapping a baby in a blanket for warmth and security. This is intended to keep a newborn infant from being disturbed by his or her own startle reflex, and it can help the baby stay warm for the first few days of life until his or her internal thermostat kicks in.

Using intellectual property licensed from Washington University, Summer Infant has since launched its SwaddleMe® Pod (pictured below) to create a womb-like feeling for a baby that helps prevent the startle reflex. This product is designed in an easy-to-use fashion so that a baby can be zipped into the SwaddleMe® Pod for a secure, comfortable fit. The SwaddleMe® Pod is currently sold in three separate models depending on the age of the baby.

This original concept was developed in 2004 by Dr. Bradley Thach, Professor of Pediatrics and Newborn Medicine at Washington University. While conducting research on infant apnea and related conditions, Dr. Thach developed a garment to prevent a newborn baby from rolling over in its sleep. The agreement between Summer Infant, based in Woonsocket, RI, and Washington University went into effect in 2010.

Castle Biosciences

Uveal melanoma, commonly known as ocular or choroidal melanoma, is a rare cancer of the eye. While the primary tumor is highly treatable, about half of patients will go on to develop metastasis—typically to the liver. While traditional staging methods such as tumor size and location still play a role in assessing metastatic risk, they are rarely used to individualize patient management plans.

The DecisionDx®-UM test was originally developed by ocular oncologist Dr. J. William Harbour while at Washington University (now at Bascom Palmer Eye Institute). The test measures the activity, or gene expression, of a set of 15 genes within an ocular melanoma tumor to identify the likelihood of metastasis within five years. This enables a doctor to determine a patient’s management plan based on an assessment of their individual risk. Castle Biosciences exclusively licensed the technology and validated the test for clinical use in 2009. Since its introduction in 2010, the gene expression profile (GEP) test has become an important prognostic tool for uveal melanoma, and is now used as standard of care by over 95% of ocular oncologists in the U.S.
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