UNIVERSITY OF PITTSBURGH

Office of Technology Management

2009 annual report

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contents

OTM

A single contact

I typically am not given to clichés. However, when I thought about how to communicate the impact of the Office of Technology Management (OTM) and the Office of Enterprise Development (OED), Health Sciences, beyond simply stating numbers, the notion of "ripple effects" really took hold. The idea that a single relationship or single contact can have lasting and far-reaching impact on the University of Pittsburgh is an idea that embodies the approach our offices take to innovation development and commercialization.

For instance, when then bioengineering graduate student Lorenzo Soletti attended a technology commercialization course hosted by OTM and the Office of the Provost in 2007, our intentions were straightforward: education and assistance in transforming research results into commercially viable products and businesses. We hoped to motivate him and others into considering the process of innovation commercialization, with an understanding that such endeavors take much time and resources to foster.

Two years later, Soletti and former graduate student Mohammed El-Kurdi, supported by their faculty mentors, have established a Pittsburgh-based start-up company that is commercializing a novel support technology developed at the University for arteriovenous grafts. Their faculty mentors, whose research endeavors over more than 10 years led to this new technology, remain at the University and continue to explore new innovations and support new graduate student innovators.

We have featured this and other examples in this annual report in an attempt to illustrate the far-reaching ripple effects of OTM and OED on education; research; faculty, staff, and students; and the local economy. We also have tried to show how a single relationship, over time, can develop into something much, much bigger.

Achieving success as a University office and fostering an entrepreneurial culture of innovation and commercialization depend on a variety of factors, some clearly tangible and others perhaps less so. As this report documents, OTM and its affiliate OED do weigh the tangible outcomes—the number of invention disclosures submitted annually, the number of licensing deals executed, and total revenue generated as a result of this technology transfer activity.

Less tangible, for instance, might be the impact of OTM's commercialization fellowship program on both the participating students and the Pitt Innovators for whom they are providing market research and competitive analysis. Or consider the long-term ramifications of potential partnering relationships

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marc malandro

developed and nurtured over time by OED's business development professionals within industry. We may not be able to predict with certainty the long-term outcome of our innovation brainstorming sessions, which bring together groups of researchers from disparate scientific disciplines, but new collaborations do emerge from such interactions that could result in fresh ideas and innovations in the future. Our job is to facilitate the process.

Indeed, our success requires a creative, persistent, proactive long-term commitment to the innovation development and commercialization process. It requires us to foster the right environment and provide a solid foundation on which Pitt Innovators can build their own success.

Today, we are engaging more faculty, staff, and students in the commercialization process than ever before. Enrollment in our educational courses remains at full capacity. Students are leaving Pitt with graduate degrees and innovation commercialization-driven career opportunities. Our staff continues to work diligently with departments and schools, the community, alumni, and industry around the world to facilitate partnerships that lead to sponsored research opportunities, technology licenses, successful faculty recruitment efforts, and new start-up companies.

Such activities have become even more crucial today in strategically building a foundation that can withstand the serious economic challenges before us. Admittedly, this past year proved to be a tough economic climate in which to conduct business, and we used the experience to take stock of what works and what we can do better in managing our many diverse activities on behalf of the University.

The good news is that our long-term strategy has proved to be effective. As a result, global economic adversity did not negatively affect the flow of new ideas from Pitt Innovators this past year, nor did it dampen their enthusiasm for staying the course in the day-to-day rigors of their own commercialization endeavors. To those who participated in the process this past year, including our Pitt Innovators, work-study students, and interns, as well as those who supported our efforts with funding, time, and expertise, we are sincerely grateful. Thank you. We look forward to working with you in the coming year.

Respectfully,

Marc S. Malandro
Associate Vice Chancellor for Technology Management and Commercialization
University of Pittsburgh

2009 year in review

Educating Pitt Innovators

Helping them to develop value propositions for their innovations

Introducing them to potential industry partners and investors

Creating multidisciplinary interactions that lead to new collaborations

Patenting and licensing their technologies

Starting new companies

Facilitating the commercialization of technologies developed by Pitt Innovators continued to take on dynamic added dimensions for the University of Pittsburgh Office of Technology Management (OTM) and the affiliated Office of Enterprise Development (OED), Health Sciences, in fiscal year 2009.

OTM and OED, which together represent a spectrum of activities that constitute technology transfer and commercialization at Pitt, rose to their many challenges this past year, exploring new ways to enhance the commercialization process and foster a more innovative, entrepreneurial culture on campus. We continued to refine and streamline processes as well as to develop new ways to engage faculty, staff, and student innovators in commercialization. We continued to strategize closely with the community to launch and fund new start-up ventures, and we strove to introduce more and more industries, investors, and entrepreneurs globally to Pitt Innovators and the world-class research that defines the University.

Certainly, the economic climate of the past year posed its share of challenges to Pitt's technology commercialization activities, particularly when it came to executing licensing deals. Nonetheless, new ideas continued to flow generously, and industry continued to express a keen interest in partnering with Pitt Innovators on a number of levels across the academic disciplines.

The pages ahead will showcase some of the efforts of the past year—and the impact, both tangible and otherwise, on research and education at Pitt, on the innovators involved in the process, and on the community's technology-based economic development endeavors.

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george stetten

One word that might best characterize University of Pittsburgh innovator George Stetten, MD, PhD, with regard to technology commercialization is persistence. After eight distinct product prototypes, three National Institutes of Health grants, another grant from the National Science Foundation, and a potential start-up venture, Stetten has shown that long-term commitment to the process does eventually offer its share of rewards.

Stetten, a professor of bioengineering, has devoted much of his last eight years of research to what he calls the Sonic Flashlight, an ultrasound-based device that provides real-time tomographic images from beneath skin surfaces. Originally a floor-standing device that looked like a giant overhead projector, today's Sonic Flashlight is handheld and comes with sterile disposable attachments.

While more traditional ultrasound technologies project images from inside the body onto a computer screen, Stetten's device reflects the image directly onto that part of the body, accurately identifying, for example, the location of a vein or artery in a hand. While developing his device, he has had to address issues of portability, user needs, image resolution, sterility, and a host of other obstacles to commercialization.

He also has participated in a number of Office of Technology Management (OTM)-hosted commercialization activities, including technology poster showcases and a presentation before OTM's new Commercialization Advisory Committee. The committee, composed of successful business leaders, local technology-based economic development leaders, Pitt alumni, and other advocates of entrepreneurship, provides constructive feedback on technologies and the commercial opportunities that might exist. Through it all, Stetten has continued to persist.

"Yes, I've had to wait, and I've gone on to lots of next things" throughout the development process, says Stetten, who also composes and records his own folk rock-style music when he's not in his lab. "But it's a lot more than a patent. It pays for my lab; it's my reputation. With four federal grants, it has been my bread and butter."

The U.S. Patent and Trademark Office issued a patent on the underlying technology of the Sonic Flashlight in 2003. The federal grants, meanwhile, allowed Stetten to develop various functions of the technology. In addition, Stetten says he also has been able to publish at least 35 academic articles based on this research and development effort.

Among his latest research projects is developing an application for jugular vein access. He also is working with Roberta Klatzky, a psychology professor at Carnegie Mellon University, to study the behavioral aspects of use in the field. He says he often conducts research in partnership with researchers at Carnegie Mellon.

Recently, Stetten and OTM have been working to make the Sonic Flashlight the key factor in a new local start-up company, which then would develop his idea even further for widespread commercial use. Stetten, though, would remain at the University.

"I like the idea, the dream of making it," Stetten says of his device and the ongoing research efforts that have led to it. "To a certain extent, it would be nice to see it out there. But the business world is a really different world; it has a bottom line."

Still, he adds, "I like my job and like what I have here. It would be nice if [the Sonic Flashlight] takes off, but if not, I'll be OK. This is where I live."

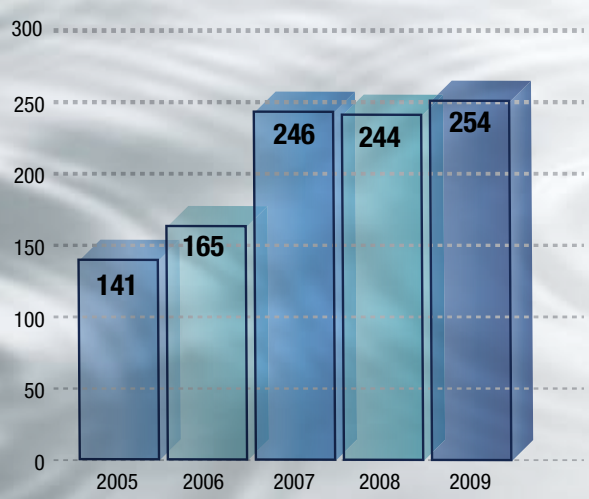
2009 year in review

Invention Disclosures

A changing culture of innovation development, fueled in part by aggressive outreach, improved customer service, better communication, and continued increases in research funding, has led Pitt Innovators to submit more invention disclosures than ever before to OTM for commercial consideration. All told, Pitt Innovators submitted 254 invention disclosures in fiscal year 2009, up from the previous year's 244. That brings the five-year total to 1,050 invention disclosures submitted—more than 700 of them in the last three years alone.

Those 254 disclosures this past year represent the innovations of more than 350 Pitt faculty members, staff members, and students who entered the process this past year. At least 57 innovators were students who had developed ideas in partnership with faculty. As in past years, a diversity of schools and departments across campus contributed to the influx of innovations, with a strong presence of innovators from the schools of the health sciences.

Invention Disclosures

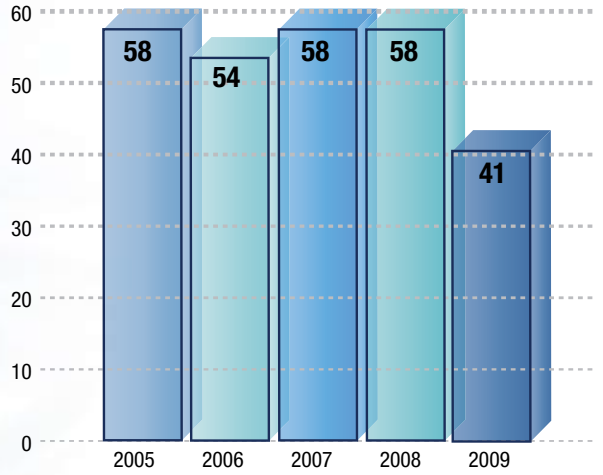


Among the largest contributors was the School of Medicine's Department of Medicine, followed by the Departments of Surgery and Pathology. At least 25 innovators from the Swanson School of Engineering's Department of Bioengineering participated as well, followed by the Department of Electrical and Computer Engineering.

Licenses/Options

OTM licensing managers continued to work with potential industry partners this past year to license or option Pitt technologies for commercial development. However, they did face predictably slower negotiating paces and decision-making cycles throughout the year. As a result, OTM executed 41 licensing and option deals in fiscal year 2009, with a number of additional

Licenses/Options Executed



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linda van roosmalen

Flip through the pages of Linda van Roosmalen's personal lab notebook and you'll find sketch after sketch and schematic after schematic of wheelchairs, casters, ratcheted restraint systems, and passenger retention devices and lots of notes and hasty scribbles—all aimed at capturing what she describes as a "slew" of new ideas in wheelchair transportation safety.

Van Roosmalen, a visiting assistant professor in the Department of Rehabilitation Sciences and Technology in Pitt's School of Health and Rehabilitation Sciences, brings many of those ideas to life in her lab on Pittsburgh's South Side. There, she and her research team piece together and then test wheelchair docking stations, vehicle-mounted retention arms for public transportation, and countless other innovations.

Among her team's latest innovations is a forward-facing wheelchair containment and occupant retention system for large accessible-transit vehicles. The system is designed to prevent the chair and passenger from tipping sideways or otherwise moving in the event of sudden turns or stops by the vehicle. This technology has been licensed to a company for commercial development.

Another recent submission for commercial consideration was an accessible seat belt system in motor vehicles for people with limited dexterity and arm function. The system allows individuals to drive independently into a prebuckled, vehicle-mounted seat belt system, without the need to buckle the pelvic and shoulder belts physically.

In pursuing her research, van Roosmalen describes herself as more of a designer than a researcher. "But I need the research to design technologies that are safe and functional," she says. "I do user research. I research people, and I like to study the interaction between products and people."

She attributes some of her design roots to her father, a civil engineer and part-time artist who designed buildings, prisons, bridges, and other concrete structures in his native Netherlands.

"I wanted to do something with colors and shapes, but I also loved solving problems," van Roosmalen says of her youth.

She moved to Pittsburgh in 1997 after graduating from Delft University of Technology in Delft, the Netherlands, with BS and MS degrees in industrial design engineering. She then earned her PhD in rehabilitation science and technology at Pitt. She focused her studies on product and system ergonomics, which then evolved into wheeled mobility and transportation safety.

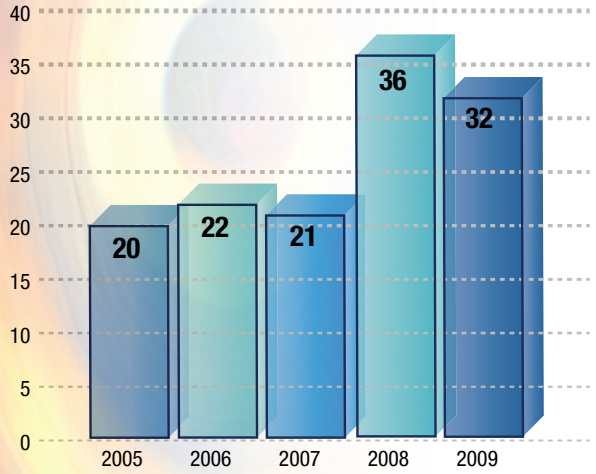
Van Roosmalen says that her research philosophy is simple: "I believe we can design technologies that take human error out of the equation" when it comes to developing safe technology for use by all. Each term, she teaches that perspective to groups of bioengineering and rehabilitation science and technology students who, as part of their course work, must solve real-world problems with their own innovative ideas.

"What I like to teach my students is to do useful research and go through a series of structured steps in the design process," van Roosmalen says. "They need to observe. They need to look at people. Then they need to go from functional analysis to innovation."

negotiations carried over to fiscal year 2010 for completion. Still, that brings the total number of licenses and options for Pitt technologies to 269 for the five years ending June 30, 2009.

As in past years, the Learning Research and Development Center's Institute for Learning contributed significantly to the licensing activity with its professional development materials for elementary and secondary school teachers and administrators. The materials are licensed to school districts across the country. Activity also included licenses or options to three start-up companies that were established around Pitt technologies (see the Start-up Activity section on p. 10 for more details).

U.S. Patents Issued



U.S. Patents Issued

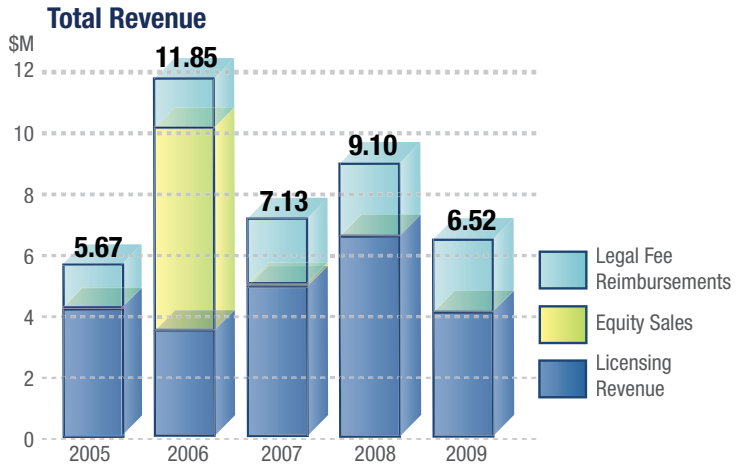
Patenting activity remained robust in fiscal year 2009, as the University continued to pursue vigorously the protection of intellectual property developed by Pitt Innovators. In fiscal year 2009, Pitt filed 105 new U.S. patent applications, up from the previous year's 100. Since 2006, the University has filed 461 U.S. patent applications.

Meanwhile, the U.S. Patent and Trademark Office (USPTO) issued 32 patents to Pitt in fiscal year 2009, adding to the 36 issued to Pitt in 2008. That brings the number up to 131 for the five years ending in fiscal year 2009. Due to a backlog of patent applications at USPTO, the latest awards represent applications that actually were filed by the University largely in 2004, 2005, and 2006.

Total Revenue

Total revenue, in line with technology licensing activity levels this past year, stood at $6.52 million for fiscal year 2009. As part of that total, legal fee reimbursements remained close to 2008 levels, finishing at

Total Revenue



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hideho okada

For Hideho Okada, MD, PhD, the passion for discovery crystallized during his student days at Japan's Nagoya University Graduate School of Medicine in the late 1980s.

"The fields of molecular biology and genetics were flourishing, and there was great promise that both fields could alter the way we treated medical issues," recalls Okada, associate professor in the Departments of Neurological Surgery and Surgery and coleader of the Brain Tumor Program at the University of Pittsburgh Cancer Institute. "Despite the optimism, though, there was still a discrepancy between standard treatments and the role of molecular science in medicine.

"I wanted to be a scientist who bridged that gap," he says. "I felt I was destined to do translational research, and, as a means of translating the science to clinical applications, I focused on immunology."

Today, that gap continues to close thanks to Okada's work on developing molecularly targeted vaccinations for gliomas—highly lethal primary tumors that aggressively invade the folds and creases of the brain.

Malignant gliomas constitute the majority of primary brain tumors and annually cause more than 12,000 deaths. Current treatments like chemotherapy and radiation are difficult to use successfully without damaging surrounding healthy brain tissue and can cause a variety of uncomfortable side effects.

Okada's research focuses on identifying and using multiple antigens—proteins found on the surface of tumor cells—to trigger an immune response to gliomas. To synthesize the antigen peptides, Okada and his team modify peptides to enhance an immune response by combining them with a class of helper peptides and dendritic cells. The dendritic cells are loaded with information about the tumor cells and will communicate with the T cells to initiate an attack on cancerous cells once the vaccine is introduced to the body. Okada's objective is an off-the-shelf vaccine that can be ready whenever and wherever needed.

"Time is critical in treating brain tumors," Okada explains. "Culturing a vaccine from a patient's own cells can take up to six weeks, allowing the patient's cancer to progress to the point where there is nothing more we can do clinically. We see our approach as more practical and potentially life saving."

The Office of Technology Management now is working with Okada to identify and attract corporate partners for broader multiphase trials that could lead to regulatory approval and commercial production of a vaccine. In the meantime, Okada is altering accepted medical thinking about the body's immune system and the ways it can fight disease.

"When I began, nobody recognized how antigens in the brain could be targeted," he says, "and the brain was considered immunologically privileged; science believed the immune system did not work there. We're demonstrating that you can train the immune system to recognize and attack cancer cells on its own in the brain."

Discoveries like these, he says, are what drive translational researchers like him.

"You develop a parent-like feeling for your research projects," he says. "I think of the protocols I develop as my children. They may have unexpected setbacks. You have to believe in what you're doing, stay with them, and work through the problems. But the time has to come, eventually, when I may have to let them go for further development."

$2.39 million in 2009. Licensing revenue, which made up the remainder of the overall revenue, totaled $4.12 million. Sales of equity from start-up companies formed around Pitt technologies totaled $10,476 in 2009.

Start-up Activity

OTM and OED, with support from several technology-based start-up business consultants and the recently established Commercialization Advisory Committee, actively pursued start-up development activities centered around Pitt technologies this past fiscal year. The advisory committee, made up of successful business and entrepreneurial leaders, including Pitt alumni, and economic development leaders, among others, provides constructive counsel to Pitt Innovators with technologies that have start-up potential.

Those combined efforts led to the establishment of several new start-up companies. Among them are the following:

Neograft Technologies, Inc.: Then bioengineering graduate students Lorenzo Soletti and Mohammed El-Kurdi teamed up with David Vorp, a professor of surgery and bioengineering, along with William Wagner, a professor of surgery, to develop a new device that provides temporary structural support to veins that are being used for arterial vein grafts (see the related profile of El-Kurdi and Soletti on p. 15 in this report).

The students, postgraduation, left the University early in 2009 to start Neograft Technologies around the biodegradable polymer-based technology, which the company licensed from the University. They established their offices and an assembly lab in an office building in the Oakland neighborhood of Pittsburgh. They also hired an experienced chief executive officer to run the company.

Venture Manufacturing Group, Inc.: This California-based product development company recently established a new start-up venture in the Pittsburgh region with the intent to develop a cost-effective working prototype of bioengineering professor George Stetten's handheld Sonic Flashlight ultrasound imaging system (see the related profile of Stetten on p. 3 in this report). The new venture then plans to take the system to potential customers to evaluate market interest in the medical device.

Kairos Instruments, LLC: This venture, based in the University of Pittsburgh Applied Research Center outside Pittsburgh, has developed lab instruments for live cell imaging. The instrumentation systems are based on live cell incubation and monitoring technologies developed by a research team led by Joel Greenberger, professor and chair of UPMC's Department of Radiation Oncology. His research team also included two Carnegie Mellon University professors.

Overall, the year proved to be productive for technology commercialization at Pitt, particularly on the front end of the process. Education, outreach, and our focus on better service continued to result in new innovations and greater participation in commercialization. The economic pause, meanwhile, allowed our combined staffs to take stock of what works and what needs to improve to push those innovations successfully through the process and into the hands of potential licensees. And it allowed us to lay the groundwork more effectively for guiding that success.

marco zenati

For Marco Zenati, a tenured professor of surgery at the University of Pittsburgh School of Medicine, a breakthrough begins with a practical vision.

"I look for a problem," Zenati says, "before I look for new methods and applications that solve it. I believe translational medical research must be bedside to bench to bedside. The clinical vision is based on what we experience at the bedside—you identify a medical need; seek collaboration to develop a solution; then bring it back to the bedside, where it benefits the patient."

Leveraging existing technology for new uses has led Zenati, who also is director of the Minimally Invasive Cardiac Surgery Program at the Mark Ravitch/Leon C. Hirsch Center for Minimally Invasive Surgery at Pitt, down a path that could make surgery less traumatic and more successful for millions of patients. Inspired by robotic devices developed at Carnegie Mellon University's Robotics Institute, Zenati worked with Carnegie Mellon researchers to develop a versatile robotic surgical probe, now called the Articulated Robotic MedProbe (ARM), and adapt it to a variety of surgical uses.

The tele-operated cardioARM, for example, is controlled with a joystick, enabling epicardial procedures from a subxiphoid single point of access on the body, compared to current devices that require multiple entry points. Highly articulated and flexible, the cardioARM readily assumes the shape of its surroundings as it moves through the body. It also remembers previous configurations as it moves back and forth, can navigate with far greater precision along nonlinear paths compared to conventional instruments, and provides the operator with nonlinear visibility. A channel within the device accommodates tools to perform various procedures.

By its very nature, the cardioARM promises a number of benefits for cardiac surgery patients, including reduced bleeding and trauma to tissue, less postoperative discomfort, faster patient recovery, and significantly lower risks compared to current procedures and equipment. The device also can be constructed of plastic and other low-cost materials, making it disposable.

Like much leading-edge medical research, Zenati says, collaboration was a key to developing the ARM. He credits a long list of colleagues and supporters—the pronoun "we" peppers his speech whenever he discusses his research—including Carnegie Mellon's Robotics Institute and Pitt's Office of Technology Management (OTM). OTM helped Zenati to navigate the licensing process and obtain outside funding to form Cardiorobotics, Inc., the local company that is taking the cardioARM into clinical trials and, ultimately, clinical use.

"The interinstitutional agreement between Pitt and Carnegie Mellon for commercializing research streamlined a great deal of the decision making," says Zenati, who also chairs the Cardiorobotics Scientific Advisory Board. "OTM was extremely helpful, both through its encouragement and with advice that helped us take the first steps toward commercialization."

The cardioARM will undergo its first human trial this fall in Prague, Czech Republic, by a team of interventional electrophysiologists headed by Vivek Reddy, an associate professor at the University of Miami. The company also recently hired a full-time chief executive officer and raised a second round of funding from outside investors. In addition to the cardioARM, the company now is developing ARMs for laparoscopic, endoscopic, and gastrointestinal applications.

"What we're doing is evolutionary, not revolutionary," Zenati says. "Everyone believed that robotics has a role in surgery, but we had to think bigger. So we went back to our own definition of minimally invasive surgery—providing the desired intervention with the least change to the body. Single-port robotic surgery lets you enter at a single point and reach around complex structures to navigate anywhere in the body, giving us that result.

"To me," Zenati adds, "that's the definition of translational research: find new, practical applications for existing technology beyond the inventor's original purpose."

engaging pitt innovators

Engaging Pitt Innovators

Behind every new innovation, behind every technology license and start-up company coming out of the University of Pittsburgh, are groups of Pitt faculty, staff, and students—Pitt Innovators—who are changing the world with their imagination, ingenuity, and resulting innovations. The Office of Technology Management (OTM) and Office of Enterprise Development (OED), Health Sciences worked diligently in fiscal year 2009 to educate and engage those innovators in the rigorous process we call technology commercialization. Our job has been to facilitate success in that process all along the way and to make an overall impact on the innovators, on Pitt research and education, and on the community.

Taking the longer-term view, OTM and OED this past year spent considerable time and resources working aggressively with Pitt Innovators to facilitate interactions between them and others, including a diversity of academic departments, potential industry partners, investors, entrepreneurs, and the technology-based economic development community.

Our goal is to foster meaningful relationships that support Pitt Innovators in their research and commercialization efforts—relationships whose impacts include new research collaborations; new ideas; new sponsored research partnership opportunities; educational and career opportunities for Pitt students; and, of course, new licenses and start-up companies.

In fact, to better support this goal and operate more efficiently within the technology commercialization realm, this past June, OED relocated from Pitt's Bellefield Hall to offices in the Gardner Steel Conference Center, where OTM is based.

Some of our combined efforts to educate and facilitate interactions can be measured tangibly according to our commercialization performance numbers. Others require a longer-term perspective that commits to the idea that, in time, these interactions, relationships, and opportunities will pay broad dividends on many levels, including effecting change in the entrepreneurial culture at Pitt.

We also should note that many of these initiatives received financial support from the Pennsylvania Department of Community and Economic Development's Keystone Innovation Grants (KIG) program. The commonwealth, recognizing the value of these programs in fostering innovation commercialization and entrepreneurship in the region, awarded OTM three successive grants to develop and support these innovative programs.

Consider the following activities, which we believe contribute significantly to the long-term, far-reaching success of both technology commercialization and the overall academic experience at Pitt.

Outreach/Education

Technology commercialization presentations: We plant the seeds for this cultural shift even before innovation commercialization begins. This past year, OTM and OED were invited to reach out to at least 15 different academic departments across campus with the comprehensive Pitt Innovator Primer Series presentation campaign. The program's goal was to introduce faculty, staff, and students to our offices; to the concept of technology commercialization at Pitt; and to some of the information needed, such as intellectual property issues, to begin the process effectively. We also hoped to motivate the more than 300 potential innovators who attended the program and received our materials.

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edward prochownik

Winston Churchill once described former U.S. Secretary of State John Foster Dulles as "a bull who carries around his own china shop."

Edward Prochownik, the Paul C. Gaffney Professor of Oncology Research and a professor of pediatrics, microbiology, and molecular genetics at the University of Pittsburgh, is fond of using this quote to describe the ways that some cancer-causing proteins can affect a cell's genome. Because such proteins cause widespread genetic instability, these cells are more likely to develop mutations that lead to cancer and that allow them to evolve even further, becoming metastatic or resistant to therapy.

Identifying and inhibiting the actions of cancer-causing genes such as these is the focus of Prochownik's research.

Working with a multidisciplinary team at Pitt and Georgetown University, Prochownik has targeted two oncoproteins, known as Myc and Max, that play a pivotal role in cell mutation and proliferation. Linked together, Myc and Max regulate hundreds of genes in our bodies, including many that promote cancer.

"Myc-Max binds to DNA and turns genes on and off, including those that control cell proliferation," Prochownik says. However, Myc also is required for normal cell reproduction. "Turning off" Myc randomly or otherwise inhibiting it could have devastating effects on normal cells. Prochownik's work takes advantage of the fact that normal cells tend to express Myc only when they are dividing, which occurs infrequently, whereas cancer cells express high levels of Myc most of the time.

Several years ago, Prochownik's research team identified several small molecules that inhibited the action of Myc-Max. Until recently, however, they didn't know how these molecules were working. Using techniques such as nuclear magnetic resonance (NMR) spectroscopy and fluorescence polarization, Prochownik and his team first showed that these molecules bound only to the Myc monomer and distorted it in such a way as to prevent its association with Max.

Then, they mapped the sites where those molecules bind and showed that only three sites bound every inhibitor and all subsequent structural variants. This allowed them to obtain NMR-based structures of the complexes, which then allowed them to design next-generation inhibitors more rationally.

One of the areas that really excites the members of the research team, Prochownik says, is their finding that, by chemically linking two of the small molecules that bind to different sites on Myc, they have been able to increase their potency as much as 5,000-fold.

"It took us more than a year to even think of doing this, says Prochownik. "We were very lucky."

Prochownik notes that cancer is not the only disease defined by excessive cell proliferation and high Myc levels. Others include diabetic retinopathy, macular degeneration, and atherosclerosis. So targeting Myc with these small druglike compounds might be a way to treat these diseases as well.

Prochownik and his collaborators have identified and tested a number of potential Myc-Max inhibitors and modeled their behavior. The next steps include testing in animals and developing precise delivery systems.

The Office of Technology Management (OTM) is working with Prochownik's team to identify and secure a partnership with outside sources that can take its discoveries to the next phases of clinical trials and move closer to eventual clinical use.

"We're an academic laboratory," Prochownik notes. "We're not positioned to develop drugs. But we are very interested in finding better-designed drugs and collaborating to improve their delivery in the body. OTM helps to make that collaboration possible."

Prochownik makes it clear that he works as part of a team, naming a long list of colleagues, partners, and others who contribute to the ongoing research.

Says Prochownik: "You can't say enough about the benefits of collaborating with people who have the complementary expertise this requires."

engaging pitt innovators

Academic Entrepreneurship: OTM, in conjunction with the Office of the Provost, continued to host its educational course for faculty, staff, and students, titled Academic Entrepreneurship: The Business of Innovation Commercialization, in fall 2008. Last year, OTM revamped its eight-week course, which was administered by the Center for Executive Education at the Joseph M. Katz Graduate School of Business, to include a more hands-on approach that would allow participants to apply what they learned to their own commercialization efforts. The improved course attracted 26 participants from across campus. That brings the total number of faculty, staff, and student participants to more than 150 since the course's inception in 2003.

From Benchtop to Bedside: In spring 2009, OED once again hosted its 10-week course, titled From Benchtop to Bedside: What Every Scientist Needs to Know. Thirty-four physicians and scientists graduated from the program—the course's largest attendance ever, adding to the 58 who had taken the course in the previous two years alone. As part of the course, Katz MBA students attended the course for credit and worked with faculty attendees to develop commercialization strategies and provide market research and competitive analysis. In addition, OED developed and ran a new five-part short course in late spring 2009 with two modules, Intellectual Property and Regulatory/Reimbursement.

Limbach Lecture Series: Six lectures over the course of fiscal year 2009, hosted by OED, brought together more than 140 Pitt faculty members, local entrepreneurs, investors, economic development leaders, and industry representatives to explore the practical realities of technology commercialization and entrepreneurship.

Commercialization Fellowship Program: In fiscal year 2009, OTM and OED continued their successful educational partnership with select undergraduate and graduate business students. The students, who also attended OTM and OED's annual educational courses, worked directly with licensing managers and business development professionals to provide market research, competitive analysis, intellectual property management support, and commercialization strategy development on behalf of Pitt Innovators. In fact, OED established a more formal partnership with the Joseph M. Katz Graduate School of Business to match Pitt Innovators and their innovations with teams of students who then developed such strategies. Teams worked with seven Pitt Innovators on joint projects.

International visitors: Working in partnership with GlobalPittsburgh, OTM played host throughout the year to delegations of educators and community leaders from the Czech Republic, Poland, Russia, China, and nations in South America, among other countries, all of whom expressed an interest specifically in Pitt's aggressive technology commercialization and entrepreneurial education activities.

Commercialization Coaching Cards: OTM and OED distributed more than 1,000 of the business card-sized cards to Pitt Innovators across campus in fiscal year 2009. The cards feature 10 tips to remember when promoting one's innovation to outside interests, particularly at conferences and other events. We developed the cards as a teaching tool for those who have entered the commercialization process at Pitt.

Facilitated Interaction

Building industry relationships: Together, OTM and OED conducted more than 100 meetings this past fiscal year with representatives from large pharmaceutical companies, investors, and other drivers of technology-based entrepreneurship. In some cases, staff members aggressively pursued such meetings at a number of large industry conferences, including the BIO International Convention, BIO-Windhover, Biotech 2008, BioPharm America, the Association of University Technology Managers (AUTM) annual conference, and other international industry events. In addition, OED staffers visited several companies, bringing with

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mohammed el-kurdi

lorenzo soletti

These days, Mohammed El-Kurdi and Lorenzo Soletti are getting their first taste of the realities of the entrepreneurial life. They're scrambling to furnish their new offices in an Oakland office building; equip their small assembly lab; order parts; hire new employees; and generally map out the future of their new start-up, Neograft Technologies, Inc.

Such challenges seem almost a world away from the nearby bioengineering labs at the University of Pittsburgh, where both scientists developed research projects that would lead not only to PhDs in bioengineering but also to innovations that would become the basis for their new company.

"There's a very steep learning curve," El-Kurdi, who has assumed the role of director of science and engineering at the fledgling company, says of the jump from academic research to business. "I always wanted to create a company, but I needed to learn more. Training myself to act more like a businessman versus a scientist isn't easy."

El-Kurdi and Soletti began their commercialization journey as doctoral students in the Bridgeside Point-based University labs of David Vorp, a professor of surgery and bioengineering, and William Wagner, also a professor of surgery. The professors and their teams had been doing research on arterial vein grafting for a number of years already when the two students approached them looking for projects from which to develop their dissertations.

Eventually, the research team developed a biodegradable polymer-based wrap for arterial veins that provides temporary structure and support in vein grafting procedures.

"It's like a girdle for a vein," says Soletti, a native of Rome, Italy, who now serves as director of product development at Neograft.

Moreover, they developed both a technique and a machine that uses electrospinning to wrap the vein effectively prior to the grafting procedure. Neograft plans to develop further both the wrap and the machine delivering it, ultimately targeting patients and surgical centers, respectively.

"Our goal was to add on to Dr. Vorp's and Dr. Wagner's research in mechanically training veins and electrospinning," Soletti says of his mentors' long-time research endeavors. Adds El-Kurdi: "We just put A and B together to control the mechanical environment of vein grafting."

But, as Vorp also suggests, "The idea went through many permutations."

Helping El-Kurdi and Soletti along in their commercialization efforts was the fact that both former students expressed an early interest in their entrepreneurial aspirations. To bridge the gap between their scientific studies and their evolving business interests, both immersed themselves in entrepreneurial education opportunities at Pitt.

Both, for instance, attended the Office of Enterprise Development's 10-week course, From Benchtop to Bedside: What Every Scientist Needs to Know. Soletti also attended the Office of Technology Management's eight-week course, Academic Entrepreneurship: The Business of Innovation Commercialization, which is cohosted by the Office of the Provost.

Apparently, the lessons they learned paid off. Both note that their first presentation to pitch their idea to potential outside partners included "15 slides about the science" and very little about the value proposition. Eventually, they refined it to include "only one slide" about the science.

"Basically, we realized our initial limitations" in the entrepreneurial realm, El-Kurdi says.

That also prompted the company's cofounders to "find a leader with a Rolodex," says Soletti. Thus, they recruited an experienced chief executive officer to run the company and lead its fundraising efforts.

Vorp says he is happy to see his former students commercialize the research group's innovation and build a career opportunity for themselves and others.

"This is a very translational environment, and I try to instill in my students the idea that they should seek out opportunities," says Vorp. "But not every student has an interest. This is exciting, though. We feel like we've got a winner."

engaging pitt innovators

them not only technology licensing opportunities but also opportunities for potential research collaborations and other sponsored research partnerships. Pitt Innovators joined OED on several of those trips. Among the roster of companies introduced to Pitt's research and commercialization endeavors in fiscal year 2009 were Johnson & Johnson; Bayer AG; PGxHealth; Pfizer Inc; Centocor, Inc.; GlaxoSmithKline plc; Sanofi-Aventis U.S. LLC; BD; Baxter International Inc; Vertex Pharmaceuticals; Roche; Takeda Pharmaceutical Company Limited; Teva Pharmaceuticals USA; Novo Nordisk A/S; Novartis AG; Eli Lilly and Company; and Merck & Co., Inc. This past year, such discussions led to numerous material transfer agreements, corporate gifts, licensing discussions, and new sponsored research partnerships.

Science2008 showcase: This annual campus event, held in October 2008 and hosted in part by OED, showcased posters of 22 Pitt technologies available for licensing. More than 130 people attended the reception, including local business leaders and investor group representatives. Prior to the event, OED paired the 22 Pitt Innovators with business-savvy mentors from the local entrepreneurial and investment communities in an effort to prepare effective value propositions and "elevator" pitches. The showcase was part of the University's annual Science conference.

i-Lab Innovation Brainstorming Workshops: This past spring, with financial support from Pennsylvania's KIG program, OTM and OED conducted innovation application brainstorming sessions with two Pitt Innovators and select groups of creative, imaginative peers from both inside and outside the University. During the three-hour sessions, which were professionally facilitated, participants explored dozens of new applications for two different innovations that emerged from research in the microbiology and molecular genetics and electrical and computer engineering departments. Several innovation brainstorming sessions are planned for fiscal year 2010 as well.

Innovator "speed dating": OED carried its tightly structured speed dating concept into 2009 with a March program between nearly two dozen prescreened faculty members and 11 local partnering organizations, including Novitas Capital, Corridor Venture Partners, Birchmere Ventures, BlueTree Capital, the Pittsburgh Life Sciences Greenhouse (PLSG), and Innovation Works (IW), as well as successful local life sciences entrepreneurs. The program has since led to additional collaboration discussions among some participants.

Many of OTM and OED's activities are designed to encourage creative interactions among Pitt Innovators, industry, local investors, economic development groups, and entrepreneurs.

From left to right: an i-Lab Innovation Brainstorming Workshop, Science2008 showcase poster reception, and an Innovator "speed dating" session

Funding facilitation: OTM and OED continued to work closely with Pitt Innovators in fiscal year 2009 to identify commercialization funding and other internal and external resources needed to move their innovations closer to the commercial market. OED, for instance, maintains expertise in Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) funding and therefore could assist innovators in applying for such federal grants. The efforts last year resulted in numerous proposals and at least one award in which a Pitt research endeavor will receive funding via a subcontract with an academic department. OTM and OED likewise assisted with facilitating interactions between Pitt Innovators and the state-funded Pittsburgh Life Sciences Greenhouse and Innovation Works.

Facilitation of other resources: OTM and OED employed the use of several business consultants, as well as teams of students from the Joseph M. Katz Graduate School of Business, to develop comprehensive commercialization strategies for specific technologies. At least one of those efforts already has resulted in a start-up company.

Celebration of Innovation: As in the previous three years, OTM and the Office of the Provost began the fiscal year with a celebration recognizing Pitt Innovators and their willingness to participate in the commercialization process in the previous year. More than 50 innovators whose technologies were licensed to industry or start-up companies in 2008 were presented with Pitt Innovator Awards at the ceremony. All told, the event drew more than 150 attendees from across academic disciplines.

Facilitating such collaborative interactions, we believe, lies at the core of what it takes for OTM and OED to manage successfully the technology commercialization endeavor at the University. As we bring more people from diverse disciplines and diverse outside groups together for meaningful dialogue and true partnering opportunities, we expect the impact to be felt at every level across campus, benefiting not just technology transfer but also Pitt's research, education, and community service missions.

We do expect to continue building on that momentum as we enhance our commercialization initiatives and explore new opportunities for our Pitt Innovators and their innovations in fiscal year 2010. In the meantime, we will continue to trumpet the successes of Pitt Innovators from across the campus to the community, to industry, and to the world as they work to change the world with their imagination, ingenuity, and innovation.

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Office of Technology Management

412-648-2206
www.otm.pitt.edu

Daniel Bates
Strategic Relations Manager
412-624-4474

Michelle Booden
Technology Licensing Manager, Life Sciences
412-648-2220

Brian Copple
Technology Licensing Manager, Physical Sciences
412-648-2208

Carla Crawford
Executive Assistant to the Associate Vice Chancellor for Technology Management and Commercialization
412-383-7665

Alexander Ducruet
Technology Licensing Manager, Life Sciences
412-648-2219

Sandy Latini
Business Manager
412-383-7664

Jessica Lindsay-Green
Intellectual Property and Licensing Associate
412-648-2225

Marc Malandro
Associate Vice Chancellor for Technology Management and Commercialization
412-624-8787

Kelly Mertz
Financial Analysis Manager
412-383-7139

Chiara Orsini
Associate Director, Intellectual Property
412-648-3220

Martania Penn
Intellectual Property Assistant
412-648-2201

Susan Rudzki
Government Compliance Administrator
412-648-2203

Lisa Spano
Technology Licensing Assistant
412-648-2206

Emily Stayshich
Accountant
412-648-2226

Harold Swift
Technology Licensing Manager, Physical Sciences
412-648-2236

Stacey Thomas
Accountant
412-648-2241

Maria Vanegas
Technology Licensing Associate, Life Sciences
412-648-4004

Carolyn Weber
Technology Marketing Manager
412-383-7140

Office of Enterprise Development, Health Sciences

412-624-3160
www.oed.pitt.edu

Michele Honko
Marketing Associate
412-624-3152

Paul Petrovich
Assistant Director, Technology Commercialization
412-624-3138

Amy Phillips
Business Development Associate
412-624-3150

Andrew Remes
Assistant Director, Business Development
412-624-3134

Karen Zellars
Administrative and Program Coordinator
412-624-3160

The 2009 OTM annual report is dedicated to our Pitt Innovators, whose imagination, ingenuity, and innovation are changing the world.

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University of Pittsburgh

Office of Technology Management
200 Gardner Steel Conference Center
Thackeray and O'Hara Streets
Pittsburgh, PA 15260

www.otm.pitt.edu

Office of Enterprise Development
101 Gardner Steel Conference Center
Thackeray and O'Hara Streets
Pittsburgh, PA 15260

www.oed.pitt.edu