

Office of Intellectual Property and Innovation 2018 Annual Report

Theory, Practice and Impact From WPI Innovation



Commissioner of the US Patent Office, Drew Hirshfeld, with President Leshin and students Tyler Marshall, Harry Chartoff, Joe Switzer, and Anna Kjelgaard receiving their Honorary National Academy of Inventor Certificates at this May's Chapter meeting.

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The **Value Proposition** of the Office of Intellectual Property and Innovation (IPI) is to accelerate the transfer of WPI discoveries from the lab to the market for the benefit of society on a local, national and global basis.

As you can see from the above picture, we had an exciting National Academy of Inventor's chapter meeting in May. Drew Hirshfeld, Commissioner of the US Patent office joined President Leshin and Vice Provost Vernescu in celebrating a record number of student honorary members for filing a patent, a record number of new faculty members for receiving an issued patent, and a record number of student and faculty members who were recognized for licensing their patents. There is a nice article from the Worcester Telegram at the end of this report describing this event.

Another new activity this year was to utilize WPI's new Seaport location. Two events were held. The Innovation Showcase, which featured up and coming technologies that may not be the subject of a startup, but are looking for commercial feedback and potential licensing. Several connections were made from the 13 presentations. We also held a Startup showcase, which featured 11 companies that were in varying stages of fund raising. Over 30 investors attended with a few companies getting invitations for follow up meetings. IPI plans on continuing these activities in FY 19 and hopefully build on previous meetings each year going forward as quality, go to events.

The IPI office received 47 invention disclosures, filed 37 provisional patents, converted 20 patents to utility patents, and received 16 issued patents. 11 licenses were signed.

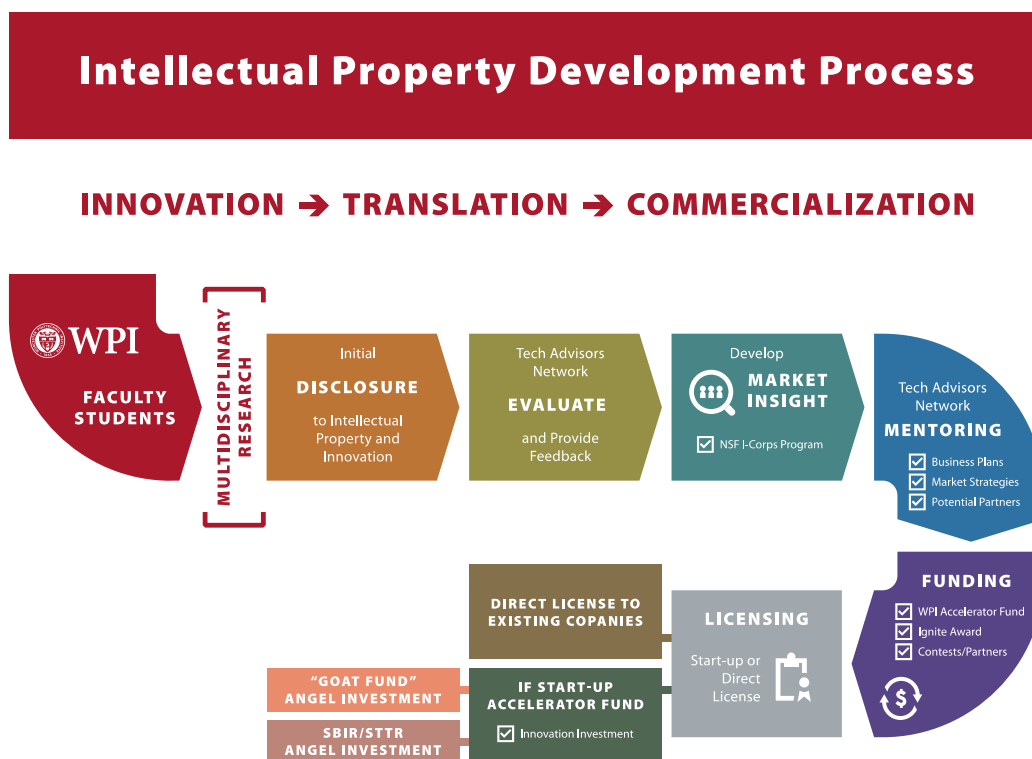
The Accelerate WPI program (based on the I-Corps Site program) held a second cohort of 5 teams in the fall of 2018. Each team once again, "pivoted" from their original idea after going through the sessions and conducting 30 customer interviews. 2 of the teams are actively pursuing their ideas with the hopes of starting a company. There were 2 graduate student based teams and 3 undergraduate teams. WPI has just been notified that it will be funded to be an I-

Corps Site. WPI will be able to train 20 teams per year for the next three years. In addition to receiving \$3000 per team to “get of the building” and conduct their 30 customer interviews, there will be a pool of \$10,000 per year available for prototyping. This is very exciting as this program will sell out. The challenge will be how to manage more than 20 teams per year!

IPI continues to work closely with the TAN program in a variety of ways. IPI is a “feeder” of potential TAN presenters and it is hoped the I-Corps program will continuously improve the quality of teams being presented to the TAN audience. IPI continues to assist in the implementation of the program as well as volunteer to be on a variety of TAN teams. IPI also relies on TAN to provide the mentors that are needed for the I-Corps program. This is especially important as WPI moves from 5 teams to 20 teams per year. Another service TAN can provide is the TAN IP Evaluation group. These members can be anywhere geographically and receive the new discoveries at their earliest stage. Once WPI files a provisional patent, a package of information goes out to those with content expertise in the field of the discovery. It is hoped that their expertise can be tapped to help guide WPI where to best invest in its intellectual property.

Various TAN members have other expertise that can assist, such as legal advice on company formation, financial modeling for early stage companies, and presentation/pitch coaching. The use of these groups helps WPI leverage their talents while reducing the need to build an internal administrative infrastructure to accomplish the same goals.

The process that WPI takes with its intellectual property is best described in the road map below:



The number of students and faculty that are being touched by IPI continues to grow. The percentage of faculty that have interacted with IPI is now well over 30%. The number of student teams coming through now range from Mass Academy (WPI's junior/senior year high school) through post doctorate students.

The opening of the new Foisie Innovation Studio will facilitate what we expect to be another record year of student initiated intellectual property.

WPI initiated a Patent Board in FY 18, which is designed to provide strategic input to the IPI office. The Board reviewed the IPI activity and settled on three major goals to achieve. There is a target number of new invention ideas to be generated, or “disclosures” that would enter the process above. As the ideas go through the process, there is a target number of licenses to be signed. Without a license, there isn’t the potential for a product. There is an adage of “our ideas are going to be worth something to somebody and they create jobs and value to our society.” The goals are based on comparing WPI to peer engineering schools based on their performance handicapped by the amount of research funding going through the school. Research funding is used as many inventions require some sort of bench research to develop the data that would lead to a patent.

The table below shows the performance vs those goals. We also looked back to when IPI was first formed. You can see that the number of disclosures has doubled in that time, licensing is significantly improved, and this was done with only a modest increase in patent expense.

INTELLECTUAL PROPERTY AND INNOVATION GOALS AND PERFORMANCE

Objective	Actual	Goal	% of goal	2012
Disclosures	47	38	121%	21
Licenses	11	6	182%	1
Net Expense	\$356,217	\$381,000	93%	\$303,401

Patents issued in FY 18

Patent No.	Issue Date	Title	Inventors
9,707,422	7/18/2017	Transport Container Flame Arrestor	Brian Elias, Ali Rangwala, Robert Zalosh
9,713,428 B2	7/25/2017	Physiological Parameter Monitoring With A Mobile Communications Device	Ki Chon, Jinseok Lee, Nandakumar Selvaraj
9,730,486	8/15/2017	Self-Recovering Impact Absorbing Footwear	Christopher Brown, Michael Doyle, Jessica Shelsky, Nicholas Workman
9,738,830	8/22/2017	Non-Calcium Geopolymer Stabilizer	Mingjiang Tao, Mo Zhang

2665410	8/30/2017	Physiological Parameter Monitoring With A Mobile Communications Device	Ki Chon Jinseok Lee, Nandakumar Selvaraj Kemal Arsava, Glenn Mahnken, Ali Rangwala, Xiaochuan Shi
9,772,108	9/26/2017	Methods And Systems For Clean-Up Of Hazardous Spills	Diran Apelian, Yan Wang, Haiyang Zou
9,834,827 B2	12/5/2017	Method And Apparatus For Recycling Lithium-Ion Batteries	Gregory Cole, Gregory Fischer, Julie Pilitsis
9,844,414	12/19/2017	System and Method for Robotic Surgical Intervention	Benzun Babu, David Cyganski, Reginald Duckworth
9,846,042	12/19/2017	Gyroscope Assisted Scalable Visual Simultaneous Localization And Mapping	Cagdas Onal, Selim Ozel
9,857,245	1/2/2018	Soft-Body Deformation And Force Sensing	Christopher Berthelette, Matthew Dipinto, Thane Hunt, Marko Popovic, James Sareault
9,879,767 B2	1/30/2018	Actuation Systems And Methods	Ki Chon, Lee Jinseok
9,888,866 B2	2/13/2018	System For Extracting Respiratory Rates From A Pulse Oximeter	
9,905,052 B2	2/27/2018	System And Method For Controlling Immersiveness Of Head-Worn Displays	Robert Lindeman
9,931,437 B2	4/3/2018	Matrix Scaffold With Antimicrobial Activity	Terri Camesano, Tanja Dominko, Denis Kole, Christopher Malcuit, Fioleda Prifti, Marsha Rolle
9,986,921 B2	6/5/2018	Detection And Monitoring Of Atrial Fibrillation	Ki Chon, Jowoon Chong
9,996,925 B2	6/12/2018	System and Method for Assessing Wound	Emmanuel Agu, Qian He, Peder Pedersen, Diane Strong, Bengisu Tulu, Lei Wang

Licenses signed in 2018 were:

Kinetic Batteries (2 patents) – inventors Aaron Birt and Diran Apelian

<https://www.kinetic-batteries.com/>

DxNow, a joint invention with Stanford, Erkan Tuzel

<http://dxnow.com/>

Melt Cognition – Diran Apelian

StrandSmart – Balaji Panchapakesan

Histogen – Marsha Rolle, Fioleda Prifti, Chris Malcult, Terri Anne Camesano, Tanja Dominko, Denis Kole

<http://www.histogeninc.com/>

Centauri Surgical – Greg Fischer

LifeLine4Moms – Bengisu Tulu

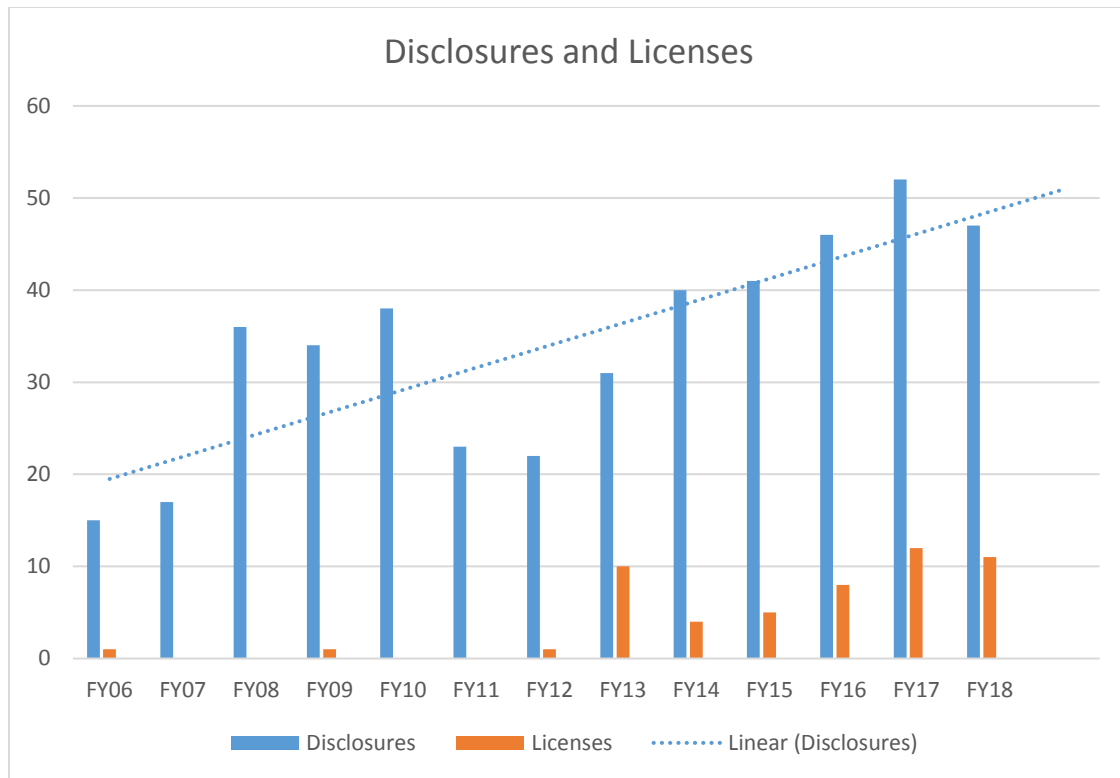
<http://www.lifeline4moms.org/>

Student Inventions

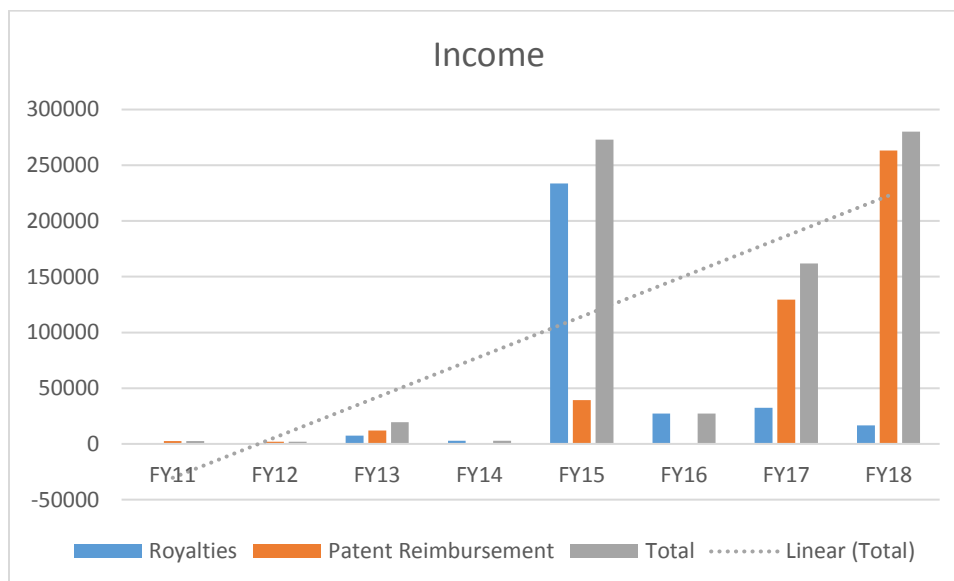
Students Saraj Pirasmepulkul and Brandon Lam – RUMER: robot for urban mining and E-waste recycling – 1% license

Student Caleigh Waskowicz – The Pick Me up Stander Walker, 1% license

Students Leo Bunyea, Nathalie Bloniarz, Kate Olguin, Brian Rubenstein – Gotta Go, 1% license

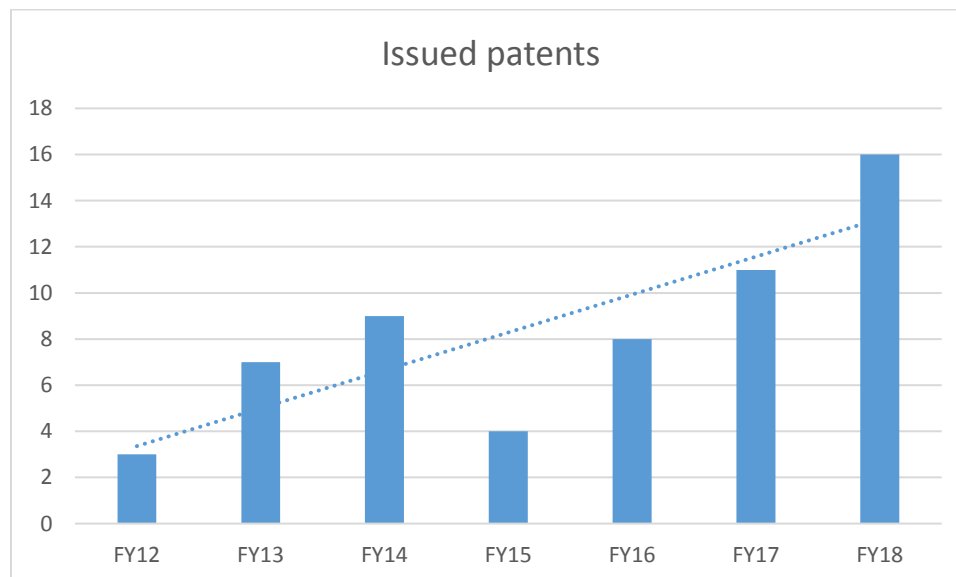


There was a slight decline in disclosures and licenses in FY 18, but FY 19 has begun extremely strong with 12 disclosures in the first two months and 2 licenses signed and 6 in negotiation.



IPI had a strong year financially in 2018. This is mostly due to the fact that the licenses that were signed in the past are now beginning to mature. Several are now reimbursing WPI for past patent expense and paying ongoing patent expense. Often these are the largest patent portfolios, so it really reduces the burden to WPI. A record \$263k was paid as patent expense reimbursement, which caused WPI to exceed the national reimbursement of 40% for the first time. Royalties were modest, but IPI has already collected \$36k in royalties in the first two months of the year. One of the companies, Global Fire Products, is forecasting sales in the fall of 2018, which would begin generating routine royalties from product sales. Several other companies are getting close to launching products in FY 2019 as well.

Issued Patents



This was a record year for issued patents. Of the 16 that issued, 9 have been licensed and are being reimbursed for their costs.

Funding is a critical factor in moving the intellectual property to market and is often extremely difficult to obtain as academic intellectual property is usually very early in the development stage vs the research stage. The IP often finds itself in the “valley of death” as it is too early for traditional forms of capital. WPI has developed a flow of funding sources to turn this into a “valley of birth” for these promising ideas. Here is the flow of potential funding. The “Goat fund” is in its early stage of discussion among alumni that are interested in investing in WPI related companies. Many of these alumni will be TAN members who will have been able to track companies from their most early stages in I-Corps through TAN and the earliest seed funding.

The I-Corps program will provide 20 X \$500 awards for prototypes per year

The I-Corps program will provide 20X \$3000 awards for customer discovery

The Accelerator Fund Ignite award will provide 10x ~\$5000 awards to get better prototypes or continue customer discovery

The Accelerator Fund Innovation Investment will provide ~ 3x \$50,000 investments to promising start-ups that need a bridge to their first funding

The promising startups will apply for SBIR/STTR grants of \$75000-\$150,000

Friends and family are the next typical funding source of a startup - \$100,000



The “Goat Fund” an external angel fund of WPI alumni would fund in the \$100,000-\$250,000 range



Traditional Angel Funding provides \$250,000-\$750,000



Venture Capital funding of \$5-10 million

BluStream and Battery Resourcers are two examples of WPI start-ups that have gotten to this stage



Successful exit via IPO or Acquisition

WPI Start-ups

WPI Startups now have 36 FTEs and have raised close to \$13 million in capital. Of the 17 listed below, 13 are in the Worcester area.

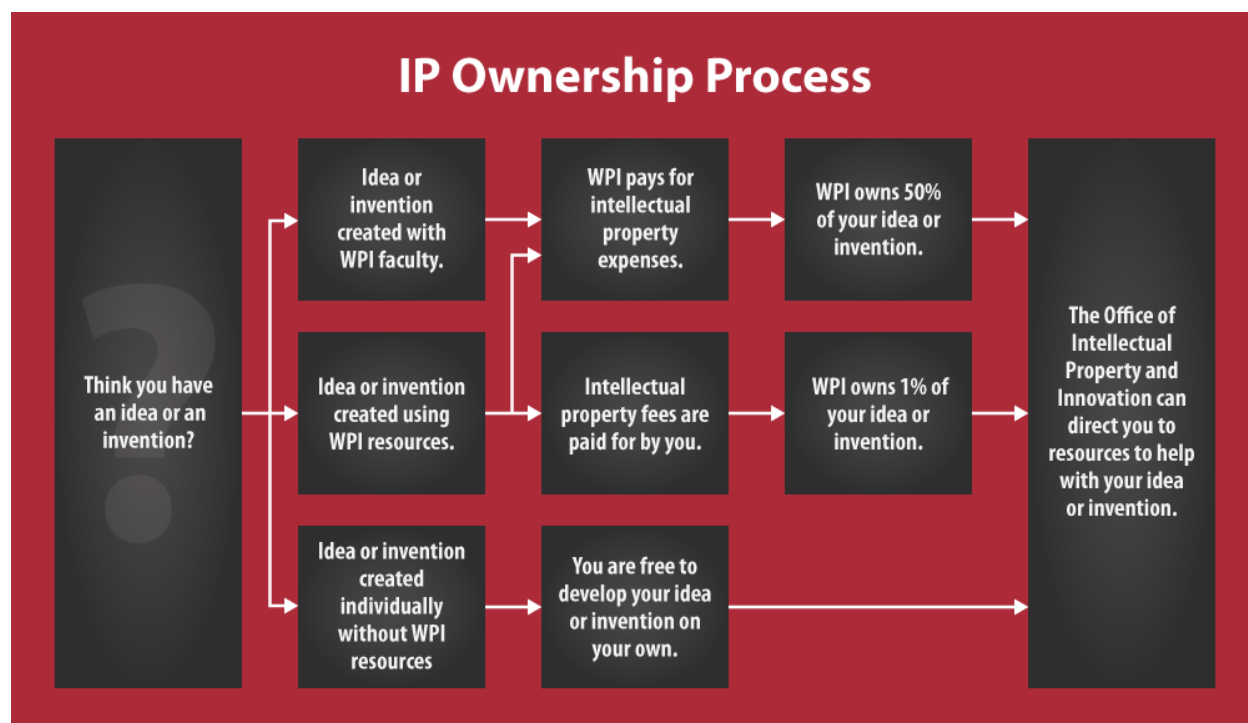


It is the intent of the IP Policy of WPI to foster and touch as many inventors in the faculty and students as possible and help them achieve the maximum potential for commercial success. The mission of the IPI department is to accelerate the transfer of WPI discoveries from the lab to the market for the benefit of society on a local, national, and global level. Several hundred faculty and students are exposed to the IP program each year. As previously mentioned there is a high percentage of faculty and a record number of students involved with the intellectual property process which is expected to increase.

Students are encouraged to be a part of this process, and the IP Policy was re-written in 2016 to facilitate and encourage student innovation. The grid and FAQ below was written by students and tested with students to make sure they understand what their rights are for their innovations. WPI would like to be totally flexible so that a student never feels that WPI is hindering their ability to exert their freedom to innovate. As a result an increasing number of student teams have engaged with IPI. 42 students were inducted into the National Academy of Inventors Honorary member WPI chapter this year.

For students, it is really simple: you invent something all on our own, it is yours. You work on something as part of a course and you use significant WPI resources, it still can be your own. We ask that you disclose and consider having WPI be a part of your discovery and assign 1% of the invention to WPI. This does not mean 1% of a company that you may form, but 1% of the invention, which WPI is flexible in defining. The main point is to stay in touch so WPI can help you achieve the maximum ability for success.

Using the Gordon Library , Foisie Innovation Studio, or other study locations for your personal intellectual property is not considered significant use. WPI would still like to hear from you and assist you with your entrepreneurial efforts.



FAQ for Students

- **What is intellectual property at WPI?** At WPI, Intellectual property refers to any idea or invention you have created that has the potential to become a patent, trademark, copyright, or trade secret.
- **What counts as Intellectual Property for me as a WPI student?** If you created an invention on your personal time at WPI, through IQP or MQP, for a class project, or for a professor, then you have created a piece of intellectual property.
- **How do I protect my idea or invention?** First, determine if you created your work separately of WPI or with WPI.
- **What if my work is independent of WPI?** If you created your invention without using any WPI resources and purchased the material on your own, then your invention is your own and WPI's Office of Intellectual Property and Innovation can provide help when it comes to marketing your invention.
- **What if I created my work independent of WPI but I want WPI to cover the patent application costs?** You have the option of being treated as a WPI faculty member where WPI will cover your patent expenses and the profits will be split 50/50.
- **What if I created my idea or invention using WPI's resources and/or with a WPI professor?** You have the option to pay for the intellectual property expense on your own and WPI will own 1% of your invention or you will be treated as a faculty member where WPI will cover your patent expenses and the profits will be split 50/50.
- **What if I created my idea or invention with a WPI faculty member?** You will be treated as a faculty member where WPI will cover your patent expenses and the profits will be split 50/50.
- **What if I want to work with a company on my idea or invention?** The IPI can provide you with a nondisclosure agreement to allow for you and the company to work with one another on the invention.
- **How will WPI help me market my idea or invention?** WPI has developed a unique group called the [Tech Advisors Network](#) that the IPI will connect you with to help with marketing your work.

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<https://www.wpi.edu/offices/intellectual-property-innovation>

See this article from the Worcester Telegram from May:

Editorial: Remaking Worcester - The union of theory and practice

Posted May 12, 2018 at 12:01 AM Updated May 12, 2018 at 6:25 PM

Worcester's Renaissance, one in which the city moved from one-time industrial giant that was down on its heels to a rising city of knowledge, is exemplified by a celebration Monday of a remarkable year at WPI.

At a meeting of the WPI Chapter of the National Academy of Inventors, the university honored 42 students who among them had filed about a dozen patents on their inventions this past year, and 22 faculty members who were issued 16 patents by the U.S. Patent and Trademark Office, and - most critically – five other patents developed by faculty, and in one case by three students working with a faculty member, that were licensed to businesses for commercial development.

Each of those categories represented a record for the institution. All coming in the same year is the result of an expanding focus on innovation and entrepreneurship that has been part of the college's DNA going back to its founding, but which is reaching a new level under WPI President Laurie Leshin.

Todd Keiller, director of the school's Office of Intellectual Property and Innovation, arrived six years ago, just prior to Ms. Leshin in 2014, to oversee and organize the filing and processing of patents and, once granted, their commercial licensing. No active patents were under license when Mr. Keiller arrived. Today there are 14 active companies, 11 of them in the Worcester and the immediate area, started by faculty as well as students that are using licensed technology from WPI. It's a pool of promise that holds the potential for growth benefiting not just the people behind these startups and WPI, but that also can impact the community as well. And it's part of a campus ecosystem involving not just faculty and students, but also alumni who work with them, acting in a coaching and counseling capacity.

This sort of ferment of discovery and creation didn't develop by accident.

It's a cycle of innovation and entrepreneurship, one in which Ms. Leshin supports not just for the opportunity it provides WPI, but for also contributions it can make in the community as a whole in creating home-grown enterprises and job opportunities, according to Mr. Keiller. In fact, he said, it's so important that Ms. Leshin is creating a position overseeing innovation and entrepreneurship on campus that will report directly to her.

WPI recently opened its Boston's Seaport facility, a place where the university showcased 14 presentations by inventors that resulted in potential investors interested enough that they're coming to Worcester for a follow-up meeting. Had the initial presentation been held in Worcester, it's unlikely that any would have come in from Boston to see it. Another presentation, this one for startup investors, is planned for June 14.

Apart from what's happening on the main campus, just on the other side of Institute Park, is the university's Gateway Park, a 12-acre office and research park that includes the WPI Life Sciences and Bioengineering Center and space leased as a business incubator. Some of the WPI work honored Monday came from there.

It's fitting that the park sits next to a link not only to WPI's history but Worcester's storied industrial past. John Boynton, who made his fortune manufacturing and selling tinware in Templeton, and Ichabod Washburn, of the Washburn and Moen Manufacturing company in Worcester, separately came up with the idea of starting a new school. Mr. Boynton envisioned a school focused more on the science and theory, and Mr. Washburn on technical training and apprenticeship. It just so happened that their separate ideas were put in front of the same man for advice. While it required some negotiation, what ultimately emerged was the idea for a school that would combine "theory and practice." Neither man lived to see what would become WPI open in 1868.

But in its fullest sense, the fruits of their union of theory and practice, is what was celebrated on Monday.

And it's the Washburn and Moen mill building, once the world's largest wire mill, that sits along Grove Street by the Gateway Park, a re-purposed vestige of Mr. Washburn's efforts back when Worcester previously hummed with invention and industry.

A similar creative energy has emerged across the community, fueled in a major way by its institutions of higher learning. On the other side of Worcester, for instance, is the city's largest biotechnology research park, alongside the University of Massachusetts Medical School, itself fueling a burgeoning biotech

sector with its own string of success stories. It's a new Worcester, in a very different way, that's humming with invention and industry.