Office of Intellectual Property and Innovation

2016 Annual Report

Theory, Practice and Impact

From WPI Innovation
The Office of Intellectual Property and Innovation (IPI) is charged with fostering the development of meaningful intellectual property that has commercial potential and facilitating the movement of the intellectual property on a commercialization pathway. Getting patents for the sake of having patents is not the goal, but rather focusing the resources on those ideas that have the best probability of becoming a product or having broad economic impact.

WPI inventors generated a record 47 invention disclosures in FY 16. Correspondingly, a record number of 82 provisional, utility and PCT (foreign protection) patents were filed. To help manage this, the IPI has formed the Tech Advisors Network IP Evaluation group. There are now over 40 alumni volunteers who look at new provisional patent filings and then step forward to review the IP with the inventor. This has resulted in certain patents to be dropped based on their feedback, while others are adjusted for better commercial potential. Several of these meetings have resulted in networking by the team to contacts in potential licensees. This “warm” introduction has been getting a serious review of the technology.

In addition to this effort, IPI uses LinkedIn to find WPI alumni at targeted licensing candidate companies. This has had a very high success rate and the alumni are generally thrilled to help their alma mater. Both the IPI Evaluation team and the LinkedIn efforts have resulted in positive engagement of WPI alumni.

Another new initiative in FY 16 was the formation of the WPI Chapter of the National Association of Inventors. This is a way to honor faculty members who have gotten issued patents. WPI expanded the program by including students who have applied for a patent, and alumni that have issued patents as honorary members. In addition to issued patents, those faculty who have licensed their patents are recognized. The highest honor is entry into the WPI Inventors Hall of Fame. This goes to a member who has not only licensed their idea, but the idea has resulted in a product that is on the market. WPI held their inaugural Chapter ceremony in March where it inducted 30 members, 32 honorary members, 8 licensees, and Ed Clarke, professor emeritus, into the Hall of Fame.

IPI signed 8 licenses in FY 16. These will be described in more detail later in the report. There is a robust pipeline of licenses heading into FY 17. The activity is coming from across campus. It is hoped that one license that is currently being
negotiated will be the first MQP that has resulted in a license. It is very exciting to see the student activity continue to be strong.

Another major activity in FY 16 was the adoption of a new Intellectual Property Policy. The last one was revised in 1996. The new policy addresses how equity is handled in licenses, which came into play in 3 startup companies that emerged in FY 16. It also addresses student inventions and makes it very easy if a student team using significant WPI resources to go on their own or request to go through the IPI office. One student team chose to go on their own in FY 16 and IPI continued to support them by getting them into the TAN program as well as helping them make contacts at potential licensee companies. Some other changes in the IP policy is that it still rewards faculty members with 50% of any income that comes from their IP, but now provides a piece of the remaining to their department, their Dean, and also to IPI. The intent is to eventually get additional funds to the department and provide an incentive for the Department Head to encourage the innovation process among their members.

IPI continues to be very active in the Tech Advisors Network and has provided hands on assistance to its Director. IPI has been a source of TAN presentations and actively assists various TAN teams.

WPI continues to exceed benchmarks established by the Association of University Technology Managers (AUTM). The Assistant Director of IPI has implemented a data base that manages all aspects of the IPI process. IPI has a much better handle of the finances on a case by case basis than in the past. Agreements can be tracked more efficiently, which is important as WPI has moved from zero licenses in 2012 to the signing of its 30th license in FY 16.

IPI continues to balance the commercial potential of a new idea with managing the patent expense associated with it. As the licenses mature, the licensee will begin paying for future and past patent expense. Several licensees have begun reimbursing for patent expenses as they move through product development.

Looking forward into FY 17, IPI expects licensing activity to remain strong. There are negotiations with license drafts being exchanged on 5 patents, with 3 startups involved. Thanks to the IP Evaluation program and the LinkedIn marketing strategy, 7 additional technologies are under evaluation during the first two months of the fiscal year. IPI also expects to pilot a new program in the fall of
2016 based on the NSF I-Corps program. This provides training and some funds to a team that needs to validate their Value Proposition via “getting out of the building” and talking to prospective customers. These will primarily be MQP teams who will be required to obtain at least 30 customer interviews with the goal that their MQP will have been directed towards satisfying a particular customer need. IPI has applied for an I-Corps grant, and if awarded, the program can be expanded to 20 teams per year. This program fits well with the overall Innovation and Entrepreneurship initiative that has been implemented as part of the Elevate Impact strategic plan.

The following pages provide a snap shot of the trends in the IPI office with additional information in FY 16 activity.

Sincerely,

Todd S. Keiller

Director, Intellectual Property and Innovation

tkeiller@wpi.edu  508-831-4907
The Intellectual Property Process

**Research** - WP has been fortunate to see growth in its research base during a time of declining funding opportunities. Without the research dollars to fund the experiments, the intellectual property opportunities will be diminished.

**Visibility** - IPI makes a concerted effort to be “out of the building” and across campus to seek out intellectual property opportunities, rather than wait for disclosures to come in. IPI routinely gives classes on intellectual property and licensing to undergraduates, graduates, and faculty.

**Disclosure** - The invention disclosure form is the starting point in seeking intellectual property protection. The form establishes what the big picture idea is, as well as the detail behind the idea. The inventors are encouraged to do a “prior art” search, using a search engine developed and donated by a WPI alumnus. It is important to document any funding agency in this form so WPI can stay in compliance, and to have the inventors sign and agree as to who has contributed to the idea.

**Assessment** - IPI has the difficult task of assessing if the idea has real commercial potential, even though most times the ideas are at a very early stage. The office tends to be liberal in filing provisional patents. IPI has negotiated fixed prices for these patents with several law firms, all of whom have WPI alumni skilled in different content areas. This allows one year to evaluate the technology and market it to get potential licensee feedback. During this time, IPI sends out
this information to its TAN IP Evaluation team. This team of over 40 alumni assists IPI in deciding if it should invest more in the IP while helping network to potential licensees.

**Marketing**- This is the critical piece to the process. Without getting market feedback to find out if we are really solving a licensee problem, we may just be spending patent funds on technology we really like, but don’t have a chance to ever recover the funds. Often the inventor has ideas on companies to go to or IPI has targets to approach based on previous experience. IPI will use different tools like IP.com and Invention Evaluator to help identify marketing targets. “Sales” oriented executive summary pieces are developed by an IPI Fellow and sent to these targets. The IPI Fellows program was established in FY 15. IPI selects a student intern(s) that is marketing oriented and has an interest in the licensing and patent field. It is a great opportunity for the student to get valuable entrepreneurial experience, and IPI gets up to date marketing pieces. We are gradually getting all of our available IP loaded on a searchable web page. You can see what is currently listed by going to: [http://www.wpi.edu/offices/ipi.html](http://www.wpi.edu/offices/ipi.html) and click on IP Catalog. Several of the technologies have the marketing materials available via a link next to the name. A critical new component of the marketing effort has been the use of LinkedIn in identifying WPI alumni in targeted potential licensees. They have been extremely helpful in providing a “warm” introduction, which has increased the number of serious reviews of the technology.

**License**- Hopefully there is interest as a result of the marketing campaign. There are two choices on where to license, an existing company or the creation of a start-up company. Of the 30 licenses signed since 2012, 12 have been to start-ups. A status of the start-ups is included later on in this report.

**Monitor/Assist**- Once the license is signed, IPI will routinely monitor the progress towards commercialization. All of the licenses have reporting requirements as well as due diligence to insure the company is still moving forward. Often with the start-ups, IPI will need to adjust and renegotiate based on a business plan not going on schedule. IPI will do this if the start-up can continue to demonstrate diligence. IPI will also introduce the start-up to various funding sources, business plan competitions, and mentors that may add value to the company.
Invention Disclosures

Disclosures

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## FY 16 Issued patents

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<td>Ski Binding Plate</td>
<td>Christopher A. Brown, John Madura</td>
<td>9,339,719 B2</td>
<td>5/17/2016</td>
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<td></td>
<td>Janice Gobert, Ryan S.J. Baker,</td>
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<td></td>
<td>Michael Sao Pedro</td>
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<td>INQUIRY SKILLS TUTORING SYSTEM</td>
<td>Christopher A. Brown, Karin E. Greene, Devon L. Rehm</td>
<td>9,089,763 B2</td>
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<td>Title</td>
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<td>Methods And Systems for Observation Of Tympanic Function</td>
<td>Cosme Furlong, Saumil N. Merchant, John J. Rosowski</td>
<td>9,155,459 B2</td>
<td>10/13/2015</td>
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FY 16 Licenses

**Atria** – Ki Chon – mobile atrial fibrillation intellectual property. Unfortunately, due to circumstances beyond Atria’s control, the license is being terminated. WP is currently negotiating with MobileSense, a new startup out of the University of Connecticut. The current software only worked in a controlled setting and not in the field. MobileSense will be working with the inventor, and may have a higher chance of succeeding.

**Global Fire Products** – Ali Rangwala. There are 5 different licenses for 5 products licensed into GFP. This will be described in the Startup section below.

**Battery Resourcers** – Yan Wang and Eric Gratz. This is a lithium battery recycling startup and will be described below.

**Toyota** – Marko Popovic, et al. This license is for the use of the hydro muscle and hydro bone robotic technology. There is also sponsored research in his lab as well as a visiting scientist from Toyota to work on an application to improve the human like occupation devices in vehicle testing.
WPI Accelerator Fund

The WPI Accelerator Fund was launched in May of 2013 through a joint effort from the Office of Intellectual Property and Innovation, School of Business, and University Advancement. The goal of the fund is to provide small, but meaningful investments into promising technologies that “fill the gap” between what grant money can achieve and what level of commercialization the technology is in to attract seed investment. Through catalyzing innovation and bridging the funding gap that is often encountered when trying to move a technology from the basic research to commercial development, these funds will stimulate an increase in the number of innovations and their readiness for conversion to commercial products and services.

In addition to the pilot funding provided by WPI of $187,000, an additional $275,000 has been raised by Mark Rice and Todd Keiller from alumni and friends of WPI. There is currently $225,000 available to invest.

An applicant to the Fund is asked to go through the TAN process. The TAN team will coach the company or inventor, focusing them on the commercial targets. It is not unusual to see a team “pivot” in their strategy while going through this process. The Investment Committee will only review a proposal that has been recommended by the team. Amounts requested are generally in the $50,000 range.

IPI manages the WPI Accelerator Fund. An independent Investment committee was formed, taking the advantage of the experience of Board members Mike Aspinwall (chair), Jim Baum, Andy Aberdale, and Tripp Peak, a partner in Long River Ventures. The board reviews proposals that have been vetted and recommended by the TAN team. They will often challenge the entrepreneur to perform certain tasks and then resubmit in order to increase their chance of success in raising the next round of funding after the Accelerator Fund. The Fund has been set up as an “Evergreen” Fund, meaning returns from these investments are to be put back into the Fund so new investments can be made.

The first investment was $100,000 in VitaThreads, which was based on the research of Glenn Gaudette and George Pins. VitaThreads has raised over $800,000 thus far. A description of their status is found below. The second investment of $87,000 into a phone app that detects A fib, based on the research
of Ki Chon, paid for critical coding that allowed clinical validation. This intellectual property is currently in negotiation for licensing and commercialization with MobileSense.

**Gweepi Medical** received an investment from the fund in 2015. Gweepi was formed by two recent alumni and received a $50,000 investment from the Fund in the form of a preferred stock offering. Gweepi develops workflow solutions for post acute medical facilities. Gweepi streamlines user processes to maximize a facility’s financial returns and the quality of care delivered to residents. This results in reimbursement optimization for the facility. They are currently negotiating a 25 facility rollout with a major Skilled Nursing Facility company.

The latest investment from the Accelerator Fund was $50,000 to **BluStream, Inc.**, a company founded by alumnus Bob Bean. BluStream has currently raised $200,000 and has 5 employees, one of which is another WPI alumnus. They are located at Running Start, the incubator located adjacent to Gateway Park. BluStream has a technology, whose first market is the acoustic guitar market. It measures the humidity and temperature in the guitar and alerts the owner if the environment is such that it will harm the instrument. They have orders from Taylor, the market leader in acoustic guitar sales, and D'Addario, the leading accessory supplier to the industry. They have expanded into the guitar case market and are beginning to penetrate completely new markets in Wine, Tobacco, and Firearms. Bob has been guided by his TAN group, and has engaged Ken Rapp, TAN member and parent of a recent WPI grad, as the CEO. Ken is a successful serial entrepreneur in the high tech space.
WPI Start-up Update

Battery Resourcers is a company dedicated to a sustainable recycling process for Li-ion batteries. It is founded by Yan Wang, Eric Gratz, and Diran Apelian. The market is expected to grow 400% by 2020 with added growth from electric vehicle batteries needing to be recycled in the early 2020’s. The company has raised $225k in STTR funding, with another $130k from the battery consortium, and $40k from the Mass Clean Energy Center. They are a MassChallenge finalist. The technology has been validated in 3 kg batches and will scale to 10 and 50 kg in 2016. A key milestone will be the feedback from customers on the recovered material, as well as the ability to get a Phase II STTR grant.

Global Fire Products Global Fire Products has licensed 5 product ideas from the work of Professor Ali Rangwala. The products are diverse, from an insert that is placed into a gas can to prevent explosions to the Refluxer™ which is a uniquely designed one step skim and burn system for hazardous spills, most notably oil spills. Prof. Rangwala went through the TAN process, and in so doing, recruited one of the TAN members, Larry Genovesi, to become the President to drive the business. The company is in active product development mode and is also in negotiations with one of the largest gas can manufacturers in the world.

Apprendis was formed in 2012 as a MA LLC by Janice Gobert, Mike Sao Pedro, and Cameron Betts (all of WPI). Apprendis is an educational software company with deep technology roots in data mining and artificial intelligence, and world-renowned expertise in Cognitive Science. Since Apprendis believes that “you get what you measure” in education, the company focuses on measuring and supporting the development of problem solving and critical thinking in science. Students need better materials that engage them in critical thinking and need
feedback *during* learning, not after when it is too late. Teachers need better, real-time assessments to make better teaching decisions that can help their students.

**Inq-ITS**, a scalable, cost-effective learning and assessment system (SaaS or eTextbook plug-in), will solve these challenges by enabling middle school students practice critical thinking skills. A working SaaS R&D prototype was developed on $10.5M of federal research grants at Worcester Polytechnic Institute’s Learning Sciences Research Group under CEO Gobert. Apprendis has successfully been awarded a Phase I and Phase II SBIR grant. In addition, they have made it as a finalist in the 2016 MassChallenge. They recently were invited to the Democratic National Convention as an example of progress in educational technology.

**Business** Centauri develops real-time MRI image guided robotic surgical and ablation systems that allow surgeons to see deep within the brain during surgery to enhance the precision of diagnosis and therapy. These systems are fast, accurate, and facilitate 3-D image guided procedures including; deep brain stimulation, tumor ablation, biopsy, lesion removal, and electrode device placement which represent a significant breakthrough over existing methods. These systems are portable and provide universal adaption to all major MR systems

**Unmet Clinical Need:** The median survival rate for patients with glioblastomas, or high grade primary brain cancer, is less than two years. A key factor contributing to this high mortality is a lack of accessibility and visibility. Early detection and treatment could significantly improve this very poor survival rate. Real-time guided intervention is capable of delivering greater accuracy and consistency than conventional methods, improving outcomes and helping to reduce ongoing care costs

**Market:** The global neurosurgery market was valued at $6.3 billion in 2014 and is expected to reach nearly $10.9 billion by 2019. Neurostimulation procedures account for more 54% of this market followed by the placement of
neurointerventional devices at approximately 17%. Both procedures benefit from real-time image guidance as provided by Centauri Surgical’s robot and ablation devices. The surgical robots market accounted for the largest share of the global medical robotic system market, by segment, at an estimated $927.7 million in 2013 and is expected to reach $1.8 billion by 2018, given a CAGR of 13.9%. The neurosurgery robotic system market is the fastest growing market and is expected to reach $127.9 million by 2018 with a CAGR of 18.1% from 2013 to 2018.

Centauri is based on the work of WPI’s Greg Fischer. The company is led by Perry Genova, who has raised an initial round of $300,000 and is currently looking to raise an additional $2 million.

Madura Product Development, Inc is in early stage development of an alpine ski binding plate which will prevent ACL injuries. The product is the first of its kind, and will prevent injury without release. Functional prototypes have been used by the inventor. The company is conducting in depth market research of alpine skiers which will be used to develop the most desirable product possible. Madura Product Development is in its seed funding round, all interested investors may contact John Madura, CEO. 201-575-1442

VitaThreads VitaThreads is a pre-clinical stage company, having developed an initial commercial iteration of their first product, VitaSuture. Over the past 3 years VitaThreads has been funded through a variety of sources. The company was awarded and successfully completed 2 SBIR Phase I grants, the first from NSF in the amount of $149K and the second from NIH in the amount of $179K. Additional SBIR-type grant submissions have been recently filed with both NIH and NSF with hopes of future grant funding for advancement of the product. A further $29K have been received in grant monies from MLSC as part of their Internship Challenge program. The company has additionally raised $308K through private equity and $40K from the founders to advance VitaSuture toward commercialization. VitaThreads has run into a roadblock at the FDA. They
expected a one year, under $1 million path to approved product, but instead received a ruling of a multi-year, multi-million dollar clinical trial. This has put the company into more of a hold pattern while they look at other ways to exploit their technology.

**Coming in FY 17** - WPI is in final licensing negotiations with a second startup of Yan Wang called AM Batteries. This company is based on new intellectual property filed by WPI on a new manufacturing process for Li-ion batteries. So Yar hopes to produce and then recycle Li-ion batteries!

WPI is also in licensing negotiations with PowerHive, which has been formed around three robotic technologies developed by Prof. Cagdas Onal. The company has actually already sponsored some research in the Onal lab in advance of completing the license for a foldable, “origami” robot that is intended for the game market.

A new company, MobileSense, has been formed out of Ki Chon’s new work at the University of Connecticut. MobileSense was originally interested in licensing some sensor technology developed by Dr. Chon at WPI, but with the Atria license termination, that portfolio is in negotiation as part of the package.

WPI has partnered with Histogen, a San Diego biotech company on an SBIR grant. WPI has intellectual property around wound healing developed by Marsha Rolle, Terri Camesano and Tanja Dominko that will be of interest to Histogen if a Phase II award is funded.

It is anticipated that the use of the TAN IP Evaluation team will accelerate additional licensing activity, which increases the probability that products will eventually get on the market over time.