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HAPPY VALLEY

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Tucked inside Penn State’s Office of Technology Management, in side-by-side offices, you’ll find Ruth Harpster and Kathy Kresovich, regular walking partners for 18+ years and avid participants in coolBLUE events hosted at Innovation Park.

Kathy, Administrative Support Coordinator, has been with the office for 23 years, and she manages the day-to-day operations and maintains the budget for the office.

Right next door is Ruth, a patent manager who does paralegal and docketing work.

“Kathy was here before me,” Ruth said, “so we met when I started working here. We found we have similar interests, have children of similar ages, and both like to exercise.”

When asked how they stay motivated to be active, Kathy said, “I think it’s the buddy system. There are days if I was by myself I wouldn’t walk, but I’m counting on her to walk and she’s counting on me.”

Both are also amateur photographers. They’ve taken tons of photos at the park and other areas around Happy Valley. In fact, they learned most of what they know about photography through a class offered at the park.

Kathy and Ruth have also teamed up for other fitness initiatives in the park, like yoga classes hosted by local instructor Elizabeth Hay this year. They also participated in the Walk to Ohio State University, a 10-week walking challenge in which participants walked the distance from Penn State to Ohio State in time for the football game.

“We participated in the Walk to OSU held a few years ago, and we actually won that one because we walked so regularly,” said Ruth. “The one this fall was fun. The goal was to get people moving, and I think a lot of people who weren't previously active participated.”

“It’s also a good opportunity for networking, and it’s nice to see people during the day,” Kathy added.

You’ll see Ruth and Kathy at many of the offerings in the park, and they’re grateful for so many opportunities.

“You pass people every day, but you don’t know them, so it’s nice to get to know your neighbors and interact with more people.”

Kathy and Ruth suggest that others get out and walk and participate in the activities offered in the park.

“There are always people out walking, so never feel like you’re alone,” Kathy said. “You can also bike if you prefer that over walking.”
CENTRE COUNTY COMMISSIONER EAGER TO COLLABORATE WITH PENN STATE ON ENTREPRENEURSHIP INITIATIVES

Centre County Commissioner Mark Higgins recently met with Dan Leri, Director of Innovation Park, and Nena Ellis Koschny, Assistant Director of Marketing & Communications for Invent Penn State, to discuss potential plans for collaboration and how the county can support Innovation Park’s and Invent Penn State’s efforts to drive economic development.

“There is a lot of support in the community now for entrepreneurship, start-ups, and economic development,” Centre County Commissioner Mark Higgins said. “Since my election two months and two weeks ago, the county has increased our economic development budget from $25,000 to $175,000 per year.”

Higgins, who ran on a platform of economic development, has expressed an eagerness to help facilitate collaborative relationships between the government, the university, and the community. In fact, he believes now is the best time for Innovation Park to work with the county to receive state and federal funding.

In the last few years, Dan Leri, Director of Innovation Park, has been working with the Ben Franklin Technology Partners, quietly promoting and supporting entrepreneurship by offering space and resources to companies of all sizes and stages. Leri said he welcomed the county’s support in broadening the region’s entrepreneurial support network.

Leri provided an overview of the Innovation Park master plan, highlighting last year’s completion of an 87,000 square foot building of premium office space being offered for lease to the business community.

“We have a very active prospect list we’re working on to fill 331 Innovation Boulevard,” said Leri.

As Innovation Park looks to expand, the county’s interest in supporting Penn State’s efforts could be just what is needed to herald a new era in entrepreneurship throughout Happy Valley.

The next step in the master plan could possibly include a building that provides wet-lab space for scientific research companies that have had some traction but not enough of an operating history to qualify for traditional commercial leases. Innovation Park hopes to offer affordable space for these promising companies that require transitional facilities after their time in the incubator. However, Leri recognizes this gap period poses a major challenge to nurturing fledgling enterprises.

“The piece we’ve been missing in these build programs is state and federal participation,” said Leri. “What Penn State needs to do is engage our other players and partners in the process.”

“We’re happy to work with the PA Department of Community & Economic Development, the Department of Commerce, and other state and federal agencies,” Higgins assured Leri.

“I’m happy to work with Innovation Park and Penn State to make something happen.”

“I’m at your disposal,” Higgins continued, “as is the Centre County Planning & Community Development Office. We have good relationships with the Centre Region Council of Governments and can coordinate with the governor and state legislatures. I’m happy to work with Innovation Park and Penn State to make something happen.”

The recently established Invent Penn State initiative aims to support the kind of work Leri has been doing all along. Nena Ellis Koschny, Assistant Director of Marketing & Communications, explains how the initiative ties into the efforts of the park and what kind of work is going on every day behind the scenes.

“Invent Penn State is an initiative to stimulate economic development, create jobs, and enhance student career success,” Koschny said.

Invent Penn State officials have identified gaps in the entrepreneurship ecosystem, which can include space to work, funding for commercialization, investment, and business training for scientists or researchers who don’t have business backgrounds.

“We help facilitate the creation of resources in all those different areas,” Koschny said. “A large part of the initiative is connecting people—whether it’s connecting researchers to places they can get business training like the TechCelerator, connecting start-up companies to potential investors, or connecting individuals to create programs and initiatives in the community to bolster entrepreneurship.”

“The role of the initiative is not always direct,” she continued. “Sometimes we’re just facilitating and making connections between people so that entrepreneurship happens.”

This new collaboration among the county, Penn State, and Innovation Park holds the promise of new and exciting opportunities for entrepreneurs, and the job creation that comes with their success.
INVENTING NEW CHROMATOGRAPHY TOOLS

Peak Diagnostics—with laboratories located in the Technology Center incubator—is the latest start-up to emerge from our region’s long line of innovators developing products for the chromatography field, joining the likes of successful companies Supelco and Restek.

Peak’s founder, Frank Dorman, is an Associate Professor in Penn State’s Biochemistry and Molecular Biology department, where he teaches undergraduate and graduate students and also pursues research interests in gas and liquid chromatography fundamental characterization, instrumentation and column development, and application to trace analysis in complex sample matrices.

Dorman’s interest in better understanding the applications for chromatography led him to create Peak Diagnostics. Operated first from a tiny space in his kitchen, then migrating to his basement, and finally to a dedicated laboratory at Innovation Park, the company is refining and customizing known chromatographic separation systems to better analyze and characterize samples using high pressure liquid chromatography (HPLC).

The company’s goal is to develop HPLC columns that have greater power to achieve difficult separations than currently available products. These new systems will have immediate application in the areas of metabolomics (study of chemical and biological fingerprints created via metabolic processes) and pharmaceutical-product R&D. “We’ve built a line of chemistries that retain—and are very receptive to—small polar molecules,” Dorman says. For example, in the field of medical diagnostics, “they can probe small molecule chemistry in the body and try to figure out if there are small markers or indicators that tell us if you’re prone to a disease, if you have a disease, or if you’re improving.”

Another possible area of commercialization is forensic analysis: “If you’re looking for explosive residues and you’re using high performance liquid chromatography to do it, there’s not really a great solution that’s commercially available right now,” Dorman says. “We think we have something that’s considerably better—a product that is really good at holding onto these small polar molecules so that you can test for them.”

Dorman is no stranger to the private sector: Prior to joining the faculty at PSU, he was the Director of Technical Development, at Restek Corporation, responsible for external research collaborations, new technology identification, and product development. His new company provides an ideal outlet to explore the commercial utility of his research.

A $250,000 grant from the National Science Foundation based on Dorman’s work during Peak Diagnostics’ formative years in his basement has allowed the company to hire an employee—Dr. William Campbell—who joined Dorman and his wife, Christine, as Peak Diagnostics’ third crew member. Bill has an extensive background in surface science, was co-author of the NSF grant, and will serve as Principal Investigator on the project.

These funds also allowed Peak to graduate to Innovation Park as it prepares to advance both its science and its business. Ready access to the Innovation Park staff and availability of business coursework through the TechCelerator program helped ease Dorman’s worries about the areas in which he lacked experience.

For example, in the area of accounting, “The TechCelerator people and the Incubator people know those sorts of things and we don’t,” Dorman said. “I think without them and without that knowledge, we’d be in trouble. If someone wrote us a check for $250,000, we’d spend it on the right stuff but I probably wouldn’t have any tracking mechanism for it and it would be a problem.”

“**The program really made it almost seamless to be able to transfer from what I had planned to do at the university or in my house, to transfer up there with very little pain involved.**”

“So those guys have been extremely helpful,” Dorman says. “It gave me a checklist: well you’re going to have to do this and this and this. They really made it almost seamless to be able to transfer from what I had planned to do at the university or in my house, to transfer up there with very little pain involved.”

Now, Peak Diagnostics is entering an exciting new phase. The company is nearly ready to begin marketing its findings and developing products to be used in collaboration with other companies. Landing the company in the collaborative environment of the Park’s incubator has provided an excellent foundation for this adventure as the area’s newest chromatographic pioneer.
Since the earliest patents for additive manufacturing devices have started to expire, the 3-D printing industry is entering a Wild West sort of stage, where innovators of new technologies will be championed and rewarded for bringing additive manufacturing to the next level.

Joe Sinclair and Innovation Park-based Solid Dynamics hope to be one of those companies at the forefront of this expansion.

The Penn State graduate has sat beside different 3-D printers in his Innovation Park lab space for the last two years, watching as different liquid polymers are spun, squirted, molded, and assembled into whatever device his clients request. Taking entire design elements from his clients and tweaking or customizing them using his own engineering skills, Sinclair and his team first use computer-aided drafting software to mock up a blueprint. That blueprint is then introduced into one of 14 3-D printing machines Solid Dynamics uses.

The machines take it from there. Cheaper builds using quicker printers are an option for clients looking for rapid turnaround time. More expensive options use printers that take longer and print the smoothest, most professional looking components for assembly.

But even these top-of-the-line printers don't always do the job well, and Sinclair and his company are ready to revolutionize the way Solid Dynamics prototypes devices for its clients. They hope to make the process more efficient by introducing a printer that can "think for itself."

"3-D printers are extremely stupid machines," Sinclair says. "Right now, I have to sit by the machine, babysit it until the component is done, and take the component off, measure everything to make sure it will fit together—and a lot of times it won't."

"If I design a nut and a bolt, and I print them to spec the first time, they're not going to fit together. It's just something that doesn't happen in additive manufacturing."

Sinclair calls himself a "babysitter" or really a machines-sitter. It's not a misnomer. Until now, engineers have had to closely monitor 3-D printers to ensure error-free operation. If there is a hang-up—think of a paper jam in your home office printer—someone has to be there to fix it, or the prototype is a loss.

"If they are at a tolerance, or if they're just completely failing, the device itself has no way of detecting that," Sinclair says. "So it's up to a highly-trained operator to be able to correct those problems before the prototype is ruined."

Considering Sinclair and his team pride themselves on their ability to complete prototypes in as little as a few days—jobs that would have taken months and months just a few years ago—efficiency is critical.

He believes there's an opportunity to make the prototyping process more fluid. The less time it takes to fabricate a serviceable prototype, the more time his clients have to test it.

"If we can get to the point where we sell machines plus software that improves quality and turnaround time, that's beneficial."

Enter Sinclair's innovation.

Solid Dynamics has built a new 3-D printer that, for the first time, introduces quality control measures and feedback mechanism software that will alert the machine when something is wrong. Patents are pending for the machine that the company plans to both use internally and sell to third parties.

The new system will make the prototyping stage more efficient and will eliminate costly back-and-forth with clients who may find that the prototype (as it is originally designed) doesn't hold up structurally when tested.

What was previously more of a guessing game in terms of which additives and polymers would best work for certain projects will now be a more exact science.

"With our design, you can introduce a drawing into our proprietary CAD software, which is very user-friendly, then the 3-D printer will optimize that CAD model for fabrication," Sinclair says. "The device will start fabricating your component on its own, and will check the component for dimensional integrity and structural integrity as the component is being fabricated."

And, no, Sinclair isn't worried about better 3-D printers making the engineers who operate them obsolete.

"We don't want to continue using the same machines with the same problems for the next 10 years," Sinclair says. "People are still going to be having the same headaches, and they will have to continue to come to us for solutions. If we can get to the point where we sell machines plus software that improves quality and turnaround time, that's beneficial."
Incomplete skeletons of once-flown drones dot the shelves alongside parts of others inside Airnest’s second-floor office at the Innovation Park Technology Center.

They’re odes to the past. The promising three-man start-up company initially built its own drones to test software which is now Airnest’s primary focus—Ben Brautigam, Justin Miller, and Sherwyn Saul want to make it easier for anyone to fly a drone.

“So we had this idea—what if to control a drone, you just drew on a map and where you drew the drone would fly?” Brautigam says.

Done. Airnest recently released its first app that is quite user-friendly for inexperienced fliers. Apply a few flight parameters into your device, draw your flight path, and the drone is on its way, relaying its perspective to you on the ground. Tilt or pan the device as you would 400 feet in the air for an eye-in-the-sky view.

It’s gotten great feedback from consumers and inquiries about custom development work from potential clients, progress that has Airnest’s founders motivated and hopeful for the future filled with drones.

“The commercial use cases are growing by the day,” Brautigam says. “So our focus has been in news and broadcasting, agriculture, of course aerial photography and video, filmmaking, oil and gas inspection.”

“There’s so much more that these things can do,” Miller adds. “And as they get less and less expensive and there are new sensors and new tools that can be attached to them, in five years, there are going to be people doing things with them that we haven’t even thought of right now.”

For Airnest’s founders, self-described “technology geeks” who gasp, groan, and chuckle at the sight of an iPhone at least three models old still in use, innovative thinking has given them plenty of ideas. They’re looking into compliance software that will make reporting data to the Federal Aviation Administration (FAA) much easier. They’ve partnered with DJI, the largest manufacturer of civilian-use drones in the world, to develop software. They’re also looking to expand their operation by adding employees, soon.

“The TechCelerator program lets you look at things like legal issues, how to protect your IP, finances, how to build a budget, and how to set up a pitch deck to talk to investors and other companies and build partnerships.”

Growing the business to this point in just over a year required a change in their thought process, however. Innovation Park’s TechCelerator program for start-ups enabled Airnest’s founders to do so.

“You have a good idea and you think you can build a company around it, but there is so much more to consider,” Brautigam says. “The TechCelerator program lets you look at things like legal issues, how to protect your IP, finances, how to build a budget, and how to set up a pitch deck to talk to investors and other companies and build partnerships.”

Airnest may not be able to do airborne demonstrations at Innovation Park due to its close proximity to the State College Airport, but the office space has helped the young company to grow in other areas. Park resources and continued access to TechCelerator advisors have kept Airnest’s founders thinking like CEOs in addition to technologists.

Proof in point, a recent conversation Miller and Brautigam had about travel.

“We started talking about how much we hate traveling and how great it would be if someone invented teleportation,” Miller says. “But instead of geeking out about the technology and the science, we started talking to each other about, ‘You know, what would be the business model for teleportation? How would you make money? How would you frame that?’ And then we stopped and we’re like, ‘Oh my god, we’ve totally changed the way we think about how we approach these things.’ And a lot of that is due to being able to go through the TechCelerator course.”
A hidden Innovation Park gem is operating 24/7 to bring life-saving alerts to a 33-county area. Between social media, newspapers, and TV broadcasts, there is no shortage of weather-related information floating around. Providers boast top-notch technologies that ensure precise and timely data. But if the only way to stay ahead of the storm would be to constantly refresh an Internet browser, how often would we be blindsided? What if we stepped away from the screen for a moment too long, missing the memo on an upcoming tornado or flash flood?

Cue the National Weather Service (NWS). They’re responsible for the public advisories, watches, and warnings that are streamed with no initiative required on our part. They bring us information about imminent, potentially catastrophic weather conditions in time to stay off the road and seek shelter.

The NWS is a federal agency that is part of the National Oceanic and Atmospheric Association (NOAA). The State College location, on the third floor of the 328 building in the Park, is home to the Forecast Office and Middle Atlantic River Forecast Center, both operations of the NWS. Warning Coordinator Meteorologist Peter Jung got started in the field of meteorology in New York City, then moved to Syracuse before relocating to State College, where has worked for the NWS State College since its doors opened in 1993 at the Rider II building downtown.

Jung explained why he was initially attracted to meteorology: “Weather is a very interesting job—every day brings new challenges.” But variety isn’t the only job perk. “We can see tangible results from the work we do,” said Jung. “We have a direct impact—our work saves lives.” The NWS, per its mission statement, seeks to protect life and property and enhance the national economy in all its operations.

NWS State College made the move to Innovation Park in December 2005. “It’s been a nice change,” said Jung, who values the ease of access, remote location, and ample parking. “We were space-challenged downtown.” Moving to Innovation Park enabled the NWS to consolidate their offices onto a single floor and design their own floor plan. NWS State College houses one of only two Forecast Offices located in Pennsylvania. It serves the middle two-thirds of the state, encompassing counties as far northwest as Warren and southeast as Lancaster. NWS’s national network comprises 122 forecasting locations, providing 95% national coverage in total.

The regional footprint of the River Forecasting Center is broader than its sister Forecasting Office, ranging from New York State to Virginia, as it services all rivers that drain into the Chesapeake Bay. Opposite from the Forecasting Office in the Innovation Park location, it is one of only 12 River Forecasting Centers in the nation. Computer modeling predicts river conditions including precipitation and flooding, and provides that output to the Forecast Office, which acts as a public interface.

Overall, the two offices employ 42 individuals who fulfill forecasting responsibilities, issue warnings and advisories for every type of weather, manage emergencies, ensure preparedness, create specialized briefs, and collaborate with other state and federal agencies. Onsite technology includes a breadth of communications infrastructure that constantly sources information from heavy computing offices in Washington, D.C., and transmits output via satellite.

Every semester, volunteers from Penn State join the team, along with occasional paid interns through the Pathways program. NWS is involved in ongoing research projects with the University, and a symbiotic relationship exists between faculty researchers and the NWS science officer. Workshops enable information sharing and reciprocal communications.

A fixture at Innovation Park, the NWS offers stability to employees and the community. Because it is a taxpayer-supported organization, all NWS products and services are free to the public. Learn more at http://www.weather.gov/ctp.

Peter Jung is happy to be situated in the Park, where NWS employees belong to a friendly, supportive community within the greater State College community.
Dr. Andrew Patterson and his team are taking on a potentially silent killer that plagues nearly a third of Americans. His team is Heliome Biotech, and with a market that broad, the start-up’s potential impact is massive.

Patterson formed Heliome Biotech in the fall of 2015 with the goal of commercializing technology that combats non-alcoholic fatty liver disease (NAFLD) and non-alcoholic steatohepatitis (NASH). NAFLD is often asymptomatic and goes undetected, but it can lead to more serious complications. “Fatty liver disease is a growing problem,” said Patterson, “so the applications of our technology are widespread.” In NASH, the fatty liver becomes inflamed and damaged, with the possibility of progression into fibrosis, liver failure, and cirrhosis, ultimately requiring transplantation.

The association of the metabolic disorder with obesity explains the rise in numbers, but the responsible mechanism is yet to be scientifically understood.

The culprit of fat buildup in the liver seems to be due to activity of the farnesoid X receptor (FXR) in the gut, which is a regulator of metabolic activity that can be a fat producer when switched “on.” Interestingly enough, the antagonistic hero that can press the “off” switch is a bile acid, which can be broken down by bacteria before it can inhibit the FXR. According to Dr. Patterson and his colleagues, the solution to this problem might be found in a therapeutic agent that is resistant to bacterial enzymatic activity.

That’s what Heliome Biotech hopes to commercialize. The compound they have discovered optimizes liver conditions in mice, thereby treating and preventing NAFLD.

Commercialization could mean prevention and treatment of fatty liver disease, which steeply affects the U.S. population.

“A lot of people see promise in what we’re doing,” said Patterson. And it’s no wonder—a bile acid derivative in pill form with the potential to reverse an epidemic is certainly a novel proposition.

Patterson started the company with a friend from his undergraduate years at Penn State, Dr. Jing Liang, who is a pharmaceutical consultant involved in start-ups in the biotechnology field. Initially, they experienced difficulty obtaining funding for the production of compounds, which occurs at Penn State Hershey College of Medicine.

Time and time again, faculty researchers have encountered this dilemma: they make a discovery with potential to transform, optimize, or even heal. They produce small-scale results, and then they get stuck. Without substantial funding, there is no way to reproduce these results on a macro level. But without macro-level results, that funding is hard to find.

Patterson was urged to seek admission to the TechCelerator. He and his team participated in a 10-week course, ultimately receiving a $5,000 award through the TechCelerator competition.

“The TechCelerator program was an eye-opener,” said Patterson, who is an associate professor of molecular toxicology at Penn State, an expert in metabolomics, and admittedly not an entrepreneur. He approached the TechCelerator as a researcher and academic, and graduated with expanded horizons. “I got to understand [business] terminology and the important steps, one of which was building the strongest team possible.”

Heliome Biotech’s Chief Scientific Officer Harry Mandeville has experience with taking drugs to market—no easy task.

“We have a tremendously strong team and can go places,” Patterson said, identifying a balance of expertise as a key feature. Some details of running a business are not on his radar, but his teammates’ knowledge base complements his scientific mind and inquisitive spirit.

Currently, Heliome Biotech is in the process of legal negotiations, as the technology is owned jointly by the university and the government.

“There is a long, arduous road ahead of us and a lot of work. The future depends largely on fundraising,” said Patterson. Despite obstacles, Patterson remains encouraged by the progress he has seen so far and optimistic about future growth. “Seeing the translational potential of our discoveries is really satisfying.”

Heliome Biotech was recently granted $75,000 by the Penn State Research Foundation Fund for Innovation to sustain research and production, an early indication of the technology’s promise and Penn State’s commitment to its Invent Penn State initiative.

PEOPLE OF THE PARK
AN INSIDE LOOK AT EMPLOYEES IN THE PARK

Belinda Tyson
Accounting Assistant, World Campus and Continuing Education

“I currently work in the Bursar’s office for World Campus and Continuing Education, and have been employed at Penn State University for 29 years. One of my personal favorite quotations is by Abraham Lincoln: “I care not for a man’s religion whose dog or cat is not the better for it.”

It’s nice to be able to take a break and look out my window and see green grass, flowering
You may be familiar with influenza, as you’ve likely suffered through it once or twice, but you may not know just how likely it is to get a false negative back from the swab test done at the doctor’s office. Therefore, early detection of a virus is crucial for the diagnosis and treatment of human infectious diseases.

Recent TechCelerator graduate—and winner of the $10,000 prize—Virolock Technologies Inc. may hold the key to a process that greatly improves the detection of viruses causing infectious diseases, like influenza, herpes, Zika virus, Ebola, and hepatitis C.

The Virolock Technologies team includes two Penn State faculty researchers (Mauricio Terrones and Siyang Zheng) and two post-doctoral researchers (Yin-Ting Yeh (Tim) and Nestor Perea Lopez).

Together, they have developed a portable technology for concentrating clinical samples and improving detection sensitivity of conventional virus detection methods, for example polymerase chain reaction (PCR). They are integrating their technology into a cartridge that is compatible with commercialized PCR systems. Using a disposable cartridge, the Virolock cartridge “traps” the virus particles, thereby obtaining a much more concentrated sample that will result in quicker and more sensitive virus detection.

“This technology speeds up vaccine development and virus discovery, because our technology captures virus by size without requiring any antibody,” Yeh said. “We can manufacture custom-made cartridges to target specific viruses.”

The team is currently publishing the results of experimentation focused on animal and plant viruses, which has garnered commercial interest from the USDA. These early data will also provide the foundation for the inventors to start a company based on their findings.

The group recently received a $75,000 award from Penn State’s Fund for Innovation, which, along with its $10,000 TechCelerator prize, will go toward commercialization. They are preparing to file for commercially focused grants from federal funding agencies.

So far, team members estimate they’ve built nearly 500 cartridges and have created a lab-scale manufacturing process that yields about 75% working prototypes.

“We are trying to demonstrate that we can scale up in building these devices,” Terrones said.

That’s been the tricky part for a group of scientists who haven’t had as much experience in the field of marketing their own ideas. The TechCelerator program helped the team focus on its business model and obtain a base of understanding for what steps to take in moving out of their university labs and progressing toward company formation.

So how has the Ben Franklin TechCelerator program affected the Virolock team?

“We are scientists,” Terrones said. “We realized that when you want to start a business, the science part is important, but as a sales pitch, it’s not as important. You need to make things very accessible. You also need to have a market. If you don’t have any potential customers, there’s no point in establishing a company. Those principles were very important. It’s not only the science that drives the company—you need someone driving the business. For us, it was a different world.”

Fellow team member, Zheng, agreed.

“We were exposed to different aspects [of business development], especially from an entrepreneurship point of view: How we can find niche market and how we might get some help from the university in terms of legal aspects, accounting, and business setup,” he said. “Now we know where the resources are—that’s very important. The other part was working with the instructors and the other groups to sharpen the whole project to make it presentable. It’s helpful to crystallize our strategy.”

Mark Henderson
IT Director, Office of the Vice President for Research at Penn State University

“I’ve worked at Penn State for over 13 years with most of those years supporting researchers. Ten of those years were spent at the Applied Research Lab. More recently, working at Innovation Park in the Office of the Vice President for Research has exposed me to all the other many and varied aspects of research at Penn State. I learn something new every day about the important and amazing research that is being accomplished by both independent faculty and research done in cooperation with industry.”

Mark Henderson
On Tuesday, March 1, The Ben Franklin TechCelerator Program hosted the Final Presentations and Award Ceremony for their ninth class of graduates. Virolock Technologies Inc. won $10,000 to advance their company.

The TechCelerator has provided a solid foundation for start-ups. Out of the 46 teams who graduated, 43 have formed companies, $7.1 million has been generated in start-up funds, and $5 million has been generated in revenue.

This particular session was designed specifically to support the Invent Penn State commercialization initiative. All participants were Penn State researchers, and many of their products are not yet ready for the market. As a result, the session served to introduce Penn State researchers to key factors affecting their development of inventions created in their work at the university. Throughout the eight-week program, the teams focused chiefly on product development. Jim Pietropaolo, Director of the TechCelerator’s newly expanded programming, led the cohort through their coursework. Pietropaolo is a medical device industry veteran with a unique combination of large companies (J&J, GE-Lunar, Hitachi-Aloka) and entrepreneurial work with tech-based start-up companies. His experience with angel and venture capital funding is of particular value in his role assisting the development of new companies through Ben Franklin’s TechCelerator program.

Prior to the final presentations, Pietropaolo explained the evaluation criteria for the contest:
1. Describe the technology and its applications.
2. What is the product? Why is it valuable?
3. Define the market opportunity.
4. Outline the development plan needed to bring the technology to market. How much financial capital will be required and where will you find it?

The graduating teams included:

**Virolock Technologies Inc.**

Virolock Technologies have developed a system for concentrating samples to improve detection of infectious viruses. They use a point-of-care PCR device coupled with a disposable cartridge comprising a nano-tube “trap” to collect virus analyte.

**BioRegen**

BioRegen has developed a controlled-release system for protein drugs. This system can be used in wound care products to treat cuts, burns, and diabetic wounds more effectively. The protein drug release is much slower in BioRegen’s products compared to their competitors’ products. The result is an accelerated recovery.

**AvoColor**

AvoColor is a natural food colorant based on the pit of an avocado. As a growing number of food and beverage manufacturers are switching from artificial to natural coloring, this team can offer a colorant that covers 40% of the color spectrum. Competitors use paprika and turmeric, which are more expensive because these substances can be used as food additives, whereas avocado pits are a waste product.

**AnyMDx**

AnyMDx is a mobile, point-of-care, genetic diagnostic platform consisting of a compact analyzer, a disposable disease-specific reagent cartridge, and an optional smartphone app for result interpretation. The platform can be used to detect viruses but will initially focus on sexually-transmitted diseases, such as HPV.

**Visual Light Communications Technologies**

VLCT has developed a faster and safer visual light-based broadband wireless network technology. It will be especially useful for aircrafts, hospitals, vehicles, and consumer electronics. Unlike traditional Wi-Fi, VLC technology has tolerance for blockage and shadowing, making it a potentially more reliable source for wireless connections.

**AbDesign BioPharma**

AbDesign has created software for designing new antibodies to be used as therapeutic drugs. This new method is much easier and quicker than the current approach to antibody generation.

Penn State’s Vice President of Research Neil Sharkey was in attendance and delighted in watching his Penn State colleagues pitch their technologies.

“This is one of the fun things that I do around here,” Sharkey commented. “Today’s presentations in particular, showed us some exciting technologies. I think projects like these bode well for the future of Invent Penn State.”

Ben Franklin’s Jim Pietropaolo wrapped up the presentations, complimenting the teams on their hard work throughout the session.

“I really enjoyed working with these folks—I had a blast,” he said. “They worked really hard and are all very motivated. If they are a sign of the motivation Penn State researchers have, then I think the Invent Penn State initiative has some great opportunities.”
**TECHCELERATOR FINAL PRESENTATIONS AND AWARDS CEREMONY**

**ABOUT THE JUDGES**

The judges for the TechCelerator Final Presentations and Awards Ceremony are entrepreneurs and experts in our local community. They volunteer their time to attend the event and evaluate the teams’ business plans. Keep reading to learn about each judge’s expertise and why they volunteer their time.

**Brad Swope** is a Senior Technology Licensing Officer in Penn State’s Office of Technology Management, where he manages the assessment, patenting, and licensing of a diverse portfolio of Penn State inventions. Swope processes about 20–30 new Penn State inventions per year with a primary focus in the engineering and information sciences.

Prior to his current role, Swope founded his own start-up business, Zennovations, which provided consulting services to universities and other clients on intellectual property protection and new technology evaluation and commercialization.

He also served as a New Products Manager for Mixing and Mass Transfer Technologies, where he was responsible for developing new product opportunities for the company. Brad is also a Registered Patent Agent and received his B.S. in Chemical Engineering from Penn State and his MBA from the University of Maryland. In his spare time, Swope is an avid mountain biker and outdoor enthusiast.

**Tim Hurley** is President of DIApedia, a company developing medical systems aimed to provide improved footwear solutions for targeted communities. DIApedia’s primary mission is to deploy its TrueContour™ insole design system to improve the health of people suffering with diabetic peripheral neuropathy.

Additionally, the company works with the army to design improved footwear solutions for soldiers to reduce injuries. Prior to his work at DIApedia, Hurley co-founded and managed a series of successful start-up businesses, including Chiral Quest and PennTurf Products, which had profitable exits.

Hurley received his B.S. in Chemical Engineering from Penn State. When not working, he’s busy as a youth coach in whatever sport is in season.

When asked why he chose to volunteer as a judge, Tim Hurley said, “Well, as a person who’s been working in start-up companies, it’s always exciting to learn about new technologies and to meet people just beginning their entrepreneurial careers.”

Hurley feels he can be a resource to these graduating teams. “I have a lot of experience in the technology commercialization area, and they’ll need people to help execute their plans,” he said. “That’s the part I enjoy the most.”

**Paul Sciabica** is Managing Partner at Augmen Advisors, a consultancy to early stage and middle market companies where he leverages his broad background on all facets of business operations: fundraising, product development, sales/marketing, strategic direction, leadership development, and M&A.

Previously, he was the Executive Director of the New York Angels, a consortium of early stage investors focusing on technology, media, and services companies. During his tenure at the NYA, he was involved in over 60 financings.

Prior to joining the NYA, Sciabica was an investment banker at Merrill Lynch where he managed a $100 million venture fund and was responsible for 50+ investments. His board seat duties included enterprise software, fabless semiconductors, Internet, and telecommunications equipment companies. Global investing included companies in Japan, China, Sweden, and Israel. The Fund had an IRR of 250%.

He has been a technologist/strategic planner for The Washington Post, The National Association of Securities Dealers, and The Board of Governors of the Federal Reserve Bank.

Sciabica holds a BA in Economics from Bloomsburg University.

When asked why he volunteered as a judge, Sciabica said, “It’s a great way to give back to the community and to learn about interesting opportunities for investment.”

**ABOUT THE JUDGES**

Do you have a technology to take to market? If so, the TechCelerator may be for you. This fall, the TechCelerator will host their annual fall session for community and university participants who want to launch a technology-based start-up in the next 12 months.

This 10-week session will include one-on-one time with mentors along with a weekly class, and will culminate with final presentations about each start-up’s business model and target market. Presentations will be judged by a panel of entrepreneurs. The 10-week program will cover:

- What is the Technology Idea? Intro to “2-minute Stand-up”
- Basic IP – Documentation, Public Disclosure, Patents, Trademarks, etc.
- Business Model Overview
- Customer Development
- Value Proposition
- Customer Segments
- Channels
- Customer Relationships – Get/Keep/Grow
- 5 minute IGNITE! Presentation
- Basic Financials – Balance Sheet, Income Statement, Cash Flow
- Estimating Operating & Start-up Costs
- Revenue/Pricing/Costs
- Funding Options
- Basic Legal – Business Structure & Ownership

To apply, visit www.techceleratorstatecollege.org.
Kevin Lloyd watches as whiskey barrels that look like they might burst at the rivets are loaded into Big Spring Spirits’ warehouse in Bellefonte: 141 in total.

Lloyd, co-owner and the distillery’s production manager, says they’ll have to use an offsite facility to store barrels eventually. For now, the red brick building that was originally part of the Pennsylvania Match Company, does a fine job of storing batches, housing the equipment to make it, and providing space for a classy tasting room complete with a long bar, comfy chairs, and a swordfish on the wall.

“It really speaks to reuse, recycle, repurpose,” Lloyd says of the building. “It’s ideal for us. It’s right on the park on one side. It has a big garage door loading dock on the other end. It’s just this really cool building with all this character and so on.”

The site has been the staging ground for Big Spring Spirits, in its third year of operation, to develop a handful of new whiskies and a host of other spirits in an environmentally friendly fashion. Last fall, the distillery earned a Gold certification in Leadership in Energy and Environmental Design (LEED) by the U.S. Green Building Council. It is one of two distilleries in the country to receive the certification.

Although Big Spring Spirits took on larger initial costs to outfit its equipment to meet LEED standards, the savings in energy costs the distillery has projected are worth it.

“All of this plays into the idea of environmental footprint,” Lloyd says. “There is the payoff as I mentioned, but in addition it’s the right thing to do. As a citizen of the world, I think we should all do what we can to minimize our footprint, and this is the one thing we can do.”

It’s helped the company market its products in a sea of competition.

“Going up against multinational companies, you can think of a handful of those,” Lloyd says. “Some of the higher-end customers—local bars and restaurants—and consumers are interested in local products. If you cater to this idea of farm-to-table or local stuff, then that’s where we fit in pretty well.”

“**As a citizen of the world, I think we should all do what we can to minimize our footprint.**”

Big Spring Spirits is also a back-to-the-farm outfit. Unused grains get sent back to local farmers to feed livestock.

“It matters to a lot of our customers.”

So will the distillery’s new offerings this fall. Lloyd says Big Spring Spirits will release at least three new whiskies—a bourbon, wheat, and rye—and hinted at others.

There are also the white spirits, which came along first since the whiskies were aging in barrels and weren’t ready for release.

“That’s two years of a lot of capital being tied up just sitting around,” Lloyd says. “We needed a revenue source to cover that couple of years so we started to look at what we could do in that time as we’re waiting for our whiskey to be released.”

Enter a complete selection of vodka, gin, rum, and white whiskeys. All made clean. There are also the special batches like the whiskey in a barrel signed by all the 2016 graduating class of Penn State’s MBA program. The students bought a batch of whiskey from Big Spring Spirits, which will be opened when they graduate. They’ll go to the distillery, help bottle it, and get to walk away with a keepsake!

“My old business was analytical chemistry,” Lloyd says. “We would get things, we would test them, the final product may be paper, it might’ve been just an electronic file that we would send to somebody. So every day was pretty much the same as the day before in terms of the physical surroundings in the laboratory. Here, we’re actually making a product.”

“You’re making something that you like, and you’re putting it out there for others to try and get their opinion on. To make a physical product is much different from what I’ve done before, and it’s very satisfying to do that.”
Penn State’s newest business pre-accelerator program, part of the Invent Penn State initiative, was launched in March with a ribbon-cutting ceremony to mark the event.

Hosted by Penn State President Eric Barron at the former Verizon Building where a Happy Valley LaunchBox logo hung all month to tease the program’s opening, the ceremony drew cheers, applause, and emotion from local entrepreneurs and community leaders who want to help grow local businesses and keep them in harmonious operation with the community.

“This is an opportunity to come from Penn State into our community, create your company with the support of the community, and to realize that your university and your community are here to help you be successful,” Barron said. “That is a wonderful message.”

Joining Barron were University Vice President for Research Neil Sharkey, State College Mayor Elizabeth Goreham, Borough Manager Tom Fountaine, Chamber of Business and Industry of Centre County President Vern Squier, and Pennsylvania Economic and Community Development Deputy Director Sheri Collins.

On hand were representatives from the first five companies that will call the LaunchBox home for the next nine months. Selected from a field of more than 40 applicants last winter, Lockeroom, Project Vive, ReDi Index, Scenomics, and Somnus will use the LaunchBox as their primary workspace to develop their businesses and tweak their technologies alongside one another.

Their residency inside the LaunchBox will be free for that span, a fact Barron brought up as he championed the program in his opening remarks.

“This is Penn State, at all of its campuses, working with its communities in partnership to promote entrepreneurial thinking to create ideas that have impacts on communities and to create companies that help spur economic development and job growth and student career success,” Barron said. “It’s quite exciting to see them all unfold.”

All five companies are striving for measurable results in the community, too. Local business leaders want to make sure results continue to translate after each LaunchTeam moves on from the LaunchBox to offices and labs elsewhere.

“After that nine months, what happens? It’s incumbent upon the community, the mayor, and others. We have to be willing to host and accommodate and encourage and provide an environment where these enterprises can thrive,” Vern Squier, President and CEO of the Chamber of Business and Industry of Centre County, said. “It’s not just existing, it’s about thriving.”

**About the companies:**

**Lockeroom** is a platform that will make management of youth sports teams and leagues easier by automating and expediting registration, scheduling, and communication between players, parents, and league managers.

**ReDi Index** provides guidance and methods for measuring organizations’ recycling programs.

**Scenomics**’s software-as-a-service concept aims to help healthcare organizations pinpoint the value of technology investments.

**Somnus** and **Project Vive** are both developing medical technologies that will assist people stricken with sleep apnea and—in Somnus’s case—communication disorders.

Mary Elizabeth McCulloch, Co-Founder of Project Vive, spoke on behalf of her company and moved local business leaders with her remarks. Wearing a red glove dotted with electronics—the Vive Device—on her right hand, McCulloch spoke about the technology that allows users to overcome nonverbal communication barriers brought on by cerebral palsy and other related disabilities.

“None of these resources would have been available without Invent Penn State. Project Vive would not be where it is,” McCulloch said. “I’m a senior in biomedical engineering and when people ask me what I’m doing next semester, I tell them I’m staying local and going full-time on Project Vive.”
INVENT PENN STATE: FACILITATING CONNECTIONS AND CREATING AN ECOSYSTEM WHERE ENTREPRENEURS CAN THRIVE

AN EXCLUSIVE INTERVIEW WITH NEENA ELLIS KOSCHNY, ASSISTANT DIRECTOR OF MARKETING & COMMUNICATIONS FOR INVENT PENN STATE

In just its first year of operation, the Invent Penn State initiative has created or strengthened several new promising programs to support a culture of entrepreneurship in the Penn State community across the Commonwealth:

**Happy Valley LaunchBox**, a pre-accelerator program, which graduated its first cohort of teams on April 28, 2016, provides community entrepreneurs with free business training, coworking spaces, access to mentors, and opportunities for business consultation. Ten more companies start in May. Capacity is estimated to be 30 companies per year. Two other LaunchBoxes have opened at the PSU Lehigh Valley and Abington campuses. [http://launchbox.psu.edu](http://launchbox.psu.edu)

**The Entrepreneurship Seed Grant Program** awarded $50,000 to six of the 24 PSU campuses in 2015 to start or enhance community entrepreneurship centers. Six more campus grants will be announced in May. Already, the effort has connected hundreds of community entrepreneurs with innovators and each other, and started dozens of companies.

**The Summer Founders Program** gives student companies $10,000 and a chance to develop their business concepts over the summer. Companies are connected with Penn State alumni and community mentors, provided space to work, and given opportunities to participate in business-development workshops. In the first year, six companies participated. [http://psufounders.weebly.com](http://psufounders.weebly.com)

**The Fund for Innovation**, a commercialization program through which the Penn State Research Foundation partners with academic colleges within the university to provide matching grants to advance research for early-stage ideas. These grants can be used by faculty-led groups to pay for activities—such as creating prototypes or developing market intelligence—not typically covered by academic research funding.

**The Invent Penn State Venture and IP Conference**, Penn State’s first, to be held on October 6 and 7. The VIP Conference will showcase the latest innovations from faculty, student, and alumni start-ups. The most promising ventures will be selected from a broad spectrum of business sectors, including life sciences, agriculture, energy, advanced manufacturing, and communications and will have an opportunity to pitch potential investors. [www.pennstatevip.com](http://www.pennstatevip.com)

These programs and events are a direct result of Penn State’s effort to create an environment that welcomes entrepreneurship. According to Neena Ellis Koschny, Assistant Director of Marketing & Communications for Invent Penn State, there is daily work being done to continue to grow the initiative and its ecosystem.

“What we do is look at the gaps in resources—space, funding for commercialization, investment, a lack of business training—and we work to facilitate the creation of resources,” Koschny said.

Invent Penn State, she explained, aims to create, coordinate, improve, and communicate about entrepreneurship-focused academic programs, business start-up training, space for incubation, funding for commercialization (intellectual property licensing or start-ups), and visibility and access to Penn State programs, intellectual property, and start-ups.

“A big part of the initiative is connecting people,” she said. “It’s also creating a culture change at Penn State to let faculty know we encourage them to start businesses, and that there are start-up resources available.”

That culture change also applies to students. “We want to make students aware that there are entrepreneurship paths for them, so we’ve created the Entrepreneurship and Innovation minor—it’s called ENTI. Students across colleges can receive an entrepreneurship minor.”

“Economic development doesn’t happen in one year. We are developing the ecosystem and momentum needed to help drive economic development long-term.”

Through the ENTI minor, students learn entrepreneurship principles and can get involved in events like IST start-up week. ENTI enrollment reached 250 students this year, a tangible reflection of the Penn State student body’s strong interest in entrepreneurship.

In terms of results and success for Invent Penn State, Koschny acknowledges there is a long road ahead. “Economic development doesn’t happen in one year. We are developing the ecosystem and momentum needed to help drive economic development long-term,” she said. “Over time, we anticipate seeing an increase in intellectual property licensing, start-up companies, students who stay in Pennsylvania to live and work, and in general, a more vibrant economy,” she said.

If you have an interest in any of the programs above, have a business idea, or would like to mentor, invest, or just connect, go to [invent.psu.edu/get involved](http://invent.psu.edu/get involved).
BUSINESS, EDUCATION, AND RESEARCH IN HAPPY VALLEY

Where there is research, there is discovery; where there is discovery, there is innovation. Innovation Park is a point of convergence for ideas and experience, and Penn State produces plenty of each.

Everything budding entrepreneurs could want or need is right here in Happy Valley, where companies are carried from infancy to prosperous maturity every day.

If you're looking for more reasons to grow your business here, look no further than the nearby pool of resources that promise to bolster start-ups.
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• Top 100 Universities in the World, World University Rankings
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