New Growth on the Horizon
331 Building Almost at Capacity, Technology Center Upgrades, and New Construction

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Innovation Park Director Dan Leri addressed a lunch gathering of park employees to update them on park-related activities. The big news was discussion of the future Building H flex-space building that will be anchored by Morgan Advanced Materials’ carbon technologies R&D group, and welcoming two large tenants to the almost-filled 331 building.

This summer, the park began the process of repaving the roads and developing a new wayfinding plan to make buildings easier to identify and add amenities that call attention to park tenants. One program might involve hanging banners to identify park companies and an enhanced flagpole to better spotlight Old Glory. Having researched local zoning ordinances, Leri disclosed that the only limit on flagpole size is that it not interfere with aircraft coming and going from University Park Airport.

Leri commented on the new build program in the park, stating that the 87,000-square-foot 331 building is almost fully leased, with only 7,000 square feet remaining.

Penn State’s Office of Human Resources will take a substantial amount of the 331 building to consolidate operations, which is currently spread across several buildings on the University Park campus, and will be joined by student-aid organization Pennsylvania Higher Education Assistance Agency (PHEAA).

These new operations will add a combined 400 employees to the Innovation Park community, and possibly necessitate additional shared parking facilities in the park.

Also coming down the pike is the 25,000- to 30,000-square-foot Building H project. Morgan Advanced Materials from the UK has announced they are putting their first U.S. carbon materials pilot plant in Innovation Park. Morgan plans to take approximately 25% of the building. The park is recruiting other tenants with complementary advanced materials focus to bolster industrial interaction among the companies, and to capitalize on Penn State’s premier materials research laboratories. Unlike the other park buildings, Building H will not be a traditional office building with common space, but instead will focus on research and light manufacturing activities.

“We’re excited because Building H provides a platform for collaborative tech transfer and commercialization activities, and we don’t have much of this type of space in the park,” said Leri.

Finally, Leri mentioned that the park has recently fielded a request for proposal from a West Coast developer interested in exploring yet another new building. This opportunity should play out soon, so by the end of the year the park may be constructing two buildings at one time.

**Upgrading the Technology Center Building**

Innovation Park will soon undertake an upgrade of its nerve center: The Technology Center building, which houses many of Penn State’s research support and technology-transfer units, Ben Franklin Technology Partners, and the core start-up incubator facilities.

The Tech Center will receive upgrades to its IT systems, new paint, lighting, carpet, and common-area furniture and, importantly, remodeled restroom facilities.
INVENTOR OF 3-D PRINTING
IMPRESSIONS BY INDUSTRY’S GROWING APPLICATIONS

CHUCK HULL DISCUSSES RAPID EVOLUTION OF ADDITIVE MANUFACTURING

For most of 1983, Chuck Hull (now dubbed the “Father of 3-D Printing”) could be found laboring nights and weekends alone in a lab, with one goal: to accelerate prototyping from a month-long process into one that could be completed in a matter of hours. He says at that time his “interest in developing 3-D printing was driven by curiosity and practicality.”

It took almost a year, but those long nights finally paid off. When all was said and done, Hull had invented stereolithography, a process for creating three-dimensional objects, in which a computer-controlled laser beam is used to shape liquid polymers into three-dimensional objects as the polymers harden on contact with the lasers.

As the story goes, he called his wife down to the lab to see the first piece he was able to create using his new process, and she still has it today.

Though he dedicated months to the development of this technique, Hull says, “I never knew how great of an impact 3-D printing would have beyond my original intentions. Now, more than 30 years later, I’m still surprised by its reach and the innovation it’s enabling in areas such as aerospace and healthcare.”

“When 3-D printing first came on the scene, it was adopted by the automotive industry to help accelerate the design process and get products to market faster,” Hull continues. “Automakers are still key users of 3-D printing technology, but they are now joined by innovators in the aerospace and defense sectors, healthcare, durable goods, and even entertainment. As the technology continues to advance, we are now seeing a significant shift from rapid prototyping to customers using 3-D printers for end-use part production.”

Its uses are turning out to be almost limitless, especially in manufacturing healthcare devices and materials.

3-D printing could eventually break the trend of rising healthcare costs because it involves additive manufacturing as opposed to older techniques that involved the removal of materials by cutting, drilling, etc. The extraction of those materials can be costly and involves much more waste. 3-D printing eliminates these costly factors by using only what is needed for each product.

“3-D printing invites so much innovation that it’s difficult to be excited about just one application or industry segment,” Hull says. “With that being said, I have been most surprised by the advances it has enabled in healthcare. It is deeply gratifying to witness the real human impact this technology has on improving how we live every day, and in some cases, even saving lives.”

Applications in the healthcare industry are changing the way we approach healthcare solutions each day. Among other applications, researchers and experts are using 3-D printing to develop skin for burn victims, ankle replacements, and casts. More importantly, they’re discovering opportunities for personalization in the healthcare industry.

Just last year, researchers discovered it was possible to print patient-specific, biodegradable implants to more effectively cure bone infections and bone cancer. It also has surprising uses in the pharmaceutical industry—3-D printing can be used to create pills in various shapes (such as pyramids and cylinders). Since different shapes offer different release rates, medicine can be customized based on each patient’s needs.

There’s still more to be done in this rapidly growing field.

So far, Hull is impressed with the advancements that have been made in the industry. 3-D printing has had a much farther reach than he ever could have imagined, and that has taught him an important lesson in taking a leap of faith.

When it comes to commercializing technologies, Hull encourages inventors to “see it through.” He says, “Your ideas are powerful and worth nurturing. You may be surprised where they take you.”

“The frontier of additive manufacturing is still a wild one. With that in mind, remember that facing your challenges doesn’t mean accepting them.”

Awards and Recognition

For his contributions to the field, Hull was inducted into the National Inventors Hall of Fame in 2014.

“It was an incredible honor,” he says. “It’s the kind of thing you don’t anticipate, and I am humbled by the distinction.”

Just this year, Hull was awarded with the Inaugural Pioneer in Additive Manufacturing Award on October 11 at the National Forum on Additive Manufacturing Education & Training at the Penn Stater in State College, PA. This event was hosted by Penn State’s Center for Innovative Materials Processing through Direct Digital Deposition (CIMP-3D).

He was honored to receive the award and glad to be a part of the event. “Events like these offer a wonderful opportunity to engage with talented, probing minds and to leave with more inspiration than you arrived with,” he says.

Hull offers one last piece of advice for others in the industry: “The frontier of additive manufacturing is still a wild one. With that in mind, remember that facing your challenges doesn’t mean accepting them.”
Kerry Small is issuing an invitation to an intentional college experience. His platform, Live It, is a three-dimensional portfolio allowing users to create, capture, and share not just their credentials, but themselves. What results is a collective representation of experiences that shape students’ development; it’s a story of the people they become across the pursuit of a college degree; it’s the vision of the futures they will create after graduation.

The ultimate goal of the platform is to provide employers and their prospective employees—college students—with a better system for getting to know each other to evaluate the quality of a future relationship. Students have a platform for organizing and sharing a broad portfolio of activities that complement their studies, and employers see a depth of information about students’ engagement during their college years that provides more comprehensive insight than a transcript and a resume.

Penn State thought highly enough of the concept to lend its name to the venture and take an equity interest in the Live It business, and employers have begun to offer their support as well. Small was part of the first cohort to graduate from the Ben Franklin TechCelerator at State College, during which time his vision for Live It evolved beyond its initial conception.

“What was interesting to me as a small business owner and entrepreneur is how our vision changed over that 10-week period,” said Small. “It also gave me the foundation to ask questions to change it even further over the following two and a half years.”

“Being open to that change, to questioning your ideas and being wrong about things, has been critical for us to get to the point where we’ve been wrong enough to be right more often—pretty well spot on with our target audience.”

Live It was conceived as a semi-closed debit card that parents and caring others could give students in lieu of the usual care package clutter. The card could be used at community partners like Tussey Mountain and 2000 Degrees—and it facilitated experiences.

The feedback was decidedly positive. According to Small, students who received the Live It card reported feeling that the university cared about them, that they were better acquainted with the retail partners, and that they knew the area better. “It wasn’t just about encouraging students to go out and find a restaurant,” said Small. “They were becoming more adventurous and more aware of their surroundings.”

Rather than solidifying his vision, this first wave of positive reviews directed Small back to the drawing board. “Because these students felt so highly about the school and the people who supported the cards, we asked, ‘Who else cares about these results?’” And that list extended well beyond parents to include alumni, instructors, and hiring corporations. The new mission required an alignment of interests.

Over the course of continuous beta testing, Small and his team have assembled a functional platform that provides students with a virtual portfolio where they can arrange and store their experiences, interact with fellow students along with mentors and recruiters, and receive feedback. Already this has proven itself to be a useful tool for both students and the companies that hire them.

Instead of listing data, users of the platform tell stories that provide a snapshot not just of what they’ve done but also of who they are. And for students who maintain a Live It presence throughout their college years, this can lend itself to much more than a robust resume.

“As we further refine it, we’ll get people who will join in and say I’m on it because it’s my own private sandbox and they can collect their experiences and control what gets published,” Small said. “They can have different tools and have an online diary and portfolio, a place to capture that. Over the course of those four years, they’ll see patterns.”

“Just reflecting alone, we’re told by behavioral scientists, is powerful,” Small continued. He believes regularly creating, capturing, and sharing experiences will allow students to better align their interests and activities, navigate the college experience, and land the best possible jobs for them.

Students and their families are investing ever-greater sums to acquire a college education, so the emphasis for a graduating senior is to obtain a good-paying job. The imperative for employers is to find highly qualified candidates to fill these jobs. The piece of the puzzle that’s most challenging to identify is ensuring that the applicant is a good fit—intellectually and socially—for the jobs companies need them to perform.

“Part of [hiring] is finding students by the skills they possess, those attributes they’re looking for, not just their majors and GPA, although that’s also valuable—but skills, by searching by tags, reading the stories they talk about, and encouraging them, just like any other mentor—by saying, this is interesting, here’s an opposing point of view; or this is really interesting, we have a program internally that will build on that, integrity of business... It’s a human development platform,” said Small.

This human development transfer technology aims to address widespread disengagement in the workplace. The most immediate goals for this small company with large ambition is to help Penn State students examine their college experience in greater depth and, by doing so, find more engaging employment opportunities. “This is part of the solution,” said Small. “It’s not the only one or the whole, but it’s a part.”

“A year ago, I hoped it was us. Six months ago, I thought it was us. Today, I believe it’s us.”
Paul Liberti, who founded BioMagnetic Solutions in 2011, is no stranger to the life sciences. A trailblazer in magnetic cell separation, Liberti now seeks to cultivate cutting-edge ferrofluid technology that could revolutionize the diagnosis and treatment of cancer.

In the 1980s, Liberti became a pioneer in the world of magnetic cell sorting with the invention of novel magnetic nanoparticles. Upon this invention, he founded Immunicon. The company’s early discoveries garnered enthusiasm in the research community, the technology, branded CellSearch, was acquired by the pharmaceutical company Johnson & Johnson. J&J eventually abandoned development of the technology.

Today, Liberti has rebooted this venture. “In my previous career, we were doing the applications, but we didn’t realize there were better ways to do what we were doing,” he said.

“There are new things we can do to make those applications even more versatile,” said Liberti. “What we were doing in 11 steps at Immunicon, we are now doing in three.” BioMagnetic Solutions, currently operating out of incubator space in the Zetachron Center, has its sights set on a clinical-scale cell separator.

Liberti’s team has engineered the increasingly effective ferrofluids, liquids containing dissolved magnetic nanoparticles. By attaching antibodies to the magnetic particles, they are able to find and bind to specific receptors on cells. The cell, in effect, becomes magnetic, and, through modulated direction and force, can be separated from non-magnetic cells.

The enhanced magnetism of these solutions, in which tiny magnetic beads are suspended, allows the technology to sort cells with uncontested precision. It can find the proverbial needle in the haystack.

In one application, the company targets T-cells, so-called “killer cells” that attack disease but are often depleted in people suffering from immune deficiencies. “Within any subpopulation of cells, you have killer cells,” explained Liberti, “but they don’t always do a good enough job.”

Enriching, functionalizing, and purifying these cells overrules the body’s natural limitations—perhaps most importantly, the immune system’s susceptibility to being shut down by diabolical cancer.

Once the desired cells are magnetically tagged, they can be extracted and enriched using molecular biology techniques such as PCR.

That enriched sample will then be shared with a larger company specializing in genetic engineering to be modified for optimal functioning. That is to say, they will correct the defect that was preventing those cells from doing their job properly.

Next, the cells will be returned to BioMagnetic Solutions for purification through magnetic separation. Liberti and his team will then have a large population of healthy cells to return to the patient’s bloodstream.

Liberti also offered the example of sickle cell anemia. The presenting patient’s stem cells, found in bone marrow, don’t produce the right kind of hemoglobin. By isolating a stem cell and plucking it from the bone marrow, the defective cell can be handed off to a third party for genetic modification. Through an engineering process, the stem cell is taught how to input the right type of hemoglobin. BioMagnetic Solutions is responsible for the capture and purification—the small but critical initial and final stages.

In addition to widespread therapeutic potential, these ferrofluids, Liberti hopes, will be utilized as a diagnostic tool.

“One area of interest for Liberti and his fellows has been cancer dormancy. “Cancers, in certain cases, spontaneously disappear,” he said, “which has led to people selling cures that don’t work.”

For many years, there was a widely accepted belief that tumor cells do not circulate in the blood until end-stage disease. But Liberti and his team discovered that circulating tumor cells are present in the bloodstream even in early stages, and BioMagnetic Solutions’ technology is precise enough to find them, even in relatively insignificant quantities.

“If there are only two cells in a billion, we can find them and take them out,” said Liberti.

Beyond extracting the cells, Liberti can glean information about the cancer: “Cells from different parts of your body have markers on them,” he said. “You should, then, be able to look at that tumor cell and identify the early stages of, say, liver cancer or breast cancer.” And of course, early detection provides the best chance of successful treatment.

“This is the wave of the future,” said Liberti, whose decades of medical research and practical experience have informed the course of BioMagnetic Solutions’ push toward improved diagnostic and therapeutic processes. With purity and yield surpassing any magnetic cell separation technology to date, the company is making rapid strides toward revolutionizing cancer treatment.
DOMINIGHT AND BEN FRANKLIN TECHNOLOGY PARTNERS

SHED LIGHT ON AN OUTDATED INDUSTRY

When Rick Hall worked for a national-based company that sold mobile LED light towers, the type used in outdoor situations like construction sites and large parking lots, he heard from frustrated customers who weren't happy with the product—the towers weren't durable for long-term use and didn't cast enough light. With a Penn State degree in agricultural and biological engineering, Hall knew there was a better way to create bright lights that not only saved money, but also reduced the harmful emissions produced from traditional lighting sources.

"For the past 50 years, the mobile lighting industry has been stagnant, offering only one solution for off-grid lighting—the diesel powered light tower," Hall says. These towers produce light from continuously-running diesel engines, which require frequent refueling and emit an average of 20 pounds of CO₂ during each hour of operation. Consider the scale of a large operation like a Penn State home football game day—the university currently uses 101 diesel-based towers to provide light in tailgating lots and around the stadium. With a 12-hour runtime on game days, these lights produce over 250,000 pounds of CO₂ each year. "Not only are they costly in terms of labor and refueling," Hall says, "but they are a relatively unregulated producer of greenhouse gases, which are costly to our air quality."

Recognizing that solar energy could be tapped to effectively power light towers, Hall left his job in 2013 and spent a year developing a prototype for what is now the Solar Hybrid LED light tower. Hall established his company, Dominight, in 2014 and reached out to Ben Franklin Technology Partners at Innovation Park for funding assistance and business support.

"Ben Franklin provided Dominight with a market scan that gave us valuable insight into the trends of the mobile light tower industry," Hall says. "I also received one-on-one consulting that further strengthened my business plan and marketing tactics. It allowed me the opportunity to delve into the fine points of the business while receiving insightful feedback throughout the process."

Even more beneficial to the long-term development of Dominight was the funding partnerships that Ben Franklin helped facilitate. One such partnership with the Chamber of Business and Industry of Centre County (CBICC) provided early funding that allowed Dominight to construct a solar hybrid demo tower.

"Rick saw the unmet need in the market for a high-quality, safely operating solar light tower, so he came out with a completely new design and produced prototypes," recalls John Rodgers, chair of CBICC's loan fund. "He was in the position where he had his product ready to go to market, and he needed funding to buy the inventory, pay the workers, and get it shipped." The solar hybrid light towers that were created with the help of this funding are now being battle-tested on the grounds of Penn State. Two towers are providing light for the tailgate lots during game days, providing a safer and more environmentally-friendly alternative to the current lights.

While the Penn State Office of Physical Plant is still evaluating the Dominight towers, they’ve been impressed with the results. "The evaluations consider both manpower efforts to facilitate the operation and maintenance, as well as the efficiencies of solar and hybrid-solar light towers," explained Mack Messner, an electrical engineer with OPP utility services. "We presently deploy diesel light towers, which require diesel fuel to sustain the operation, as well as refueling during the season. The towers being evaluated are equipped with on-board controllers that would allow the towers to be pre-programmed for specific runtimes. These timers eliminate manpower needed to keep the towers running while reducing the travel time and associated costs with tower upkeep.

Looking to the future, Dominight plans to operate a rental fleet from their State College facility while establishing dealers on the West Coast. The company is also developing hybrid heaters and light towers specifically for construction projects.

"We are at a pivotal point in the development of our business and the support of local companies, and Penn State University, in particular, is very helpful in validating our product and helping to stimulate the growth of the company," Hall says. "Our goal is to remain in Centre County and provide long term, high-paying, skilled manufacturing jobs. I believe this is a noble cause that anyone who resides locally, or has any interest in the prosperity of the local economy, can get behind."

### FOUNDER RICK HALL’S KEYS TO SUCCESS

- ✓ Start networking now. It’s never too early to establish business contacts.
- ✓ Be ready to lay out a lot of cash and time. The process to take a product from concept to market is costly and will require 100% of your efforts.
- ✓ Make sure that your family, significant other, pet cat, and anyone or anything that relies on you in any way is as committed to the business as you are. A lot of sacrifice will be required, and you don’t want it to come as a surprise to anyone that you are involved with.
- ✓ Get input from other professionals who can provide constructive criticism (Ben Franklin is a great resource for this!).

### ABOUT THE DOMINIGHT SOLAR HYBRID LED TOWER

- ✓ Brightest LED tower in the world
- ✓ Near silent operation
- ✓ Stores up to 50 gallons of diesel but uses only 0.7 gallons per night
- ✓ Can run up to 70 nights without the need for refuel
- ✓ 90% lower fuel consumption
- ✓ Lithium battery reduces emissions
- ✓ Durable and long-lasting, even in harsh conditions
- ✓ Made in Centre County

### AROUND TOWN

Dominight light towers have been deployed at the following locations:

- ✓ East Halls construction site
- ✓ Overnight RV parking lots on campus
- ✓ Student Farm inauguration
- ✓ Central PA 4th Fest
- ✓ 2016 Arts Fest
- ✓ Central Pennsylvania Visitor’s Bureau
Q&A WITH LEE ERICKSON,
CHIEF AMPLIFIER
OF HAPPY VALLEY
LAUNCHBOX

Q: What’s happening in the current session?
A: This fall, LaunchTeams include: Musical Minds, creating the first wellness-based music recommendation engine that leverages brainwave-sensing headphones to identify songs that help you focus, relax, get motivated, and reduce stress; Rain Reality, developing holographic exhibits for museums that inspire and educate while cutting the costs associated with providing hands-on and collaborative learning to diverse audiences; Stockd, a full-service grocery delivery service that is changing the way busy people plan and shop for meals; What’s Poppin’, an online centralized platform allowing students to search for and discover unique events to fully immerse themselves in all their colleges have to offer; and, Visionese, a virtual tour company combining 360 panoramic and aerial drone photography to deliver next-generation experiences for remote users.

Q: Are there any changes to the format you’re using this session?
A: In addition to a focus on lean start-up principles and creating a sustainable business model, we are now integrating Design Thinking “sprints” into the program. Design Thinking is a process for innovation that matches people’s needs with what is technologically feasible and viable as a business model. It helps our LaunchTeams learn from their customers, find patterns, and iterate their solutions quickly.

Q: When does the session wrap up?
A: Graduation will be held just before the end of the semester in early December. We invite the community to hear about the progress that LaunchTeams have made and to celebrate their wins. The graduation date will be announced as we near the end of the bootcamp.

Q: What would you like to share that you think people don’t know about LaunchBox?
A: Many people don’t realize that our facility, bootcamp, and no-cost clinics are open to everyone, Monday through Friday from 8:30–4:30—they are not exclusive to Penn State students or faculty. Also, Jason Huber, our Entrepreneurial Cog Connector, is also a talented artist and he’s been hard at work painting various mottos and art on the walls to create an energized and welcoming environment. We encourage everyone to come check it out and to build a race car to launch off our LaunchDerby track.

Q: Is there any additional info you can share about the Spring 2017 accelerator session or upcoming events at LaunchBox?
A: Applications for our Spring Accelerator Bootcamp are open. We encourage interested start-ups to drop by to check out the facilities and take advantage of our no cost professional clinics—details on the Advice and Help section of our site.

About Lee

Q: Tell us about your experience and how you landed at LaunchBox.
A: Working at the LaunchBox is the perfect combination of my 25 years of entrepreneurial and teaching experience. Prior to coming to Penn State, I was an instructional designer for GE Information Service as well as the co-founder of multiple businesses including Erickson Barnett, a full-service marketing agency specializing in B2B technology marketing, and Erickson & Associates, an independent consulting firm that developed computer-based instruction and online help systems for large corporations. I’ve worked with established companies, start-ups, and associations. I came to Penn State in 2008 to pursue my Ph.D. from the College of Information Sciences and Technology (IST) with the objective of getting back into the classroom. After graduation in 2012, I took a job teaching in the College of IST and building their entrepreneurship curriculum and events. With the arrival and support of President Barron, the entrepreneurial ecosystem took off and Happy Valley LaunchBox was a direct result of his leadership and vision. It was a great fit with my background, and the opportunity to play a key role in building it from the ground up was just too good to pass up.

Q: How long have you been in this position, and what have the highlights been so far?
A: I officially started as the Chief Amplifier on August 1, 2016. Highlights to date include meeting the wide variety of students, faculty, and community members who are working to build and grow their businesses, participating in an economic development panel with Congressman G.T. Thompson, President Barron, Neil Sharkey, and Hunter Swisher (a recent LaunchBox graduate), and hosting Project Vive’s poetry event “My Voice, My Power” with Arlyn Edelstein. Every day the energy is building, people are volunteering to share their expertise, and all and all it’s amazing to be around this kind of energy.

Q: What are you most excited about accomplishing in the next year?
A: I’m most excited about building a network of experts, advisors, and mentors who can help local start-ups to learn fast, de-risk their businesses, and increase their chances of success.

Q: How do you feel like your unique background has prepared you for this role?
A: As a serial entrepreneur who has started, managed, and grown a number of small businesses, I have experienced first-hand the emotional (and financial) ups and downs entrepreneurship brings. Additionally, having personally worked with hundreds of technology-focused and early stage businesses as the co-founder and CEO of a full-service marketing agency, I understand how to build a brand, generate awareness, and engage customers with limited resources and funding. Furthermore, my work with some of the nation’s largest venture capital firms and the Kauffman Foundation has broadened my understanding of the entrepreneurial ecosystem with regard to sources of support and funding for start-up and growth-stage companies. Teaching and mentoring have been a consistent thread throughout my career so I am able to bring that experience to developing new programs. Finally, I have been working with individuals in the local entrepreneurial ecosystem for over five years so I have been able to build relationships with many individuals who will be key to our success.

Q: Is there anything else you want to share?
A: I’m particularly impressed with how much the Invent Penn State team has accomplished in less than two years. Thirteen innovation hubs have been set up across the Commonwealth, Happy Valley LaunchBox has graduated 15 LaunchTeams, and in October, there were over 500 investors, inventors, and start-ups who attended the Venture & IP Conference. It is a testament to President Barron’s vision, the amazing people who work long hours to make his vision a reality, and how ready this region is to work together for the common good. I’m happy to now be a part of this group and am looking forward to watching the energy continue to build and seeing the impact firsthand.
Innovation Park’s coolBLUE Community strives to provide a dynamic environment and make a positive impact on the quality of work-life for employees in the park. Networking, workshops, “field trips,” lunch programs, walking and running clubs, and other activities help companies in the park connect with each other, and retain their top talent.

Here are just a few highlights:

“We appreciate the variety of programming that Michelle [the coolBLUE Lady] and Patty, [the previous coolBLUE Lady], bring. We have seen many different things because of the coolBLUE opportunities offered.”

—Ruth Harpster, speaking for herself and Kathy Kresovich

“I like the elective classes offered, such as yoga, salsa dancing, and Zumba during lunch hour.”

—Belinda Tyson

The coolBLUE Community and the Center for Performing Arts have brought many outstanding musical groups to the park for exclusive performances, including Brooklyn Rider.

Employees gathered in the courtyard of the Penn Stater this fall for a brief concert by a quartet from Sphinx Virtuosi while enjoying ice cream from Berkey Creamery.

The annual park picnic: Each year, employees are invited to attend and enjoy music, conversation, and picnic food (including ice cream from Berkey Creamery).
Three local food trucks are making sure that the minds of Innovation Park’s entrepreneurs stay well-fueled. The trucks, Food For Thought, Street Meat, and World’s Fare Catering, serve Innovation Park four days a week from 11 a.m. to 1:30 p.m.

The food trucks are one perk of Innovation Park’s coolBLUE Community. Setting up at two different locations during prime lunch hours, the trucks are a quick and easy lunch option for the park’s busy inhabitants. But their popularity comes from more than just convenience; they are all serving unique and top-notch food.

Food For Thought is a true melting pot, bringing the best of the world’s street foods right to State College. From international items like Korean Pulled Pork and Curry Chicken Salad Wraps, to American favorites like Smoked Gouda Mac-n-Cheese, there is something for everyone. Food For Thought also serves sweet treats like the S’more Sandwich and French Toast Sticks with Cayenne-Maple Syrup, and incorporates new specials each week.

Innovation Park became one of Food For Thought’s first selling destinations when owners Mitch and Sharyn Angle started. Now going on their third year of operation, they have had wonderful feedback ever since.

What makes food trucks so special, Mitch says, is that they serve high-quality food made by people who truly care about what they do.

“Food trucks are great for quick fixes but with quality, made-from-scratch ingredients,” he said. “Like the quote, ‘It’s not fast food, but good food, fast.’”

Street Meat, based out of Bellefonte, offers meals with grass-fed, pasture-raised meats, plus an array of other comfort foods. Customers can choose between sandwiches like the Angus Burger and Gourmet Grilled Cheese, sides like hand-cut French fries and mac & cheese, and desserts like milkshakes and homemade pie. Street Meat also serves breakfast sandwiches all day, as well as delicious daily specials.

Owners Susan Smith-Shannon and Kerry Shannon started Street Meat in May 2016, and have been serving Innovation Park since August. The inspiration for Street Meat came when Susan and Kerry found themselves with an excess of fresh meats produced from their farm, and suddenly realized they could find a much better way to share it with people.

“One thing I am most proud of is that we raise the meat we serve on the truck,” said Susan. “It truly is ‘farm to food truck.’”

The Street Meat team is currently putting the finishing touches on a second truck, which will open soon and serve soups, salads, and subs.

World’s Fare Catering, the newest truck to join the park, is a hub of global flavors of all kinds. Calling on his diverse culinary background— including Mexican roots, training in Paris, Asian cooking experience, and three restaurants under his belt—owner Michael Marx, along with his wife Jennifer, serves comfort cuisine from all over the world. With different items on the menu each week, customers can always expect something totally fresh and exciting. Polish pierogi, Greek gyros, Mexican taquitos, Thai soup… Only at World’s Fare can you find all of this in one place.

Marx seconds Mitch’s statement about the quality and care that goes into food truck meals, and says they truly make a team effort to support each other.

“It is the epitome of small-business—the epitome of fresh and local,” said Marx.

Food For Thought, Street Meat, and World’s Fare Catering have nothing but five-star ratings and rave reviews on their Facebook pages, and the truck owners are enjoying the ride just as much as their customers.

“Things have been great so far,” said Susan. “We are having a great time serving at Innovation Park.”

Visit innovationpark.psu.edu for the complete schedule and locations of the food trucks.
Innovationpark.psu.edu

James Delattre, Associate Vice President for Research and Director of the Office of Entrepreneurship, addressed a networking luncheon in the park’s Technology Center to debrief the group on the results of Penn State’s recently concluded Venture & IP Conference.

“We had 585 attendees at the conference. We were going to declare victory if we got 300, so that just tells you there was a great response from the university community and from places far away,” Delattre said, reporting that attendees came from all across North America.

“We had 100 attendees participate in tours of the Millennium Science Complex and the Happy Valley LaunchBox on Allen Street, so that was a huge response. There is great interest from people in the entrepreneurship space to learn about the resources Invent Penn State has here in the community.”

Delattre summarized some of the other highlights of the event:

- 95 start-up companies attended, with 75 participating in the Venture Connection event—a “speed dating” forum in which start-ups had twenty minutes to pitch their companies to professional investors who had been matched with their profile.
- 69 professional investors participated in the conference, including 39 who met with start-ups in the Venture Connection.
- 39 organizations stepped up to sponsor the event, defraying much of its cost and making the event possible, including State College-based Accuweather.
- 30 Penn State students were able to shadow professional investors for two days—a unique learning laboratory to introduce them to the world of early-stage investing.

Tech Tournament

Another major segment of the conference, the Tech Tournament, featured 14 faculty innovations, each of which involved Penn State intellectual property. Four of these technologies received cash awards to support their continued development:

1st Place: AdvanceRib, an FDA-approved device to improve outcomes of rib surgery invented by a team at Hershey Medical Center led by Barry Fell.

2nd Place: Avocolor, a natural food colorant developed by Penn State food researcher Greg Ziegler that is being commercialized by Ziegler’s start-up company, Persea Naturals LLC.

3rd Place: Project Team, an anti-bullying curriculum developed by a team of Penn State Education faculty members.

People’s Choice: Lasers for Innovative Solutions LLC (LAIS), a laser imaging system, developed by Penn State grad student Ben Hall, which provides highly detailed images of samples as the laser slices them into fine layers. LAIS is a tenant in the Innovation Park incubator.

Startup Showdown

Twelve more mature start-up companies were selected to make presentations in a “startup showdown,” with three Pennsylvania companies winning cash awards:

1st Place: Indigo Biosciences, a tenant in Penn State’s Zetachron incubator.

2nd Place: Actuated Medical, from Bellefonte, PA.

3rd Place: RenderFX, from Eerie, PA.

Inc U Competition

Since Penn State is first-and-foremost in the business of educating students, the conference also featured an Inc U event (organized by PENNTAP) in which eight student entrepreneurs each received $2,500 awards to advance their student start-ups. This group included Phosphosolutions, which is currently enrolled in the Ben Franklin TechCel- erator program in Innovation Park.

Follow-Up

Penn State’s next venture conference is tentatively scheduled for April 2018, which will provide an eighteen-month period for the venture pipeline to recharge and will also position the conference to offset and complement Pittsburgh’s 3 Rivers Venture Fair, thus allowing the two events to collaborate under the common direction of Kelly Szejko, who organizes both.

Delattre discussed his objective of having the Penn State entrepreneurial community interact with and learn from the more mature venture community at work in Pittsburgh.

“Entrepreneurs will have increased opportunity to refine their business plans so that as they mature and begin to look for executive management and funding, we’ll have some really strong bonds there,” Delattre said.

At the conclusion of his remarks, Delattre encouraged the local start-up community to get to work early to develop their applications for the next conference—admittance was highly selective, and he wants to encourage the local community to play a major role. He also told the group he expects the next venture conference to have a greater emphasis on education companies and technologies (EdTech) because of Penn State’s strength in this field.

Persea Naturals has recently begun operations in the Innovation Park incubator.
Hundreds of innovators, entrepreneurs, investors, technology scouts, alumni and media convened for a showcase of disruptive Penn State technologies and a wide range of capital seeking ventures.

**Penn State Technologies**

14

**Attendees**

585

**Startups**

95

**Venture Capitalists**

69

**Inc U Competition**

8

**Sponsors**

39

**Startup Winners**

3

**BY THE NUMBERS**

- 14 Penn State Technologies
- 585 Attendees
- 95 Startups
- 69 Venture Capitalists
- 8 Student Startups
- 39 Sponsors
- 3 Startup Winners
- 3 Fantastic Keynotes
- 4 won big money:
  - $75,000 AdvanceRib
  - $50,000 PERSEA Naturals / AvoColor
  - $25,000 Project Team
  - $10,000 L4IS
- 3 Student Startups:
  - Indigo BioSciences
  - Actuated Medical
  - RenderFX
- 3 Keynotes:
  - Dr. Eric Barron
  - Jon Hirtle
  - Ray Lane

Sponsored by:
Penn State’s Vice President for Research, Neil Sharkey, presented chemist Steve Benkovic with the newly established Inventor of the Year award. This award recognizes a Penn State researcher who signifies excellence in both inventorship and entrepreneurism.

VP Sharkey’s remarks are excerpted below:

“Penn State has numerous renowned inventors and, as you can imagine, choosing one individual could be a difficult task. For this inaugural award, however, there is one person who has made this decision an easy one. Truly, there is not a more deserving innovator to receive it.

Dr. Benkovic began his Penn State career in 1965, more than 50 years ago. He has been one of the most influential researchers in the fields of chemistry and biochemistry, not only at Penn State, but also in the world.

Dr. Benkovic’s body of work is renowned for its striking originality and unusual breadth, redefining how we understand the role of proteins as catalysts. With over 600 peer-reviewed publications and 25 issued patents to his credit, his work has been instrumental in developing our fundamental understanding of the interrelationship of chemistry and biology, and has been a fountain for innovations in chemical biology. He largely defined the field of mechanistic enzymology through decades of innovative kinetic methodologies, the invention of novel biological protocols for investigating the chemical sequence and structural basis of enzyme activity, and the discovery of enzyme inhibitors with therapeutic potential. His decades of research have proved to be of fundamental importance in the design of drugs and antibiotics to treat such things as bacterial and fungal infections, HIV, and cancer.

Those contributions earned Dr. Benkovic accolades such as the National Medal of Science, the nation’s highest award for lifetime achievement in scientific research, presented to him by President Obama in 2010. We are inspired to watch Steve’s contributions to the world multiply exponentially as his students, spanning five decades, become innovators in their own right, making countless contributions. They credit him for his passion, leadership, and mentorship, a role that he treasures.

Over time, Steve’s research results led him to co-found Anacor Pharmaceuticals with Dr. Lucy Shapiro at Stanford University in 2002. Anacor is a biopharmaceutical company focused on discovering, developing, and commercializing novel small-molecule therapeutics derived from its boron chemistry platform. Earlier this year, Anacor was purchased by Pfizer for $5.4 billion.

Given Steve’s “time in the business,” you might presume that he is receiving the Inventor of the Year award for these past accomplishments. Not so. Steve continues to make groundbreaking discoveries, to patent technologies, and to start companies. He currently has seven pending patent applications. His most recent work focuses on the assembly and
kinetic characteristics of the enzymatic machinery responsible for DNA replications and DNA repair in T4 phage and human cells. He has also recently collaborated with colleagues at Penn State to use nanodevices, called acoustic tweezers, which are capable of precisely manipulating cellular-scale objects that are essential to many areas of biomedical research.

Additionally, Steve just launched another company, Boragen, which is developing improved fungicides to combat agricultural diseases. He continues to amaze us.

We can’t wait to see what he does next.

“A Role Model for Aspiring Inventor Entrepreneurs

Steve Benkovic sat down with us and reflected on Invent Penn State and his “business” career.

“The university has gotten a lot better at backing up inventors by providing patenting, which I applaud,” Benkovic said. “There has to be a connection between start-up funding and next-stage investors. The seeding idea of innovation is good, but who’s going to couple it out? To go to a VC firm, you have to have a good business plan. You have to have passion and a desire to do it, but you can’t do it yourself.”

When asked for advice on how to achieve success in the highly competitive field of drug discovery, Benkovic mentioned that he had enjoyed a longstanding relationship with GlaxoSmithKline. GSK provided guidance for him and his colleagues in who they should approach for funding and management assistance from a strategic perspective.

“We turned to some of our friends, and we all consulted at a high level, and they gave us good contacts. Once we had our funding, we had a lab underway within two weeks,” he said. Along the way, the company attracted CEOs capable of advancing the company through its various development stages, with the final CEO being an expert at packaging and selling companies. In the case of Anacor, this meant acquisition by Pfizer.

“With Anacor, the company had a strong scientific advisory board and one or two employees who interacted with CROs (contract research organizations), and they went to the CROs to make sure things were being done correctly. Then we realized what we had to bring in-house because we couldn’t get the services we wanted. And then we started to grow. And then of course once we got into clinical trials we had to have our own capabilities—statisticians and other specialists—and then by the time we were sold, we had about 90 employees, but that was over ten years. We were small for a long time until we had something.”

The Next Entrepreneurial Chapter: Boragen and Beyond

Benkovic’s newest venture is Boragen, an agricultural products start-up. The company’s technology platform is a very broad spectrum fungicide for plants.

“We’ve come with a new fungicide for agricultural use. There are a number of new fungi that are out there for various plant diseases—ranging from turf grass and the dollar spot fungus to lettuce in the Napa Valley to bananas in Costa Rica to wheat rust in India—that have become resistant to existing fungicides. What we have is a new mechanism of action, using boron compounds, and as a consequence we are hitting the fungi in new pathways. So our hope is that we’ll not only have a stand-alone product, but that we’ve already demonstrated that the addition of our materials to many existing fungicides creates a synergism in attacking the fungi.”

In his spare time, Benkovic is consulting for a University of Minnesota start-up whose chief scientific inventor is a faculty member and one of Benkovic’s past postdoctoral students. The Minnesota model couples a university start-up with seasoned industry executives to accelerate development. According to Benkovic, “That’s the way to do it. Their CEO asked all the right questions, knows where to take it. You need a strong business leader.”
How does a full-time musician fall into a techy job at Penn State University? Kate Twoey says that due in part to the financial crisis of 2008, she took a day job to supplement her music career and she hasn’t looked back since.

Kate’s Work
For the past seven years, in addition to continuing her music career, Kate has worked as an Instructional Production Specialist for Penn State’s World Campus. The World Campus is PSU’s online learning platform that offers students all around the world the opportunity to earn certificates and associate, bachelor’s, and master’s degrees from Penn State entirely online.

“I had no idea that I was a tech geek until seven years ago when I started this job,” says Kate. Her job is to onboard new Learning Design staff and train them on new and changing processes and systems. Penn State is in the midst of transitioning to a new Learning Management System, so this has been a particularly busy time for her.

She says that she cried every day after work for the first two weeks when she started her job. She hopes to save other new hires from feeling that way.

“I want our new staff to know that I completely understand how hard it can be to start a new job,” she says, “and help them find that balance between learning so much your brain hurts and laughing so hard your face hurts!”

Kate’s passion for her work is evident when you talk to her. She’s excited to be the first person to work with new staff and her hope is that when people ask them “How’s your new job?”, they can say that it’s really fun.

Part of her role also includes working on the Human Resource and Employment Relations courses for the various certificate, associate, bachelor’s, and master’s degree programs. Hundreds of courses are available and it takes months to prepare them for launch.

“When we are opening the courses at the beginning of a new semester, I feel like ‘Look! Look what we just did! We made all of these courses for students all over the world. The courses are ready for you!’” says Kate.

The Perks of Working at Innovation Park
Kate takes full advantage of the many perks available at Innovation Park. She visits the food trucks and the farmer’s market in the summer. She likes that she can pop over to the Penn Stater for conferences, hop on the bus to campus, or take a stroll on the walking paths. Being a musician, she also enjoys working in close proximity to a radio station.

“Personally, I love that our office is in the same building as WPSU!” she says. “There is no end to the exciting things happening in the WPSU studio. We got to meet Mr. McFeely!”

Kate regularly attends events at the park including the Innovation Park picnic that is held every summer outside at the Penn Stater. She partakes in coolBLUE field trips including the one to Pegula Ice Arena and the Palmer Art Museum.

About Her Band, Pure Cane Sugar
Kate and her band, Pure Cane Sugar, are well-known around town. It’s an Americana band, and while many of their songs are originals, they sometimes put their own spin on popular songs. They have put out two albums and are currently in the studio working on more tunes.

Pure Cane Sugar plays parties and events and has a standing Saturday night gig at Zeno’s. Kate’s favorite gig by far though is playing at Arts Fest.

“When I was about 10-years-old I’d watch the Arts Fest musicians play and fantasize about doing that someday,” she recalls. “Playing Arts Fest for me is a reminder every year that dreams can actually come true.”

She confesses that she’s a little obsessed with Arts Fest and it’s one of the reasons she moved to the area. Her entire house is full of Arts Fest posters from over the years, and she counts down the days each year.

Occasionally, when Kate is at work at Innovation Park someone will recognize her from a gig. And sometimes when she’s playing with Pure Cane Sugar, someone will recognize her from the park.

“It used to weird me out when those worlds collided, but now it’s great,” she says. “It’s always fun to see faces from work at gigs as well!”

Originally from Mechanicsburg, Kate has been living in State College since 1994 with her husband, Gary, and their teenage son, Jakob. Kate grew up in a musical family and studied voice performance. You can follow Pure Cane Sugar on Facebook at www.facebook.com/purecanesugar.
BUSINESS RESOURCES & EVENTS

Celebrating Success for Local Business

2016 CBICC VISION DINNER/EXCELLENCE IN BUSINESS AWARDS
December 15, 2016
5 p.m., Mountain View Country Club
The Chamber of Business & Industry of Centre County is pleased to partner with Pennsylvania Business Central in celebrating the best of Centre County business. As part of the CBICC’s Vision Dinner, the Excellence in Business awards will recognize business achievement in six categories. An independent panel of business and community leaders will select the finalists and winners.
Learn more: cbiccvisiondinner.com

Helping Business Compete with Technical Assistance

PennTAP helps Pennsylvania companies improve their competitiveness by providing technical assistance and information to help resolve specific technical questions or needs. The program focuses on helping smaller firms that normally do not have the in-house expertise or resources to resolve specific technology questions or needs. PennTAP technical advisors assist small companies by providing technical advice, technical information, and connections to other expertise, resources, or programs. PennTAP services the entire state of Pennsylvania through a network of technical advisers who have specific areas of technical expertise and are located throughout the state.
Learn more: penntap.psu.edu

Building Local Business Through Tourism

The Central Pennsylvania Convention & Visitors Bureau (CPCVB) is a nonprofit, membership-based organization that promotes travel-related activities and coordinates visitor services to bring people to Central Pennsylvania and boost economic activity. Membership connects local businesses to a network of business professionals who understand that travel and tourism are vital to the overall wealth and economic strength of the region.
The CPCVB operates the Centre County/Penn State Visitor Center, a state-of-the-art facility serving hundreds of visitors each day. Guests can find out what’s happening in the area and pick up brochures on Central PA Businesses, attractions, and outdoor recreation. The Center is open and staffed seven days a week.
Learn more: visitpennstate.org

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

Chao Liu
Chief Executive Officer | Aleo BME, Inc.
Chao Liu is the CEO of Aleo BME, a start-up that participated in the Ben Franklin TechCelerator program and is now located in the Incubator in the Technology Center at Innovation Park.
"Innovation Park provides a sense of business community for small technology start-ups like us," Liu says. "We learned from experienced business mentors in the TechCelerator program and can share the experience and resources with other smaller companies."

Liu also explains the unique story behind the naming of Aleo BME:
"The company was named from an inspiration after reading Leo astrology," she says. "Leo is a large constellation (the lion), said to represent the lion slain by Hercules. Penn State's mascot is also the lion, and Aleo BME was started based on a few licensed technologies from PSU. In addition, Leo is the fifth sign of the zodiac, for people who are born from July 23 to August 21. One of the co-founders, Dr. Jian Yang was born during this time span. In Leo astrology, it is said that business dealings are easy and successful for Leos if they are in command and control. For all these reasons, the company was named as Aleo BME, where Aleo means 'A-leo' and BME represents 'Biological, Medical, and Environmental,' which is aligned to the long-term mission of the company to develop meaningful products to solve problems in these areas."

Liu is the mother of two daughters, six and eight years old. In her spare time, she enjoys doing yoga and spending time with her children.

Linda Chadwick
Student Transfer Credit Specialist | Academic and Enrollment Support Services, Penn State World Campus
Linda Chadwick takes full advantage of working in an office located in Innovation Park.
"I like working and being active here at the park," she says. "I bring my bike in the summer months and ride throughout the park. The Innovation Park office has a bike that you can check out too, which I have done before."

Chadwick also enjoys walking and running when weather permits. "During the winter, I like to walk through the woods and enjoy the solitude. It can be very peaceful and rejuvenating."
She also takes advantage of the Penn Stater’s workout room for a monthly fee.

"The coolBLUE community has facilitated many campus tours and that has been a great way to connect with individuals at the park and with our colleagues," she adds. Those have included trips to: The Housing and Food Building for cooking demonstrations from Chef Laychur, The Arboretum, Pegula Ice Arena, The Millennium Science Complex, Medlar Park, and more!
Now Seeking Tenants for Upcoming Advanced Materials Flex Space
Building H to Focus on Research and Light Manufacturing Activities

The Innovation Park community offers:
- Resources and a network for start-ups and expanding businesses
- World class research facilities and meeting spaces
- Access to top talent and cutting-edge technology from Penn State
- Employee perks, including opportunities for fun, fitness, and personal and professional development
- Daycare services right inside the park

If you’re interested in learning more about Building H Flex Space, contact Dan Leri at 814-865-5925.