SMART CITIES START RIGHT HERE

THE RISE OF THE INTERNET OF THINGS IS ONE OF THE MOST SUBSTANTIAL CHANGES IN MANUFACTURING IN HISTORY...AND HAPPY VALLEY IS RIGHT IN THE MIDDLE OF IT ALL.

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Bringing The Wall to Centre County

WPSU and a dedicated group of community volunteers and partners are bringing The Traveling Wall—an 80% scale replica of the Vietnam Veterans Memorial Wall—to Centre County, Oct. 5-8.

This special event will be held in conjunction with the 50th Anniversary of the Vietnam War and will be the culminating community event of WPSU’s project, A Time to Heal. The installation officially opens at Noon on Thursday, October 5, and closes at 2:15 p.m. on Sunday, October 8.

Event Details

The installation at Innovation Park at Penn State will be free and open to the public 24-hours a day for the duration of the 4-day event. The event includes...

- An opportunity to reflect and honor all veterans
- Opening and closing ceremonies
- Reservable ceremony times and commemoration space
- Engagement and education for secondary school and college students
- Personal experiences with the memorial and interactions with Vietnam Veterans
- WPSU documentary screenings of A Time to Heal
- WPSU’s Story Corps recording studio
- Vietnam War timeline and statistics display
- Zippo Lighter war era lighter display
- Musical tributes
- Visitors will be able to make rubbings of names and pay tribute by leaving personal mementos.

More details are here: wpsu.psu.edu/vietnamwall/
The exciting decision was formalized in a memorandum of understanding the company signed with Penn State.

“We are very excited to sign this memorandum of understanding with Penn State and firmly believe it will lead to numerous opportunities for increased collaboration in materials, transportation, information sciences, life sciences, agriculture, energy and advanced additive manufacturing,” said Richard Lee, company founder and president.

RJ Lee Group partners with manufacturing clients of all kinds to help solve problems of industrial regulatory compliance and product failure, and provides a wide range of services, including materials characterization, product failure analysis, environmental health and safety evaluation, manufacturing and process quality control, product development support, post-disaster assessment and litigation support.

RJ Lee Group is recognized by numerous organizations across the country, including the American Association for Laboratory Accreditation, the U.S. Department of Agriculture, and the U.S. Food and Drug Administration, among many others.

“We’re thrilled to welcome another industry leader to Innovation Park to fulfill its mission of industry collaboration for the purpose of moving great ideas to the marketplace,”

RJ Lee Group plans to initially hire ten full-time scientists and technicians to work at the Innovation Park facility once construction is completed. The company will also provide opportunities to students.

“Penn State, through its undergraduate and graduate programs, has a huge resource of scientific personnel. We will offer internships and work for hire through our laboratory we’re establishing,” said David Crawford, RJ Lee Group vice president.

“Certain other groups within our company, like our information services group, are always looking for programmers,” Crawford added, noting that Penn State and State College are “big resources for us in getting the best people and helping them train for the industries they want to get into, through internships. It’s a reciprocal relationship.”

The company has a history of making technological advancements and breakthroughs. These include automating the scanning electron microscope, developing a process for tire recycling to transform scrap rubber into useful products, and developing a standardized test kit for gunpowder residue detection.

“We’re working on a technology right now that addresses the travel industry in bomb threat detection, and Ben Franklin is interested in providing us with some funding to commercialize it,” said Crawford. “If that occurs, Richard Lee has committed to move the assembly, test and distribution of that product to State College, and which would also create jobs.”

“There is excitement about the near-term and future economic impact potential of RJ Lee Group’s decision to locate in the county,” said Vern Squier, president and CEO of the Chamber of Business & Industry of Centre County.

The company also recently signed a memorandum of understanding with Morgan Advanced Materials, a global leader in advanced carbon and ceramic materials. Morgan is establishing a Carbon Science Centre of Excellence at the same location in Innovation Park. Morgan initially recommended Innovation Park to RJ Lee Group as a potential location for the new laboratory, to facilitate partnership between the two companies.

“Morgan Advanced Materials welcomes the new laboratory being established by RJ Lee at Innovation Park,” said Dr. Phillip Armstrong, lead for the Carbon Science Centre of Excellence. “As we develop new materials and technologies, partnering with experts in testing diagnostics and methodologies is fundamental, and working with RJ Lee is an important part of our plans.”

Construction at 310 Innovation Boulevard is still underway and anticipated to reach completion by November of this year. RJ Lee Group expects to open the company’s 2,700-square-foot laboratory facility at the newly constructed building as early as December. The company plans to be a 15-year tenant.

INNOVATION PARK WELCOMES RJ LEE GROUP

ON AUGUST 17, RJ LEE GROUP — A LEADING INDUSTRIAL FORENSICS ANALYTICAL LABORATORY AND SCIENTIFIC CONSULTING FIRM HEADQUARTERED IN PITTSBURGH — ANNOUNCED A NEW LABORATORY AT 310 INNOVATION BLVD.
The TechCelerator at State College has been releasing startups into the world since 2012. The ten-week training program provides key resources for entrepreneurs, along with business incubational services, covering topics such as financials, funding options, customer development, legal business structures and more.

"Sixty-one companies have gone into business under the direction of [TechCelerator Director] Don McCandless," according to Robert Dornich, a member of Ben Franklin Technology Partners’ Transformation Business Services Network. "These startups have generated more than $10 million in revenue, and created more than 130 jobs. The key has been to create sustainable jobs in Pennsylvania. The return on investment has been invaluable."

Not a bad track record after just five years.

According to Centre County Commissioner Mark Higgins, startups that emerge from the TechCelerator have a five-year success rate of more than 50%, compared to 25% for new businesses that don't complete an incubator program.

“The businesses that have consistently created jobs over the past several decades are new businesses, startups and entrepreneurs," Higgins said. "Supporting these efforts through a strong incubator program like TechCelerator significantly improves the odds for success.”

Relationships with other startup resources help to boost the effectiveness of the TechCelerator. Loans and investments, business support, and mentoring are all available through various networks closely connected to the program.

"Ben Franklin loans up to $5 million a year for startups," said Dornich, "and Ben Franklin's Transformations Business Services network provides strategic planning, market analysis, and research. Ben Franklin supports the process with the early money startups need."

Other partners in the local business ecosystem, including the Chamber of Business and Industry of Centre County, Venture Investment Forum, Penn State Small Business Development Center, Penn State's Office of Technology Management, and Innovation Park at Penn State, also play key roles in helping the TechCelerator provide robust support to startups and entrepreneurs.
CATCHING UP WITH THE CLASS OF 2012: WHERE ARE THEY NOW?

In 2012, a group of budding entrepreneurs completed the first TechCelerator program. It was rigorous, but proved worthwhile. Journeys caught up with a few of them:

De Novo DNA

“We develop user-friendly software that makes specific predictions to improve the performance of your genetic systems. Our customers develop next-generation biofuels, renewable materials, recombinant enzymes and medical therapeutics,” said founder, Penn State Professor Dr. Howard Salis.

“I started this company fairly early in my career,” he continued. “Now, the product has enabled individuals to actually utilize what they are working on in the lab. We have 7,000 customers in terms of people who use the product, and we are also generating revenue from our industrial clients.”

After initial success in the marketplace, new milestones are on the horizon. De Novo DNA received Phase I funding from the Defense Advanced Research Projects Agency (DARPA) for technological innovation, research and development. Dr. Salis has his sights set on Phase II DARPA funding.

Ascent Bio-Nano Technologies LLC

Tony Huang and Lin Wang formed Ascent Bio-Nano Technologies LLC to develop gentle, safe cell and particle separation devices for medical diagnosis and research studies.

The company secured second place in the Big Launch Challenge 2016, a competitive technology startup event, and in the same year relocated to First Flight Venture Center at Research Triangle Park in Raleigh, North Carolina to continue to advance its mission.

Live It

“The current goal of Live It is to help individuals to understand and develop life skills such as teamwork, leadership and problem solving,” according Kerry Small, CEO of Live It. “Over time, the product evolved from promoting specific experiences to users, into helping them gain greater value out of the experiences they were already having.”

Small said the TechCelerator helped the company as it transformed its mission and direction, and helped eliminate common technical problems that startups often experience. Now, Live It is growing.

“Currently, Live It is being tested in higher education and K-12,” said Small. “And we are looking to move into other markets, like youth groups and the military.”

L4IS

Ben Hall and Brian Reinhardt created Lasers for Innovative Solutions (L4IS), a laser ablation technology that automates the process of examining small specimens and reproducing them as a three-dimensional structure.

With its advanced tomography technique, L4IS targets agribusiness and horticultural research firms that would typically have to rely on more complex and expensive systems. The technique provides rapid 3D visualization that is not possible with methods like X-rays.

When Hall and Reinhardt started in the TechCelerator, Penn State was in the process of obtaining a patent for the technology. Now, the technology is patented and L4IS licenses it exclusively from Penn State.
IoT: CHANGING THE WORLD FROM HAPPY VALLEY

IT GOES BY MANY NAMES – THE INTERNET OF THINGS, MACHINE TO MACHINE OR M2M, CONNECTED DEVICES, SMART PRODUCTS. IT IS CHANGING THE WORLD, AND STATE COLLEGE IS RIGHT IN THE MIDDLE OF IT

What is IoT?

The Internet of Things (IoT) is the inter-networking, to each other and to the internet, of devices containing electronic components for the purpose of automated transmission of data. This networking is accomplished via software, sensors and connectivity capabilities. While the term may be unfamiliar to some, the products are not. It started with your PC years ago, then your tablet, smartphone, TV and fitness tracker. Now your car, refrigerator, medical devices and even shoes can contain embedded sensors that enable everyday items to collect and exchange data, allowing the functions of such objects to be computer integrated for greater efficiency, automation and convenience.

Michael Porter from the Harvard Business Review has called this the most substantial change in manufacturing since the Second Industrial Revolution, more than a century ago. He has pointed out that the Second Industrial Revolution in the 19th century was powered by machines, and the technology revolution that started in the 1960s was powered by computers, and now they are combining to create an Industrial Revolution of Things that combines both industry and technology in the form of intelligent machines.

Two factors have significantly impacted the rapid growth of IoT: low-cost sensors and the development of long-range WiFi networks like LoRa that can extend WiFi ranges from 35m to more than 15km. BI Intelligence, a research service from Business Insider, predicts that by 2020, there will be more than 24 billion IoT devices on the planet. That’s more than four devices per human!

Beyond Smart Phones

When thinking of IoT, we as consumers immediately are reminded of how we interact with the personal devices in our lives and how this changes the way we live. For example, smart home devices that automatically adjust lighting and heating/air conditioning based on your daily routines, washing machines that send a text when clothes are ready for the dryer, ovens that can be controlled remotely, and wearable health-care monitors that track vital signs and alert doctors if a problem is detected — all are becoming more commonplace.

But the IoT is also changing industries all around us — agriculture, aviation, manufacturing, inventory control systems, and power generation are just a few.

For instance, low-cost sensors strategically arrayed throughout a farm to detect soil moisture levels can communicate this data via long-range WiFi signal. The information can either be communicated to a person through an app, or delivered to an automated system that will decide on action, such as whether or not to irrigate, based on an algorithm or machine learning. This setup can help increase crop yield, improve the management of water resources, and save precious time.

Other examples include electrical grids incorporating smart meters and smart appliances for agile and efficient power distribution, intelligent transportation technologies such as traffic signal systems for better control of traffic flow, parking information systems for maximum optimization of parking resources, and many more.

The number-one variable in IoT is the human factor: how people interact with the “Things” in ways that are beneficial or, conversely, in ways that pose threats to privacy and safety. Concerns about loss of privacy and risk of hacking are valid.

Plus, just because something is “smart” doesn’t necessarily mean it’s useful or beneficial, or worth the expense: Consider a $99 smart salt shaker that can control ambient lighting as well as monitor salt intake or a $6,299 refrigerator, with a WiFi-enabled screen showing what’s inside — information easily gleaned by opening the door.

The companies most successful incorporating IoT are those that take people into account and find means of organizing the flood of data collected by smart devices.

Making State College a Smart City

OGOVO, a communication technology company in University Park, recently graduated from Happy Valley LaunchBox’s startup accelerator where it received early-stage mentorship, workspace and consultation for its product, PairSense. The product is a system of networked sensors to collect and analyze foot traffic in urban communities. PairSense hosts third-party, location-based software to cost-effectively manage services such as street cleaning, sidewalk repair, waste collection, and optimization of routes for first responders.

Michael McCarthy, co-founder and president of OGOVO, says advancement starts right here in our hometown: “I believe State College can become Pennsylvania’s first successful smart city within the next few years. Extraordinary solutions happen when you dream of using technology to solve real-life problems.”

In fact, State College recently solved a real-life problem with IoT. The city turned to IPS Group in San Diego to provide additional coin-free
The Internet of Things has been called the most substantial change in the manufacturing world since the Second Industrial Revolution.

Happy Valley is known for a lot of things: a top college town, safe family environment, walkability, success for startups...and now a groundbreaking IoT community?

The Borough of State College uses IoT to make parking easier and collect parking data for informed decisions.

“I believe that State College can become Pennsylvania’s first successful Smart City within the next few years.”
– Michael McCarthy, cofounder and president of OGOVO, a State College IoT startup.

10-15 Companies meet every other month to explore regional IoT projects, including KCF Technologies, Cumulus, Minitab, EnergyCAP and others.

$6 trillion total business spending on IoT solutions by 2021. (Business Insider)

$73 trillion global spending on IoT across markets in 2016. (IDC)

$75.4 billion connected IoT devices worldwide by 2025. (IHS)

Learn more about the Internet of Things in State College, with our in-depth article on pg. 6-7.
parking downtown, such as smart parking meters and kiosks that accept credit cards (and send reminders to users when their parking time is almost up). The devices are convenient for visitors, borough residents and the borough itself – smart meters have greater than 98 percent uptime (the time a machine is ready for use; the opposite of downtime) and will automatically call for repair if vandalized or malfunctioning. According to Douglas Shontz, communications specialist for the Borough of State College, “The biggest advantage the smart parking technology has given the borough is the access to parking data. We’re able to use that data when looking at our parking policies and rates, and make informed decisions.”

Shontz adds that the borough is constantly striving to discover how technology can help increase residents’ access to services, and is asking residents to share their thoughts on these initiatives at statecollegepa.us/engage.

Other area groups are exploring the incorporation of IoT into residents’ day-to-day lives. Centre Region Entrepreneur Network’s exploratory subgroup focused on IoT is comprised of 10-15 companies that meet every two months to collaborate. Companies involved include familiar local brands such as KCF Technologies, Cumulus, Minitab, EnergyCAP, and others.

“The focus is technical, with each meeting featuring an ‘education’ talk to expose the attendees to what another member is doing, or something a company embedded in IoT that might help regional companies,” explained Bill Hall of Ben Franklin Technology Partners. “The real purpose is to explore the IoT and what is being done locally. We have a diverse group of companies that are interested in how IoT can benefit them. We are learning as we progress. As a direct outcome of these meetings, we have had some of the companies start interacting with each other, seeking to improve their products and services. We have found that local companies are aware of each other, but until they sit face-to-face in a meeting, they don’t really know what each other’s capabilities are and how they can complement each other,” he said.

“Locally, we have technology advantages, partly due to the Penn State research activities that provide ‘big city’ technological access in an affordable rural area. We want to showcase this to leverage economic development in the region.”

IOT in Education

Kyle Bowen, director of the Teaching and Learning with Technology program at Penn State, shared that for the first time in technological history, people from every discipline can learn and implement IoT. His students range from English majors to future high school science teachers.

“We are teaching skills for technology that hasn’t even been invented yet,” Bowen said. “We are giving people the building blocks to invent and solve problems.”

“In one creative writing class, students are tasked with identifying a problem and inventing a solution that uses a smart device. The writing assignment can be a reflection on the invention process, an article outlining the features of the IoT device or a piece documenting the technology. The assignment is an immersive experience for students, and blows up the left brain/right brain myth, allowing students who have chosen majors that are not in math and sciences to fully develop logic, problem-solving and invention.

“IoT is at the heart of the startup/tech culture here in the region. It is already changing our lives in a multitude of ways, and it has just started,” said Hall. “Technology changes are happening now at an exponential pace, largely driven by the availability of cloud computing, driving the push to rely on data analytics and incredibly powerful modeling/simulation tools. IoT allows the output from all of these advancements in computing power to be used to derive actionable results literally almost at the speed of light. Locally, we have technology advantages, partly due to the Penn State research activities that provide ‘big city’ technological access in an affordable rural area. We want to showcase this to leverage economic development in the region.”
STEM is hot. Ask any school administrator: get kids involved in STEM to set them on course for the right degrees and the fastest-growing careers. As STEM programs take shape across the country, it’s easier said than done. STEM careers rely not just on intellect and talent, but also on a variety of life skills, like independence and teamwork, that aren’t always as easy to teach.

Centre County 4-H Robotics (CC4-H) incorporates these skills into its activities. Founded in 2012 as part of Penn State Extension Centre County 4-H, CC4-H Robotics is a local STEM organization focused on education, teamwork, and real world innovation. The group is student-led, supported by volunteer adult mentors, and recruits a diverse group of students from grades 4-12, regardless of educational background. Students from public and private schools, as well as home-schooled students, participate.

The students take part in robotics projects, gaining experience in fields ranging from science and engineering to marketing, business development and design, ensuring that all members have valuable roles, making it accessible for a wide range of students. The group competes in robotics competitions, including large tournaments.

Lead mentor Bill Jester, a director at Siemens by day, said his son’s participation in the group has given him a space to connect with like-minded kids. While Jester and other mentors are there for guidance, the students work independently, giving them the responsibility for planning a robotics project and providing a safe platform to problem-solve and collaborate.

**Success in competition**

CC4-H Robotics is participating in FIRST Robotics Competition, an international event giving students the opportunity to design and build fully-functional, full-sized robots that compete in tournaments. Recently the group finished in second place at the Greater Pittsburgh Regional, a victory that Jester described as “ahead of schedule.”

“The students had been aiming for small improvements from year to year,” he said. “But they took a huge jump.” Jester said the skills the students hone in CC4-H Robotics transcend beyond the classroom or even future career to personal development. Students learn the importance of persistence and of leaving one’s comfort zone. They are encouraged to widen their range of abilities rather than to specialize in a specific aspect in which they already excel.

CC4-H Robotics member Mary Davis, a senior, explained, “It’s easy to become extremely adept at one thing, so the chance to participate in elements of robotics that are new to me is exciting and extremely challenging.”

**Expanding the reach of STEM**

As one of just a few female members, Davis uniquely understands one of the key aims of CC4-H Robotics: to increase exposure to STEM to underrepresented demographics. Women hold only 35% of university degrees in STEM fields, one of the greatest gender imbalances among academic subject areas. Davis says lack of confidence, or the notion that robotics are an activity for boys, could be keeping girls away from STEM. She said being part of CC4-H Robotics has helped her to defeat her own mental obstacles and given her confidence in her own STEM abilities. Jester said the group also seeks to add students from more rural school districts.

**How businesses can support the mission**

In addition to being volunteer-supported, CC4-H Robotics relies on voluntary contributions from sponsors and individuals who are interested in advancing STEM to more students and schools districts in Centre County. Are you interested in a sponsorship opportunity that will help local students advance in STEM? Learn more at...
SHELF SCOUTER REBRANDS FOR THE FUTURE OF SHOPPING

SHELF SCOUTER GOES FROM A “MOM” APP TO A BUSINESS SERVICE TOOL, AS A STRATEGIC AND NECESSARY MOVE, OPENING UP DOORS FOR ENDLESS OPPORTUNITIES

Shelf Scouter was initially a grocery store app for mothers who needed to keep track of all of the products that were being purchased for their homes. Lindsay Fairman, founder of Shelf Scouter, created the idea out of a need, knowing other parents would benefit from this tool to help run their households more efficiently.

With time, Shelf Scouter grew into something larger, and it’s not just for moms any more. The app was initially connected to places like Amazon and Walmart, big box retailers who already have a huge following. However, Fairman found that diversifying its market helped Shelf Scouter grow into something more inclusive and worthwhile. Now, Shelf Scouter works with independent businesses.

Fairman explains, “We now service independently-owned grocers and cooperative markets who are looking for new ways to connect with their current and new customers.”

“While there have been many challenges along the way, it is incredibly rewarding now to be able to help local businesses connect in new ways with their customers and grow through modern technology and marketing. Your neighborhood market brings such a unique value to its community. Given the right strategy and tools, they’ll continue to grow and thrive thanks to the special service they provide to their customers.”

Shelf Scouter offers automated price updates for products, and exciting features benefiting small, independently-owned grocery stores. Shelf Scouter software integrates the store’s point of sale system with the ecommerce websites from different grocers, ensuring accurate pricing at any given time. This integration automatically syncs all products and lets the consumer make informed decisions while clicking through the site.

The best part? Shelf Scouter has made partnerships with delivery services that will ship the purchases straight to someone’s home or place of business. This takes out the complicated guesswork that local grocers would have to do to send groceries to a household, and lets them better focus on their quality, inventory, and growing customer base.

Fairman understands the importance of this accessibility. “As shoppers are moving more of their grocery purchases online, offering digital storefronts which are open 24/7 and convenient fulfillment options helps the independent and locally-owned stores continue to serve their customers and communities.”

Having an intuitive storefront is downright essential to the product. Shelf Scouter promotes an online storefront feature, where local businesses can put their own logo on the site, and also helps replicate in-store department aisles. This keeps things simple, and makes both the business and customer happy.

With any business, large or small, there are rewards and often a few challenges on the road to success. Fostering fruitful partnerships is one of the key ingredients to Shelf Scouter’s success, and Fairman is thrilled with the progress.

“We’re developing a number of partnerships very quickly in this space to provide a robust set of solutions to a variety of retailers. The landscape is changing rapidly and we’re positioning our customers for long-term success.”

Fairman remarks, “We’re developing a number of partnerships very quickly in this space to provide a robust set of solutions to a variety of retailers. The landscape is changing rapidly and we’re positioning our customers for long-term success.”
Innovation and quality control are top concerns for Urban Engineers. From start to finish, this Innovation Park tenant executes ideas that are practical, efficient and effective. The company’s range of projects and capabilities include buildings, bridges and highways, railroads, ports, and manufacturing facilities, among many others. More than 50 years of experience and dedication have turned Urban Engineers into a highly intuitive company, predicting the needs of communities and industries, and visualizing a safe and structurally sound future.

As vice president and office manager, Dr. Ed Gannon oversees the State College office. He creates and monitors urban projects, ensuring top quality and meeting clients’ needs. He also forges strong relationships along the way, both with clients and colleagues. Gannon and his team do important work while maintaining the essential work-life balance among employees. Gannon believes this is what sets Urban Engineers apart: a forward-thinking work environment, beyond the bottom line.

“There’s the work we produce and the way we produce it. We do a lot to enhance the lives of people, whether it involves engineers’ relationships with the environment, or how we live, work and play,” he explained. “Everything we do elevates the standard of living for people. We are a business, and we do have to make money to survive, but Urban Engineers’ threshold for the work-life balance is growing as we push a lot of things like continuing education, volunteerism or reaching out and helping the community. We really push hard for our people to be involved in community.”

In Gannon’s words, the company strives to “produce a well-rounded life.”

The company has offices on both coasts, with the main hub located in the mid-Atlantic area.

Gannon was hired to grow the company’s reach within and beyond the State College region, working with educational institutions and the manufacturing sector.

Gannon’s role reflects Urban Engineers’ efforts to provide services in a broad range of industries.

“We do a lot to enhance the life of people, whether it’s engineers’ relationships with the environment, or how we live, work and play. Everything that we do elevates the standard of living for people.”

“We have a wide line of business in engineering, such as roads and bridges, buildings, mechanical systems, electrical systems, typical engineering stuff, but we also do smaller niche markets,” he said. “We do a lot of work in piers and waterways in the port areas in the city of Philadelphia, like rehab repairs and new facilities. We do a lot of work in bus transit, freight and passenger rails, trolleys and light rails, and Amtrak as well. We also do airports.”

With nearly all-encompassing engineering capabilities, the company could practically create a complete, highly functioning city from the ground up.

Predicting how cities will work in the future has been Urban Engineers’ key to success. According to Gannon, it isn’t just about the mathematical equations, it’s about knowing the environment and the people who inhabit it. While superb math skills are vital, he is looking for engineers with strong skills in collaboration and communication.

“We’re trying to develop young engineers to be more collaborative,” he said, adding that the days of students being advised to go into engineering if they preferred to minimize human interaction are over. “The guidance counselor suggesting engineering to kids who want to sit in their rooms and play with numbers is not helping us. We need people to collaborate on projects. We need to optimize the construction process as a whole. We need to put together a group of people that can freely talk about what is important to their specific expertise, and add it together as a whole.”

“We need to put together teams of engineers that can go into a problem to diagnose and solve it, producing an entire project from the time the order has been placed to handing over the keys at the end.”

“We need to put together teams of engineers that can go into a problem to diagnose and solve it, producing an entire project from the time the order has been placed to handing over the keys at the end,” he said. “This challenge needs to be solved not only for Urban Engineers, but for the industry itself.”
NAVIGATING THE FUTURISTIC WORLD
OF ELECTROMAGNETICS
FROM SMARTPHONE CAMERAS TO SPACECRAFT
OPTICS, ELECTROMAGNETICS IS THE NAME OF
THE GAME FOR E X H, NO MATTER THE PROJECT

From telescopes to binoculars to movie camera lenses, E x H is in the business of using electromagnetics to make our current technology better, fine-tuning the intricate systems we take for granted on an almost daily basis.

While the concept of electromagnetism and how it relates to everyday items isn’t always apparent to the average user, E x H co-founder and president Jeremy Turpin was intrigued by the concept from an early age.

“The flow and propagation of waves is at the same time quite intuitive and extremely non-intuitive, and this dichotomy was very rewarding to study and learn. The study of electromagnetism, which is foundational to light, radio and wireless communications, is the closest area in the field of Electrical Engineering to Physics,” he said.

For Dr. Turpin, electromagnetics goes beyond a fascination. He created a company and wanted to bring, “the technology discovered and developed in the academic environment and spread it to the commercial world.”

The name E x H is part of the part of the electromagnetics law entitled “Poynting Vector S” was invented by John Henry Poynting in 1884, and is one of the fundamentals in electromagnetics and physics. The ‘E’ represents the electric field and ‘H’ is the magnetic field. They cross paths with the ‘X’.

“The feeling of building something that is used by others and enables new solutions and new technologies to be developed is very rewarding to me. Taking the knowledge and approaches from academia and extending them to apply to new circumstances and to contribute to real products is exciting.”

E x H’s flagship product, reTORT, is an optical ray tracer that will predict how light or radio waves interact with dielectrics and other materials. In other words, inventors and entrepreneurs in tech fields, working on tech products that require antennas or optical components, can create a better product through thorough testing.

Dr. Turnpin described how the reTORT software works: “A system of lenses, such as a smart-phone camera lens or a set of binoculars, can be input into the software and the response (path of the light) predicted for a range of incident light sources. In addition to predicting responses to a given input, our software is specialized to allow design of new systems to reach a particular set of design goals… reTORT and E x H’s other tools have very powerful optimization capabilities that enable engineers and designers to easily tune or update a design to meet their design constraints.”

“We are moving aggressively to improve our existing capabilities and add new ones in order to help develop new customers. Our existing partnerships with Penn State on multiple projects are also helping our ability to deliver novel features and design options that are not available in other tools.”

But what about technology that’s already widely used? E x H plans to improve those products as well. For major inventions, like the telescope and movie cameras that are already in production, E x H’s vision is to assist in producing new models that are as near perfect as possible, with the help of its design synthesis tools, were created in the Penn State Computational Electromagnetics and Antennas Research Laboratory (PSU CEARL).

While the various products and software E x H has been producing fall in line with Dr. Turnpin’s passion for electromagnetics, the company has also allowed him to fulfill his desire to one day own a business. While founding a company was always a dream of his, he didn’t expect to have the opportunity quite so soon.

“I have learned a lot about running a business, including the non-technical aspects of managing projects, employees and finances. My father was an entrepreneur, and I had always planned to start and run a business eventually, but I had not expected to have the opportunity as soon as I did. The feeling of building something that is used by others and enables new solutions and new technologies to be developed is very rewarding to me. Taking the knowledge and approaches from academia and extending them to apply to new circumstances and to contribute to real products is exciting,” he said.

What’s next for E x H? Dr. Turnpin believes the key to the company’s success is to power ahead into the future. “We are moving aggressively to improve our existing capabilities and add new ones in order to help develop new customers. Our existing partnerships with Penn State on multiple projects are also helping our ability to deliver novel features and design options that are not available in other tools.”

E x H is thriving on its founders’ healthy sense of curiosity and a drive to deliver better outcomes for technologies new and old. Only time will tell where and how this company will use its seemingly complicated products to impact not only tech startups, but the tech making regular appearances in all our lives as well.
INNOVATION WITH PURPOSE: LAUNCHBOX SUMMER 2017
PENN STATE’S LAUNCHBOX PROGRAM PROVIDES CRUCIAL TOOLS AND LEARNING SPACE FOR LOCAL ENTREPRENEURS

There’s more to a successful startup than a good idea; all the same, that good idea can’t get lost in the midst of planning and process. Penn State’s Launchbox plays into this delicate balance, helping aspiring entrepreneurs fully realize their driving force, while giving them the tools they need to execute a lasting business model.

These five startups spent the summer at LaunchBox. Here are their good ideas:

Improving Cycling Safety & Driver Awareness: Embrace the Space
Tackling a major public safety issue, Embrace the Space addresses the relationship between drivers and cyclists. A long-time cyclist, Marina Cotarelo has personal experience with the consequences of unsafe cycling practices and driver negligence. After losing a member of her team to reckless driving during a charity event, Marina started Embrace the Space to cultivate a healthier relationship between cyclists and motor vehicles through high visibility products and education that increase rider safety and driver awareness and education.

Marina acknowledges that education is just as important as practical application, and she believes that the best way to make an impact is to instill these practices early on through educational programs. Marina is currently working on a children’s book that will reinforce these ideas in young minds. Following her passion, she has plans to take her safety initiative to neighborhoods and eventually DMVs, where she can expand the reach of her important message.

Fresh, Local Produce for All: Node
Website developers Aidan Stomer and Adam Remick believe everyone should have access to fresh, produce. Node, an online platform, allows consumers to get “farm-to-table” service, no matter where they are. While many services occupy this market space, Aidan and Adam see an opportunity to correct problems in the industry and consumer turn-offs, such as restrictive memberships. Through Node, the team wants to create a more intimate experience that resources from local farms. With local farm participation, Node guarantees fresh food every time and the peace of mind that comes with knowing where your produce comes from. Node plans to strengthen loyalty by giving clients an individualized experience, allowing them to curate boxes of their chosen preference. In handling sales and shipping, Node seeks to be the connecting point between farm and shopper interactions, thereby improving supply chain and the customer experience.

Better Health, Your Way: BOSS Health Journey
As a software developer, Jeffrey Kern has found a way to use his skills to fuel a newfound passion for health discipline. Understanding firsthand the mental and physical adjustment needed to make a commitment and achieve results, Jeffrey created BOSS Health to singularize the experience to match users’ personal skills and pace.

The app syncs music to each workout, implements virtual coaches to reinforce success, and keeps track of progress through regular reporting. The BOSS Health app enables users to share their achievements on Twitter, creating a support system with family and friends, along with other users.

One-stop Shop for Tiny Living: Sleuth Tiny Homes
Sleuth Tiny Homes takes the dream of affordable, eco-friendly housing and makes it a reality for the growing number of consumers interested in sustainable living options. Unlike other companies that currently occupy the tiny house space, Sleuth Tiny Homes services customers start to finish. As full service contractors, Tony Amitia and Sean Banul want to erase the apprehension that goes along with building a house from scratch. As part of their business model, they wrote the handbook on tiny houses, offering consumers a plan that doesn’t compromise comfort for convenience. In developing a site that surveys and provides models pre-sale phase, Sleuth Tiny Homes creates a clear image of what a custom tiny home would look like. Unique to both the customer’s layout and style preferences, Tony and Sean have set out to prove that with proper guidance, owning a tiny home is not a fantasy but an attainable living style.

Watches for Men Who Love Watches: Ardor & Forge
As an industrial/graphic designer, Zack Rackovan wanted to take his experience creating graphics and manufacturing signage to invent a product that was entirely unique. After doing some research, he discovered a niche market: “watch guys.” Despite the volume of watches out there, Zack couldn’t find a product that served both a practical and collectable purpose. Zack defines his customer base as watch fanatics — men owning between 5 and 100 watches — who prioritize value. Zack started Ardor & Forge to meet his consumers’ need for versatility, without compromising their desire for an eye-catching design.

“By incorporating innovative material combinations, textures, and reclaimed metals, our watches garner the attention that our customers demand,” he says. In choosing to make watches with only the best materials and sell them in a singular location, Zack hopes to leave his mark as a brand with integrity and “a passion to create.”
**Heather Smoyer**  
Center Director | Daybridge Child Development

**Q: Could you give us a brief bio of your career?**  
**A:** I started at Innovation Park at the end of May. I received my Master’s of Human Resource Development from Georgia State University. I have more than 15 years of experience in the child development industry.

**Q: What do you like most about your company being located within Innovation Park?**  
**A:** I like how easy it is for parents to visit their children throughout the day. A lot of parents are able to stop by during their lunch break.

**Q: Are there any special events that you enjoy participating in at Innovation Park?**  
**A:** Yes, there are a few special events at Daybridge. We recently celebrated our 20th anniversary of serving Penn State. When Penn State has Thon, we also throw an event with the children. For our fall festival event, we walked the children around Innovation Park in their costumes. Whenever Penn State has an event, we will do our own mini-event with the kids.

**John Baker**  
Attorney | McNees Wallace & Nurick LLC

**Q: Which company do you work for within Innovation Park, and what do you do there?**  
**A:** I am an attorney at the law firm of McNees Wallace & Nurick LLC. I am the managing partner of our State College office. We also have Pennsylvania office in Harrisburg, Lancaster and Scranton. My practice focuses primarily on employment law and healthcare. I provide advice and counsel to private and public sector employers on any number of employment-related issues that they may encounter. In the healthcare area, I work with hospitals, physician practices and nursing homes on compliance issues, including any specialized labor or employment-related issues that may arise.

**Q: Tell us something interesting about your company, and why it adds something to the Innovation Park community.**  
**A:** Daybridge adds a lot to the Innovation Park community. Having a childcare center here that provides quality childcare to families in the community is invaluable. It provides families with peace of mind.

**Q: Could you give us a brief bio of your career?**  
**A:** I am a Centre County native. After graduating from law school in 1999, I was fortunate to find a good opportunity to return here and start my practice. I have been in the private practice of law since then, the last 14 of which have been with McNees. Our offices have been in Innovation Park for most of that time.

**Q: What do you like most about your company being located within Innovation Park?**  
**A:** It is a beautiful area with great views. It is also convenient and accessible for our clients. There is always something happening in the Park that is aimed at connecting people and opportunities. I think that is a good thing.

**Q: Are there any special events/activities that you enjoy participating in at Innovation Park?**  
**A:** The Park has lots of opportunities to meet different people with all kinds of different backgrounds and professions. I enjoy those opportunities. Beyond that, it is a great place to just take a walk during lunch or a break and recharge.

**Q: Tell us something interesting/special about your company, and why it adds something to the Innovation Park community.**  
**A:** We fit well here. Our firm is progressive, just like the Park. We believe in promoting thought leadership in everything we do. Our attorneys are specialized in many diverse areas of the law such as business counseling, estate planning, litigation, intellectual property, government relations, data security and privacy, energy and employment. I think our firm’s collective skills and culture mesh well with the Park’s philosophy and the many outstanding friends and Park neighbors we have met in our time here.
SBDC Seminars
SBDC courses, seminars, and conferences provide up-to-date, practical information on a wide variety of business topics and are designed to educate entrepreneurs about new and innovative management procedures. The programs teach basic business skills as well as more advanced and specific business management. These low-cost workshops feature experts and leaders from industry, government, higher education, and professional associations.

The First Steps of Starting a Business
When: Nov. 7, Dec. 5; 9 a.m.-12 p.m.
Where: 200 Innovation Blvd., Suite 243
Cost: $20
Have you always had a dream to start your own business but didn’t know where to start? This workshop will help aspiring entrepreneurs begin the process of successful business ownership, including evaluating business ideas, developing a business plan, and exploring financing options.

Learn from a business consultant about:
• Learn from a business consultant about:
• lifestyle requirements of business owners
• how to assess the feasibility of your business idea
• the legal and tax implications of owning a business
• how to develop a business plan
• how to compile a bank-ready financial package
• how to market your product or service
• the health and safety regulations that may apply to your business
• where to find other resources that may help you succeed

Learn more: sbdc.psu.edu/events

Helping Business Compete with Technical Assistance
To help local businesses grow, PennTAP actively promotes training and education opportunities to clients. They provide online training through webinars hosted by technical advisors, in addition to hosting in-person learning events and conferences throughout the year.

Training typically encompasses one or more of the pillars of Advanced IT Solutions, Energy and Environmental Services, or Innovation Services.

The Entrepreneurship Ecosystem at Penn State
When: Oct. 19; 12-1 p.m.
Where: Online Webinar
Are you a student at Penn State who has toyed with the idea of starting a business, but you are not sure where to start or how to seek assistance?

How to Move Your Company Toward Sustainability
When: Nov. 16; 12-1 p.m.
Where: Online Webinar
In order to move toward more sustainable practices, industrial managers need to understand what cultural, environmental and economic challenges exist, and how to respond to them.

SBIR and STTR – What Are They and How Can You Partner and Benefit?
When: Dec. 21; 12-1 p.m.
Where: Online Webinar
The U.S. Small Business Administration (SBA) is tasked with assisting small businesses through partnerships that can lead to research commercialization and job creation.

Learn more: penntap.psu.edu/events

CBICC Events: Strengthen and Grow Your Professional Circle
CBICC Business After Hours are held from 5:30 to 7:30 p.m. The cost to attend is $5 for members, $20 for nonmembers. All employees of a member business receive the member rate. Be sure to invite your coworkers and team! Business After Hours are a great way to learn more about Centre County’s business community while enhancing your professional network.

CBICC Business After Hours Events
Oct. 19: Nittany Eye Associates
Nov. 2: Big Spring Spirits
Nov. 30: Happy Valley Vineyard & Winery

Learn more: cbicc.com

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
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http://www.innovationpark.psu.edu/

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- Abundant free parking
- High-grade construction materials, efficient design and immaculately landscaped
- Penn Stater Hotel
- Daybridge daycare services located within Innovation Park
- Free CATA public bus transportation service every 20 minutes to/from University Park and surrounding community

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Knight Frank

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