



Environmental Innovation & Entrepreneurship Program

Progress Report | December 2018

Duke 
NICHOLAS SCHOOL OF THE
ENVIRONMENT



Dear Nicholas School supporter,

Thanks in large part to your confidence and generosity, the past year has been fruitful and exciting for the Environmental Innovation and Entrepreneurship (EIE) Program at the Nicholas School of the Environment. Some highlights include:

- A revolutionary tire-tread sensor technology was licensed from Duke by startup company Tyrata, Inc., which launched with a \$4.5 million Series A deal.
- The Duke University School of Nursing is now licensing TAMS, an advanced scheduling software, to 15 schools of nursing around the country.
- EI&E summer grants funded two promising student projects – one focused on sustainability solutions, the other on renewable energy.
- Two young businesses with ties to the EIE Program – 2017 Duke Startup Challenge winner Ungraded Produce and kombucha company Mobtown Fermentation – are making remarkable progress.
- QATCH Technologies, which developed a novel fluid sensor with a range of applications, is preparing to grow.
- The prototype of a sophisticated mass spectrometry tool that detects underground leaks is expected next year.
- One of our student teams is working with Cotton, Inc. to develop a commercial path for ultra-low gossypol cottonseed (ULGCS) – a genetically engineered cotton variety whose seeds do not contain the toxic compound gossypol – making this highly nutritious seed fit for human and animal consumption.
- Deb Gallagher and I have been busy growing the popular Business and Environment (BE) concentration in the Master of Environmental Management program.
- Students have learned about innovation and entrepreneurship through the Duke Doctoral Academy, the Innovation and Entrepreneurship Fundamentals and Global Immersion Program, Career Trek, and the Environmental Mega Trends course.

I invite you to read more about these topics and others throughout this progress report. And as always, I thank you sincerely for your investment in our work.

Jesko von Windheim

Gorguze-Peters Professor of Environmental Entrepreneurship & Innovation
Nicholas School of the Environment



Pioneering tire technology secures \$4.5 million, launches startup

Durham's Tyrata founded on Duke technology license



Sensor technology that assesses tire-tread wear in real time was licensed from Duke by startup company Tyrata, Inc., which launched with a \$4.5 million Series A deal announced in February 2018.

"This start-up expects to have a significant impact on tire safety and sustainability, leading to significant social and economic impact," Jesko says. "In 2014 *Consumer Reports* reported that the likelihood of tire-related crashes increases from just 2.4 percent to a staggering 26 percent as tires go from full tread to worn-out tread."

Tyrata aims to address these safety issues with in-tire sensors that warn drivers when treads have become unsafe. The sensors also will promote sustainability, as optimized tire use will result in less waste and cost reduction.

Tyrata's launch took place thanks to financing from several entities, including a lead investment by Dealer Tire, LLC, a leader in parts distribution

and provider of replacement tires for automotive dealerships.

The technology was conceived and developed by the research group of Aaron Franklin, associate professor of electrical and computer engineering and chemistry at Duke.

Franklin says that working with Jesko and his team made the investment possible.

"Jesko and his colleagues have unique experience and support capabilities that allow them to quickly ramp up a startup," Franklin said. "I was amazed at how efficiently they were able to take what we'd been trying to do for months with limited success and organize it into a smooth and effective effort that brought investors to the table."

Learn more at pratt.duke.edu/about/news/tire-startup.



Innovative mass spectrometry tool detects underground leaks

Prototype expected next year



Thanks to a 2016 National Science Foundation (NSF) grant and a collaboration between Duke's Pratt School of Engineering and PFT Technology, a prototype of a pioneering leak-detection technology is expected around the middle of 2019.

Assistant research professor Jason Amsden and doctoral student Kat Horvath – both of the Department of Electrical and Computer Engineering – explain how the technology works:



“We put tracer molecules inside high-voltage underground transmission lines, which contain a dielectric, petroleum-based fluid that keeps the transmission process working properly,” say Amsden and Horvath.

“Our miniature mass spectrometer – designed specifically for this application – is used above ground to detect those tracer molecules when there's a leak below ground.”

And the highly sensitive tool can be adapted to detect more than just tracer molecules. It can be used to detect leaks of natural gas, volatile organic compounds and potentially, explosives. Because leak information is reported in real time, this technology has a number of security and medical applications.

The technology has clear environmental and financial benefits, as well.

Many transmission lines are old and leaky and require fluid to be added continually, they say, which can harm the environment and get costly. Detecting, repairing or replacing leaky lines mitigates those issues.

“This technology has the potential to be a rare triple-bottom-line success story,” says Jesko. “The cost of maintaining leaking electrical cables is prohibitive, both financially and environmentally. The miniature mass spectrometer addresses this problem in a cost-effective manner, ultimately leading to many millions of dollars in savings.”

In addition, he says, “We are close to field testing and I look forward to developing a commercial pathway with the team in the coming year, as we did with Tyrata.”

The Duke team is also working with the Renaissance Computing Institute (RENCI) at UNC Chapel Hill to develop data-visualization software that works with the mass spectrometer to upload leak information to the cloud.

Amsden and Horvath are grateful for Jesko's guidance and expertise throughout the process. “His help has been invaluable as we've worked to develop and commercialize this technology – from identifying the tracer-molecule leak-detection application to putting us in touch with PFT to helping work through some of the technical challenges.”

Training tomorrow's sustainability experts, impacting the private sector:

Deb Gallagher talks about the Business and Environment concentration



Deborah Gallagher, PhD, of the Nicholas School serves as an Associate Professor of the Practice of Resource and Environmental Policy; Director of Professional Studies; and Chair of the Business and Environment Program.

Q: How did the Business and Environment concentration come to be?

A: When the Nicholas School launched the Master of Environmental Management (MEM) Business and Environment (BE) concentration two years ago, there was already a lot of interest in the subject matter.

The BE concentration teaches students to become managers and analysts who help organizations implement environmentally sustainable business practices. Courses cover topics that include marketing, finance, life cycle and value chain analysis, strategic analysis, stakeholder analysis, applied data analysis and appreciative inquiry.

More and more students were taking these types of courses because they wanted to learn in-depth about the financial and business aspects of sustainability. So in 2016 – thanks in large part to funding from outside supporters – the Nicholas School made it an official master's-level concentration. Prior to that, I taught BE courses and helped to develop a certificate program in sustainable systems.

It's exciting to see the program growing so quickly. There were five graduates in the first class, and we're expecting 20 graduates in 2019. The support we've received for integrating business practices into the Nicholas School is helping to move the school forward and ultimately, benefiting our environment.

Q: How does the BE concentration benefit students?

A: In addition to having great communication skills, these graduates have a solid understanding of finance, business strategy and stakeholder analysis, including knowing how to analyze things like life cycle, value chain and the environmental impact of how goods and services are created.

Our BE graduates are having a lot of success taking their coursework and experience into the private sector through some incredible internships and fantastic jobs.

We have alumni working in sustainability at Conagra and Campbell's Soup, in ESG assessment at Citibank, and with other employers that include Kraft Heinz, United Airlines, L'Oreal, Sony Entertainment and Owens Corning.

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Training tomorrow's sustainability experts, impacting the private sector, *continued*

Q: How does the program benefit the environment?

A: BE graduates are making a positive impact on the environment by helping a wide array of private-sector organizations implement and maintain environmentally sustainable business practices.

These alumni are doing things like working in sustainable procurement and supply-chain management; discussing sustainable practices with customers; minimizing waste; identifying and addressing water-resource risks; and reporting outcomes to leading frameworks such as the Global Reporting Initiative and the Dow Jones Sustainability Index.

For example, as a senior manager of corporate social responsibility for Campbell's Soup, Megan Maltenfort MEM'11 supports the company's sustainability practices in a number of ways – from partnering with farmers to working with the factory to reduce post-use packaging.

Barbara Gore MEM'17, a global sustainability manager with Las Vegas Sands Group, works to meet strategic goals by focusing on corporate sustainability practices, such as optimizing building operations, minimizing food waste and "greening" transportation.

Bobbi Lesser MEM'18, an ESG disclosure analyst with Citibank, communicates the company's environmental social and governance (ESG) performance to a variety of external stakeholders.

Q: How does the BE concentration tie in with the Nicholas School's Environmental Innovation & Entrepreneurship (EIE) Program?

A: Because of the business-related nature of both the BE and EIE programs, there's a lot of integration of content. Jesko and I are both Professors of the Practice, which means we bring real-world industry experience to the program.

We both teach several BE courses, with Jesko focused more on the external – topics like entrepreneurship, creativity, and risk tolerance – while I focus more on "intrapreneurship," which involves working within companies to develop new practices that are important to both finance and entrepreneurship.

This includes things like finance marketing communications, which is aimed influencing the uptake of practices of people and investors within companies and reducing environmental impacts along the supply chain.

[BE students are working on a number of exciting technology-commercialization projects, Jesko adds – several of which are featured in this report.

"In addition to being fantastic teaching vehicles for the Business and Environment program, these projects have the potential to tremendously impact the environment, health and safety," he says. "This is the link between the BE concentration and the Environmental Innovation and Entrepreneurship Program."]

Q: What sets the Nicholas School's BE program apart from others of its kind?

A: Duke is an innovator in this emerging field. Some other schools have similar programs, but Jesko and I designed the program whole-cloth, redesigned the courses and built it from there.

In addition to our ongoing partnership with Duke's prominent Fuqua School of Business, we also draw on executives in residence. Jesse Daystar, for instance, is an adjunct assistant professor who teaches life-cycle analysis every spring. He's also Chief Sustainability Officer and Vice President for Sustainability at Cotton Incorporated.

Our program is successful and growing, as we continue to serve student interests and industry needs. There are additional courses planned, such as those that delve into life-cycle analysis and business-based skills. With growing student interest in food, agriculture and textiles, we hope to add depth in those areas by combining sector-based knowledge with skills training in supply-chain management.



Nicholas School students working on key environmental issues

EI&E summer grants funded student projects in sustainability, renewable energy

Thanks to summer grants from the Environmental Innovation and Entrepreneurship Program, two Master of Environmental Management (MEM) students were able to pursue valuable summer work.

Emerging Renewable Energy Technology

Andrew Slaughter, a second-year



MEM/MBA student, used his grant to pursue research and development in emerging renewable energy technology.

“My goal has been to evaluate the

feasibility and establish a detailed structure of a business model centered on distributed generation of solar, storage and wind resources,” says Slaughter, who collaborated with Solaris Holdings, LLC on the work.

“It’s important to innovate and create new consumer-facing energy and domestic-utility products and services that are less coal- and carbon gas-reliant,” he continues.

“I want to create and/or support a for-profit model that would contribute significantly to national decarbonization, while also circumventing and resolving some of the barriers to renewables penetration in the energy market.”

One of those barriers, Slaughter says, is that utility systems are based on centralized generation of power in homes – which could be decentralized via community-supported solar

solutions. Another barrier is a lack of consumer understanding about the sources and processes behind energy and electricity.

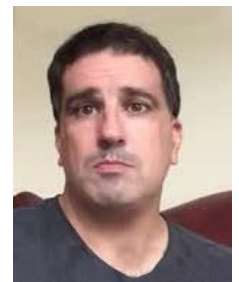
“I’m looking at things like the economic value of renewables, the behavioral psychology of energy use and ideas for passive consumer-education tools,” he says.

Slaughter says the EI&E grant gave him the opportunity to focus on a subject he’s personally passionate about.

“This project has the potential to generate a business structure that is innovative, elegant in its simplicity and profitable,” he says. “I hope to secure more support as I continue this work.”

Assessing Sustainability Solutions

Piyush Gambhir, a second-year MEM student, used his grant to move forward a Master’s Project started by Adam Long MEM’18 and Collin Walker MEM’18 in Fall 2017.



The project aimed to develop an energy-usage modeling product to conduct property audits and look at the financial viability of sustainability practices for Drucker + Falk, a large property management firm.

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Nicholas School students working on key environmental issues, *continued*

The team, which Gambhir joined in Spring 2018, evaluated three of the company's 170 properties and identified sustainability solutions. They then investigated scaling those solutions to the client's other properties – and more broadly within the property management industry.

"The product has an environmental and sustainability focus, and it is used to conduct sustainability analyses, evaluate financial benefits, look at investment funding and show what the savings would be if sustainability practices were implemented at all of this client's properties," Gambhir says.

"Because people in property management tend to work on commission, many don't think of sustainability solutions as worthwhile investments – or realize that the savings are ultimately less than the cost – which is why not much progress has been made in that industry yet in terms of sustainability."

Long and Walker's Master's Project was not intended to last into the summer, but because the project was progressing and so well received, Gambhir applied for the summer grant on his own to continue the work.

With that funding, he was able to make more headway.

"I was able to look at the business value of this project and conduct market research with consumers, with similar companies and projects, and with other universities," Gambhir says.

"The goal was to assess whether Nicholas School students can offer every year this energy-usage modeling product to identify sustainability solutions for this and perhaps other clients. Students would work for class credits – not money – which is a bonus for customers."

In 2018-19, a follow-on Master's Project team consisting of Gambhir, Honglin Du, Mengting Xu and Yuanwei Li will use Long and Walker's results to conduct further audits for Drucker + Falk, adds Jesko.

"A stretch goal for this year's team will be to work with Pratt School of Engineering students to develop an iPhone-based app," he says. "This will allow Drucker + Falk to roll out the sustainability program to all of its 30,000 properties."



Duke Startup Challenge winner triples monthly sales in a year

Ungraded Produce sells (and donates) “ugly” and excess produce



When Courtney Bell T’17 won the 2017 Duke Startup Challenge for her business Ungraded Produce, she couldn’t have predicted the tremendous growth the company would see in just a year’s time.

Based in Hillsborough, N.C., Ungraded Produce works directly with farmers and other wholesaler-like organizations to source fruits and vegetables that don’t meet commercial and consumer aesthetic standards (“ugly” produce) and those that are in excess. Drivers then deliver the produce to customers’ homes.

The service not only reduces the economic and environmental impacts of discarded produce; it makes more food available to people who need it.

In September 2017, the company had 270 customers in Durham County and about \$7,000 in monthly sales. Now it serves some 500 customers throughout the Triangle and takes in more than \$20,000 a month. To date, the company has distributed 60 tons of ugly and excess produce.

Ungraded Produce also has donated 46,000 pounds of fruits and vegetables to local food banks. Inedible, moldy and broken produce is composted.

“A year ago, I couldn’t have grasped this,” Bell says. “Winning the Duke Startup Challenge opened some doors because of Duke’s reputation – especially because I’m young, female and don’t have a lot of experience yet – and the \$50,000 prize helped me lay the groundwork and infrastructure for growth.”

A large investment from a Duke-affiliated donor in December 2017 helped Bell expand Ungraded Produce even more.

“As an entrepreneur, the financial support has not only been a major confidence boost, it’s set me up with the resources to execute my vision with more optimism and the security to do what had seemed impossible,” says Bell.

“I had been doing everything myself – with most of my time spent on operations and keeping existing customers happy – and was spread very thin.”

Bell is now focused on growing the for-impact company.

“I spent this past winter and spring pursuing growth projects, including developing an e-commerce site and hiring our first full-time employee, an operations manager,” she says.

“We’ve also done grass-roots testing aimed at gaining more customers, supporting our customer base, managing operational challenges, improving our products and adding more drivers to our team.”

Bell credits Duke and the Nicholas School for giving her what she needed to launch Ungraded Produce.

“I always tell people that I would have had no idea how to start a business if I hadn’t done it in college. From the mentorship of people like Jesko to the innovation and entrepreneurship initiatives to Duke’s large entrepreneurship network, it was all incredibly valuable.”



Nicholas School students conducting market analysis for Cotton Incorporated

Work could help mitigate global protein shortages and raise caloric intake



Cottonseed is high in protein and is currently used as dairy cow feed. In the absence of gossypol, a larger variety of animals, including humans, are able to digest cottonseed.

Thanks to recent advances in genetic editing, using cottonseed as a food source may soon be a viable option – which has the potential to offset global shortages of protein and increase calorie intake.

Cotton Incorporated, a cotton industry group, holds the exclusive licensing rights to a technology that silences the expression of the toxin gossypol in the cottonseed kernel while allowing gossypol to remain in the stem and leaves to protect the plant.

Ultra-low gossypol cottonseed (ULGCS) received regulatory approval in the U.S. in October 2018 and is on its way to being approved by the FDA for human consumption, at which point it can be sold as food or feed.

The use of ULGCS can increase revenue for farmers by adding an additional market for their crop; serving as a substitute for unsustainable aquaculture feeds; and even being used in human food products to close the protein gap in nutrient-deficient communities.

A team of four Nicholas School Master of Environmental Management students – Allison Carmody MEM'19, Jia Jang MEM'19, Rebecca Marx MEM'19 and Shannon Thoits MEM'20 – are conducting a market analysis of the product for Cotton Incorporated.

This Master's Project – which will include the creation of a complete business portfolio – aims to help Cotton Incorporated see the value proposition of ULGCS in terms of food security, environmental impacts and food prices, while also examining cultural sensitivities that could hinder the product's sale and consumption.

The team is looking at the potential for ULGCS in markets for cattle, poultry and aquaculture feed, as well as its possible use in human food products.

Career Trek gives students an up-close look at corporate sustainability and energy

Hoping to learn more about real-world corporate sustainability and energy practices, the 12 students who recently went on a Career Trek to Philadelphia achieved their goal – and then some.

Their three-day October trip included visits to seven diverse businesses and organizations: Dow Chemical Company, Saint-Gobain, an IKEA distribution center, Campbell Soup Company, Comcast Corporation, Amtrak and the Navy Yard.

The students also managed to squeeze in an alumni social, where they were able to connect with a handful of Nicholas School and other Duke alumni.

Most participants – including trip coordinator Sneha Balasubramanian MEM'19 – were Business and Environment (BE) master's degree students.

This year's Career Trek was funded in part by the Nicholas School's Environmental Innovation and Entrepreneurship Program.

"This funding is what allowed us to travel to Philadelphia, and we're all grateful to have been able to go on such a great trip," says Balasubramanian.

"As students, we benefited from the real-world exposure – especially since BE is a relatively new field, and there aren't a lot of established career paths and role models yet. Everyone took something away from our visits."

Nicholas School alum Megan Maltenfort MEM'11, a senior manager of corporate social responsibility at Campbell's Soup, used her professional network to help the group plan visits to other area companies, which was also very helpful, Balasubramanian says.

"The people at most of the places we visited had presentations prepared and were excited about our interest in what they do," she says. "And because BE is still kind of a niche field, they were interested in what we're studying and what we plan to do with our degrees."



SAINT-GOBAIN



CAMPBELL SOUP COMPANY



DOW CHEMICAL COMPANY



IKEA

"Everyone took something away" during trip to Philadelphia

Environmental Mega Trends speakers discuss environmental trends, opportunities for sustainable entrepreneurship



Environmental Mega Trends is a Nicholas School course that explores significant big-picture trends and their likely long-term trajectories in environmental science, policy, thought and practice.

"The course is designed to help students identify these trends in their areas of career interest – and to give them the tools to analyze trends so that they may capitalize on opportunities to enhance sustainability," says Joe Bachman, the School's new executive-in-residence in natural resource finance.

Bachman is teaching this year's Environmental Mega Trends course, as well as teaching and advising students in the Business and Environment, Forestry, and Ecosystem Science and Conservation master's-level concentrations.

"Joe is a senior-level investment executive who has worked all around the world with businesses large and small," says Jesko. "We're very fortunate to have him leading the Environmental Mega Trends course this year."

The course includes a speaker series. This semester's topics and speakers were:



■ Food and Its Future

Kelly D. Brownell,
Director of the World Food
Policy Center



■ Technology and Marine Ecology

Pat Halpin, Professor
of Marine Geospatial Ecology;
Co-chair Coastal
Environment Management
Program



■ Energy and Data Science

("The nexus of energy and data science:
how recent advances in data analysis
are transforming the energy industry")

Kyle Bradbury, Lecturing
Fellow and Managing Director,
Duke Energy Data Analytics Lab



■ Global Value Chains

Gary Gereffi,
Professor of Sociology;
Director of the Center
on Globalization, Governance
and Competitiveness



School of Nursing now licensing innovative scheduling system

TAMS is in 15 schools of nursing, being rolling out to other entities

After more than five years of using and refining its automated Teaching Assignment Management System (TAMS), the Duke University School of Nursing (DUSON) is now licensing this advanced scheduling software to 15 schools of nursing around the country.

TAMS is a data-management program that facilitates the often complicated process of scheduling faculty teaching assignments.

"It's been a great year for TAMS, which has contracts with 15 schools of nursing and is looking to expand into other areas," says Michael Evans, DUSON's Assistant Dean for Communications, Marketing and Business Development.

"Several schools are actively reviewing the program, all of the schools that have used it have had very positive responses and we're doing more demos every week."

The academic institutions currently licensing TAMS for their schools of nursing include Yale, University of Virginia, Marquette, Emory, George Washington, University of Illinois at Chicago, University of Texas at San Antonio and the University of North Carolina.

While the DUSON continues to market the software to schools of nursing, word about TAMS is spreading to other types of organizations and industries.

"We're now being contacted by non-schools of nursing, which led us to introduce TAMS at October's Leadership in Higher Education Conference," Evans says.

"We're looking at how TAMS may benefit academic units in other disciplines – which would expand our market – by reaching out to our Duke colleagues and current clients and exploring commonalities and differences among academic disciplines."

TAMS also was featured at November's Invented at Duke Celebration, an annual networking event focused on promising innovations at Duke.

"As we developed the strategies for taking TAMS to market, we consulted with Jesko often to take advantage of his expertise and experience in launching new products," Evans says. "His counsel helped us determine how to best introduce TAMS and to anticipate some of the problems that start-up organizations face."



Baltimore kombucha company making great strides

Mobtown Fermentation looks forward to upcoming move

Mobtown Fermentation began brewing, bottling and selling its Wild Kombucha in 2016, just as many Americans were first hearing about this fermented tea beverage. Since then, the company – co-founded by Sid Sharma MEM'14, one of our first entrepreneurship certificate students – has seen tremendous growth.

“Our goal is to make a more accessible product,” says Sharma, and the Baltimore-based company is certainly succeeding.

In April 2016 Mobtown Fermentation was distributing about 1,500 bottles of kombucha each week to 70 stores in Maryland, Virginia and Washington, D.C. Today it's distributing 10,000 bottles weekly to 700-plus stores – and has expanded its footprint to Delaware and Pennsylvania.

In addition to its three founders, Mobtown now has eight full-time and two part-time employees.

Both Kombucha drinkers and the environment are benefiting from the company's success.

“We donate one percent of our profits to organizations that protect wildlife habitats,”

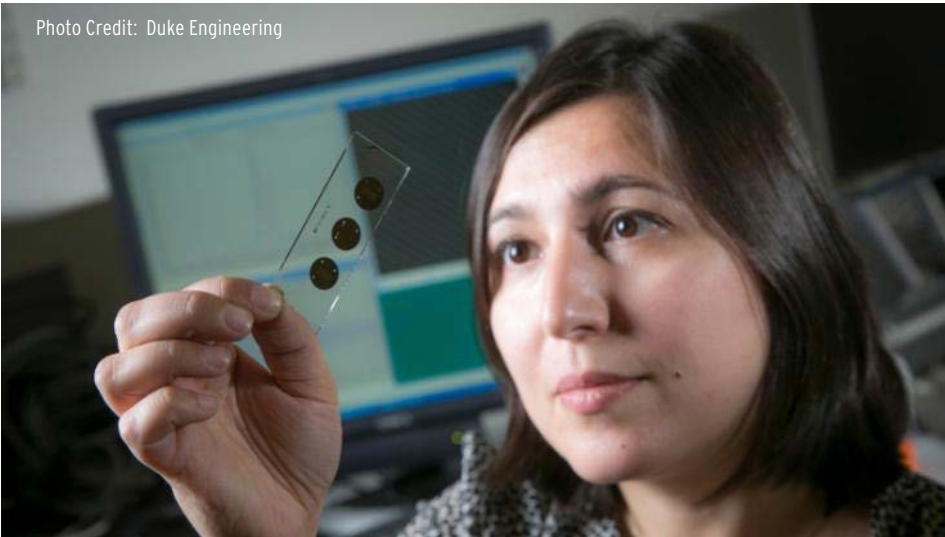
Sharma says. “We've been giving to the National Wildlife Federation, and on January 1 we'll start supporting the Chesapeake Bay Foundation, which has a regional focus.”

In addition, Mobtown Fermentation's sustainable practices include a kegs program, which sees the kombucha packaging come back for reuse.

There's more good news on the horizon: the company is moving to a 13,000-square-foot brewery in Baltimore in February 2019.

“Venture capital and private donors have helped us secure a lot of the funding we need to make this transition, but we're still raising money,” says Sharma, who largely credits his Duke experience and connections with Mobtown's growth.

“I still have quarterly phone calls with Jesko, whose experience makes him an invaluable resource,” Sharma says. “He always stresses that when you're learning about a new industry, you don't know what you don't know – and that it's critical to have knowledge and skills that are applicable across all industries.”



Innovator QATCH Technologies aims for growth

Novel fluid sensor has a number of applications

Since founding QATCH Technologies and receiving an NSF Small Business Technology Transfer (STTR) Phase I grant in 2016, Zehra Parlak has been investigating applications for her innovative sensor technology.

Parlak, who was a postdoctoral researcher in Duke's Zauscher Lab, has been working on the concept of a portable, low-cost fluid sensor since 2013. She's found that QATCH technology can be used as a point-of-care blood-coagulation monitor for warfarin management.

Now Parlak is working to build her business. "Jesko has been helping me from the start, and I've taken his entrepreneurship and innovation classes," she says. "One of the first things Jesko told me was that this is a platform technology, and I had to keep an open mind and talk to a lot of people to understand the pain points."

Parlak plans to continue working on blood-coagulation monitors as she applies for a Phase II grant that will enable her to scale up the technology. But she also has discovered other applications for QATCH's technology.

One possible use, she says, is as an "injectability sensor" for drug formulations.

"This could help pharmaceutical companies figure out sooner rather than later if a drug will be easy to syringe out, if it can be injected," explains Parlak. "This would help patients – particularly those with chronic diseases – as well as cut costs for drug companies and speed up the drug development process. We've already received very enthusiastic comments from pharma companies about this."

Another potential application for the QATCH sensor is alcohol proofing.

"This was a happy coincidence, because I had always used alcohol solutions to test the devices before applying blood because it was simpler," Parlak says. "Then I discovered that the technology can measure the alcohol percentage in beverages as it is – and that the disposable and handheld alcohol proof system that we had already developed for coagulation monitors is really attractive for craft distilleries."

Parlak says the QATCH team is now looking for business-development people to help them develop a business strategy and determine the next steps.

In the meantime, she says, "I'm trying to balance between being focused on furthering the technology and keeping my eyes open to see who needs it most."



International students come to Duke to learn about innovation and entrepreneurship

Summer program offered by Duke and Duke Kunshan University

Eager to learn more about innovation and entrepreneurship from experts, 22 undergraduates and recent grads traveled to Duke University this summer from around the world.

The group – 16 students from China, four from Korea, one from Kazakhstan and one from the U.S. – took part in the Innovation & Entrepreneurship Fundamentals and Global Immersion Program, a three-week summer program offered by Duke and Duke Kunshan University (DKU).

The students spent a week at DKU and then two weeks at Duke.

During their mornings at Duke, participants – their majors ranging from electrical engineering and business to computer science and chemistry – attended seminars and examined case studies with Jesko, his start-up team and other Duke faculty members.

Seminar titles included Introduction to Entrepreneurship and New Business Creation, Startup Financing, Product Development, Corporate Legal Structure in the U.S., Marketing and Communications, Innovation and Wealth Creation, Scaling Up Your Business, and Next Steps for Entrepreneurs.

In the afternoons, the group visited organizations in the Raleigh-Durham area that included the Center for Entrepreneurial Development; Lenovo PC International; the NC Office of Science, Technology & Innovation; Red Hat, Inc.; the NC Biotechnology Center; the American Underground Entrepreneurs Tech Hub; and the Duke Innovation and Entrepreneurship Initiative.

The competitive program received twice as many applications as the number of students accepted, says Executive Education program coordinator Laura Lipps. Participant feedback was overwhelmingly positive, with all students reporting that they enjoyed the experience overall and learned invaluable career skills and fundamental concepts in innovation.

“The extraordinary value of this program lies in immersing students into the mindset of entrepreneurs and innovators,” Lipps says. “Taught by successful entrepreneurs, the experience is an ideal springboard for students who want to start a company or be part of an innovative company in the future.”

Duke University and DKU plan to expand and continue offering the Innovation & Entrepreneurship Fundamentals and Global Immersion Program.



Hong Guo



Savannah Hardeman



Xiaoyan Huang



Yufeng Guo



Daulet Kurmantayev



Jinwoo Lee



Photo Credit All Images: Meg Mendenhall

Summer Doctoral Academy teaches skills needed by innovators and entrepreneurs

By participating in the 2018 Duke Summer Doctoral Academy, a group of 11 Duke PhD students learned the fundamentals of how to start a company based on an innovative idea.

The wide-ranging areas of study for this year's Summer Doctoral Academy participants include mechanical, biomedical, electrical and computer engineering; neurobiology; computer science; genetics and genomics; and chemistry.

2018 courses included a five-day Technology Commercialization session taught by Jesko and his start-up team.

Kevin Hoch, managing director for education of the Duke Innovation and Entrepreneurship Initiative, says the two-week Summer Doctoral Academy is aimed at meeting student needs for professional development.



"The program takes an action-oriented approach that focuses on ways to look at problems or challenges and find solutions," Hoch says. "Summer Doctoral Academy courses teach skill sets that can be applied repeatedly in all types of professional, commercial, and academic environments."

