



Environmental Innovation & Entrepreneurship Program

Progress Report | December 2016



Duke 
NICHOLAS SCHOOL OF THE
ENVIRONMENT



Dear Nicholas School supporter,

This has been a year of major progress for the Environmental Innovation & Entrepreneurship (EIE) Program at the Nicholas School of the Environment.

Our educational programs continue to resonate with the Nicholas student body and we are also increasing our reach to engineering and business graduate students and faculty. Beyond those who choose to complete the official Certificate in Environmental Innovation & Entrepreneurship, dozens more are enrolling in individual classes (Environmental Mega Trends, Foundations in Environmental Entrepreneurship, Entrepreneurial Experience and Entrepreneurial Execution) and participating in our new Duke Venture Mentoring Program™ and other learning opportunities.

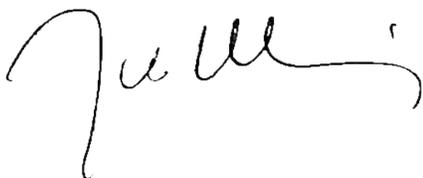
EIE's ultimate goal is to teach people how to be entrepreneurs, and then to encourage them to develop practical environmental applications. We are already doing this daily – and quite successfully, according to past and present students – in the Nicholas classroom; now we are taking that model and finding ways to scale it.

We are taking the powerful educational content that we have developed for the Certificate program and distributing it to a wider – indeed, global – audience. As you will read in this report, we are starting to deliver our Environmental Entrepreneurship curriculum to other institutions and agencies, and we have developed a website to share video content from our popular Environmental Mega Trends course and speaker series to reach others interested in environmental trends outside our classroom.

In addition, we are developing diverse teams of scientists, engineers and business people to focus on practical applications of new technologies that have the potential to have a significant positive impact on the environment. Earlier this year we convened a team of faculty at Duke University (Pratt School of Engineering, Nicholas School of the Environment, and Psychology and Neurosciences), staff at the Renaissance Computing Institute (RENCI), and PFT Technology, LLC to develop a smart leak location system for underground oil leak detection. Recently, ***the National Science Foundation announced a \$1 million award for this project.*** We are working to leverage this success into other funding opportunities as we expand our programs.

As you read this report, I hope you will be as excited as we are by the progress we have made over the past year. Many of the things we envisioned when we launched this program are coming to fruition, thanks to your generous support and the trust you have invested in me and my colleagues. Thank you!

With gratitude,



Jesko von Windheim

Associate Dean, Professor of the Practice, Environmental Innovation & Entrepreneurship
Nicholas School of the Environment

P.S. Check out our new and improved website at sites.nicholas.duke.edu/innovate/



2016 EIE Summer Grant Recipients

Our EIE summer grants continue to draw interest from Duke students who are excited to explore entrepreneurial approaches to solving environmental issues. This year's grant recipients include Duke undergrads, Nicholas master's and PhD students – even a recent Nicholas alum. While all of these projects are still early-stage, they identify unique opportunities to address diverse environmental issues, and we are excited to be able to help them during this exploratory stage.

Developing a risk assessment tool for water investors

Water infrastructure investors require accurate, readily accessible data. Currently, there is no single, comprehensive data source available on the health of water systems, leaving investors with the time-consuming task of tracking down data from many different sources.

Dr. Lauren Patterson, a water policy associate with Duke's Nicholas Institute for Environmental Policy Solutions and **James Young MEM'91**, a Nicholas graduate and co-founder of web application developer Terraine, Inc., are working to **create a single, online data platform that will give investors instant access to a wide variety of data and analytics relevant to water**

systems in any U.S. county. These include: impacts to water that may be linked climate change; types of supply available and access to those supplies; and potential stressors such as population growth, endangered species and fossil fuel extraction.

Mark Ziman MEM'16 joined the team this summer. They used their EIE grant to build a **working prototype** for the tool, gather feedback from potential customers and develop a business case.



UPDATE: In last year's EIE report we featured **Kelly Garvy MEM'15**, who had just completed the Certificate in Environmental Innovation & Entrepreneurship. Kelly is now on the staff of Duke Innovation & Entrepreneurship, the university's overarching entrepreneurial initiative. She works in Duke I&E's downtown "Bullpen," where she helps manage events and programs like the Duke Startup Challenge, HackDuke, and the Melissa & Doug Entrepreneurs fellowships. It is terrific for the Nicholas School to have one of our EIE graduates engaged in the university program, and an indication that EIE is preparing our graduates well for leadership in this field.



2016 EIE Summer Grant Recipients

OCEANS X LABS

Facilitating crowdfunding for conservation

Despite billions of dollars spent on conservation efforts, extinction rates for mammals, birds and sea life are higher than ever. Conservation is not succeeding fast enough, say **Mauricio Hernandez MEM'16** and **Jocelyn Tsai MEM'16**. They believe that part of the solution is changing how we fund the next generation of transformative conservation solutions.

The pair has been working on this concept for over a year, and received an EIE summer grant to design and build **Conservation X Labs**, a proof-of-concept **crowdfunding platform to connect individuals, businesses and nonprofits interested in raising money for conservation-related projects with people who want to fund them**. They also developed a certification process

to ensure credibility and quality of posted projects, and selected two worthy conservation projects to pilot on the site. They eventually intend to scale the platform for an unlimited number of high quality projects, and support the communication and management of customers during every stage of the crowdfunding campaign.

Read more about this platform at www.oceansxlabs.org.

Reducing food waste by creating a market for 'ugly produce'



Things got ugly this summer for Duke undergraduates **Anya K. Ranganathan** and **Courtney Bell**. The rising seniors used their EIE grant to test the potential of selling "ugly produce" to reduce economic and environmental impacts and food insecurity.

Ugly produce includes fruits and vegetables that don't meet commercial and consumer aesthetic standards, as well as produce discarded by retailers as they approach their sell-by date.

Anya and Courtney spent the summer developing the infrastructure to pilot **Ungraded Produce LLC**, an **online, subscription-based delivery service**, in Durham this fall. They acquired commercial kitchen space, finalized contracts with

their initial supplier and made connections with local farmers to source produce that does not meet the appearance standards to sell commercially, applied for a business license, and signed up 15 Duke student customers for weekly home deliveries starting this fall. The pair aims to double their client base by spring. Customers will also have the opportunity to sponsor a local food-insecure family and provide them with free produce deliveries.

EIE invests in Duke Startup Challenge

The Nicholas School doesn't have any finalists in this year's Duke Startup Challenge, but EIE has contributed \$5,000 toward next year's prizes to encourage innovation around environmental applications. The Startup Challenge is a fantastic way to inspire the entire Duke community to embrace innovation, and we're glad to be a part of it.



Entrepreneurial Experience course goes global

This fall, the EIE program's Entrepreneurial Experience course was licensed by the Nicholas School to the City of Amsterdam, Netherlands as the Venture Mentoring Program™ (VMP). The VMP was licensed to Amsterdam for 10 years and will be delivered this fall at the Amsterdam Health and Technology Institute (AHTI). AHTI instructors will facilitate in-class learning with support from the team at the Nicholas School.

The Amsterdam course centers mainly on health innovations, but the curriculum is broadly applicable

to any technology field where there is interest in entrepreneurship. We particularly look forward to developing applications that focus on the intersection of health and the environment.

In addition to the full course, we are also extending our reach globally through shorter workshops in Amsterdam, China, Germany and through Duke Executive Education.



"Our strategy is to use education as the tip of spear to foster environmental entrepreneurship. People are very interested in learning about entrepreneurship and as we transition into practice, we encourage a focus on sustainable applications."

Jesko von Wilhelm, EIE director

ALL PHOTOS: WHITNEY VAN SCHYNDEL

New Entrepreneurial Workshop Series

EIE is also offering the Venture Mentoring Program™ (VMP) content through a series of workshops focusing on marketing, sales, finance and start-up operations. The program is targeted at Duke students who want to develop the broad skillset needed to start and grow a new venture, as well as outside groups interested in availing themselves of Duke's expertise. The series focuses on fundamental and practical aspects of starting, growing and exiting an innovative venture, with examples and tools that participants can immediately apply to their career or entrepreneurial venture.

Currently, EIE Director Jesko von Windheim leads workshops on Start-Up Business Planning, Guerrilla Marketing and Investor Pitching. For the Introduction to Sales workshop held at Nicholas in March, we were fortunate to have two very successful businesswomen – Natalie R. Smalles, a top client advisor with SunTrust Private Wealth Management, and Aaron S. Driver, a partner and client executive with Sentinel Risk Advisors – lead and share their expertise regarding customer

engagement, sales, leadership skills and career progression.

The workshops, which are open to all Duke University students, have gotten high marks from participants. We plan to continue this series on campus this year. In addition, this December Jesko will pilot a similar workshop series at Duke Kunshan University in China through Duke Global's Education and Research Innovations in China (ERIC) Program. We are also

submitting proposals to teach the VMP content to under-resourced communities in North Carolina. To that end we have partnered with NC A&T (a Historically Black College & University) and North Carolina State University with the goal of extending the VMP to the NC A&T/UNC-Greensboro Joint School on Nanoscience and Nanoengineering as well as to other tier 2 and tier 3 educational organizations in North Carolina.



**Katherine Hurrell MEM'17
(Energy & Environment)
Co-President, Business
and Environment Club**

"At the Nicholas School, it's easy to become completely absorbed in my classes. Workshops and events sponsored by the EIE program, such as the Sales Workshop, have allowed me to step outside of my bubble and learn practical career skills that are not taught in my other courses.

"The EIE program does a great job of integrating environmental considerations into courses such as finance and marketing. I believe the program has made me a more well-rounded student, and thus a better job candidate. Dr. Jesko von Windheim's knowledge, experience, advice and willingness to help his students truly make the program special."

Mega Trends Course content available to all

As an entrepreneurship program, we take communication and outreach very seriously. As part of that we are creating online content from our courses and sharing the material online with the greater public. This summer, we went live with a new website that offers much of the content from our popular Environmental Mega Trends course (one of the cornerstones of the EIE Certificate), which analyzes overarching trends in environmental science, policy and practice. The new site, sites.nicholas.duke.edu/megatrends, features presentations (video and audio versions) by top thought-leaders from our speaker series as well as informative content from the course. We plan to add new content to the site each year.

We have also redesigned and refined our Environmental Innovation & Entrepreneurship Program website to make it more user-friendly. Check it out at sites.nicholas.duke.edu/innovate.



2016 Mega Trends Speakers

We had another fantastic roster of thought-leaders lined up for this fall's Environmental Mega Trends course to share their insights on where environmental science, policy, thought and practice are headed in the coming 25 years.

September 8:

Dr. Bill Pan, Assistant Professor of Global Environmental Health, Duke University:
"Mercury Exposure and Peru's State of Emergency in Madre de Dios"



September 22:

Dr. Brian Murray, Environmental Economics Program Director, Nicholas Institute for Environmental Policy Solutions and Interim Director of the Duke University Energy Initiative:
"The Global Challenge of Accessible, Affordable, Reliable and Safe Energy"



September 15:

Dr. Stephen Lee, Chief Scientist, U.S. Army Research Laboratory/ Research Army Office:
"Wildlife Security Convergence with Conservation and Innovation"



September 27:

Dr. Lincoln Pratson, Semans-Brown Professor of Earth and Ocean Sciences, Duke University:
"Some Major Implications of the Ongoing Transformations in Cars and Trucks"



Full presentation recordings are available on the EIE Program website at sites.nicholas.duke.edu/megatrends/

Building interdisciplinary teams across Duke and beyond

Interdisciplinarity is not only a cornerstone of the Duke experience, but one that EIE embraces fully in all aspects of our entrepreneurial work. To promote collaboration across disciplines, Jesko teaches a modified version of the Nicholas School's Entrepreneurial Execution course at the Fuqua School of Business.

As a result of his experience in that class, Fuqua student **Nick Kirby MBA'17**, long with a fellow Fuqua

Encapsio

student and a Pratt Engineering PhD grad, have launched Encapsio, a company that produces precision silicone microencapsulation systems for the protection and controlled release of active ingredients in product formulations.

Nick called Entrepreneurial Execution one of the best classes he has taken at Fuqua. "Taking a deep dive into case studies based on commercializing innovative technologies helped shed light onto the critical decisions and challenges our start-up might encounter," he says.

Encapsio is launching its first product, a retinol delivery system, in the skin care space – but the technology's applications are wide-ranging across industries. The interdisciplinary Duke team received a \$50,000 grant from NC IDEA and recently won \$20,000 for placing first in The Big Launch Challenge. Duke's demonstrated success in building interdisciplinary teams such as this directly contributed to the NSF's confidence in our program and to their decision to provide the \$1 million grant, and we anticipate that other major funders will be similarly impressed.



EIE awarded \$1 million grant for major project

In September, EIE was awarded its largest grant ever - hopefully the first of many. ***The three-year, \$1 million grant from the National Science Foundation's Partnerships for Innovation: Building Innovation Capacity initiative*** will fund a joint project between Duke's Pratt School of Engineering and UNC-Chapel Hill to productize a new technology for detecting underground oil leaks. The grant will be used to develop and test prototypes of a mass spectrometer technology at Pratt and cloud computing technology at UNC; funding also provides opportunities for Duke MEM and Engineering students to participate in the commercialization of this technology and to apply classroom learning to an actual startup.



Fermenting Success: MEM/EIE Certificate alumna launches specialty beverage business



“One thing the EIE program prepared me well for is that, no matter what startup you’re in, there will always be tons of ups and downs, and it’s all about not panicking and figuring out how to solve the problems you encounter. It’s definitely more of a marathon than a sprint.”

Sid Sharma MEM’14 (EIE Certificate)

Co-Founder, Mobtown Fermentation

Within 18 months of graduating from the Nicholas School, **Sid Sharma MEM’14** (Certificate in Environmental Entrepreneurship & Innovation) was running his own business. He and two childhood friends launched **Mobtown Fermentation, a Baltimore-based company that brews Wild Kombucha, a carbonated drink made from fermented green tea.**

Mobtown Fermentation’s three flavors of Wild Kombucha (a fourth is coming this fall) are now stocked in 90 stores in Maryland, Washington DC, Virginia and Pennsylvania, including Whole Foods and other

natural food stores, restaurants and cafés. (You can even find it in the Baltimore Orioles’ clubhouse!) This spring, Mobtown moved from a tiny facility into a 4,000-square-foot brewery. The team has also hired three part-time employees and contracted with distributors to keep up with demand. In April, Mobtown won an entrepreneurship competition and brought home the \$30,000 grand prize to help mechanize their production process as they make plans to expand distribution along the East Coast.

Next up for Mobtown: selling kombucha in kegs (less waste, lower carbon footprint), donating a portion of sales to a nonprofit organization, and continuing to build the brand.

Sid says that his EIE education was particularly helpful as the company started up. “Jesko did a really good job of teaching us how you evaluate the market, how you decide pricing, etc. And now, what we learned about sourcing and supply chain has been really helpful as we work to balance responsible sourcing (we use fair trade and organic ingredients) with efficient production and pricing.”

“The EIE certificate has been very valuable for me, not just due to the connections that I made with entrepreneurs in the classroom but also for the classroom lessons that I’ve taken into professional discussions and my job. The hands-on experiences of taking real entrepreneurial projects from a concept stage through marketing communications and financial work to an eventual launch stage provides a skillset that is valuable not just in the entrepreneurial world, but in NGOs and large for-profits as well.”

Maximilian Peter Christman MEM’16 (Certificate in EIE)

Sustainability Specialist, UW Health

