2017 has been a very productive year for Drexel’s College of Engineering. This report highlights some of the accomplishments of our students and faculty who have worked together to imagine, discover and innovate in partnership with industry and community, thus helping to define and solve societal challenges.

We have sparked the intellectual curiosity of our students. They have expressed their creativity impressively, and have developed problem-solving skills in the classroom and through broad experiential learning. This includes involvement in over 1,800 co-op jobs, many hundreds of research projects, as well as innumerable student group activities, study abroad opportunities, and civic engagement. Collectively, we have published prolifically and with impact. Numerous patents have been awarded and technologies continue to be licensed. Many members of our distinguished faculty have received recognition and new grants. During the past year, we have added new research laboratory facilities for wireless communication (Drexel Wireless Systems Laboratory — DWSL) and enhanced the operation of our 20,000-square-foot open collaborative space called the Innovation Studio.

In the coming year, we renew our dedication to an unsurpassed student experience and to research and scholarship focusing on three strategic areas: advanced manufacturing, cyber-physical infrastructure, and health and medicine. I hope you enjoy these 2017 highlights as we look forward to 2018.

Sincerely,

Giuseppe R. Palmese, PhD
Professor and Interim Dean

ENROLLMENT BY DEPARTMENT

<table>
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<tr>
<th>DEGREE GRADUATE MS</th>
<th>ENROLLMENT</th>
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<tr>
<td>TOTAL 3414 456 284</td>
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</tbody>
</table>

In 2016, Drexel’s College of Engineering

RANKED #5

in the US among private institutions in total number of engineering bachelor’s degrees awarded.

1ST

in the US among private institutions in total number of engineering master’s degrees awarded.

8TH

in the US among private institutions in total number of engineering doctoral degrees awarded.

13TH

of Drexel’s Undergraduate Engineering Students are INTERNATIONAL

15%

82%

82%

11%

7%

% ENROLLMENT BY ENGINEERING DEGREES

82%

11%

7%

CO-OPS

Since 1919, cooperative education at Drexel has enabled undergraduate students to fuse classroom and laboratory learning with practical, hands-on experience prior to graduation. Students alternate six-month periods of on-campus study with full-time employment in industry or government, including national labs, facilitated by Drexel’s Steinbright Career Development Center.

Addressing the most significant global societal challenges demands talented engineers who can navigate and bridge across cultural and geo-political divides. More Drexel Engineering students are adding international experiences to their education through co-ops, by contextualizing their training and professional networks with peers in other countries.

Drexel enrols and graduates more than 1% of our nation’s undergraduate engineering students in the above degrees.
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**DEGREES AWARDED**

- **BACHELOR:** 778
- **MASTERS:** 316
- **DOCTORAL:** 52

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<thead>
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<th>Department</th>
<th>Undergraduate</th>
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In Partnership with Industry

In collaboration with Europe, a world-leading heat-transfer equipment manufacturer, WorleyParsons, a global engineering consulting services provider, the Electric Power Research Institute, and Creative Thermal Solutions, Ting Shen (MSE), Matt McCarthy (MEAM), and Grant Hauen (CAEE) are advancing indirect dry cooling using recirculating encapsulated phase change materials, as part of a $1.6M ARO project.

In collaboration with PPG, Giuseppe Palmese and Cameron Abrams (MEAM) were awarded a $2.4M cooperative agreement from the Army Research Laboratory (ARL). Their goal is to gain a fundamental understanding of the processing-structure-property relationships of novel bio-based systems, enabling the design of high-performance polymer matrix composites for aircraft structures. Focusing on carbon fiber and glass fiber epoxy-matrix composites, the work involves examining dynamic compression, dynamic cyclic fatigue and fracture, internal impact testing, and exploring failure behavior under extreme environmental conditions within the framework of a novel comprehensive analytical damage model.

* Acknowledgement and Disclaimer can be found here.

SAFER WATER | Patrick Gavron, Mire Olozen, and Charles Hao (CAEE) are leading an EPA-sponsored project to combine existing and new data into a plugging risk-assessment tool for building regulations. The $2M, three-year project includes collaborators from the University of Colorado, Penn State, and the Environmental Policy and Research Institute. Their goal is to gain a fundamental understanding of the processing-structure-property relationships of novel bio-based systems, enabling the design of high-performance polymer matrix composites for aircraft structures. Focusing on carbon fiber and glass fiber epoxy-matrix composites, the work involves examining dynamic compression, dynamic cyclic fatigue and fracture, internal impact testing, and exploring failure behavior under extreme environmental conditions within the framework of a novel comprehensive analytical damage model.

KEEPS IT REAL | With the support of a $650K Rapid Innovation Fund grant from the US Army Research Office, Matt Steiner, James Shackelford and Nadia Kandasamy (MECE) are developing high-performance techniques to identify the source and authenticity of digital videos using multimedia forensics.

ARCHITECTED THERAPIES | With the support of a grant from the National Institute of Allergy and Infectious Diseases and the NIH, Hao Cheng (MESE) and Elizabeth Blankenhorn (College of Medicine) are studying injectable biomaterial scaffolds for inducing antigen-specific tolerance to treat autoimmune disorders to specifically block the function of self-reactive immune cells, rather than suppressing the entire immune system.

LOFTY AMBITIONS | New ONR Young Investigator Leslie Lamberson (MEM) is exploring multi-axial and multi-temporal loading conditions on polymer matrix composites for aircraft structures. Focusing on carbon fiber and glass fiber epoxy-matrix composites, the work involves examining dynamic compression, dynamic cyclic fatigue and fracture, internal impact testing, and exploring failure behavior under extreme environmental conditions within the framework of a novel comprehensive analytical damage model.

GRANT HIGHLIGHTS

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HIGHLIGHTS

2016-2017 FACULTY HIGHLIGHTS

- 106 TENURE TRACK
- 28 TEACHING FACULTY
- 6 RESEARCH FACULTY

IN FISCAL YEARS 2013-2016

<table>
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<th>CAE</th>
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<th>ECE</th>
<th>MESE</th>
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156 TENURE TRACK PROFESSORS
106 TENURE TRACK ASSOCIATE PROFESSORS
42 TENURE TRACK INSTRUCTORS

DEDICATED RESEARCH ENGINES

$20 MILLION RESEARCH EXPENDITURES

IN FISCAL YEARS 2013-2016

<table>
<thead>
<tr>
<th>CBE</th>
<th>CAEE</th>
<th>ECE</th>
<th>MEM</th>
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<tr>
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</table>

Selected Faculty Achievements

Michael Baroukis (MEM) has been elected Foreign Member of the Royal Swedish Academy of Engineering Sciences and Nanoscience Foundation Chair of Excellence in Grenoble, France.

James Breen (EN) was named to The Power List 2017 for The Medicine Maker. This selective list recognizes individuals who are pioneering the pharmaceutical industry and bringing life-changing medicines to market.

Allan Glynn (MEM, EN) was elected fellow of the American Society of Mechanical Engineers. Also join Bork Fornalik and Nick Cernansky (MEAM), who were elected in 1996 and 2014, respectively.

Charles Hao (CAEE) received the National Water Research Institute Alumni Robert Johnson Prize Career Prize.

Simi Haque (CAEE) was awarded a NSF CAREER Award in 2016.

Leslie Lamberson (MEM) was named a 2017 Office of Naval Research Young Investigator. She joins her MEM colleague Antonios Kontsos, who won the award in 2014.

Michelle Marcolongo (MEAM) was named a National Academy of Inventors Fellow in 2017.

Michele Olozen (CAEE) was invited to participate in the National Academy of Engineering Frontiers of Engineering Symposium.

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In Partnership with Industry

In collaboration with partners throughout the world, industry offers research opportunities that are not possible within the confines of a university environment.

In collaboration with European Union-funded projects, the Earth Observation Group is helping develop the European Space Agency’s new earth monitoring satellite using advanced sensors and algorithms for environmental monitoring.

In partnership with 3M, the College of Engineering researchers are developing high-performance techniques to identify the source and authenticity of digital videos using multimedia forensics.

In collaboration with Evapco, a world-leading heat-transfer equipment manufacturer, the Electric Power Research Institute is exploring multi-axial and multi-temporal loading conditions on polymer matrix composites for aircraft structures. Focusing on carbon fiber and glass fiber epoxy-composites, the work involves examining dynamic compression, dynamic tensile, and indirect dry cooling using recirculating encapsulated phase change materials in support of a $1.4M ARAE IP Co-Investigator project.

In collaboration with Advanced Materials, the College of Engineering is exploring the thermal and mechanical behavior of advanced materials.

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Strategic Research Areas

Drexel Engineering is creating advancements in translational research and scientific discoveries. We pioneer use-inspired research and engineering innovations in the areas of cyber-physical infrastructure, health and medicine, and advanced manufacturing.

**ADVANCED MANUFACTURING**
The College engages in research that significantly impacts the entire process of advanced manufacturing by particularly bridging the gap between basic science and product design. For example, life cycle assessment (LCA) methods have been applied to evaluate the sustainable design of products and engineering systems and is especially valuable in prospective design in advanced manufacturing systems. Sabrina Spatari (CAEE) has developed and applied LCA in the selection of automotive materials, transportation fuel systems, power generation, and more recently, with Jason Baxter and Aaron Fafarman (CBE), evaluated the design of advanced solar cells.

**HEALTH & MEDICINE**
Engineering significantly contributes to solutions for the biggest problems faced in health and medicine. The College believes that these problems are best tackled in a multidisciplinary fashion, through active engagement and collaboration with researchers from a broad spectrum of fields. Steven Wrenn and Aaron Fafarman (CBE) have been collaborating with two Drexel cardiologists (Brett Angel and Andrew Kohut) with financial support from Coulter-Drexel. With contributing research by PhD student Michael Cimorelli and three undergraduate students (Kyle Barrett, Benjamin Andrien, and Michael Flynn), they have developed a voltage-activated ultrasound contrast agent. The current application for the agent, based on the adage that ‘dead meat don’t beat,’ utilizes electrical activity of the heart (and lack thereof) to detect whether a person is having (or is at risk for having) a heart attack. The team filed a provisional patent application earlier this year, and successfully demonstrated activation of the agent using the hearts of both small and large animals.

**CYBER-PHYSICAL INFRASTRUCTURE**
Physical infrastructure and cyber-infrastructure have historically been considered distinct areas of inquiry; however, modern cities have begun to blur the dividing lines with the rise of cyber-physical systems. For instance, in our new partnership with Cisco IoT, our researchers are leveraging new technologies to enhance the understanding of how we work and interact with our dynamic urban structures and spaces.

**PHD GRADUATES INTO TENURE FACULTY POSITIONS, 2012-2017**
15 of the College of Engineering PhD alumni were recruited for tenure track faculty positions at a number of institutions, including:
- Aligarh Muslim University
- Arizona State University
- BITS Pilani
- Clemson University
- Louisiana State University
- Michigan State University
- Texas A&M
- Tulane University
- University of Alabama in Huntsville
- University of Bath
- University of Groningen
- University of Nebraska
- Villanova University
- Virginia Tech
- Worcester Polytechnic Institute

**New Laboratories**
In 2016, several laboratory construction and renovation projects throughout the College were launched or completed. Among these is an exciting new home for the Drexel Wireless Systems Laboratory (DWSL), located within a $5 million, 10,000-square-foot complex that also houses the Institute for Energy and the Environment (IExE), and the Innovation Studio (see page 7). Led by Kapil Dandekar (ECE), the DWSL is now equipped with several state-of-the-art facilities to support the broad spectrum of its research activities. Features include: electromagnetic anechoic and reverbervation chambers; a ceiling grid measurement “arena” for mounting of software defined radios, RFID, and other Internet of Things technologies for over-the-air testing; aerial wireless research capabilities; antenna fabrication facilities including printed circuit board fabrication and materials printer facilities; programmable software defined radio testbeds; an extensive assortment of high frequency testing equipment; several microwave and wireless systems analysis software packages; and collaborative work and conference room spaces.

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Features include: electromagnetic anechoic and reverberation chambers; a ceiling grid measurement “arena” for mounting of software defined radios, RFID, and other Internet of Things technologies for over-the-air testing; aerial wireless research capabilities; antenna fabrication facilities including printed circuit board fabrication and materials printer facilities; programmable software defined radio testbeds; an extensive assortment of high frequency testing equipment; several microwave and wireless systems analysis software packages; and collaborative work and conference room spaces. DWSL is one of the labs anchoring the new Vertically Integrated Projects (VIP) program, and is also seeking to build closer ties to industry in support of Schuylkill Yards.
The proliferation of electronics in recent decades has contributed both to the volume of electromagnetic radiation generated on our planet and also to its noticeable. This can lead to malfunctions and overall degradation of everyday devices such as cell phones, tablets, and laptops. Current shielding is achieved by using thick metals; however, material consumption and weight leave them at a disadvantage for use in aerospace and telecommunication applications. Researchers in the Nanomaterials Group led by Distinguished University and Charles T. and Ruth M. Bach Professor Yury Gogotsi (MSE) reported in the journal Science about the development of the first lightweight barrier made from MXenes, a two-dimensional material discovered at Drexel by Gogotsi and Distinguished Professor Michel Barsoum (MSE). This can be more effective at blocking and containing electromagnetic interference, with the added benefit of being extremely thin and easily applied in a coating just by spraying it onto any surface — like paint.
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College of Engineering Students Compete
In SpaceX Hyperloop Competition

Drexel students participated in a competition to design an optimal Hyperloop program. In January 2016, Drexel, along with 122 other universities, presented its original design concept to participate in the competition. Elon Musk’s company SpaceX challenged the teams to design a new mode of high-speed ground transportation that would travel at 700+ miles an hour, levitating on a small pocket of air. The Drexel team became one of 31 teams invited to the final competition. While another group won the competition, Drexel is proud to have participated and congratulates its students on their efforts.

CoE Students Win
IEEE Philadelphia Award

The Institute of Electrical and Electronics Engineers’ (IEEE) Philadelphia Section has awarded five students from Electrical and Computer Engineering with the Section Student Project Award. Advised by Kapil Dandekar (ECE), the joint undergraduate and graduate team of Dahn Nguyen, James Chacko, Cem Sahin, Xaime Rivas Rey and Logan Henderson won the award for their research in augmented reality for wireless systems. The project, BeamViewer, is an AR framework that utilizes data collected from the radio’s controlling antennas to produce a real-time, detailed visual representation of their radiation patterns.

Student Fellowships

85/MS student Carlee Moonbeam (BS BioMed and MS MSE) was awarded a Fulbright US Student Program grant in 2017 from the US Department of State and the J. William Fulbright Foreign Scholarship Board. Carlee is the third Drexel MSE student to receive a Fulbright scholarship while enrolled as a student in the department, joining Sarah Lighthart Vidal and Aaron Sakulich.

2012 to 2017

**Fulbright Scholars**

9

**Goldwater Scholars**

7

**NSF Graduate Research Fellows**

17

**National Defense Science & Engineering Graduate Fellows**

5

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Technology Commercialization

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2012 to 2017

9 Fulbright Scholars
7 Goldwater Scholars
17 NSF Graduate Research Fellows
5 National Defense Science & Engineering Graduate Fellows

Patents

Drexel is ranked 22nd in the 2016 Top 100 Worldwide Universities Granted US Utility Patents. The ranking is published by the National Academy of Inventors and Intellectual Property Owners Association. More than 60% of patents submitted since 2012 involve research performed in the College of Engineering. Drexel outpaces universities that have larger research expenditures.

- Patent Applications: 100
- Invention Disclosures: 60
- Patents Issued: 36

SERIAL ACADEMIC INNOVATORS

Over a decade of R&D and the initial support of the Wallace H. Coulter Translational Research Program at Drexel enabled Wei-Heng Shih (MSE), Wan Shih (Stafford) and Ari Brooks (Penn Medicine) to invent and create a prototype of a new portable handheld sensor to detect the early stages of breast cancer. Their technology, delivered in iBreastExamSM, brings together innovative materials technology and mobile computing in the form of an FDA-approved, ultra-portable wireless breast scanner. The technology is licensed by UAE LifeSciences, which recently announced a global partnership with GE Healthcare to commercialize the product in 25+ countries across South Asia, Southeast Asia and Africa. In 2013 Shih and Shih launched the startup Leonea Field Diagnostics LLC, a developer of molecular diagnostic tests designed to offer low-cost treatments for infectious diseases. The company’s molecular diagnostic test utilizes a piezoelectric plate sensor for detection and treatment of chronic infectious diseases. Using a circulating cancer marker, the sensor simplifies the genetic testing process and enables low-cost rapid testing of multiple nucleic acids.

Drexel is ranked 72nd in 2016 Top 100 Worldwide Universities Granted US Utility Patents. The ranking is published by the National Academy of Inventors and Intellectual Property Owners Association. More than 60% of patents submitted since 2012 involve research performed in the College of Engineering. Drexel outpaces universities that have larger research expenditures.
**JACOB LOCKSPEISER ’20**  
**Engineering Technology (ET)**

Owing to his co-op with the U.S. Army Research Laboratory’s Weapons Guidance program, Jacob Lockspeiser was able to tell you that drones will occasionally fly into GPS-denied areas. When they do, engineers need to know where they are relative to other drones. Lockspeiser worked on the radio frequency communications for drones, drilling down into the intricate systems that direct the radio frequency communications for drones, relative to other drones. Lockspeiser worked on they do, engineers need to know where they are occasionally fly into GPS-denied areas. When

**JOSEPH FRANKO ’18**  
**Civil, Architectural and Environmental Engineering (CAEE)**

"I love creating stuff and learning about technology. I knew the co-op program would allow me to try new work experiences and see what kind of work he likes but what kind of work he doesn’t. Philip, who "found" his co-op at a campus career fair, developed multiple pharmaceutics models and GlassSEM® that helped refine his analytical skills in chemistry. More important, the co-op helped him decide that his career interest was, indeed, drug delivery research.

**FREDERICK WACHTER ’18**  
**Mechanical Engineering and Mechanics (MEM)**

"My classes at Drexel focus on theory and on practicality and parts that are specific to the use of a given design," said Gabrielle Madden. "It helped me to take the lead on a board design and carry the responsibility for its development."

**GABRIELLE MADDEN ’19**  
**Electrical and Computer Engineering (ECE)**

"It is hard to underestimate the impact of Joseph Frank’s two co-ops with Langan Engineering and Environmental Services here in Philadelphia and abroad. He had experience doing earthwork analysis for a building site, he was nominated for Drexel’s Outstanding Co-op Award, and he got a job with Langan following graduation. Franko started his co-ops at Drexel with a small structural steel company, but it was the work with Langan that proved the most compelling for him.

**AUSTIN PHILIP ’20**  
**Chemical and Biological Engineering (CBE)**

"I thought I knew what I wanted to do going into college, but you don’t really know until you go out and test it. My co-op just made me more interested in what I want to do next," said Philip. "That’s Drexel’s heart, the co-ops. It’s a very integral part of the college experience. It puts the students ahead and gives them a real-life application of what they’re learning in class. A year and a half of work experience is a major leg up on other candidates coming out of college. It’s a test-run for the rest of your life, and I really appreciate that."

**MARIA NATALIA NORIEGA PEDRAZA ’19**  
**Materials Science and Engineering (MSE)**

"I’m working for are to benefit the health of human beings. I am passionate about that.”
**JACOB LOCKSPEISER ’20**
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Owing to his co-op with the U.S. Army Research Laboratory’s Weapons Guidance program, Jacob Lockspeiser learned to tell you that drones will occasionally fly by GPS-denied areas. When they do, engineers need to know where they are relative to other drones. Lockspeiser worked on the radio frequency communications for drones, drilling down into the intricate systems that direct and localize drone swarms. When he said it was cool as it sounds.

**JOSEPH FRANKO ’18**
Civil, Architectural and Environmental Engineering (CAEE)

It is hard to underestimate the impact of Joseph Franko’s two co-ops with Langan Engineering and Environmental Services here in Philadelphia and abroad. He had experience doing earthwork analysis for a building site, he was nominated for Langan’s Outstanding Co-op Award, and he got a job with Langan following graduation. Franko started his co-ops at Drexel with a small structural steel company, but it was the work with Langan that proved the most compelling for him.

“The experience I had in a work setting, as well as on a wide variety of projects, really tested my abilities. Tasks ranged from storm water management design, earthwork analysis, traffic impact studies, utility connections, and more,” said Franko. “It allowed me to combine a lot of the skills I learned in class with real-world scenarios.”

**FREDERICK WACHTER ’18**
Mechanical Engineering and Computer (MEM)

When you have a co-op in Sweden that stretches through the winter, it’s going to be dark most of the time. So while he lived abroad during his co-op, Frederick Wachter especially appreciated the Swedish practice of fika, the twice-daily national coffee break that brought him together with his colleagues at Production Technology West in Trollhattan.

“This co-op helped me figure out that I wanted to understand the engineering concepts involved, while also being able to implement the designs into physical hardware,” said Wachter. “I also learned what it is like to live alone in a foreign country, and the importance of the people I surround myself with.” Wachter worked in automation technology with a group that seeks to locate defects within welds in automated welding processes through the use of infrared light.

**GABRIELLE MADDEN ’19**
Electrical and Computer Engineering (ECE)

“My classes at Drexel focus on theory and on specific building blocks that are common across many electrical engineering sub-fields. But at my co-op, I focused on practicality and parts that are specific to the use of a green design,” said Gabrielle Madden of her co-op with WoodwardMcCoach, Inc., an electronic design and software firm. Madden designed printed circuit boards and performed initial testing on new products. Her managers also allowed her to take the lead on a board design and carry the responsibility for its development.

“There are so many different aspects of electrical engineering — circuit design, control theory, power grid, buildings systems, micro-scale electronics, etc. I knew the co-op program would allow me to try out the fields and decide for sure what I liked. And I love the idea of being able to have 18 months of real work experience upon graduation.”

**AUSTIN PHILIP ’20**
Chemical and Biological Engineering (CBE)

Austin Philip chose his first co-op to find out not only what kind of work he likes but what kind of work he doesn’t. Philip, who “found” his co-op at a campus career fair, developed multiple pharmacokinetics models on GlassMimix that helped narrow his analytical chemistry skills in more. More important, the co-op helped him decide that his career interest was, indeed, drug delivery research.

“I thought I knew what I wanted to do going into college, but you don’t really know until you go out and test it. My co-op just made me more interested in what I want to do next,” said Philip. “That—Drexel’s heart, the co-ops. It’s a very integral part of the college experience. It puts the students ahead and gives them a real-life application of what they’re learning in class. A year and a half work experience is a major leg up on other candidates coming out of college. It’s a test-run for the rest of your life, and I really appreciate that.”

**MARIA NATALIA NORIEGA PEDRAZA ’19**
Materials Science and Engineering (MSE)

First in France, where she designed silicon formulations for additive technologies, and then in Germany, where she characterized nanoparticles for biomaterials work, Maria Natalia Noriega Pedraza enjoyed back-to-back co-ops that persuaded her a PhD in her field would be worth pursuing. Noriega, who learned to speak French while she was abroad, said the lab techniques she first practiced at Drexel enabled her competency overseas, so that she was able to make solid contributions to the programs during her co-ops.

“My priority now, topic-wise, is the medicinal field,” said Noriega. “I’m doing my track on biomaterials, and just motivates me to know that the applications I’m working for are to benefit the health of human beings. I am passionate about that.”
**INNOVATION STUDIO**

The Innovation Studio at Drexel University brings students together in a shared space to collaborate on turning their ideas into reality.

The Studio’s mission is to offer students a place to create projects using a “flow through” area. Initial designs begin as mock-ups, proceed to working prototypes, and finish as completed projects.

Over 1,000 engineering students are currently making use of the 20,000-square-foot space; students, including College of Engineering first-year students, use the studio for their design projects throughout their undergraduate experience. In addition to Drexel’s Machine Shop, which contains heavy machinery for advanced manufacturing of metal parts for student projects, woodwork equipment and 3D printers are also available.

The idea for the studio materialized from the widespread acceptance of the Maker Movement. This trend is meant to encourage and inspire individuals from different backgrounds to come together to create, develop, and build even better products than those currently available on the market. Drexel’s CoE has extended this concept by creating even greater opportunities for our students to engage in experiential learning.

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**GRADUATE SPOTLIGHT**

Ryan Hoos, BS & MS '17

“I have been fortunate enough to graduate with my Bachelor and Master of Science in Chemical Engineering (CBE). Starting Drexel five years ago as a scared freshman, I could not imagine the adventures I have experienced. Drexel gave me the opportunity to see the world, move across the country, and meet countless incredible people. Being a part of the Chemical and Biological Engineering Department has given me the knowledge and skills to excel in the work force, the classroom, and academic research. Networking through the CBE department gave me the opportunity to work for Tesla in both Silicon Valley and at the Gigafactory as a Battery Technology Intern for the third co-op. After graduation, I will be returning to Tesla to work at the Gigafactory in the Cell Quality and Materials Engineering group.”

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**CoE Student Develops App to Aid Public Speaking**

Danish Dhamani ‘17 (MEM) and Paritosh Gupta ‘18 (CS) developed a speech app called Orai to aid public speakers improve content and delivery. Orai records speech patterns, then identifies annoying filler words such as “ums,” “uhhs,” and “you know.” Orai also notes clarity of pronunciation, measures talking speed and length of pauses, and more.

oraiapp.com

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**THANK YOU FOR YOUR SUPPORT!**

Over 125 years ago, Anthony J. Drexel foresaw the need for an institution that would prepare his beloved Philadelphia for the challenges and opportunities of the Industrial Revolution. Boldly, yet without fanfare, he stepped into this void with a disruptive notion that higher education should be open to all, advancing the ideals of a just and diverse society.

Since then, Drexel University College of Engineering has relied on alumni, faculty, staff, and Drexel parents and friends to sustain our founder’s vision and take it in dynamic new directions.

In fiscal year 2017, 1,572 donors gave to the College of Engineering, a total impact of over $8.3M.
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STUDENT AID – 61% $5,122,657

ACADEMIC UNITS – 18% $1,458,796

RESEARCH – 12% $1,029,050

OTHER – 9% $747,550

TOTAL IMPACT $8.3 M

1,572 DONORS

OVER 125 YEARS AGO, ANTHONY J. DREXEL FORESAW THE NEED FOR AN INSTITUTION THAT WOULD PREPARE HIS BELIEVED PHILADELPHIA FOR THE CHALLENGES AND OPPORTUNITIES OF THE INDUSTRIAL REVOLUTION. BOLDLY, YET WITHOUT FANFARE, HE STEPPED INTO THIS VOID WITH A DETERMINATION THAT HIGHER EDUCATION SHOULD BE OPEN TO ALL, ADVANCING THE IDEALS OF A JUST AND DIVERSE SOCIETY.

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