A bird’s-eye view of the initial construction phase of the new Duke Engineering Building (page 6) being built at the nexus of Pratt, Trinity and the School of Medicine.
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Dear friends,

There are few things in the world that can be as transformational to a school as thoughtfully designed space. It can provide students with new opportunities to learn through classrooms tailored to tomorrow’s reimagined engineering curriculum, and “makerspace” workshops outfitted with the latest tools of the trade. It can support the recruitment and retention of world-class faculty, opening new offices and laboratories in “neighborhoods” that bring researchers from different fields together to tackle the world’s grandest challenges. And with ample gathering space, it can encourage the sense of community that I’ve come to love and respect about our corner of campus.

That’s why it’s no surprise that the New Engineering Building currently rising at the end of Research Drive features so prominently in this issue of the student-written DukEngineer Magazine. With 150,000 square feet of new space, the new building will expand current engineering student classroom, lab and program space by nearly 50 percent. Its strategic design supporting next-generation approaches to engineering education will maximize the use of every single square foot.

It’s been 15 years since the Fitzpatrick Center opened its doors, enabling Duke Engineering to quickly grow and become one of the fastest-rising engineering schools in the U.S. News & World Report annual rankings. I’m proud to report that in the most recent rankings, our graduate program cracked the top 25 and received its highest ranking ever at 24th—and our undergraduate program at #18. This goes with two of our faculty being elected to the National Academy of Engineering this year (with a record six of our faculty elected to this highest honor in the last four years!). And with the New Engineering Building supporting our vision for the future, there’s no doubt in my mind that this upward trajectory will continue and accelerate.

To name just one example, the building will provide custom-designed space for our signature undergraduate experience focused on entrepreneurship, design, research opportunities and data. Our first-year design course was so popular during its 2017-2018 pilot that we’ve already made it a standard part of every Pratt student’s first year on campus. We are moving forward with a similarly inspired sophomore-level class “Introduction to Data & Decision Sciences,” focused on team-based, authentic problem-solving. The impact this type of class can have is clearly evident in research working to pull actionable insights out of the constant stream of data being collected by today’s wearable technologies (page 10).

The opportunities our students have access to is nothing short of mind-blowing. Our students can work to genetically engineer pollution-eating microbes (page 8). They can learn about foreign cultures while honing their engineering skills in Costa Rica (page 24), complete a high-tech internship in Silicon Valley with a built-in support system (page 14), or even set a new Guinness World Record (page 26).

We’re also offering more entrepreneurial support than ever before, including the launch of our inaugural team of Clark Scholars (page 12). Our exciting, creative and new Master of Engineering Management Founder’s Track helps teach engineers who want to gain business skills and entrepreneurial confidence how to identify problems, conceive solutions, build prototypes and develop a start-up strategy. For undergraduates, our Founder’s Workshop course guides student teams through development of startup plans, while guest speakers provide real-world insight. And our new Design Health Fellows program (page 21) exposes students to the biomedical engineering commercial market by having them actively identify, validate and prioritize problems that have an impact on human health.

After reading through these and more inspirational stories in this year’s DukEngineer Magazine, I know you’ll be excited and energized about the future of Duke Engineering, and the impact our students are primed to have on both our local communities and the world.

Prof. Ravi V. Bellamkonda
Vinik Dean of the Pratt School of Engineering
Ashish Vankara is a senior biomedical engineering major who aspires to study medicine. He was born in India and raised in Columbus, Ohio as an OSU Buckeyes fan. In his free time, he enjoys lifting, reading and playing basketball. On campus, he is involved with Duke Diya, Happy Kids Healthy Kids, the Sigma Chi fraternity, the Duke Center for Genomics and Computational Biology, and the Duke peer tutoring program. He has been involved with DukEngineer since his freshman year and is grateful for all the opportunities that it has afforded him.

Sabrina Qi is a junior from New York studying biomedical engineering and global health in the hopes of pursuing a career in medicine. On campus, she is involved with Devils En Pointe, Dance Expressions and independent research. In her free time, she enjoys reading and drawing.

Mary Gooneratne is a sophomore studying electrical and computer engineering and computer science. On campus, she stays involved with Duke Technology Scholars, Baldwin Scholars, Outing Club and Society of Women Engineers. With her free time, she likes to bake, hike, read and spend time at the beach.

Jade Grimes is a sophomore from the New Orleans area. She is pursuing a double major in civil engineering and environmental science with a certificate in architectural engineering. Outside of class, she is a volunteer tutor at the Emily K. Center, an admissions tour guide, an Annual Fund worker and a tutor to Duke student athletes. She enjoys drawing, cooking and visiting the gardens.

Emilia Grzesiak is a junior from the Chicagoland area. She is majoring in biomedical engineering and minoring in chemistry. On campus, she is an NAE Grand Challenge Scholar and a BME Design Fellow, conducting research on wearable devices. In her free time, she enjoys working out and Skyping her Polish relatives.

Nimisha Pant is a sophomore studying mechanical engineering from Charlotte. She is interested in sustainability and clean energy. On campus, Nimisha is involved with DEV, Brownstone and Duke Rhythm. She has been involved with DukEngineer since freshman year and is thankful for the opportunity to serve as both an editor and a writer.

Ryan Piersma is a junior from southwestern Michigan studying electrical engineering and computer science and minoring in Arabic language. Around campus, he is involved in musical groups such as the Duke Marching and Pep Band and the Devilish Keys Piano Ensemble and has acted as a TA for several engineering classes. Currently performing computer architecture research in Dr. Benjamin Lee’s lab, Ryan hopes to continue at the graduate level to obtain a PhD in computer engineering. In his free time, he enjoys playing chess and the electric guitar. This has been Ryan’s second year working with the DukEngineer as a writer, but his first as an editor. He has immensely enjoyed this opportunity.

Will Schmidt is a sophomore studying mechanical engineering. He is interested in materials science and aeronautics, and enjoys reading and hiking.
Pratt’s undergraduate Engineering Student Government has long been committed to enriching and enhancing the undergraduate engineering experience from a holistic perspective. Engineers across the school have partaken in initiatives and events executed by ESG, and our board of 12 puts in significant effort throughout the year to bring the best time to all Prattstars.

This year, ESG is shifting and expanding its reach slightly to continue helping and positively impacting the Pratt community. Besides executing long-time traditions, ESG members this semester are breaking off into small committees to work on an array of projects spanning disciplines from academic advising to career development and more. Most notably, ESG is working with the Office of the Dean to put together an Undergraduate Engineering Task Force comprising a small group of ESG members and other Pratt undergrads to serve as a sort of consulting team, advising administration on the effectiveness and value added by various administrative initiatives.

ESG is also working together with the Engineering Alumni Council, the Duke Innovation & Entrepreneurship initiative and the Pratt administration to remodel and refine the student experience. By gathering and sharing feedback and suggestions from students regarding their curricular and extracurricular experiences, ESG has continued to serve as an forum for students to provide input on how to keep Pratt at the vanguard of innovation in engineering education.

As always, weekly E-Socials, which bring together student groups and industry players for an afternoon of mingling, are an excellent way for our students to learn about interesting opportunities both on campus and beyond. Due in large part to the work of Class of 2021 President Kunal Upadya, Student Group Liaison Austin Li and Industry Relations Chair Claire Szuter, we’re expecting some unique E-Socials this semester; players from nVIDIA to Duke’s own Foundry can be found on the Harrington Quad soon!

Our other major traditions continue to be strong drivers for shared community and Pratt pride and are continually growing in capacity! From E-Ball to E-Picnic and E-OktoberFest, these bright spots in the semester provide respite from the library for students, with fun shirts to boot!

ESG has always stood for ensuring that students and administration are aligned in their efforts to provide students the most out of their time at Pratt, and we hope to continue our endeavors in pursuit of this goal as the world of engineering education continues to transform with time.

Rishi Tripathy
Engineering Student Government Executive President
My first chance to be a part of the Duke community was through EGSC. Selected to represent my department before the start of my first graduate semester, I immediately recognized the exceptional nature of the Pratt graduate community. While much has changed for me and on campus since that fall of 2016, the support from and connection to my peers has remained as constant as it has been invaluable. Engagement lies at the core of the Duke engineering graduate student lifestyle; we in EGSC are proud to help foster this spirit of community both on campus and in Durham.

Social engagement on campus has continued most regularly through our continued Pratt Chats, held in the Harrrington quadrangle—outside when possible—almost every week of the year. With beverages and the occasional catered meal offered as a refreshing end to each work week, this event reliably reinvigorates the Pratt graduate student community after its members have spent several days cloistered in their respective labs and offices. The energy at these events is tangible; the conversations—held sometimes between students just meeting for the first time—float between coursework commiserations, basketball debates and intersecting research topics. However grueling the work week has been, Pratt Chat enables our community to consistently end the week on a collective high note.

This year, we in EGSC have worked to extend our community’s social engagement outward into Durham by sponsoring special events off campus every month. In September, we encouraged our graduate students to celebrate Oktoberfest in downtown Durham at an event sporting traditional German music and cuisine. EGSC later raffled away tickets to special Halloween movie screenings at the Carolina Theater. Some students even dressed up as some of their favorite characters for the screenings! In the upcoming semester, we anticipate bowling nights, room escapes and more will ensure our extraordinary community will flourish off campus as well as at Duke.

Advocacy for oneself and for one’s community are other facets of EGSC’s mission to burgeon the spirit of engagement within Pratt graduate students. We have encouraged self-advocacy this year through our biannual free professional headshot sessions and our recent career development workshop. Just two of our planned spring 2019 community advocacy events include a forum organized in conjunction with the Office of Sustainability and a research seminar co-hosted by the Office of Diversity and Inclusion on the broader impacts of people’s research. We have found that our peers are astoundingly receptive to these opportunities to engage academically and professionally with their peers when they are given the opportunity to do so.

The EGSC board is currently hard at work organizing our several recruitment events as well as the upcoming Envisioning the Invisible photography competition. In this team of peers, I have found supportiveness, drive and creativity, which galvanizes my own passion for serving my community. Hosting so many unique and meaningful events throughout the year requires an extraordinary team of committed student leaders; it has been a privilege serving among them.

Michael Lee
EGSC President
Building New Opportunities

ABOVE: Artwork by Michael McCann provides a conceptual view of the New Engineering Building scheduled to open in late 2020.

Sustainability and Collaboration Under One Roof

Scheduled to open for classes in 2021, Duke’s new engineering building is already being used as a learning experience.

It’s not uncommon to hear alumni reminisce of the time when there was no “E-quad,” when the area in front of Hudson was a mere parking lot, and when Science Drive connected to Research Drive. The Pratt School of Engineering’s newest building, the Fitzpatrick Center for Interdisciplinary Engineering, Medicine, and Applied Sciences, opened in 2004, transforming a parking lot behind the libraries into what students now know as the Harrington Engineering Quad. The Fitzpatrick Center doubled the building space for engineering students. Now, 15 years later, teaching space in Engineering is doubling once again to include a $115 million, 150,000-square-foot, five-floor addition.

Designed to encourage active student learning, the open classrooms have their seating around large tables rather than rows of individual desks. Common areas, like the learning commons, a new auditorium, open classrooms, and collaboration spaces. He also hinted at the possibility of a studio for videos and podcasts.

As part of the recent Duke Engineering initiative to give students an educational experience that encourages firsthand experience with design, data science, computing, research and entrepreneurship, the new research spaces, or “neighborhoods,” will not be appropriated to individual departments, but rather overarching academic themes, like health innovation, computing and intelligent systems, and environmental health. Dean Ravi Bellamkonda stresses that he’s excited about the “quality of the space,” one that includes new labs (for design and research), offices, workstations, a learning commons, a new auditorium, open classrooms, and coll-
commons, a fourth-floor terrace and informal study spaces further promote collaboration.

Dean Bellamkonda notes that the new building is at a great location. At the intersection of the medical school, Pratt, Trinity and the libraries, “It is the closest engineering will be to the main quad” and even “looks out to the Chapel from many conference rooms.” The critical placement reinforces the intent behind the research neighborhoods by allowing faculty and students from multiple Duke schools and disciplines to work together on improving the future.

Mitchell Vann, Duke Engineering’s director of facilities, infrastructure and safety, emphasizes that while the building design promotes the creation of new technologies and innovations, the building itself makes use of new and sustainable technologies for water conservation, energy performance and resource management. It is expected to receive a LEED certification of at least silver.

By combining chilled water flow through beams as air conditioning, optimizing lab exhaust through experimental wind tunnel testing and employing other energy-conscious construction methods, the building has an “energy performance 30 percent beyond code requirements,” according to Vann. Over 20 percent of the building’s materials are from regional sources and over 20 percent are from recycled sources. A semi-permeable continuous air barrier will reduce the building’s moisture intake while insulation, sun shading devices and a solar reflectance “cool roof” will reduce heat intake.

The construction of the new building is also being used as a learning experience. Skanska USA is providing class and student group construction tours of the site until summer 2020. Even years before its opening, the building is offering students a real-world view on infrastructure, sustainability, systems and construction engineering. Undoubtedly, when it opens for classes in January 2021, the new engineering building will promote the upward trajectory of the Pratt School of Engineering, a school on the rise.

Jade Grimes is a sophomore pursuing a double major in civil engineering and environmental science with a certificate in architectural engineering.
Tiny Organisms, Huge Possibilities

Researchers across Duke University are working to harness the power of microbiomes in many different arenas

As the global population rises, laboratories across the world are working to develop methods to reduce human impact on the environment. At Duke University, Claudia Gunsch, the Theodore Kennedy Associate Professor of Civil and Environmental Engineering and director of IBIEM (Integrative Bioinformatics for Investigating and Engineering Microbiomes), an interdisciplinary graduate training program, currently leads cutting-edge research in laboratories before dedicating her time to studying pollutant-degrading microbes as a graduate researcher.

In Gunsch’s laboratories today, graduate and undergraduate students sequence microbe genomes and modify them by transferring useful genes to other species already thriving in target habitats. By finding ways to stimulate the desired species’ activities, it is possible to increase their rates of bioremediation—the process of using living organisms to neutralize or remove contaminants from a certain environment.

The researchers are also trying to understand how microbes collaborate, which could explain beneficial and harmful adaptations, such as antibiotic resistance. Because the surge in antibiotic-resistant bacteria has resulted in illnesses that are untreatable with available resources, this is one of the most urgent threats to public health.

After decades of studying microbiomes—highly structured communities of microorganisms—Gunsch demonstrates optimism for the future of her field by saying, "In the past, I would take two years or more to identify a single gene related to the degradation of a pollutant. Now, with new technology available such as machine learning and computation, scientists are able to work at a much faster pace.”

Other researchers at Duke University are studying microbiomes to improve people’s lives and the environment. For example, Lawrence David, assistant professor of molecular genetics and microbiology in the Duke Center for Genomic and Computational Biology, guides a research group that...
focuses on understanding how diet can be used to shape human-associated microbial communities.

To pursue their nutrition work, David’s research group combines device development, microbial ecology, gene sequencing and computational analysis. His group is currently exploring the effects of over-the-counter nutritional supplements in both health and disease.

Another example of Duke researchers working with microbiomes is Adela Rambi Cardones, associate professor of dermatology at the Duke University School of Medicine, who leads a research group that is interested in understanding how alterations in cutaneous microbial flora and the associated human immune response promotes autoimmune disorders.

When people restrict their thoughts on microorganisms to the human variety, they forget about the fascinating and complex environmental microbiomes located everywhere from the soil to the air to a table surface. Researchers at Duke University aspire to gain a better understanding of both environmental and human microbiomes, like how they interact, what controls them and what they affect. This could lead to impressive outcomes and discoveries.

Ana Luiza Mees is a first-year student expecting to double major in electrical and computer engineering and computer science.
Improving Patient Outcomes by Analyzing Wearable Data

MEDx Investigator Jessilyn Dunn brings a fresh perspective on big data and wearable technology to Duke’s growing network of engineering and medical collaborations

Over the past few years, Duke University has launched an interdisciplinary initiative to strengthen research and innovation in the realms of data science, engineering and medicine. MEDx (Medicine and Engineering at Duke, https://medx.duke.edu/), a collaboration between the Pratt School of Engineering and School of Medicine begun in summer 2015, promotes the exchange of ideas between doctors, engineers, researchers and innovators. Through interdisciplinary programs, MEDx hopes to stimulate the development of new therapies, diagnostics, devices and educational opportunities in order to accelerate science and its translation to clinical practice to improve patient care.

The effort is already bearing fruit, as Duke has proudly made advancements in health informatics, drug and device innovation, tissue and genetic engineering, reverse-engineering the brain, and basic science fields. One of the primary areas of growth has been driven by new biomedical imaging and sensing technologies that generate new data for electronic health records and beyond. By studying these topics, students and faculty seek to develop innovative data science, machine learning and digital health modeling approaches to improve biomedical data analytics and patient care.

To build on its leadership in this arena, Duke University’s Departments of Biomedical Engineering and Biostatistics and Bioinformatics welcomed Jessilyn Dunn as a new faculty member and MEDx investigator (with appointments in both engineering and medicine) in January 2019. Dunn served as a postdoctoral fellow at Stanford University, obtained a PhD in biomedical engineering from Georgia Tech and Emory University, and graduated from Johns Hopkins University with a BSE in biomedical engineering. In previous work, Dunn has conducted research in multi-modal biomedical data integration with the goal of improving personalized medicine.

Each year, MEDx works alongside departments in both the School of Medicine and Pratt School of Engineering to award grants to support pilot projects. This year, one of the winning projects is spearheaded by Dunn and Mark Feinglos, professor of medicine and associate professor of psychiatry and behavior sciences and pathology. Together, the two are examining digital biomarkers of pre-diabetes and glycemic variability. The project coincides with Dunn’s research on multi-omic biomolecular data sets, which include genomics, epigenomics, proteomics and metabolomics.

In addition to her MEDx project, Dunn plans to continue her research in biomedical engineering. “We are developing a comprehensive infrastructure for personalized risk classification and tailored, remote intervention strategies.”
big data at Duke, with a focus on studying the information stored in consumer wearable devices to gain insights into patient health.

As medical technology becomes more accessible to patients outside the clinic—as well as more more ubiquitous and consumer friendly—Dunn has learned to take advantage of such technologies. She has studied data collected from wearable devices like Apple Watches and Fitbits with the intention of using the data to make general predictions on patient conditions that can be applied to larger patient populations and improve future patient care.

Many wearable devices on the market today collect data on users’ daily activity, sleep patterns, workout habits and basic conditions like heart rate and body temperature. “Most of life occurs outside of the clinic, and by analyzing the data recorded by these wearable devices, we can capture patient health outside of the clinic,” Dunn explained.

Dunn hopes to collect information that is clinically actionable from the wearable devices, like the users’ heart rate, physical activity, temperature, electrodermal activity and location, to make general predictions on patient health. “We can use the data to make a prediction that someone is deteriorating in some area based on the data we can collect from their watch,” Dunn said.

Dunn’s research is not case specific, and she hopes to apply large-scale data science principles on data collected from wearable devices to broader populations. “Instead of focusing on developing more complex sensors, we hope to understand what more basic sensors can accomplish and translate the things that we learn from individual patients to a broader population as well as make predictions about future health events,” Dunn added.

Dunn’s research is focused on studying data collected from wearable devices to make improvements in treating patients with cardiometabolic disease. Cardiometabolic diseases, which are combinations of cardiovascular diseases, like heart disease, and metabolic conditions, such as diabetes, are epidemics across the country.

As Dunn joins Duke, she looks forward to working with patients, physicians and researchers who may benefit and contribute to her research, saying, “We are developing a comprehensive infrastructure for personalized risk classification and tailored, remote intervention strategies.”

In the coming months, Dunn is looking forward to taking advantage of Duke’s “state-of-the-art medical facilities, data science and localization to the Southeast.” Through Duke’s cross-campus initiatives to integrate biomedical engineering and medical research, she is confident that her research will accelerate through collaborations with MEDx and other research and clinical groups on campus.

As Dunn prepares to join the Duke family, she says she is “most looking forward to getting involved with both the Duke and surrounding community and building an impactful translational research program.”

Diane Chernoff is a first-year Pratt student planning to major in biomedical engineering from New York.
Emerging Leaders at the Intersection of Engineering and Entrepreneurship

The new A. James Clark Scholars Program at Duke selects 10 incoming students each year for a demanding yet rewarding curriculum focused on leadership, service, and business and entrepreneurship.

Duke University received $15 million from the A. James & Alice B. Clark Foundation to establish a new program focused on leadership, service, business and entrepreneurship at the Pratt School of Engineering. This endowment is the single largest gift to Duke Engineering for an undergraduate scholarship program. Ravi V. Bellamkonda, Vinik Dean of Engineering at Duke, supports the view of the Clark Foundation, remarking that, “Technology is profoundly changing the world, and engineering leaders with business savvy and entrepreneurial mindsets will undoubtedly shape our future.”

The A. James Clark Scholars Program is a signature component of Duke Engineering’s initiative to encourage an entrepreneurial mindset among all its undergraduate students. Ten promising students will be selected each year based on financial need, academic accomplishments, engagement in engineering and leadership skills. Throughout their undergraduate experience, each Clark Scholar will receive financial support to help offset loans, work-study and summer requirements. This will allow them time and freedom to participate in unpaid service, extracurricular activities, internships and the creation of their own startup. They will receive one-on-one mentorship, access to business courses and leadership training, and a focused summer program in entrepreneurship and management.

The First Class of Clark Scholars Arriving on campus for a full pre-orientation week, the Clark Scholars began the Duke experience with workshops on learning and practicing resiliency, a necessary skill for both engineering and entrepreneurial ventures. Training continued with team-bonding exercises and personality tests, helping the students to become aware of the strengths that they can apply when working in team environments.

“College is a time for personal growth and development—practicing the resiliency lessons we learned really helps. These are some of my best friends now. We eat together, we study together, we hang out together; it’s everything I could’ve imagined,” said Filip Bartel, one of the inaugural Clark Scholars.

The students unanimously agreed the first week was an amazing opportunity, making them feel like a family and setting the stage for a great college experience.

Bill Walker, the Mattson Family Director of Entrepreneurship at Duke Engineering, and Steven McClelland, executive-in-residence in the Pratt School of Engineering, are leading this initiative as part of their involvement in all of Duke’s entrepreneurial engineering efforts. Alumni of Duke Engineering themselves, they...
The inaugural cohort of 10 Clark Scholars handpicked from six separate states across the country.

possess over 40 combined years of work experience in technology companies. They maintain a mindset of creating leaders who transform and better the lives of others.

“They’re approachable, caring, knowledgeable and intelligent. There aren’t enough positive adjectives to describe them,” said Clark Scholar Hosam Tagel-Din.

The Clark Scholars Program honors the values of A. James Clark, a successful engineer, businessman and philanthropist. Duke University joins the Clark Scholars network including The George Washington University, Georgia Tech, Johns Hopkins University, The University of Maryland, University of Pennsylvania, Stevens Institute of Technology, Vanderbilt University, The University of Virginia and Virginia Tech.

“We are honored to partner with Duke University to establish the Clark Scholars Program as part of our commitment to building the pipeline of future engineers,” said Joe Del Guercio, president and CEO of the A. James & Alice B. Clark Foundation.

Duke alumna Courtney Clark Pastrick ’77, board chairman of the A. James & Alice B. Clark Foundation, noted that she is particularly proud to have Duke University become a member of the Clark Scholars network.

“My dad always talked about the transformative impact a scholarship had on his life. At the Foundation, we want to ensure that generations of students are not limited by their financial status but propelled by their potential and promise,” she said.

The cohort will begin their first community service project together in the spring. With their newly formed network and connections at Duke, they plan to inspire others to give back.

“These students truly embody Duke’s ‘outrageous ambitions’ to take on humanity’s greatest challenges, and we are excited to welcome them to Duke and to the Pratt School of Engineering,” Bellamkonda concluded.

Scholar bios can be found at clarkscholars.duke.edu/scholars. Visit the A. James & Alice B. Clark Foundation at clarkfoundationdc.org.

Philip Liu is a first-year student double majoring in mechanical engineering and economics.
Solving Imposter Syndrome Through Community-Building and Interdisciplinary Work

Shaundra Daily joins the Pratt School of Engineering faculty devoting her time to developing community through Duke Technology Scholars and beyond.

Shaundra Daily has joined Duke University as a professor of the practice in electrical and computer engineering and computer science. She is also a core faculty member in Innovation & Entrepreneurship and faculty director of Duke Technology Scholars. Outside of teaching, she is a co-founder and creative director of DEEP Designs, LLC. Daily received her undergraduate degree in electrical engineering from Florida State University, and her Master's and PhD in media arts and sciences from the Massachusetts Institute of Technology.

Daily began her engineering career as a means to an end; her goal was to get a job at the CIA. She had a budding interest in investigative work, and her decision to pursue engineering was rooted in a desire to be a good CIA candidate.

As she progressed in her undergraduate career, however, she developed a passion for electrical engineering. Daily continuously exceeded expectations, and one of her professors took note, approaching her about pursuing a PhD. Though Daily was hesitant at first and hadn't imagined pursuing a PhD, she abandoned her plan of working for the CIA. She entered an electrical engineering doctoral program at Florida Agricultural and Mechanical University (FAMU) and spent time researching topics from solar power to biomimetics, but eventually discovered her calling in education innovation.

While at FAMU, she designed and executed a curriculum for a National Society of Black Engineers program called Technical Outreach Community Help (T.O.R.C.H.). It was here that she discovered her talent for creating lesson plans and a particular interest in pedagogy. This experience led her to reevaluate the focus of her PhD.

Daily decided she wanted to explore the intersection of electrical engineering and pedagogy. When faced with barriers to pursuing this at FAMU, she finished a masters in electrical engineering and opted to apply elsewhere, landing at the Massachusetts In-
DTech Scholars participants and leaders gather together during an event featuring a visit by Eddie Cue, a Duke alum and Apple’s senior vice president of internet software and services.

DTech Scholars par-

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services.

stitute of Technology Media Lab in 2003 to complete her doctorate. At MIT, she focused on implementations for affective computing in educational technology and thrived in the Media Lab by exploring the often-untapped potential in interdisciplinary, creative work in engineering.

Daily went on to co-found a company focused on bringing others’ ideas to reality. Although she enjoyed the experience, Daily recalls that “there was something missing.” Subsequently, Daily was offered a position at Clemson University as an associate professor, which she viewed as the perfect fusion of self-agency and stability. It was a welcome change for the single mother of two.

Daily compares being a professor to being an entrepreneur, saying, “I’m able to choose my own problems and go after funding to support my ideas. I set my own hours…for the most part. The big difference is somebody else is paying my salary.”

“When you talk to other people, you realize you’re not the only one dealing with particular challenges.”

come change for the single mother of two. Daily compares being a professor to being an entrepreneur, saying, “I’m able to choose my own problems and go after funding to support my ideas. I set my own hours…for the most part. The big difference is somebody else is paying my salary.”

While at Clemson, the project Daily designates as her proudest professional achievement came to fruition. A juncture of her interests in affective computing and teaching, Virtual Environment Interactions (VEnvI) is a software that melds choreography with computational concept education.

To develop this software, Daily drew on her gymnastics and dance background. The software was aimed at engaging middle school girls in a programming curriculum by demonstrating that computing can center around creative and expressive potential.

When asked about her thoughts on the stereotype of engineers as one-dimensional, Daily replied, “I think that engineering gets overlooked for the creative activity it is. Yes, there’s a lot of math and science, but have you seen how beautiful engineering creations can be? Or thought about the creativity it takes to design mechanisms that operate everyday objects?”

Daily firmly believes that keeping her artistic side active throughout her college career and beyond has bolstered her career by giving her a unique skillset. While she acknowledges that the skillset she possesses may not give her the same technical know-how as her more specialized colleagues, she is more than okay with the tradeoff.

“I can understand why students feel a pressure to fill their resumes with the latest technical skills,” said Daily. “But my best interview conversations and most notable projects have come from allowing all the parts of my personality to shine through.”

As Daily headed for increasingly administrative roles, she was offered a position at
DTech Scholars spend time together during their summer internship programs in Silicon Valley, Chicago and RTP while taking advantage of opportunities to visit local tech firms and learn from mentors.

Duke that provided what she terms a “return to what she enjoys...teaching.” Here, Daily teaches two introductory engineering classes as well as a higher-level class, Special Projects in Electrical and Computer Engineering.

When she’s not teaching, Daily advocates for students to be both technically savvy and multi-dimensional. She encourages her students to proudly interweave their unique talents and diverse backgrounds with their technological endeavors and to create inclusive communities.

Her primary channel for these beliefs is Duke Technology Scholars (D'Tech), a partnership between Duke’s Trinity College of Arts & Sciences Computer Science Department and the Pratt School of Engineering’s Electrical & Computer Engineering Department. Daily explains, “D'Tech is a comprehensive effort to inspire a more diverse group of Duke undergraduates to choose careers in computer science and electrical and computer engineering. The D'Tech program centers around the idea that relationships, mentorship and hands-on experience make the difference in recruiting and retaining diverse individuals in technology fields.”

Through the program, Daily works with executive director Monica Jenkins and staff to mitigate the feelings that accompany imposter syndrome. To her, “The biggest thing about D'Tech is that the students have been able to create community with each other. When you talk to other people, you realize you’re not the only one dealing with particular challenges.”
It is Daily’s firm belief that this open communication among students within close-knit communities can alleviate imposter syndrome because, as she says, “In a community where you can be transparent and vulnerable, you get to learn it’s not just you feeling that way.”

Daily hopes the D'Tech model of community building will extend beyond its current participants and that the propagation of such communities across campus will instill a sense of belonging among all students. And perhaps, by creating the right environments for students, the prevalence of imposter syndrome will begin to fade.

Nami Reddy is a junior double-majoring in biomedical engineering and computer science with a minor in computational biology and bioinformatics.
Piloting Project Edge for First-Year Students

New program Project Edge looks to introduce first-year students to Duke and entrepreneurship before classes even begin.

Who would want to give up a week of their summer and go to school early? Despite confusing many of their peers, there’s no shortage of first-year students who choose to come to Duke a week early to participate in pre-orientation programs designed to acclimate first-year students to college. This year was the first for the pre-orientation program called Project Edge.

Project Edge is a week-long program led by returning students staff that exposes first-year students to innovation, entrepreneurship and practical design. It helps them get to know people at Duke, become aware of the professional business and entrepreneurship resources available on and off campus, and learn skills and processes important to innovation.

A typical day of the program starts with a group lecture at the Bullpen, an extension of Duke’s campus in downtown Durham, where an entrepreneur, professor, former student or other professional speaks to the students about business and entrepreneurship. Following the presentation, the group has lunch and works on a team project.

At the beginning of the week, the students are split into teams of three with one upper-classman mentor. Each team is tasked with creating a business to address an issue affecting Duke. Some of the issues this year included connecting Duke students to the city of Durham, reducing the amount of food waste on Duke’s campus, and increasing voter participation among Duke students.

To help connect Duke students to Durham, one team designed a Google Chrome extension that gives students access to more information about what events are going on in the city and how they can participate. Another team came up with the idea of creating an app that would reduce the amount of food waste on Duke’s campus. The app would be attached to the students’ Duke Hub and help students earn extra food points as part of a reward program every time they did not waste food. Another team also designed an app to increase voter participation among Duke students.

Jonathan Riley, a first-year member of this team, explained that the whole thought process behind this app was “to make the very complicated process of registering and voting easier for the Duke student.” First, the user would choose where they wanted to vote, then the app would lead them to either the voter application for North Carolina or the absentee ballot form of their state of choice.
The app would also clearly show all of the deadlines to ensure no confusion. There was also an incentive associated with the app: the more times you voted or shared the app with other people, the more points you earned, which could be redeemed at local stores.

Besides the smaller team-based groups, there were also larger social groups within the program composed of eight students and four leaders. This created a sense of community within the program and allowed everyone to get to know each other very well.

Throughout the program, first-year student Megan Wang learned a variety of skills including “team-building skills, prototyping skills and 3D printing.” Meanwhile, Kassen Qian discovered that “entrepreneur-
ship is a process—it is about putting in the work and having dedication.”

Being able to see the workspaces of different startups and talk with entrepreneurs about their careers gives students insights into the qualities necessary to be an entrepreneur. Since the program was in its pilot year this summer, it was not perfect, but Kassen Qian felt that it was even better that way, since “entrepreneurship is all about adapting to the current situation.” The pilot status of the program also meant that there were only 20 first-year participants. In the future, hopefully many more students will have the opportunity to participate in Project Edge.

Caroline Salzman is a first-year student majoring in biomedical engineering.

Learn more about pre-orientation programs at Duke at: studentaffairs.duke.edu/new-students/preorientation-programs
An Enterprising Program for Design Education Students

The new Duke Design Health Fellows program connects the engineering classroom to biomedical commercialization.

The new Duke Design Health Fellows Program exposes students to the biomedical engineering commercialization process. Comprising clinical fellows from the School of Medicine, professional students from the Fuqua School of Business, and graduates and undergraduates from Duke Engineering, the interdisciplinary program takes an integrated look at innovation. The multi-school partnership exposes Design Health Fellows to copious and impactful opportunities to revolutionize digital health and medical devices through design. It also connects students to the enterprising networks needed to foster an impact through medicine.

Although this is the program’s pilot year, Eric Richardson, associate professor of the practice in biomedical engineering, notes that the program has received “overwhelming support and mentorship from the Duke community, the Duke Clinical Research Institute and the broader entrepreneurial community in Durham.”

The program’s immediate success is in part because of its dedicated leadership. Pioneered by Richardson and Joe Knight, adjunct professor of biomedical engineering, who quickly added Paul Fearis, senior lecturing fellow and director of designs and insights, the program could not have more innovative directors. A veteran in biomedical design, Richardson recently transitioned to Duke from Rice University, where he was the founding director of the Global Medical Innovation Program, a program similar to the Design Health Fellows but focused on global emerging markets. Richardson was also the associate director of the Texas Medical Center Biodesign Fellowship, which connected scholars to a comprehensive venture formation curriculum with the goal of developing medical device startups.

An innovator himself, Richardson previously served as a principal research and development engineer at Medtronic and developed a transcatheter heart valve—a product that currently serves over 100,000 patients. Coupled with Richardson’s demonstrated entrepreneurial spirit, Knight is currently a core faculty member in the Duke Innovation & Entrepreneurship Initiative as well as the CEO of InnAVasc Medical, a company started at Duke which designs and develops products for vascular access for hemodialysis. And Fearis recently joined Pratt after 30 years in the medical device design industry and a pivotal teaching role in the Center for Bio-
Through mobilizing partnerships with the Duke Heart Center and the Duke Clinical Research Institute, Design Health Fellows are exposed to numerous resources to develop their products. Above, a team of Design Health Fellows work with a circuit board in a design lab in the Chesterfield.

“They have visited the heart failure clinic and talked to patients, observed surgical cases in the operating room, and seen interventional procedures in the catheterization lab.”

Richardson explains that instead of having students solve predefined problems, the program allows students to actively identify, validate and prioritize problems that have an impact on human health.

Beginning in September of every year, the competitive partnership is a nine-month program in which fellows are exposed to clinical environments and use structured ethnography tools to collect unmet needs. Fellows then screen, prototype and analyze hundreds of these needs using a system of market analyses, intellectual property assessments and other tools to transition to an entrepreneurial concept. The team then develops business, regulatory, reimbursement, clinical and manufacturing plans to deploy a polished product and business model that they can choose to take to market.

The program’s encouragement of diverse, dynamic partnerships complements other biomedical design and Pratt opportunities.

This year’s fellows decided to focus on peripheral artery disease and heart failure. Richardson adds that the two teams of fellows, still in the development phase, have
been deeply immersed within clinical environments. To further develop their identified unmet needs (and hopefully impacted fields), Richardson said, “They have visited the heart failure clinic and talked to patients, observed surgical cases in the operating room, and seen interventional procedures in the catheterization lab.” The teams will be presenting their top three needs to the dean of Duke Engineering and Duke University Hospital’s chief of cardiology and chair of surgery.

While he makes it clear that “the current teams have met and exceeded our expectations,” Richardson hopes to add to and improve the pilot program for the next iteration of students. Richardson elaborates that this year, the partnership, which aligns with other dedicated enterprises in which he has invested his time, is a “highly talented team of people with a mix of engineering, clinical, and business training and experience. It’s this diversity that makes working with them so much fun.”

Jackson McNabb is a first-year student interested in electrical/computer and biomedical engineering.
Pratt in Costa Rica

Despite long, intense classes, the engineering-focused Pratt in Costa Rica study away class offers students a whole new world of learning opportunities.

Pratt in Costa Rica is one of several study abroad options for engineering students. What’s special about this program is that it allows students who cannot fit an entire semester abroad into their academic schedule the opportunity to experience learning in a different setting and culture. Students have two course options. The first is a combination of Math 353A (Ordinary and Partial Differential Equations) and Spanish 92A (Culture and Language in Costa Rica), while the second includes BME 271A (Signals and Systems) and Spanish 92A.

Last summer, the students’ days started with three hours of Spanish class in the mornings from Monday to Thursday, with students placed into beginner, intermediate, advanced or native Spanish sections. With fewer than five people in each class, the students were able to learn and practice more Spanish within a shorter period of time. Topics covered included common conversational phrases and vocabulary pertinent to simple tasks like ordering food and giving directions to drivers.

In her experience last summer, participant Emilia Grzesiak felt that the program helped her become more comfortable conversing with her
host mother, who was only able to communicate in Spanish. For Libby Bucholz, assistant professor of the practice of biomedical engineering and the instructor for BME 271A, it was an opportunity to delve past simple vocabulary in her Advanced Spanish class and explore Costa Rican culture and history.

One aspect of Costa Rican culture that fascinates Bucholz is the annual pilgrimage of millions of citizens to the sacred stone of La Negrita (the Patron Saint of Costa Rica) in San José, an event she was able to witness in person during Pratt in Costa Rica. The millions of worshippers, each hoping to be cured of their illnesses and problems by La Negrita, are led by a priest in a large celebration after the pilgrimage. They leave behind a shrine of millions of tokens representing wishes they hope La Negrita can grant.

After Spanish class and a 90-minute lunch break, students continued to their technical classes. These took on a different structure from similar classes offered during the academic year. Students stayed in their engineering or math class for three hours in the afternoon from Monday to Thursday.

Grzesiak explains that even though students would learn a week’s worth of material per class, they didn’t feel as rushed as during the year since more time was being spent in class. And because Bucholz was able to spend so much time with the same seven students each day, she was able to understand each student’s learning habits better than she could during the school year. The longer instruction time also allowed Bucholz the opportunity to work closely with the students on problem sets and MATLAB assignments, further reinforcing information taught in lecture during these “built-in office hours.” These three-hour classes were by no means endured without any frustration; however, being able to share the sense of accomplishment with her students after working out problems with them is what made the long classes valuable.

Following technical class, students took a break from their studies by attending cultural classes like salsa lessons and cooking classes. After all of the day’s classes were over, students typically convened at a coffee shop close to campus to study for the remainder of the day before heading home to their host families.

At the end of the program, the students worked on a MATLAB project, implementing tools they had learned throughout the summer in a real-world application. The math class made a project out of their trip to a natural reserve, where they were able to take frequency information from several suspension bridges and model a bridge’s oscillations in both damped and undamped conditions. The signals and systems class made a project out of their trip to Monte Verde, where they used a spectrogram to make “fingerprints” for various bird sounds, utilizing MATLAB to correlate with the spectrograms and properly identify bird calls. Bucholz expressed pride in her students for going from very little MATLAB experience to mastering MATLAB in a real-world application.

Having four days of classes left the students three days each week to explore Costa Rica. They participated in planned excursions, including opportunities to explore the city of San José, tour a coffee plantation, visit Irazu volcano and visit the cloud forest Monte Verde, described by Bucholz as “probably the most beautiful place I’ve ever been.” Additional trips planned by the students included visits to Montezuma Waterfall, Manuel Antonio National Park and a chocolate plantation.

Bucholz emphasizes how grateful she was for the opportunity to spend time with her students outside of the classroom setting. In experiencing a good balance of academics and adventure with the students, she saw students grow and find their voice both inside and outside the classroom.

Sabrina Qi is a junior majoring in biomedical engineering and minoring in global health.
The Duke Electric Vehicles team broke the Guinness World Record for most fuel-efficient vehicle in history. Duke Electric Vehicles (DEV), a student-run organization, accomplished this feat at Galot Motorsports in Benson, North Carolina on July 21, 2018.

It is impressive how, despite the demands of being a Duke Engineering student, these students were able to accomplish such an achievement. But when you look closer, they used a simple recipe; the students had a goal and followed a timeline to meet that goal.

The fall semester for DEV is typically used for strategizing, design conceptualization and training new members. The spring semester is used for manufacturing parts, testing and competitions. DEV initially planned to break the world record at the Shell Eco-Marathon, which they compete in annually in the spring. However, the club members discovered that the magnitude of what they were trying to accomplish warranted more time, so a few students worked on the vehicle all summer until they were able to attain their goal of breaking the world record in July.

The members of DEV faced many challenges in the process. The team needed to adjust to implement the fuel cell, which was new this past year and therefore unfamiliar, even to members who had been on the team for years. DEV president Gerry Chen said,
“We only had a year to work with the fuel cell, whereas the rest of the parts of the car had been worked on for about seven years.”

Even with many challenges, members of DEV believe key characteristics of the team set them apart from other teams and made it possible for them to achieve the world record. Co-president Shomik Verma noted, “Our team members with vast experience with electronics definitely set us apart.” Chen emphasized that all team members were able to test each component and figure out how to optimize it to create the best overall product, which made DEV’s vehicle that much better than everyone else’s.

Student groups at Duke can have far-reaching impacts, both inside and outside the Duke community. The impacts are most profound upon the members of the groups. DEV certainly requires team members who are dedicated to working through a product from start to finish and not giving up until it is done.

The impacts of this impeccable work ethic are far-reaching. When asked how DEV added to his Duke experience, Verma replied, “DEV helped me build confidence in my design decisions.” He continued by expressing that classes ordinarily give specific problems that have one correct answer, while at DEV, students are tasked with choosing from an infinite number of ways to solve a large problem.

Being able to collaborate with a team and work through making real decisions to meet design constraints helped Verma and other students on the team become comfortable and confident in their decisions—a skill that can be translated to most jobs in the real world. Beyond impacts on the team members, DEV is also reaching out to local high schools to help them with their electronics.

Now that DEV has broken the world record for being the most fuel-efficient vehicle, what’s next? The team hopes to create a fully battery-powered vehicle, which would mean breaking yet another world record. They also intend to go a step farther, hoping to eventually make their vehicle autonomous and be able to drive more efficiently that any human could. It seems that there’s much in store for DEV and hopefully they’ll be breaking world records for years to come.

Nimisha Pant is a sophomore studying mechanical engineering at Duke.
Saving the World One Toy at a Time
Despite the intense intellectual demands of an engineering degree, some diligent and community-minded Pratt students have found the time to give back to the city of Durham in a creative and unique way. Project Tadpole is a club built around applying engineering skills to modify toys for the benefit of disabled children.

The engineering gurus of Project Tadpole partner with local organizations such as the Durham Public Schools or the Lenox Baker Children’s Hospital to upgrade toys. These toys have various sources and applications—some originate directly from retailers while others are specialized tools used by learning specialists or medical personnel.

However, the members of the club know it won’t stop there. The club envisions a future in which they can supply the knowledge necessary to make toys accessible for the disabled to anybody with the desire to contribute by means of both live and video tutorials. They have successfully conducted events in the past to teach local community members skills like soldering wires or how specific modifications can make a toy accessible. They are also in the midst of recording new video tutorials as part of a more global outreach process.

Project Tadpole is striving to provide access to skills typically cultivated at higher-education institutions to the general public in a similar manner to the extensive knowledge given through nonprofit organizations like the well-known Khan Academy. “Next, we hope to reach even greater audiences, so that if someone from Texas was interested in modifying toys for their kids, they could go to our website and follow our video tutorials,” says current club co-president Martin Li.

A club with such a unique purpose is sure to have an equally unique culture. Working out of the “sub-basement” of the Teer Engineering Building, as many as 15 members of Project Tadpole come together each week to build toys while enjoying each other’s company and the harmony of a common goal.

“I joined Project Tadpole because one of my good friends told me to check it out with them. It was pretty fun taking apart things and putting them back together, so I just ended up going back again and again,” explained Li, further emphasizing the duality of the club’s laid-back nature and the determined focus of its members to give back to the community. The culture of Project Tadpole is healthily distributed between these two aspects, simultaneously nurturing its members’ skills as they learn how to contribute to its projects while allowing them to step outside of the surrounding high-pressure academic environment.

Despite all these amazing declarations, one may still be left wondering, “But aren’t there a proliferation of other clubs that perform the same functions at a university like Duke?” Project Tadpole begs to differ—when asked about what distinguished Project Tadpole from other engineering clubs at Duke, Li was quick to respond.

“Project Tadpole aims to improve the local community. In contrast to other engineering clubs which often revolve around an internal project of building a prototype or a product, our product is more of a service to the community,” said Li. “We’re able to help improve the lives of other people and are constantly trying to come up with new ways to do so.”

Wish the members of this club luck as they ambitiously reach out further into the Durham community and beyond—to Texas, new countries and even new continents as they aspire to continue improving the quality of life and fun that disabled children are able to experience as they grow up. And while you’re at it, maybe the audacious creativity behind Project Tadpole will give you your own inspiration to see how your skills could benefit the greater community and provide to those in need.

Ryan Piersma is a junior studying electrical engineering and computer science.
AcrosS the Harrington Quad

Growing Student Group Promotes Drones Across Campus

Students founded a new chapter of the Academy of Model Aeronautics in response to a growing interest in drones among the student body.

In recent years, the development and use of unmanned aerial systems (UAS) has skyrocketed. Commonly known as drones, these systems have wide-ranging applications from exploration and research to art and recreation. The Duke Academy of Model Aeronautics (AMA) was founded in April 2018 in response to this growing interest in drones among the student body.

As a chapter of the national AMA organization and the only student organization dedicated to promoting drone technology on Duke’s campus, Duke AMA seeks to create a space for students to explore drones and their potential applications. This includes advocating for safety while operating drones, as well as teaching students how to design and build these unmanned systems.

The original motivation for Duke AMA stemmed from work by Duke’s team in the Shell Ocean Discovery XPRIZE competition, a program aimed at advancing the development of robotic technologies in deep-sea research. As part of the Ocean Engineering and Robotics class led by Martin Brooke, associate professor of electrical and computer engineering, the competition required a team of students from the Pratt School of Engineering to develop an 18-motor heavy-lift drone that was capable of carrying sensors to map the ocean floor.

Through that effort, team members and engineering students Virginia Pan and Yao Yuan saw great potential in exploring drone technology and a demand for a drone-focused campus organization. As a result, they launched Duke AMA with Brooke as their faculty advisor to bring attention to drones across Duke’s campus.

A Better Drone Policy

Duke AMA’s current work seeks to reform Duke’s campus drone policy, which the organization considers to be too limiting. Other than two designated flight sites in the Duke Forest, drone use on campus requires special approval from the Duke Drone Committee, and hobbyist use is generally prohibited. Consequently, Duke AMA has been pushing for changes including a well-defined safety code that would offer students more freedom to fly drones on campus while still maintaining the necessary regulations.

As part of its goal to improve drone safety and accessibility, Duke AMA also provides all of its members with liability insurance for piloting drones. The group has also established an indoor flight space in The Foundry, a makerspace in the basement of Gross Hall.
Top view of the heavy-lift drone platform developed for Duke's entry in the Shell Ocean Discovery XPRIZE Competition.

Even students with minimal piloting experience are able to fly small-scale drones there with the protection of safety nets.

**Sky-High Projects**
Duke AMA also facilitates the development of new applications for drones by funding student projects. Virginia Pan, the president of the organization, says, “The aim is to inspire students to come up with their own project ideas.”

One project spearheaded by a Duke AMA team is developing a low-cost firefighting surveillance drone equipped with thermal imaging technology. They hope to make the use of drones in firefighting operations more cost-efficient, accessible and widely available. They are experimenting with a quadcopter platform and are planning to implement the technology at larger scales that may be better suited for longer-range applications, such as forest fires.

Meanwhile, another team of students is in the initial stages of designing a drone powered by a novel power source—hydrogen. Currently, drones are typically powered by lithium polymer (LiPo) batteries. Because LiPo batteries have low energy density, and the power required by drones increases steeply as weight is added, adding more batteries doesn’t necessarily result in longer flight times.

The team is investigating the practicality of hydrogen (with a hundredfold increase in energy density compared to LiPo batteries) as an energy source to power drones. They wish to build one of the first hydrogen drone prototypes in existence and gather experimental data for analysis.

**Not Just for Engineers**
For Pratt’s students, Duke AMA provides an opportunity to gain hands-on, real-world experience while working with some of the latest technologies, including autonomous flight and artificial intelligence. “It’s a great way to practice what you learn,” says Yao Yuan, vice president of Duke AMA.

Because the group isn't focused on competing in one single competition, students devel-
oping projects have increased flexibility and resources. “We give members as much freedom as possible to pursue their own interests. If you have any drone idea, we aim to help you,” Yuan adds.

As projects become increasingly multidisciplinary, however, Duke AMA is seeking non-engineering students from across the university as well. It has plans to collaborate in the future with the Nicholas School of the Environment, Innovation Co-Lab and Duke Photography Club for drone applications around campus.

**Future of Drones at Duke**

Besides teaching more students about drone safety, advocating for changes to campus drone policy and providing piloting training, Duke AMA hopes to expand its horizons with more projects and get even more students involved. With planned projects to optimize wing shape design for fixed-wing aircraft and build 360-degree drone cameras, the future of drones at Duke looks promising.

Alex Xu is a first-year student intending to major in electrical and computer engineering. He is passionate about aerospace, robotics and photography.
1970s
General Gilmary Hostage III E’77 returned to campus to receive the Air Force ROTC Distinguished Alumni Award.

1980s
J. Jon Brophy E’82 through work at Cincinnati Children’s Hospital, helped to launch two medical device companies in 2017-18.

Henry M. Quillian III E’85 was named president of the Foundation of the Federal Bar Association.

1990s
Randal C. Jones E’92, former Duke football player, is in the Duke Athletics Hall of Fame Class of 2018.

Terry J. Myerson E’77, G’92 is joining Madrona Venture Group and The Carlyle Group.

Andrew J. Armstrong E’96, S’15 was promoted to full professor of medicine at Duke University where he runs a laboratory funded by the National Institutes of Health and Department of Defense dedicated to understanding prostate cancer and treatment resistance, metastasis. With over 150 publications, he has led research in clinical trials and biomarker studies that have led to improved survival of men with advanced prostate cancer. He was recently awarded his first NIH R01 grant to understand immune evasion in prostate cancer. He collaborated with Tony Huang, PhD (ME/BME), at Duke on the acoustic separation of circulatory tumor cells in prostate cancer, which should enable precision medicine approaches in this disease. He has served on the Duke community (IRB, career protocol committee, fellowship committee, molecular medicine scholar program) for 12 years now.

Sanyin Siang-Miller E’96, B’02 was named one of the LinkedIn Top Voices 2018: Influencers.

Robert C. Sprague E’96 is treasurer-elect for Ohio State.

2000s
Lisa R. Betz E’02, associate and senior project manager at Dewberry, a privately held professional services firm, has been recognized by Engineering News-Record magazine as a Mid-Atlantic “Top Young Professional” for 2018. The awards program honors professionals who have built extraordinary industry portfolios early in their careers, many of whom donate time and expertise to serve their communities. The award recipients were profiled in the February issue of ENR Mid-Atlantic. Betz has been in the industry for more than 15 years. She is an experienced site/civil project manager focused on total project consulting for multidiscipline, land-based projects including residential, commercial and institutional developments. She is currently involved in the ongoing work at the Smithsonian Environmental Research Center to provide improved infrastructure, including access and utility upgrades, and the Mattawoman Energy Power Plant, where the firm is developing lateral designs for reclaimed water, gas and transmission lines. Betz earned her bachelor’s degree in civil engineering from Duke in 2002. She is a professional engineer in Maryland, Nevada and Pennsylvania; and was the coordinating editor for the third edition of Dewberry’s Land Development Handbook, a textbook widely used in college engineering programs.

Howie T. Liu E’09, creator of Airtable, built a $1B software giant.

2010s
Abhishek Kumar T’10, E’11 is on Forbes 30 under 30 list.

Kyle P. Rand E’14 is on Forbes 30 under 30 list.

Elizabeth Neely X’15 and Charles Blue B’15 were married in Asheville, North Carolina, on April 8, 2017.

Caleigh A. MacPherson X’16, a mechanical engineer, is named to New Hampshire Union Leader’s “40 under 40,” which recognizes the state’s brightest young achievers.

Gautam S. Chebrolu E’17 is on Forbes 30 under 30 list.

Nitish Garg X’17 has been included in the 2018 class of Energy Scholars.

Joshua S. D’ArCY X’19 has been chosen as the inaugural recipient of the new Barr-Spach Medicine and Engineering Scholarship. The scholarship was created by a gift from Maynard Ramsey III, M’69, G’75, who established an endowment to honor his Duke mentors, biomedical engineering professor and associate professor of pediatrics Roger C. Barr, BS’64, PhD’68, and pediatric cardiologist Madison S. Spach, T’50, MD’54, HS’54-59. The endowment also provides seed money for faculty research collaborations between the schools of medicine and engineering. The Barr-Spach Scholarship—administered through Duke MEDx—will support D’Arcy as he completes a master of engineering degree through the Pratt School’s innovative new Doctor of Medicine-Master of Engineering (MD-MEng) dual-degree program. Designed to create a pipeline of newly minted MDs with engineering expertise, the program seeks to foster innovation in health care and, “Prepare our doctors to think more deeply about developing novel solutions that help patients, solve problems and serve society,” according to Brad Fox, program director and associate dean for master’s programs at the Pratt School. In addition to being the first
Barr-Spach Scholar, D’Arcy is the first student to pursue Duke’s novel MD-MEng dual degree option. By giving third-year Duke medical students an opportunity to receive specialized training in engineering design and technical problem-solving, says Fox, “The program supports physician-inventors who will focus on developing new products and technologies and drive innovation in medicine.”

Dr. Robert R. Everett E’42, a pioneer in the field of electronic computing, former president and CEO of the MITRE Corporation, and prominent member of the defense technology community, passed away on August 15, 2018 on Cape Cod, Massachusetts, after a brief illness. He was 97. Born on June 26, 1921 in Yonkers, New York, to Chester and Ruth Everett, he graduated at the top of his class from Duke University in 1942. In 1943, he received a master of science in electrical engineering from the Massachusetts Institute of Technology (MIT) and joined MIT’s Servomechanisms Laboratory, where he engaged in critical wartime work, including development of hydraulic servomechanisms for stabilized shipboard radar antennas. In 1945, he and Dr. Jay Forrester of MIT began work on “Whirlwind I,” the first digital computer at MIT and the fastest of its time. The Whirlwind Project led to the founding of MIT’s Lincoln Laboratory and the development of the Air Force’s Semi-Automatic Ground Environment (SAGE) air defense system. In 1947, Everett joined Lincoln Lab and in 1956 became head of its Division VI, responsible for SAGE design and testing. When MITRE was established in 1958, Everett became its Technical Director. In 1969, he was named MITRE’s president, remaining in that position until his retirement in 1986, after which he continued to serve as a director and honorary director on MITRE’s board until his death. Everett received many awards for his scientific work, including the National Medal of Technology in 1990 and the Eugene G. Fubini Award in 2008 for contributions to the Department of Defense. Throughout his career, he served on numerous government and non-government boards and advisory committees, including a term as chairman of the Defense Science Board from 1988 to 1989. In addition to his technical contributions, Everett pursued interests in many areas, particularly history. He was an avid reader and took great joy in serious conversations. He will be remembered for his quick wit and generous spirit. Everett leaves behind his wife Ann and sons Robert, Bruce, Douglas, Theodore, Michael and David. He is also survived by six grandchildren, Ryan, Brendan, Matthew, Meghan, Catherine and Morgan, and four great-grandchildren, Olivia, Benjamin, Caroline and Ethan.

Paul C. Sherertz E’43 passed away December 6, 2016.


Ronald L. Wilson E’54, 85, passed away Friday, January 25, 2019. Ron was born May 23, 1933 to the late Lenard and Violette Wilson in Schenectady County, New York. In 1954, he graduated from Duke University with a degree in mechanical engineering and was a registered engineer. He proudly served his country in the United States Air Force as a pilot. He was an avid fisherman, enjoyed all sports and loved all the animals in his life. Throughout the years, he volunteered with A Helping Hand, Duke University Engineering and the professional engineering societies of which he was a member. Ron played lacrosse for Duke and continued to officiate and support lacrosse for many years. In 2008, he was inducted into the North Carolina/USA Lacrosse Hall of Fame.

David William Austin E’59 died December 11, 2017 at Duke Regional Hospital in Raleigh, North Carolina.

Spruill G. Bunn E’59 passed away on October 7, 2017.

Alan Kaganov E’60, 80, died in his home in Los Altos Hills on February 2, 2019 after a long battle with pulmonary fibrosis, which he fought with his characteristic combination of optimism, scientific analysis and creativity. Even two days before he died, he was in discussion with colleagues on ways to improve the oxygen delivery systems that were sustaining his life. “Alan has thought a lot about how he can apply his knowledge and experience to so many ‘unmet needs’ in pulmonary medicine,” said his wife, Carol M. Kaganov, writer and editor. “Although millions of people suffer with lung disease, it’s a bit of a stepchild in terms of research dollars and entrepreneurial efforts. Alan’s curious mind continued to analyze problems and think about solutions, right to the end.” Holder of 15 U.S. patents, Dr. Kaganov
was a pioneer in biomedical engineering. He helped to develop treatments for many conditions including heart arrhythmia, internal issues, spinal and circulatory disease, and drug-delivery systems. In 2017, Dr. Kaganov and Carol established the Kaganov Research Initiative at Duke University, which aims to advance the diagnosis, treatment and outcomes of pulmonary diseases by fostering new collaborations across Engineering and Medicine at Duke, where he earned his BS in 1960 in mechanical engineering. Previous gifts to Duke’s Pratt School of Engineering established a Kaganov bio-design fellowship, scholarships, a conference room and a professorship to help Duke recruit and retain educators with a focus on energy, medicine and the environment. Dr. Kaganov received Duke’s Distinguished Engineering Alumnus Award in 2004. His undergraduate degree was just the beginning of Kaganov’s trailblazing career, which focused on the new field of biomedical engineering, first at Johnson & Johnson. Along the way, he earned an MBA at New York University in 1966 in corporate finance, but he knew that further technical training was needed in his chosen field of healthcare. “In the mid-60s, many graduate engineering programs did not include biomedical engineering,” said Kaganov. “I decided to get my doctorate at Columbia University, and I had to work with three different department heads to structure my own program for my customized biomedical engineering degree.” This culminated in three separate doctoral exams: chemical engineering, mechanical engineering and biology/physiology. Through a prestigious career fellowship from the National Institutes of Health in biomedical engineering, Kaganov was able to fund his studies. He holds an M.S. and an Sc.D. in biomedical engineering from Columbia. Carol and Alan Kaganov established a professorship at Columbia as part of their legacy. Kaganov had a varied career focused on developing innovative new technologies at major medical device companies as well as start-ups, moving from R&D roles to general management. He placed a high value on education, which he believed allowed him to reach his initial goal of director of R&D at the Davis and Geck division of Lederle, then part of American Cyanamid. He moved on to Baxter Healthcare in Illinois, where he was general manager of the Fenwal Division, and then—recognizing his entrepreneurial spirit as well as R & D skills—he was made vice president of technology and new ventures. A chance to become CEO led to EP Technologies in Palo Alto, California, a start-up that produced steerable catheters for treating arrhythmias. It was acquired by Boston Scientific, where he became vice president of acquisitions and strategic planning.

Alan joined U.S. Venture Partners in 1996, where he served as a venture partner, partner and senior advisor for over 22 years. He distinguished himself as an incisive, passionate and successful investor and as a mentor to many executives in the firm’s portfolio. He was curious and wise and used his experience to guide others to develop many medical devices used today to treat hundreds of thousands of patients in the U.S. and worldwide. He cofounded Aptus Endosystems in 2002 and served as its chairman. Other board positions included NewUro, Neuros Medical, Atricure, St. Francis, MicroHeart, Curon, Cryovascular Systems, Articulinx, A-Med Systems, Sanarus Technologies, Spinal Elements, and Flextronics. “Alan had an unusual combination of personality, skills and experience that made him a great venture capitalist. He could not only identify and articulate the strategic issues, but based on his strong technical background and experience, he was an unusually valuable resource to entrepreneurs. And he was also a nice guy that everyone loved,” remarked Phil Young, a longtime general partner and current senior advisor at USVP. Dr. Kaganov loved to work with entrepreneurs and early-stage companies. He said, “The entrepreneurs of the world have special drives and needs – they’re competitive, high energy, multi-tasking and persistent in their determination to make change happen—and I hope that describes ME!” Along the way, he took pride in providing the mentoring that so many people have provided him, including the teenage founder of SafeWander, a wireless wearable sensor. Alan Kaganov was especially proud of his contributions to the Stanford BioScience Lab, Bailard, Inc., where he was a health care advisor, and the Gladstone Institute, where he was on the board and established an innovative fellowship. Gladstone researchers focus on unsolved cardiovascular, viral and neurological diseases. Dr. Kaganov is survived by his wife of 51 years, Carol Kaufman, from Albany, New York. They met on vacation in Nantucket in 1966, and have lived in New York, Chicago, Boston and the Bay Area, all cultural meccas. He has been a generous supporter of the San Francisco Symphony and the Smuin Ballet, where he was an avid audience member as well as on its board. He was a passionate traveler, gardener, investor and dedicated fan of the New York Yankees, the New York Giants and the Duke Blue Devils.

Alan L. Kaganov was born in Brooklyn, New York, on December 7, 1938, son of Morris and Sally Kaganov, and grew up in Miami Beach, Florida, where he attended high school. He is also survived by his sister Debby (Gil) Wolfenson, brother-in-law Henry Kaufman and wife, Meryl Unger, nephews Andrew (Jennifer) Wolfenson and Barry Wolfenson, nieces Carin (David) Blatteis and Erica (Dan) Asher, and eight grand-nieces and nephews.

John “Jack” A. Abbott III E’65 passed away on April 12, 2018.

David C. Swarts E’71 passed away Saturday, June 23, 2018. David was a resident of Fort Wayne, Indiana, at the time of passing. He was a 1967 graduate of Rushville High School and 1971 graduate from Duke University with a bachelor degree in mechanical engineering.
February 11, 2018. He was just shy of his home in Salt Lake City, Utah on Sunday, monikers, passed away suddenly at his “Dooba,” and surely many other playful friends far and wide as “Wavey Dave,” Finley Stafford.

Jenni Stafford passed away suddenly on April 12, 2018. Dr. James D. Collins E’74, G’76, G’82, the envy of many, from which he often a vegetable and flower garden that is Green and the Snake rivers. He created Grand Canyon and Cataract Canyon, the one could “feel the ancient ones.” He had also paddled the Colorado through Yellowstone, which allowed him to both be and boss Robert Smith said that Dave work for several weeks a year in “Jelly,” in the outdoors he treasured and to of Utah, which allowed him to both be and into the woods or for long bike rides. After graduating from Columbia High School, he went to Duke University, where he earned a BS in engineering, and the University of Utah, where he earned a PhD in material science and engineering. Dave always had an unapologetic way of being himself, laughing at conventions and rebelling against the dominant paradigm. He spent more than 200 days backpacking in the Wind River Range of Wyoming and fell deeply in love with Yellowstone National Park in the early ‘90s. It was his good luck that he eventually became a seismograph technician for the University of Utah, which allowed him to both be in the outdoors he treasured and to work for several weeks a year in “Jelly,” Yellowstone National Park. His friend and boss Robert Smith said that Dave probably knew Yellowstone better than many of the rangers there. Dave also spent a lot of time floating rivers with a group of good friends. Every year or two he was out on the San Juan River. He once commented that on that river one could “feel the ancient ones.” He had also paddled the Colorado through Grand Canyon and Cataract Canyon, the Green and the Snake rivers. He created a vegetable and flower garden that is the envy of many, from which he often
gifted family and friends. He also played guitar, practicing many hours at a time and always aspiring to be better. He loved silly songs and beautiful folk music. He was a man of the Earth and a man of the people. He will be greatly missed by all who knew him.

Alexander Ching E’16, of Holmdel peacefully slipped into eternal rest at home early Christmas morning, on December 25, 2018 with his loving family by his side, after heroically fighting his cancer diagnosis for 17 years. Alex was born on May 19, 1994 in Red Bank, New Jersey. He is survived by his parents Lisa and Michael; sister Maddie; brother Ethan; paternal grandparents, Yau Chau and Siu Ching; maternal grandparents, William and Dorothy Keeley; uncles and aunts, Joseph and Kathy, Billy and Laura, Jim and Fran, Doug and Anglie; and cousins Christopher, Benjamin, Patrick, Leigh, Maggie, Brady, Bryn, Megan and Brent. Alex was first diagnosed when he was seven years old. There were very few people who knew that Alex went to bat with this disease through the rest of his life. That was because he never let it define him. Not only incredibly bright and generous, he had a creative side that led to dabbling in photography, painting, drawing and rapping. In middle school, he joined the cross-country team and continued to play basketball, hockey, tennis and flag football all while undergoing treatment. He excelled in school, became an EMT with the Holmdel First Aid Squad, and served as the Student Advisory Board President for Holmdel High School Class of 2012. During graduation, he delivered a “classic Alex” speech, opening with a joke: the punchline was that he was the smartest, funniest and best looking guy in his class. At the end of his senior year, it looked like Alex would have to delay going to college to focus on his health. But not missing a beat, he was there for freshman orientation at his dream school, Duke University! He loved his ATO fraternity brothers and every minute of his Blue Devil experience (including setting up a full-size hot tub in his fraternity house dining room). Alex studied mechanical engineering but decided to pursue a career in finance instead. To boost his resume, he studied for the CFA (Charter Financial Analyst), self-taught himself the material, and passed Level I, a test with less than a 40 percent pass rate. In 2016, he graduated with his bachelor’s degree in mechanical engineering and accepted a job with Raymond James & Associates in Tampa, Florida. Alex moved to Tampa in June and joked that he was going to live in the Bay Area. He loved his work and quickly formed friendships with his fellow RJ associates. However, only two short months later, Alex relocated to the New York area to start yet another round of treatment. He absolutely loved living in the city, in his Kips Bay apartment, even though it did not allow corgis (much to his mother’s relief). He continued to work for Raymond James in the New York office, and most recently was promoted to senior equity research associate. Alex lived every day, every moment, to the fullest. He never complained about the hand he was dealt. All who knew him know this. Everything was always “fine” even when it wasn’t. Over the past two years, he skied at Solitude Mountain in Utah, traveled to Notre Dame to visit his brother at school, went to Houston to visit his friend (to which he said the humidity felt like being in a NYC subway), rented a drop-top Camaro and drove up the California coast with his best friend, drove an ATV through the Aruba landscape with his family, walked over a mile down Broad Street to soak in the celebration after the Philadelphia Eagles won the Super Bowl, traveled to Colombia with two of his best friends, sat front row at a Drake concert at Madison Square Garden, and saw Roger Federer play in the U.S. Open with his dad and grandfather. In the last week before he passed, he talked about going to the Catskills with his friends for New Years. Alex was truly an inspiring son, brother, grandson, nephew, colleague and friend. We will never forget the lessons he taught us about perseverance, resilience and the power of a positive outlook. He will be missed beyond words but will always remain in our hearts. Forever.

Dr. James D. Collins E’74, G’76, G’82 passed away suddenly on April 12, 2018 at his home after a year of declining health. He is survived by wife, Marianne Collins, three children, Jenni Stafford (husband, Ben), Zachary Cook and Alex Cook, and two grandchildren, Tippett and Finley Stafford.

David Liska Drobeck E’81, known to friends far and wide as “Wavey Dave,” “Dooba,” and surely many other playful monikers, passed away suddenly at his home in Salt Lake City, Utah on Sunday, February 11, 2018. He was just shy of his 58th birthday. Dave was born in Albany, New York, on February 19, 1960 and was the son of Hans Peter and Beryl Liska Drobeck. He grew up in the environs east of the Hudson River Valley, often smarter than his peers, frequently heading out of the house and into the woods or for long bike rides. After graduating from Columbia High School, he went to Duke University, where he earned a BS in engineering, and the University of Utah, where he earned a PhD in material science and engineering. Dave always had an unapologetic way of being himself, laughing at conventions and rebelling against the dominant paradigm. He spent more than 200 days backpacking in the Wind River Range of Wyoming and fell deeply in love with Yellowstone National Park in the early ‘90s. It was his good luck that he eventually became a seismograph technician for the University of Utah, which allowed him to both be in the outdoors he treasured and to work for several weeks a year in “Jelly,” Yellowstone National Park. His friend and boss Robert Smith said that Dave probably knew Yellowstone better than many of the rangers there. Dave also spent a lot of time floating rivers with a group of good friends. Every year or two he was out on the San Juan River. He once commented that on that river one could “feel the ancient ones.” He had also paddled the Colorado through Grand Canyon and Cataract Canyon, the Green and the Snake rivers. He created a vegetable and flower garden that is the envy of many, from which he often
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Dear Duke Engineering Alumni:

Some of you may remember back in the ‘80s when Duke’s President Terry Sanford coined the term “outrageous ambition” to describe Duke’s rapid growth and pursuit of excellence. It’s really no surprise to hear Dean Ravi Bellamkonda borrowing that same terminology to describe the current state of engineering at Duke. In his words, “In undergraduate and graduate education, in research, in entrepreneurship and in service, we’re committed to leading boldly to shape this technological era by creating an environment that enables our community to achieve great things, and yes—be outrageously ambitious!”

Our alumni play a key role in that ambition and the on-going growth and success of the Pratt School of Engineering. Over the past few years, the Engineering Alumni Council (EAC) has shifted gears, focusing on new and tangible ways to connect our alumni to each other, current students and the projects they are working on that are changing the world.

A few of the new opportunities for alumni to get engaged are highlighted below. We hope that you will consider signing up for one or more of these, as your involvement will help drive an enriched experience for our current students and for other alumni.

Unless specifically noted otherwise, all opportunities can be remote and aren’t limited based on your geographic location.

Mentor a student:
In 2018, we launched the new Pratt Vertical Mentoring Network, which pairs alumni mentors with students to share advice on careers and life after graduation. Mentoring engagements may range from a few phone calls to a multi-year relationship, depending on the pairing.

Advise a Student Project Group
Serve as a technical advisor to one of the many extracurricular student projects within the school of engineering. Advisors assist teams with technical engineering questions and project management strategies and help connect them with other industry resources.

Submit an idea for a Student Design Project
Submit a real-world design challenge for a student design course. Projects can range in complexity from week-long freshman assignments to semester-long senior-level design projects. You’ll work with a faculty member to tailor the project to the students’ skill level. Alumni also have the option to engage with students as mentors as they develop and refine their design solutions. Ideas can be based on the alumni’s personal/work experience or outside ideas such as solutions for challenges faced by non-profit organizations.

Submit a nomination for the Engineering Alumni Council
The EAC works to develop strategies and programs to engage Pratt Alumni and serves as ambassadors of our great school. Are you, or do you know, a passionate Engineering Alum who would be interested in serving on the EAC? Expectations for Council members are available here. Please submit your nominations by December 1 annually.

Submit a nomination for an Engineering Alumni Award
Do you know someone who is distinguished within their field, a young alumna/us who is doing great things, or someone who has served the Pratt School of Engineering immensely over their lifetime? We need to know about them! For more information about our awards or to submit a nomination, visit http://pratt.duke.edu/alumni-giving/alumni/awards. Nominations are due by January 1 annually.

I hope many of you will join me and the Engineering Alumni Council and volunteer for one or more of these great opportunities! If you have any questions, please contact Pam Hanson at pamela.hanson@duke.edu.

Will Senner, E’06, X’06
President, Engineering Alumni Council
A Part of Duke Engineering, Past and Future

Every year that passes finds me one year farther away from my time as a student at the Pratt School of Engineering (Go Class of 2001!). It has been a real gift having the opportunity to work at Pratt the past 10 years as a member of the development team. While my student memories may grow farther and farther away, I’m making new memories of being a part of Duke Engineering’s incredible rise every year.

When I first applied for a job at Pratt back in 2009, I remember Judge Carr E’71 looking at me very wearily and pointing out that he wasn’t really sure I loved Duke Engineering as much as I was claiming. Before I could defend myself, Judge noted that I had never made a gift to the Annual Fund in the eight years since I graduated. I promised Judge that whether or not I joined the team I would make my first Annual Fund gift before the end of the year. From the outside looking in, I still wasn’t sure that my $100 was going to make a difference, but if that’s what I needed to do to validate my love for Pratt, it was cheap at the price.

I am glad Judge took a chance on my love of Pratt. After being back and truly embedded within the school I hold so closely to my heart, I have come to realize that Judge was right—my $100 really did make a difference. It made a difference because Duke Engineering has 14,500 alums, and if you add up all the gifts of $100 and more, it puts us well on the way toward our goal of over $3.8 million to support the school’s mission. It made a difference because, right or wrong, part of the school’s national rankings and reputation are influenced by the percentage of alumni who give back.

And maybe even more importantly, giving back made a difference because I now felt invested in the school. I may have enjoyed memories of my times past as a student, but it’s just as rewarding to imagine what the school will become in the years ahead. I was now part of not only Duke Engineering’s past, but its future as well.

For all of us who saw sunrises from the lab, know that feeling of silliness that arises after working with the same team for 14 straight hours on a senior design project, and think back fondly on the extra effort we put in (real or imagined) relative to our Trinity counterparts—I encourage you to join me and become part of Pratt’s future. With Dean Ravi Bellamkonda, and the great students and faculty, I can tell you from the inside—your support makes a difference and the future is bright!

Cheers,

Jim Ruth E’01
Associate Dean and Director of Development
Pratt School of Engineering
## Annual Fund Campaign

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<td>41%</td>
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<td>30%</td>
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<td>Alumni</td>
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<td>$2,630,827</td>
<td>38%</td>
<td>39.5%</td>
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<td>Parents &amp; Friends</td>
<td>$1,085,100</td>
<td>$1,176,173</td>
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<td>Total</td>
<td>$3,800,000</td>
<td>$3,807,000</td>
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### Honor Roll 2017-18

### Recognizing Leadership Giving

Each year, leadership contributions represent more than 75 percent of the Annual Fund’s cash total. These gifts provide the university with flexible resources to support a wide range of important needs. In recognition of these generous donors, Duke has established a number of leadership gift clubs. Membership is renewable annually and is based on Annual Fund gifts made or facilitated by the individual and his/her spouse. Corporate matching gifts count toward membership if received or verified within the fiscal year.

### Duke Annual Fund Leadership Giving Societies

**President’s Society**
- Executive Cabinet: $100,000+
- Cabinet Member: $50,000-$99,999
- Executive Council: $25,000-$49,999
- Council: $10,000-$24,999

**Washington Duke Society**
- Partner: $5,000-$9,999
- Fellow: $2,500-$4,999
- Member: $1,000-$2,499

**Young Alumni Leadership Society**
- $500-$999 for undergraduates 5-9 years out
- $250-$999 for undergraduates 1-4 years out

**Student Leadership Society**
- $100+ for current undergraduate students

### President’s Society Executive Cabinet - $100,000+
- 1971 Mr. John T. Chambers
- 1994 Mr. Michael James Bingle

### Parents and Friends
- Mr. Anthony and Mrs. Mary Barra P’19, P’21
- Mrs. Eryn Ament Bingle
- Mrs. Constance Elaine Chambers
- Mr. David and Mrs. Jeanine Eklund P’18, P’22

### President’s Society Cabinet - $50,000 - $99,999
- 1962 Dr. William Walter McCutchen, Jr.
- 1973 Mr. Fred Mehlert Fehsenfeld Jr.
- 1981 Ms. Martha Lee Monserrate
- 1987 Mr. Lawrence D. Lenihan, Jr.

### Parents and Friends
- Ms. Katherine Durant and Mr. Gordon Sondland
- Mrs. Suzanne White Fehsenfeld
- Estate of William Edward Hankins, Jr.
- Mrs. Irene Lilly McCutchen WC’62
- Mr. Herbert Hardinge McDade III T’81
- Mr. Alexander and Mrs. Rachel Rebbecca Stern B.S.’88, P’21
- Mrs. Penny Vinik P’13

### President’s Society Executive Council - $25,000 - $49,999
- 1960 Dr. Alan L. Kaganov
- 1967 Mr. Jerry C. Wilkinson
- 1973 Mr. William J. Hanenberg
- 1976 Mr. William A. Hawkins III
- 1980 Mr. James D. Heerwagen
- 1983 Mr. John Martin McDonald, III
- Mr. Steven Craig Rosner

### Parents and Friends
- Mrs. Catherine Dean
- Mr. Jeffrey and Mrs. Martha Powers Gendell A.B.’81, P’16, P’19, P’20
- Mrs. Patricia Lister Hanenberg P’04
- Mrs. Sharon Doyle Hawkins P’09, P’12, P’14
- Mrs. Carol M. Kaganov
- Ms. Lena Lee
- Mrs. Dawn Renee McDonald P’17, P’21
- Dr. Bradley L. Miller T’81 and Ms.Kathy A. Hollister A.B.’81, P’17
- Mrs. Melissa Ellen Perkins
- Mr. Biggs and Ms. Marilyn Gilbreath Porter A.B.’76, P’14
- Mr. James and Mrs. Heide Reilly P’19
- Mrs. Carol Rosner P’18
- Mr. Michael and Mrs. Denise Salvino P’20
- Mrs. Elizabeth Piley Schiciano P’21
- Mrs. Karen Schiffer
- Mrs. Hillary A. Schneider
- Mrs. Joan and Mr. C. Kevin Shannahann P’18
- Mrs. Susan G. Simon
- Mrs. Anna Oates Skudlarick
- Mr. Steven and Ms. Lucia Bassett Steinhilber A.B.’76, P’12, P’15
- Mrs. Laurette and Mr. Seymour Sternberg P’08
- Mrs. Marsha Heillard Taylor P’10, P’14, P’16
- Mr. Eric James Schiffer
- 1984 Mr. Kenneth Thomas Schiciano
- 1986 Mr. Alexander L. Dean Jr.
- 1988 Mr. Thomas Alan Burger Jr.
- 1992 Dr. Robert James Stets, Jr.
- 1996 Mr. Joshua Brant Skudlarick
- 1997 Mr. Theodore Grey Perkins
- 2000 Mr. Sean Everett Delehanty

### Presidents and Friends
- Mrs. Andrea and Mr. John David Tracy P’19
- Mrs. Beverly Anne Wilkinson P’98, P’00, P’03

### President’s Society Council
- $10,000 - $24,999
- 1950 Mr. Robert Willis Chapman
- 1956 Mr. W. John Swartz
- 1958 Mr. Harold L. Yoh Jr.
- 1959 Mr. William K. West, Jr.
- 1961 Mr. Carl E. Rudiger
- 1962 Mr. Cleveland C. Kern Jr.
- 1963 Mr. Charles L. Grossman
- 1964 Mr. David A. Coolidge
- Mr. James F. Rabenhorst
- 1966 Mr. Thomas E. Harrington
- 1967 Mr. Stephen C. Coley
- Mr. George H. Crowell
- 1968 Mr. Donald H. Turnbull
- 1973 Mr. Ozye Knight Horton Jr.
- 1977 Mrs. Janis J. Rehlaender
- 1978 Mr. Herman Cone III
- Ms. Alison A. Ives
- 1979 Mr. Charles A. Thornstrom
- 1980 Mr. Christopher M. Relyea
- 1981 Mr. Ajmad Bseisu
- Mr. James Christopher Daues
- Mr. David Ivson Rowland
- Mr. Armando A. Tabernilla
- 1982 Mr. Christopher Bertrand Cook
- Mr. Russell A. Fadel
- Mr. John C. Hausman III
- Mr. Thomas Anthony Natelli
- 1983 Mr. David McDowell Bennett
- Mr. Daniel M. Dickinson
- 1984 Ms. Julie Anne Keenan
- Mr. James Kelly McGowan
- 1985 Mr. Stephen Ray Bolze
Honor Roll

1989 Mr. Stephen Michael Nickelsburg #
Mr. Sean Welch O'Brien
Mr. Peter John Perrone #
Mr. Steven C. Sands
Ms. Shereen Sharon Shermak
1990 Mr. Dennis J. Courtney
1990 Mr. Bruce L. Faulkner
Dr. William F. Walker
1991 Dr. Stacy Stansell Gardner #^*
Mrs. Tanda Shoenfelt Nizialek #
Dr. John Joseph Mastrototaro M.S. '84, Ph.D. '89
Mr. Frederick J. Hamilton
Mr. Jason C. Nizialek B.S. '91 #
Mrs. Jacqueline Morrison Naclerio, Esq A.B. '83, P'09, P'12
Mrs. Mary Trettis Kirby P'09, P'12
Mr. Robert E. Olson P'17, P'19
Mr. Jack Wei-Chung Pan A.B. '98
Mrs. Leslie S. Parran B.S.N.'79, P'07, P'11, P'13
Mrs. Mary and Mr. Gregory Pearlman P'19
Mr. Robert A. Peloso P'05 #
Mrs. Margaret Cobey Perrone A.B.'89, P'19 #
Mrs. Elaine Peterson P'22
Mrs. Jennifer Pietrewicz #
Mrs. Maureen Deanna Pond P'19
Mrs. Sally-Christine Rodgers #^*
Mrs. Julie W. Rogers A.B.'97, J.D.'04
Mrs. Margie Sands
Mrs. Suman and Mr. Nirish Sanghi P'20
Mrs. Nicole A.B.'93 and Mr. Michael Schaufele P'22
Mrs. Joy V. Seppala #^*
Dr. Bansi and Sumati Shah P'97
Mrs. Ian Simmons #
Mrs. Anne and Mr. Richard Smalling P'19
Mrs. Patricia Ann Spearman P'06, P'08, P'11, P'13 #
Mrs. Michelle and Mr. Michael B.S.'89 Taylor #
Mrs. Alene Theresa Valdes P'17 #
Mrs. Anissa Veshela Walker
Mrs. Stacey Wyche Williams
Mrs. Sharon Crutcher Yoh A.B.'83, P'09, P'17 #^*

$2,500 - $4,999
Washington Duke Society Fellow

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Mrs. Karen Rose Alcorn
Mrs. Judith L. Anderson P'20, P'21 #
Mrs. Lisa Lew Aston A.B.'86, P'17
Mrs. Elizabeth Hanna Barnett #
Mrs. Sally Poisfoot Baldwin P'07, P'08 #
Mr. and Mrs. D. Theodore Berghorst P'09 #
Mrs. Kara Bolwell P'19
Mrs. Mary A Brandt
Mrs. Stacie Lea Brewster
Mrs. Laureen Belle Brockett P'09, P'20 #
Mrs. Caroline Nathaniel Buza A.B.'95
Mrs. Patricia T Cammerzell P'17
Mr. Eric Brian Childs B.S.'01 and Mrs. Tessa Anne Chamberlain
Mrs. Elizabeth Young Christiansen #
Mrs. Christine Courtney
Mrs. Lydia and Dr. Leonardo Cruz Ph.D.'68
Mrs. Nancy A. Dabney A.B.'79, P'05
Dr. Diane Holditch Davis B.S.N.'73, P'12
Mr. Victor and Mrs. Diane de Galard P'20
Mrs. Karen and Mr. Marc de Saint Phalle A.B.'88
Mrs. Joanne Burke Dellaoer A.B.'86 #
Mrs. Linda Derrick #
Mrs. Elizabeth Dickinson A.B.'61, P'89 #^*
Mrs. Suzanne and Mr. Timothy P. Ekersley P'16
Mrs. Stephanie E. Elbers-Donaho A.B.'78, P'08, P'11 #
Mrs. Lynn Kendrick Erdman #
Mr. Thomas Kleberg Espy A.B.'94 #
Mrs. Lina and Mr. Fady Fakhoury P'19
Ms. Tala Fakhoury
Mrs. Tina M. Falkner
Mrs. Cherie Fogle Faulkner
Mrs. Holly Schorr Beck Freestone #
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Mrs. Patricia Gabriel #
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GP'18, GP'19 #^*
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Mrs. Mansi Agarwal Goyal
Mrs. Kimberly Smith Gueker #^*
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P'21 #
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Mrs. Polly Jo Klemmer
Mrs. Barbara T. Kennedy A.B.'73
Mrs. Nancy Trettis Kirby P'09, P'12
Mrs. Ellen A.B.'89 and Mr. Timothy Kollar, P'21 #
Mrs. Helen and Mr. Roger A Krone P'14
Mr. Alexander P. Kwamme A.B.'10
Mrs. Lori Langhenagen P'22
Mrs. Bettsy Creigh Leib B.S.N.'62, P'93, P'95 #
Mrs. Lisa and Mr. Henry J. Leibowitz P'18
Mrs. Angela Ann Lesuisse A.B.'00
Mrs. Nancy and Mr. Donald A. Lewis P'07,
P'10 #
Dr. Kelly K. Liang P'19
Mrs. Guillemette Loisel #
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P'17, P'20 #
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1999 Mr. Young Jai Choi
Mr. David Earl Stilwell
Mr. Jason David Stapanov
2000 Mr. Arnaud P. Karsenti
2001 Mrs. Sarah Bradley Higgins
2004 Mr. Jeremy Michael Tucker
2005 Mr. Jeffrey Michael McCormick
Mr. Kevin S. Parker
2008 Alexander McKinnon
2009 Ms. Molly Rebecca Bierman
Mr. Douglas William Bycoff
2015 Mr. Max Orenstein
2016 Mr. William Kane Dougherty

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Ronald J. Epstein Ph.D.'96
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Mr. Andrew N. Ford
Mrs. Tamara Duncan Free A.B.'93, M.B.A.'99,
J.D.'99
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Mrs. Yvonne Galinko
Mrs. Nicetas Giordano P'19
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H.S.'92-'95
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Mrs. Hayes Neely Jones B.S.'06, M.E.M.'08
Mrs. Susan and Mr. Richard Hubert Jones Jr.
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Mr. Allan Y. Kim A.B.'88 and Mrs. Wonmee Chun
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Recognizing those individuals who have followed the example and generosity of Duke University’s founder,
James B. Duke, by continuing his vision through involvement and support, and by providing cumulative gifts
exceeding $100,000, pledged or paid, to all areas of Duke University.

^ Braxton Craven Society:
Recognizing individuals whose extraordinary commitment and leadership have helped transform Duke, just as
President Craven transformed Union Institute into Trinity College, and whose generous support of the university
totals $1 million or more, pledged or paid.

* Founders Society:
Recognizing those individuals who have distinguished themselves by looking to the future of Duke and the
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Engineering to commemorate their loyalty and support in perpetuity. (active from 1980 through 2004)
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Mrs. Nancy and Dr. Thomas White P'20
Mrs. Jessica Bradley Weinberg
Mrs. Barbara Valk Wierengo P'14
Mrs. Barbara Valk Wierengo P'13 #
Mr. Mark Trutna P'17 #
Mr. Xavier Vegas M.B.A.'09
Mr. Michael John Wassmer A.M. '94
Mrs. Linda Gray Slawson
Mrs. M. Virginia Stockbridge
Mrs. Linda Gray Slawson
Ms. Elisa Elena Thielen Vallenilla
Dr. Yi Yang Ph.D. M.S. '00 and Mrs. Lin Sun
Mr. Michael John Wassmer A.M. '94
Mrs. Kathy and Mr. Thomas J. Rucker P'96
Mr. John and Mrs. Karen Wood P'21
Ms. Julie Suzanne Withers A.B. '78
Mr. Alvin R. Murphy Jr.
Mr. Richard E. Bisbe
Mr. James Arthur Cavenaugh, III
Dr. Joseph M. Hunt, III
Mr. Armon Dula
Mr. Thomas Eugene Gallagher
Mr. Randall Charles Herring
Mr. Charles Thomas Paul
Mr. George M. Grills **
Mr. John C. Orr
Mr. Kenneth D. Kennedy, Jr. #^
Mr. Michael Nickelsburg USN (Retired) #
Mr. Nathanael Broker
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Mr. Truman Dent Donoho, III
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Mr. James L. Stuart, ESQ #
Mr. George Joseph White
Mr. Edward E. Kaufman
Mr. James W. Redmond
Mr. David Lyman
Mr. Richard L. Goldstein
Mr. David Lyman
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Mr. W. Russell Scheirman II
Mr. Donald L. Stegner
Mr. Charles W. Treat
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Mr. Walter Jeffrey Bishop
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Mr. Robert E. Fraile
Mr. Robert F. Stevens
Dr. J. Erby Wilkinson
Mr. R. Gregory Stortstrom
Mr. Peter W. Waxter
Dr. David Martyw Wheeler
Mr. Edward Anapol
Ms. Laurie C. Conner
Mr. Robert T. Summers #
Mr. John D. Roberts #
Mr. Mebane E. Turner Jr. #
Mr. Robert Eadie
Mr. Alvin R. Murphy Jr.
Mr. Richard E. Bisbe
Mr. James Arthur Cavenaugh, III
Mr. Edward E. Kaufman
Mr. Jan Lee Mize #*
1961 Dr. Martin George Buehler
1960 Dr. William F. Chambers
Mr. Harmon Thomas Gnuse
Dr. Joseph M. Hunt, III
Mr. Armon Dula
Mr. Thomas Eugene Gallagher
Mr. Randall Charles Herring
Mr. Charles Thomas Paul
Mr. George M. Grills **
Mr. John C. Orr
Mr. Kenneth D. Kennedy, Jr. #^
1988  Mr. Carlton Hayes Gerber
    Mr. Amede William Hungerford
    Dr. Michael Thomas Munley
    Mr. Elmer Alas Ramirez
1989  Mrs. Mary Cates Carlson
    Mr. James David Kolenski
    Ms. Jennifer Kelley Robinson
    Dr. Elizabeth C. Tyler-Kabara
1990  Mr. John D. Adkins, II
    Dr. Michael Goodwin Cetta
    Mr. John Patrick Comerford
    Mr. Paul Thomas Hertlein
    Mr. Thomas Eric McMullen
    Dr. Robert Alec Naslund
    Mr. Richard E. Nicholas
    Dr. Maria A. Manning
    Mr. Mark Edward Kraynak
    Mr. Brian L. Helm
    Mr. James A. Grover
1991  Mr. Jonathan Lowell Danielson
    Mr. Daniel R. King
    Dr. Steven Hsin-hung Lin, M.D.
    Dr. Denise Iuliano Pittaro
1992  Dr. John Joseph Devaney, Jr.
    Mr. Jaime D. Hobbeydar
    Dr. Elizabeth McClelland Lutostansky
    Ms. Valerie Denise Maclin
    Mr. Justin B. Mean
    Mr. Brian James Nalle
    Dr. John Patrick Rodgers
    Mr. John Anthony Sartor
    Mr. William Tilghman Schlough
    Dr. Seth Alain Watkins #
1993  Dr. Rahul Vinod Deshmukhi
    Mr. Ian Christopher Doiron
    Mr. Louis A. Falvo, III
    Lieutenant Karl William Kottke
    Mr. Michael Lincoln Krachon
    Dr. Hong Andy Park
    Mrs. Gillian Fisbach Parton PE.
    Mrs. Margaret M. Rodgers
    Mr. William John Schesessele
    Ms. Ann Marie Scott
    Mr. David James Sullivan
    Mr. David S. Wasik #
    Mr. Robert Alton Wyatt
1994  Dr. Henry F. Butehom
    Mr. James A. Grover
    Mr. Brian L. Helm
    Mr. Mark Edward Kraynak
    Dr. Maria A. Manning
    Mr. Paul Joseph Osulak Jr.
    Mrs. Julie Davidson Rocheroille
    Ms. Linda Quing Young
1995  Dr. Jeffrey A. Chard
    Mrs. Allison Broker Cleveland
    Mr. Scott W. Dubbeling
    Mr. Richard Edward Finley
    Mr. Brian Marchiel
    Mr. Steven Andrew McClelland #
    Mr. Robert A. McClung
1996  Mr. Ethan Isaac Berger
    Mr. Thomas M. Brundage
    Mr. Peter Bryan
    Mr. James Douglas Campbell III
    Mrs. Holly Crist-Mansson Kelly
    Dr. Sunil Narendra Gandhi
    Mr. David B. Morton
1997  Mr. Arthur Warren Brackin, IV #
    Ms. Stacey Jean Davis
    Mr. Francisco Javier Fernandez
    Ms. Anita Marie Suchdeo
    Mr. Marwan Khaled Saeed Tabbara
    Mr. Michael Allen Wesley
1998  Dr. Nathan David Bronson
    Mr. Damian Vinson Dolland
    Mrs. Amanda Haliet Gelber #
    Mr. Nicholas Robert Gelber #
    Mr. Lee Ott
    Mr. Robert Benjamin Vermillion
1999  Mr. Joshua Philip Arwood
    Mr. Anthony Lagnese
    Mr. Wesley Rogers McCleenland
    Dr. Kevin Bryce McGowan
    Mr. Mark S. McKeag
    Mrs. Ann Nelson Mittelstadt
    Mr. Eric Zen-Shah Wang
2000  Mr. Grant R. Allen
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Farley W. Bolwell (27)
John A. Board, Jr. (26)
Barbara K. Caldwell (17)
Robert A. Canfield (3)
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78 Donors/ 219 Class Roll
36% Participation
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Peter T. Baker (5)

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Arlens Zeqollari (1)

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91 Donors/ 290 Class Roll
31% Participation
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Robert S. Ansel (3)
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Gaurav Bhat (3)
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Abigail R. Canignan (1)
Edward P. Caterral (3)
Allison M. Chaffo (3)
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Griffin A. Cooper (2)
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Mengyun Lu (3)
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Stephanie N. Laughton (3)
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David R. Kornberg (3)
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Allison T. Hyans (3)
Brian L. Huynh (3)
Tracy Huang (2)
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Juwan Hong (2)

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Qian Wang (2)
Muhammad Wasim (1)
Courtney White (1)
Jessica Yan (1)
Edward Yin (2)
Sherry J. Zhang (2)
Xinyun Zou (1)

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26% Participation
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Archit Verma (2)
Craig G. Vincent (2)
Alexandra von Briessen (2)
Michaela J. Walker (1)
Xinheng Wan (1)
Qian Wang (2)
Muhammad Wasim (1)
Courtney White (1)
Jessica Yan (1)
Edward Yin (2)
Sherry J. Zhang (2)
Xinyun Zou (1)

Class of 2018
133 Donors/ 289 Class Roll
46% Participation
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