INSIDE
Farewell to a Pratt legend
Tackling our century’s
grand challenges
Making a global impact

Edmund T. Pratt Jr. School of Engineering at Duke University | 2015

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Above: Duke members of the Oculus Microgravity Team at the NASA Reduced Gravity Flight Program Hangar in Ellington Field (Houston, TX) – June 2014

Duke Motorsports team members at the Parents’ Weekend Pratt Engineering BBQ – October 2014

Below: Pratt students and families celebrated at the Parents’ Weekend BBQ — October 2014

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On the cover:
Duke Engineers for International Development in Uganda. See more at pratt.duke.edu/75.
Wyatt Shields is a fourth-year biomedical engineering PhD student in the research group of Gabriel P. Lopez. His research interests include chip-based methods for acoustic bioseparations and the programmed assembly of anisotropic particles into advanced, hierarchical materials. Wyatt also enjoys hiking, traveling, music and long-distance running.

Amy Xiong is a sophomore biomedical and electrical/computer engineering double major who likes to design and create. She was born and raised in Minnesota, and is proud of it—occasionally you might see her in flip flops during the “winter” here. Amy is an undergraduate researcher in the Lopez Lab at Duke who works with microparticle assembly and is hopeful that her work will allow her to develop new biomedical applications. She enjoys watching good movies and traveling to new places.

Justin Yu is a senior majoring in biomedical engineering. He is a member of the Art, Vision and the Brain Bass Connections team, which is organizing an interdisciplinary symposium to examine art from neuroscience and engineering points-of-view. He has conducted research at the M.D. Anderson Cancer Center, where his work used digital image processing to examine the effects of radiation therapy on the brain. In his free time, he enjoys playing basketball, volunteering in the hospital and trying to cook. He plans to attend medical school in the fall.

Efe Aras is a sophomore majoring in ECE/CS with additional course load in philosophy and mathematics. He also has an interest in computer security, which he supplements with working in the IT Security Office at Duke. During his spare time, he likes to read Harry Potter and just close his eyes and think.
Dear Friends of Duke Engineering,

I am writing this column on my way back from a meeting with President Obama and a group of the 122 deans across the US who have signed a commitment to create a Grand Challenge Scholars program—similar to the one begun here at Pratt in 2009. As of this year Pratt will graduate its 100th National Academy of Engineering-recognized Grand Challenge Scholar, and the deans have committed to graduate 20,000 more Grand Challenge engineers over the next decade.

As I explained to the President in a clutch in the Map Room just before the annual White House Science Fair on March 23, what we are trying to do as an engineering community is to ensure that when the bright young students at the fair get to college, they have a more empowering engineering education waiting for them—one that will prepare them not just to build cool devices but also to create solutions to society’s most vexing challenges.

It is great to see so much enthusiasm for something born from formalizing the rich co-curricular experiences available to our undergraduates and connecting them to help students develop both the skillset and mindset to take on the Grand Challenges for engineering and society in the 21st century. As the program grows nationally, I’m also excited about our plans to construct a Grand-Challenge-themed new building at the end of Science Drive that will support our growth, connect to Physics and build community among students in the Grand Challenge Scholars and other programs.

Our commitment to providing specialized training to brilliant young minds to tackle the Grand Challenges is only the latest evolution in a long tradition of excellence. Since our beginnings 75 years ago, Duke Engineering has graduated leaders and problem-solvers, over 13,000 of them (!), who change the world for the better. Today, we’re able to offer students even more inspiration and even more opportunities to excel than ever before. Just consider:

- Duke is among the fastest-rising engineering schools in the U.S. News & World Report rankings—most recently ranking #18 for undergraduates and #28 for graduates—both record highs. And we’re ranked in a tie for 10th among U.S. engineering schools in research productivity (Academic Analytics 2014).
- Our total external research funding has more than doubled in the past decade. And, we now have successfully competed for seven major externally funded research centers over the past seven years—a tremendous sign of the growing strength and impact of our faculty.
- New Duke-developed programs like PhD Plus offer students additional opportunities for professional development to complement their research training.
- Total graduate student enrollment increased by nearly 40 percent over the past five years. Undergraduate enrollment today totals nearly 2,500 students—and breaks selectivity records year after year.

At this point in our history, Duke Engineering is on a truly breathtaking upward trajectory—thanks to our incredible students, world-class faculty, entrepreneurial and interdisciplinary culture, and the support of generous alumni and friends who fuel our success.

Here’s to all those who made our first 75 years fantastic. Seeing all the new beginnings, can’t you just imagine what Pratt will be like at 100?

Tom Katsouleas
Vinik Dean of the Pratt School of Engineering
Engineering Student Government (ESG) was excited to start 2014-2015 off with a bang! Our team of 11 very motivated and dedicated executive board members worked hard this year creating some phenomenal events for all of Pratt.

Led by Class of 2017 president Sebastian Baquerizo, a series of E-Talks highlighting distinguished faculty research was hosted on East Campus in the fall. It was a great way to get freshman engaged early in their academic careers with research and spark passion for engineering while never having to leave the comfort of East Campus.

ESG’s Academic Action Committee also collaborated with the Duke Student Government’s Academic Affairs Committee and Pratt’s Dean’s Office to work on improving advising for all Pratt students. Now, Pratt is taking an advising “network” approach to allow students to solicit input from a variety of sources and mentors.

March saw a completely sold out E-Ball at Hope Valley Country Club. Everyone from freshmen to professors enjoyed the beautiful weather of the outdoor patio and an evening of socializing, relaxation and taking a break from problem sets. Deans Karoula and Franzoni couldn’t help but join in the fun—and even Dr. Michael Gustafson was one of the last ones on the dance floor at the end of the night!

We also continued the tradition of weekly E-Socials every Friday afternoon at a new time of 4:30 pm. Due to the hard work of Industry Relations Chair Kristin Murray, we have had a wide variety of E-Social sponsors this year, from Duke’s chapter of the American Society of Mechanical Engineers to Edwards Life Sciences. We continue to work closely with EGSC on hosting E-Socials, and this year we are beginning to focus on making them more sustainable, with new reusable cups to be rolled out in early 2015.

The annual traditions of E-Oktoberfest and E-Picnic also continued with record crowd turnout for both events. These well-loved events (and the associated T-shirts!) continue to be time-honored classics that students look forward to after a long week of midterms and studying.

Last but not least, ESG is excited to be helping with some of the Pratt 75th anniversary celebrations. Spring 2015 will bring a revitalization of some of the “old-school” engineering competitions while the Pratt Board of Visitors and friends are in town. We’ll see if they can show the youngsters how it’s done or if beginner’s luck holds out.

Stay tuned for more great things from ESG in the upcoming years. We hope to continue to improve student life on E-Quad, and are always open to new ideas!

Sincerely,
Anna Knight
Executive President

Anna Knight is a senior majoring in biomedical engineering and the president of the Engineering Student Government.
The Engineering Graduate Student Council (EGSC) is dedicated to representing the interests and concerns of the graduate students of the Duke University Pratt School of Engineering. EGSC works to facilitate the integration of incoming Pratt graduate students and to promote social interaction, academic interaction and outreach amongst fellow graduate students.

One of this year’s more gratifying events was the 5th Annual Abhijit Mahato Memorial held in November. In remembrance of Abhijit, a Duke graduate student who was tragically killed in 2008, Duke University and Pratt have collaboratively and generously sponsored an annual memorial to celebrate his passion for the merger of the visual arts and sciences. Currently in its fifth year, the event includes an image and photography contest, a keynote speaker, and a cocktail reception. Fanny Besem (EGSC vice president, MEMS) and the Mahato Organizing Committee (Hannah Meredith, Lauren Lowman, Tamara Slingerbit, and Lauren Czaplicki) did an amazing job organizing the event. Winning images are displayed in the atrium of the Fitzpatrick Center for the upcoming year.

Another successful EGSC endeavor is the PhD Plus Professional Development Program. PhD Plus is a student-funded, student-run program designed to assist engineering PhD students in making effective career decisions and prepare students for the real world. The program includes summer workshops, seminars, networking opportunities and internship resources. PhD Plus Chair Sarah Diringer (CEE) has done a fantastic job leading this program, and we look forward to more spectacular events from PhD Plus in the near future.

EGSC is also active in improving research support and academic awareness across Pratt. So far, EGSC has organized an external funding workshop seminar for graduate students seeking to gain insight from previous fellowship awardees on how to apply and win fellowships. This fall, we also organized two graduate student seminars led by Isvan Cordova (EGSC treasurer, ECE), David Miller (EGSC departmental representative, ECE), Ethan Hada (EGSC departmental representative, MEMS) and Lauren Redfern (EGSC secretary, CEE), where Pratt graduate students were able to showcase their amazing research efforts amongst their peers.

This spring, you are invited to our final two graduate student seminars of the academic year, led by Cordova, Samagya Banerjekota (EGSC departmental representative, BME), Jane Cooper (EGSC departmental representative, CEE), and Wankun Zhu (EGSC communications chair, ECE). By encouraging students to learn about the work of their Pratt peers, whether through upcoming qualifying examinations, preliminary examinations and/or oral conference presentations, we aim to foster the interdisciplinary collaboration that is not only strong at Duke, but also important across the world.

This year, EGSC has branched out to other engineering graduate/professional-based programs and brought two new members onto the executive board: Ankur Manikandan (Master of Engineering Program representative) and Jon Wright (Master of Engineering Management representative). The MEng program gives an in-depth study in a technology field paired with a business leadership and management education. Offered by the Pratt School of Engineering with support of Duke’s Fuqua School of Business and School of Law, the MEM program offers early-career engineers a tech-savvy alternative to an MBA. We are very glad to have them on our executive board.

Socially, EGSC plans activities to allow graduate students to de-stress after a long week of research. Every Friday evening, EGSC and the Engineering Student Government (ESG) organize an engineering social (E-social) hosted by various companies (Edwards Lifesciences, Stryker) and/or on-campus organizations (Society of Women Engineers, Women in Science and Engineering, and American Society of Mechanical Engineers, just to name a few). To help “green-ify” our future E-socials, EGSC is collaboratively working with Sustainable Duke to replace the currently used disposable plastic cups with reusable tumblers.

Also in celebration of Engineer’s Week, we plan to organize a graduate field day to promote healthy competition amongst the different departments within Pratt. Finally, we are organizing a Duke basketball watch party for students to be able to meet and greet with one another. We hope you will join us at some of these events.

In addition to these academic and social initiatives, EGSC organizes outreach events through organizations such as Habitat for Humanity and North Carolina Science Olympiad so that graduate students can make an impact in their local communities. Over the years, many of our Pratt students have found these experiences both rewarding and life-changing.

In my limited time as EGSC President, I have been blessed with the opportunity to work with a very diverse and exciting executive board. I look forward to continuing to bounce ingenious ideas off of one another and disseminating our results to the Pratt community. The character and class exemplified by our EGSC student leaders is a major reason I not only chose to run for EGSC presidency, but what continues to make Duke such a uniquely balanced and wonderful place to be.

Ugonna Ohiri is a second-year PhD student in electrical and computer engineering and president of the Engineering Graduate Student Council.
It is a truth universally acknowledged that today—more than ever—the demand of caring for an aging population, the need of reacting to changes in healthcare, and the desire to increase the effectiveness of medicine while decreasing its invasiveness have all led to the commitment to one thing: biomedical engineering. In the midst of the field’s rapid growth and desire to fulfill the many new demands of healthcare, Duke has brought forward Ashutosh Chilkoti, PhD, as the newest chair of its biomedical engineering department.

With a long and prestigious history of success, Duke BME has been one of the crown jewels of the university ever since Chilkoti has long had a deep affinity for Duke and the varied work of the department. From the start, the program has provided unique challenges to overcome, questions to answer and ongoing projects to move forward as the rapid expansion and maturation of the biomedical industry flourished. In response to the system that has helped him develop as both a researcher and a professor, Chilkoti accepted the position of chair in 2014 as a way to give back.

With over 100 programs in the country now dedicated solely to BME, one can no longer consider biomedical engineering as a “boutique department,” says Chilkoti. While this was never the case at Duke, its program must now face very real challenges.

“Duke BME remains excited about the explosion in the field but, at the same time, incredibly aware of the challenge to remain strong in the face of so many other programs,” says Chilkoti. “There is always that push to improve.”

In approaching this new challenge, Chilkoti speaks to a multi-faceted approach: renewing the leadership that Duke currently holds and moving forward with new projects and areas of research. In the next few years, Duke BME will look to expand its presence in genomic engineering, currently represented by the prowess of Charles Gersbach, PhD, among others (see page 10), as well as new faculty members brought on in the past few years. Similarly, the neuro-engineering group has gained two more members.

That effort to push the boundaries of modern research and develop innovative approaches extends to each of the traditional disciplines. For example, Chilkoti will look to immunology to advance therapeutic treatments and into big-data analytics as it relates to the brain.

With so many changes occurring at the many nuanced levels of biomedical engineering that has historically covered a litany of interests, a multi-faceted approach to the change is truly inevitable.

When considering the explosion in biomedical engineering, we must also remain cognizant of the changing field of health-
care—and the new strain this will place on BME departments everywhere to "increase efficiency and decrease costs while maintaining quality," states Chilkoti. "There is a balance to be found."

Indeed, this balance may come in the form of a new and stronger relationship with Duke’s School of Medicine and health system to cultivate a "more formal mechanism by which research problems can be identified and bring together the people who would best spearhead those projects." While cross-collaboration is ongoing, Chilkoti aims to take advantage of not only that short commute across Research Drive from the E-Quad to the Medical Center, but also the potential to bring together the right teams and people to foster problem-solving and innovation.

To better encourage open discourse and ideas regarding this time of transition, Chilkoti will be hosting a retreat in the spring of 2015. The group will discuss how to better improve the department’s innovation and response to the changing field—including its role in the classroom.

As the field evolves, so too must the books used to teach it. Therefore, a thorough review of the BME undergraduate curriculum will begin shortly, looking to highlight its strengths and improve potential deficiencies. And at the graduate level, the department is re-evaluating the emphasis placed on preparation for non-engineering roles. With many BME graduate students finding work in consulting or finance, Chilkoti must assess how best to prepare students for their new roles.

The excitement surrounding the explosion of BME as an industry must overcome all else. With plans to add 10 new tenured faculty in the next four to six years, Chilkoti has wasted no time in adopting a proactive approach to his role as chair of BME. In looking to maintain Duke BME’s strength in its existing fields and expanding into new ones, considering the undergraduate curriculum and graduate student preparation, and cultivating a new team-centered approach to the road ahead—whether within the department or cross-departmental collaboration—Chilkoti’s plans all move in one direction: onward, to new heights.

Claudia Dantoin is a sophomore majoring in electrical engineering and double-minoring in French and chemistry.
A Chat with Dean Simmons
Duke Engineering legend retiring after 37 years of service

Connie Simmons served as the Associate Dean for Undergraduate Affairs at the Pratt School of Engineering. She started working at Duke University in 1978 and has held various positions over the years. She was hired by Aleksandar S. Vesic (dean of engineering from 1974-1982) and has served under four university presidents and six deans. After 37 years at Duke, she retired in March 2015. DukEngineer spoke with her about her memories and legacy of service to students, faculty and staff.

What do Pratt students come to you to talk about?
There are many different reasons students come to me, from help with their class schedules to personal problems or academic difficulties. A common theme is first-year students who are making the transition from high school to college. A lot of the students who come here were at the top of their class, making straight As, then they come to Duke and get that first C and are devastated, because for those students getting a C is like getting an F. So I try to tell them that there is a transition period—one C is not going to destroy everything and they can still graduate with honors.

Some students also come here without a habit of studying because they didn’t need to do so in high school. Others might study for an exam but don’t get as good of a grade as they expected and start wondering if they really belong here. To those students I reaffirm that we wouldn’t admit a student that we thought would not be successful. During those moments I just try to build their self-confidence and advise them to use all the great resources that are available at the university for personal and academic support.

I also see a lot of upper-class students who come to the office for advice about career planning, study abroad, pre-medicine or balancing academic work with other endeavors. Often times we have students trying to do too much—for example, two majors plus a minor and/or a certificate and either pre-medicine and/or studying abroad! Other students who come to me are dealing with personal and psychological issues, or having academic challenges or need to find summer employment. And some come just to share their excitement about being selected as a Pratt Fellow or inducted into Phi Beta Kappa or receiving a post-graduate award like a Rhodes, Marshall, Churchill or Fulbright. I hear a little bit of everything!

What should we look for in the next undergraduate dean?
I think you need someone who will give sound advice, but is also dependable and caring. A math professor may call us saying that they haven’t seen this one student for a couple of days and are wondering if something is going on. You need someone who will contact that student and ask “Are you OK? Do you need to come in and see me?” Likewise, if a student is in the hospital, they should visit them and tell them, “I will e-mail your professor, I will let them know. You just focus on getting better.” I have always tried to let students know that I care, and would hope that the next upcoming dean will be just as caring.

Of course there are times when you have to be a little firm. Students don’t like to hear the word “no” but the fact of the matter is sometimes you have to say it. For instance, if a deadline has passed, we have to tell the student that we’re sorry but no exception can be made for them, because in doing so, there are 1,200 other students that would not be able to have the same option. So you have to have a balance of being concerned and caring but also fair to all students.

What is your favorite part of your job?
I have just really enjoyed working with students. Earlier this week I talked to an alumna whose son is graduating from Duke this year, and I told her that I am just as hap-
I see students go through four years of college, and some of these students go through big struggles. At their graduation, I am just as happy as the parents because I have been there with the students through this time! When you see a student through four years of college and then 20 or 25 years later their son or daughter is here at Duke, that’s very special. Overall, this job is just very rewarding.

What is the biggest change you have observed during your time at Duke?

Well, Duke has grown so much over the years. I’ve been here long enough to see the changes in the outline of the campus as new buildings were built. I remember when some of the buildings that I can see from my window had to be approved by the Trustees!

There has been a great increase in the student body. In 2005 when Kristina Johnson was the dean, the enrollment for engineering students was increased by about 200. I have also seen more diversity, with more female and minority faculty and students. I still remember when the first female faculty member and the first African-American faculty member started!

The programming for the school has grown as well. When I first started working here Duke didn’t even have minors. Now we have so many organizations—HackDuke and many more programs that we never use to have. It is exciting to have witnessed all that change over the years.

When you first started working at Duke as a secretary did you had any idea how far you would go?

Definitely not, I had no idea that I would be where I am today. When I first started working here I had my degree and my plan was to work here for about three years. The secretarial job was a unique opportunity because I got to work with Associate Dean Marion Shepard. I would talk to students who came in and try to help them out with their problems. I took on many different positions over the years but with all of them I was interacting with students, which I really enjoyed. I had great bosses and my colleagues here at Pratt are amazing. So it followed that Pratt just became my family. I am very thankful and appreciative for the opportunities that all the deans I have worked under have given me.

What are you going to miss about Duke the most?

I am truly going to miss interacting with and helping students. After 37 years I have a lot of good memories, which I am grateful for. Also, I will miss the faculty and my colleagues in Pratt and across the university. Did you know Dr. G* was a student when I was here? He was the first student to do a double major with electrical and mechanical engineering. So when students ask about double majoring with ECE and ME, I tell them go see Dr. G. Of course it’s not only Dr. G, there are other faculty members who were students when I started working, like Dr. [John] Board, Dr. [Craig] Henriquez and Dr. [Dan] Sorin. Seeing them become graduate students and then go on to become professors is so exciting as I get to witness their growth. That’s just another example of why this has been an amazing journey.

Petek Sener is a first-year Pratt student and a projected biomedical engineering major.

*Associate professor of the practice Michael Gustafson
You are the sum of 46 chromosomes, three billion base pairs or six gigabytes of information. Before you are born, your genome determines how you will look and, to some degree, how you will act. At the same time, this means that genetic diseases such as certain muscular dystrophies are as intrinsic to those affected as their appearance or personality. There is currently no cure to many genetic diseases, since a cure involves the difficult task of modifying our most fundamental programming.

A group of researchers led by Charles Gersbach, professor of biomedical engineering here at Duke’s Pratt School of Engineering, is tackling this issue using a variety of strategies, one of which is based on curiously named protein motifs known as zinc-fingers.

These protein subunits have garnered significant interest since the early 1990s for their ability to seek out a sequence of three or four base pairs and grip to that site of DNA with “fingerlike” structures. Researchers can synthesize chains of zinc-fingers that bind to sequences many times longer for a more specific and targeted approach. These “magic bullet” proteins can be attached to other functional protein domains to build an entire kit of genomic engineering tools. One of the most significant of these tools are zinc finger nucleases (ZFNs)—fusion proteins of zinc fingers and nucleases used to cut DNA at target sequences.

Gersbach seeks to develop this technology for human gene therapy—the treatment of disease on the genetic level. Previous genetic engineering methods used ZFNs to make cuts at sites of interest in DNA. This would in turn activate the native DNA repair pathways to ligate the cut ends, which is an unreliable mechanism that could introduce errors. However, in his article Targeted plasmid integration into the human genome by an engineered zinc-finger recombines published in Nucleic Acids Research, Gersbach describes a “two-step method for utilizing [zinc-finger recombinases] in any cell type at randomly distributed target site locations.”

Recently, Gersbach and his lab has moved toward a different genetic engineering technology—the CRISPR/Cas9 system. Originally found in bacteria, where it was used in a form of acquired immunity to cut up foreign DNA, scientists have adapted this system for use in human genomic editing. CRISPR/Cas9 is
unique in that, rather than using a protein subunit, this system relies on guide RNA to target sequences of DNA. Because it is much easier to synthesize RNA than a protein, CRISPR/Cas9 is more versatile and cost-effective compared to zinc fingers. Gersbach’s research has, among other things, involved the evaluation and expansion of the CRISPR/Cas9 “toolkit.” In one paper, Gersbach’s laboratory engineered CRISPR/Cas9 transcription factors, which use the CRISPR/Cas9 system to target and activate specific genes.

While the discovery of zinc fingers and CRISPR/Cas9 have been landmarks in genomic engineering, there is still much ground to be covered before a patient can walk into a doctor’s office and walk out cured of Duchenne muscular dystrophy or cystic fibrosis. One major unanswered question is the specificity that can be achieved by each system. While each system can be engineered to target a certain sequence, there are limits to how long, and therefore how specific, the target sequence is.

A ZFN could accidentally cut a site upstream or downstream with the same sequence, or a CRISPR/Cas9 transcription factor could activate the wrong gene, each of which can have drastic consequences. Meanwhile, the CRISPR/Cas9 is constrained by the fact that its target DNA must be followed by a short sequence of bases with stricter requirements for binding. Nonetheless, this exciting research is the key to unlocking the genome and the groundwork for a future of safer, potent, personalized medicine.

Edward Liang is a freshman majoring in biomedical engineering.
Our world depends heavily on energy. We have progressed as a society through the discovery of new, more efficient energy systems. Even before the concept of energy was fully realized, humans have used energy to make their lives easier.

In the beginning, we relied on various biomasses—such as wood or peat—to fuel fires as a source of energy to cook food and provide warmth. Through subsequent energy revolutions, we have powered our way through the industrial revolution with steam engines, created the modern infrastructure of cities with piped natural gas and fueled our way to the present with coal and petroleum. The majority of our energy currently comes from these fossil fuels, with growing demands on shifting energy consumption from these unsustainable mainstays to renewable energy sources.

Knowing that fossil fuels are limited and unsustainable at our current rate of consumption, David Mitzi, professor of mechanical engineering and materials science at Duke University, is driven by thoughts of what may be the next energy revolution. His research focuses on designing new materials and connecting the structural properties of these materials with their potential applications as solar cells.

Solar cells generate electrical energy by converting the sun’s energy into an electrical current. Mitzi seeks to explore low-cost solar cell materials composed of earth-abundant elements. Such research would make it possible for cost-effective solar energy options to be deployed more universally.

One of the materials Mitzi is investigating in his lab is called “perovskite,” named after its specific crystal structure. Perovskites can accommodate a wide range of elements, thereby allowing significant opportunity to tailor the properties of the materials. Perovskites show promise in absorbing sunlight and transporting the charges generated from sunlight, which is crucial for photovoltaics.

The power conversion efficiency of solar cells is calculated as the ratio of the electrical output to the input of light energy. The progress in improving the efficiency of perovskite solar cells has been enormous, soaring from 4 percent to 20 percent over just the past five years, which has led it to become the material with the most rapidly rising energy efficiency in the industry.

Mitzi’s research targets a few areas of possible improvement in perovskites as a solar cell material. He seeks to delve further into the crystalline structure to increase the efficiency to over 20 percent. As a comparison, the highest efficiency of currently available commercial solar cells is around 20 percent. Although solar cells have been created with efficiencies almost up to 45 percent, such cells are not economically viable for large-scale application. Alternatively, manufacturing perovskite structures using low-cost, thin-film techniques makes their production more feasible and realistic in terms of cost.

Above, Professor David Mitzi, Duke University, Department of Mechanical Engineering and Materials Science; Right, X-Ray diffractometer that is used to characterize crystalline materials.
Another concern besides increasing efficiency is the safety and robustness of perovskite materials. The best perovskites have thus far contained lead, making toxicity an issue. Another concern for Mitzi is the stability of the material due to its sensitivity to moisture. An additional challenge has been the occurrence of anomalous hysteresis in the current-voltage curves of perovskite solar cells. Hysteresis is when the output of a system is dependent on not just the input parameters, but also on the path used to reach the measuring point. Such a quality creates additional concerns in the stability of the material—concerns that Mitzi and his group are actively working to solve.

“My research seeks to take us to a place where solar energy can be a mainstream method of generating electricity,” said Mitzi. “In our energy-defined society, such research in material science and engineering promises an exciting future where solar cell technology will revolutionize our energy dependence and limitations.”

Mitzi views these numerous challenges through a materials perspective—looking at the interface between material structures and device properties and how one might model devices with such materials. In addition to perovskite materials, Mitzi is exploring other options such as chalcogenide materials based on the kesterite crystal structure. Here, the key is to design a system with little or no atomic disorder, which—when present—can negatively impact device performance.

Although the challenges for the design and refinement of solar cell materials are immense, Mitzi and his group are leading the charge in engineering materials that could lead to an energy revolution.

Grace Ying is a sophomore majoring in biomedical engineering.
Testing the Waters
with Innovative Technologies

Along the coast of California, sewage and fertilizer pollution has resulted in an “acidification hotspot” that extends larger than some U.S. states. These pollutants cause algae blooms that raise the acidity of the waters, which in turn has downward-spiraling effects on all levels of marine ecosystems. Although the ramifications of ocean acidification can be seen across the globe as one of the deadliest threats to ocean health, few tools exist that can detect changes in ocean pH. Ocean acidification is poorly documented in high latitudes, coastal areas and the deep sea, and existing sensors are often expensive and inaccurate.

Fortunately, 13 teams remaining from an initial 77—with backgrounds ranging from surfboard engineers to well-known names in the field of oceanography to high school rookies—are competing to alleviate this detection problem. The Wendy Schmidt Ocean Health XPRIZE competition hopes to improve the world’s understanding of ocean acidification by challenging teams to develop the best ocean pH sensing technologies. Two prizes are available: the $1 million Accuracy award for the most accurate and stable sensors and the $1 million Affordability award for the most precise, yet cost-efficient sensor. Blue Devil Ocean Engineering, made up of students from the Pratt School of Engineering and the Nicholas School of the Environment, is one of the 13 teams remaining in this vigorous 22-month-long competition.

The competition officially launched in San Francisco on September 9, 2013, and since then the Blue Devil Ocean Engineering team has been hard at work designing the most robust and low-cost sensor. The team proposes to use a multi-metal electrochemical cell to measure ocean pH based on the simple and cost-effective technology of soil pH meters.

Essentially, both types of sensors involve
simple meters that measure the potential generated by two metals. To address the problems of fouling and corrosion, and the possibility of the potentials being sensitive to various chemical potentials besides pH, metal diversity was used in their prototype sensor. Copper, zinc, aluminum, tungsten carbide, titanium, nickel, brass, 316 stainless steel and bronze rods are arranged into a multi-metal pH sensor head, in which the metal potentials are measured by an amplifier system on a microcontroller board. The overall sensor form factor is made with PVC, with the sensor package encased with epoxy to withstand 3000 meter water depth.

Although all teams submitted their prototypes in July 2014, the final results of the competition will not be revealed until July 2015 due to the intensive lab, coastal and sea trials that take place in the interim. Teams’ sensors that successfully complete laboratory testing move to large saltwater tanks in Monterey Bay, CA, to test accuracy and to test performance in areas of such “acidification hotspots” along the coast of California. Evaluation of the sensors continues in Seattle Aquarium—where the team’s sensors are now—to test highly variable conditions from Puget Sound. Finally, testing concludes with the high-pressured depths of the open ocean near Hawaii to test stability.

The ultimate objective of this competition is to develop the most accurate and affordable pH sensor, but it also seeks to catalyze ocean acidification awareness and research. New sensing technologies allow for better knowledge on the state of ocean acidification, hopefully inspiring industry and the public as a whole to be involved in solving this issue.

The innovation of the Blue Devil Ocean Engineering team toward addressing the problem of ocean acidification further instills hope: any team needs only to briefly “test the waters” of a new project before diving right in.

Rachel Yang is a freshman planning on majoring in biomedical engineering.
Duke’s Center for Global Women’s Health Technologies (GWHT) is an entity that, in the words of senior mechanical engineering major Mikayla Wickman, “refuses to be compartmentalized.” Started in 2013 and led by Nimmi Ramanujam, professor of biomedical engineering, global health and pharmacology, GWHT operates at the intersection of engineering, global health and education. It consists of three staff members as well as numerous graduate and undergraduate student fellows.

The center’s mission is to increase research, education and training in women’s health and empowerment on a global scale. This mission involves a two-pronged approach: education and research. According to Marlee Krieger, research project manager in Ramanujam’s laboratory, these two aspects are somewhat loosely separated into the “center”—focused on education and implementation—and the lab—focused on technological innovation. GWHT approaches design challenges like these by first considering the cultural, economic and political settings in which these solutions are to be implemented. In many cases, standard Western technologies will not be sustainable. They must be reverse-engineered and subsequently reimagined to be applied in resource-limited settings.

As GWHT looks to improve the quality of life for women worldwide, these technologies are developed to be widely accessible and unobtrusive. An example of one such technology is GWHT’s imaging tool for cervical cancer detection. According to the center’s website, over 85 percent of cervical cancer deaths occur in developing countries because resource limitations prevent the regular screenings and multi-visit approach commonly seen in countries such as the United States. To streamline the process of cervical cancer screening, researchers at GWHT developed a transvaginal digital colposcope—an optical device similar in size and shape to a tampon. This device is inexpensive, accessible to low-resource clinics and mitigates some of the discomfort for women in developing countries who might be unfamiliar with traditional screening tools. This technology, which has been used to examine more than 60 patients, will be deployed in the summer in East Africa, India and Peru.

Integral to the mission of GWHT is to engage students in the STEM fields by providing multidisciplinary learning experiences related to women’s health. GWHT’s goal is to expose students to the rewarding possibilities of careers that integrate technology and global health. The center looks to increase educational opportunities in the academic disciplines of science, technology, engineering and math (STEM) for young women around the world.
Integral to the mission of GWHT is to engage students in the STEM fields by providing multidisciplinary learning experiences related to women’s health.

Senior GWHT fellows Mikayla Wickman and Kendall Covington traveled to Muhuru Bay, Kenya, this summer to bring their engineering experience and enthusiasm to the all-girls secondary school started by WISER NGO, which was founded by Duke professor Sherryl Broverman, whose mission is the social empowerment of underprivileged girls. Mikayla, Kendall and GWHT fellow Christine Schindler worked closely with Broverman, WISER faculty, Ramanujam and GWHT staff member Christine Mulvey, PhD, to develop a curriculum for an engineering club at WISER.

The engineering club worked to build up science and engineering concepts for a culminating project in which the girls built their own flashlights incorporating local materials and renewable energy, using mechanical cranks and squeeze mechanisms to charge a rechargeable battery that powers the flashlight. The GWHT fellows who created the program chose the flashlight after in-depth discussions with Broverman in part because the resistors and circuit boards that are commonplace in a Duke lab would be novel and exciting to the girls at WISER. But mostly they chose the project because of the need for light at the school using renewable energies and because, according to Broverman, access to light is a gender issue in Kenya.

According to Mikayla, the Kenyan classroom is “characterized by call-and-response,” and she found the students to be “wonderfully competitive and driven,” making it the ideal environment to implement their curriculum. At the end of the flashlight project, Mikayla and Kendall organized a nighttime flashlight scavenger
Mikayla Wickman, Kendall Covington and engineering club member Nimon at the WISER school in Kenya.
hunts on WISER’s soccer field. In what Mikayla described as a “lightbulb moment,” it became clear that the flashlight project was not only an educational tool, but also a practical tool for the WISER girls: they used them to study during power outages, and to provide extra security while walking home at night.

GWHT’s educational efforts are continuously expanding and evolving to reach more students in new locations. One of the latest developments is a collaboration with DukeEngage. Christine Mulvey, a research scientist in Ramanujam’s laboratory, worked to initiate a partnership with a GirlsInc location in Orange County, CA. GirlsInc runs many summer programs but has identified a need for more programming related to STEM fields.

Mulvey found this particular location interesting because of the socioeconomic dichotomy in the area. Although Orange County is typically thought of as affluent, this GirlsInc site serves a population in which 70 percent of households have annual incomes under $30,000. GWHT will be responsible for selecting DukeEngage applicants for the Orange County site beginning in the summer of 2015. Participants will develop a curriculum before arriving on-site in California, where they will implement it and train volunteers to do the same. The curriculum will change each summer and could potentially be adopted by GirlsInc on a larger scale. DukeEngage participants can continue to work with GWHT once returning to Duke in the fall. The renewable energy flashlight curriculum is also going to be implemented by students in Kolkata this summer, by students participating in Professor Baishaki Taylor’s DukeEngage program.

GWHT represents the type of interdisciplinary innovation that is part of the mission here in Pratt. It has been highly successful in inspiring the next generation to use technology to develop solutions to problems that are meaningful to them. Evidence of this success can be seen in the continuation of the WISER engineering club as well as Mikayla and Kendall’s new initiative called Worldwide Empowerment of Women Engineers (WEWE, meaning “you” in Swahili), which has raised over $6,500 to provide supplies for a 120-flashlight campaign, allowing the local engineering club to start providing “torches” to all of the students in the school. Kendall and Mikayla are also stepping into the lab to begin designing a wind-powered back-up generator for the WISER campus, which will double as an educational tool for future Engineering Club activities. Their efforts create a full circle that embodies the ideals of sustainability and interdisciplinary that lie at the core of GWHT.

Katherine MacAdam is a senior majoring in mechanical engineering.
Buying professional prosthetics is no casual decision—certainly not for young children, whose rapid growth necessitates new replacements every few years. In reality, a single prosthetic device can cost in excess of five thousand dollars. But for Dillon, an eleven-year old boy from Durham, his reality was that a solution for his underdeveloped hand (a palm, but no fingers) didn’t even exist yet. That’s when DukeMakers entered the picture.

One of the youngest student organizations on campus, DukeMakers was launched in January 2014. Spanning multiple disciplines—including mathematics, biology, visual arts and engineering—the 30 active members of DukeMakers include both undergraduates and graduate students who hold strong interest in 3D printing. Together, they form a functioning node of the global Maker Movement—a niche composite of inventors, designers and artists who embrace open-source learning in both the arts and popular technology.

Although additive manufacturing (3D printing’s most basic operational concept) is not new technology, it has successfully captured the imagination of the public. Over the last half decade, 3D printing has seen large, multifold increases in its accessibility. Today, powerful 3D modeling software, like Sketchup, is even available for free. Commercial 3D printers with resolutions of one hundred microns are also now available for around $1,500—a measly fraction of traditional manufacturing setup costs. Never before in the history of manufacturing has rapid prototyping and customized production been more accessible.

Reluctant to eschew the vast potential of 3D printing, DukeMakers has quickly taken full advantage of the resources
made available to it. In just nine months, DukeMakers acquired or built three fully functional 3D printers—and five more are soon on their way. These five remaining printers are being built by DukeMakers’ organized printer teams, guided not by bare bones, but open-source instructions from the Internet. Members of these teams gain hands-on hardware experience that can go beyond what is taught in ECE courses, imparting a unique sense of ownership to them as they successfully conclude these demanding endeavors.

Although DukeMakers had only existed for a month when Dillon’s friends and family asked the organization to find a solution, DukeMakers eagerly accepted the challenge. With modifications of preexisting hand designs, juniors Ouwen Huang and Suyash Kumar were able to slash the price of a customized functioning prosthetic hand from thousands of dollars to less than fifty.

Having researched preexisting 3D models of prosthetic hands and resized their components before, Ouwen notes, “The prosthetic can be developed as Dillon grows. When it becomes too small for him, we can print out a slightly larger version of the hand, assemble and prepare it, and deliver it to him with ease.”

Dillon’s satisfaction with his new printed wrist had reverberated within the Durham community and more entities have reached out to DukeMakers in hopes of partnership ever since.

In a similar vein, the Sand for Life Solutions approached DukeMakers to create the molding parts for a biosand filter. Biosand filters are large concrete filters packed with sand and gravel that filter contaminated water into cleaner water ready for drinking, but are normally machined from steel band and cost up to a quarter of a million dollars each. Ying Wang, an ECE junior and the president of DukeMakers, personally modeled and printed the necessary components of a biosand filter—with processes and materials summing to less than $200. With large-scale 3D printers and filament extrusion devices, Ying commented that the costs could be reduced to just over five dollars.

With each tenth of a millimeter of plastic extruded from their 3D printers, DukeMakers comes one step further than it did when it started just months ago. Recently, the club brought 20 members in its visit to the World Maker Faire in New York City, making connections with next-generation manufacturing giants like Shapeways. Optimistic about the club’s future, senior visual arts and computer science major Rebecca Lai remarks that 3D printing could “reshape industries and perhaps the world.” Driven by collaboration, action and the vast life-changing potential still left unexplored in 3D printing, DukeMakers continues to search for more work and more partners.

Henry Quach is a sophomore majoring in mechanical engineering.
Duke’s iGEM Team Takes Gold in Boston

The International Genetically Engineered Machine (iGEM) competition is a new kind of science fair. Undergraduates, graduate students, and even some enterprising high school students form teams and represent their schools at an international research conference, or jamboree.

In November 2014, the Duke iGEM team took part in the annual competition in Boston called the Giant Jamboree, where teams presented on everything from making a touchscreen device with bacteria to eliminating microplastic pollution in water. About 2,500 students from all over the world participated, and at the end of their presentations, teams were awarded bronze, silver or gold medals, depending on the quality of their project.

The judges were impressed with Duke’s iGEM team’s novel use of 3D printing technology and its DNA synthesis protocol, earning the team a gold medal after months of hard work—the first time the Duke team has won gold, having won silver last year.

Competing in Boston

Duke’s iGEM team attempted to improve the CRISPR/dCas9 system. CRISPR/Cas9 is a naturally occurring form of defense against viruses. The system uses small RNA sequences to guide an enzyme (Cas9) to a target sequence of foreign DNA, which the Cas9 protein then degrades. This prevents the foreign, usually viral, DNA from replicating in the bacterium and eventually harming or killing it.

The dCas9 enzyme is a modified version of the Cas9 protein that does not cleave DNA but instead represses its replication process. Scientists have begun to embrace the CRISPR/dCas9 system of genome modification due to its ability to target specific genetic sequences extremely accurately and modify gene expression without actually modifying the gene itself. Its limitation lies in the fact that it can’t be confined to two discrete levels of activity, like being either on or off. Moving past this hurdle would vastly increase the number of potential uses for the system, allowing scientists to have either traditional or switch-like CRISPR behavior, depending on the needs of the system.

Applications of this ultra-sensitivity would be bi-stability and scalability, i.e., a biological toggle switch that can be mass-produced. This has useful applications in the emerging field of gene circuitry, especially because the CRISPR/dCas9 system is so sequence-specific. Find out more about the Duke team’s research by visiting the team wiki at http://2014.igem.org/Team:Duke.

Several of the Duke iGEM team at the Boston Jamboree.
From left to right: Mike Zhu, Matthew Faw, Delta Ghoshal, and Garima Tomar.
The Human Side
The iGEM program places a large focus on exploring how synthetic biology affects the public, due to its potential benefits and its perceived risks. The Duke team set out to answer the question, “How can we improve access to synthetic biology?”

The first problem the team noticed was the prohibitive cost of lab equipment. The team, specifically Matthew Faw (BME/ECE ’17), designed and 3D-printed several prototypes for lab equipment. From a test-tube rack to a small roller drum, the result was an average price reduction of 98 percent. 3D-printed tools have the advantage of customizability—different labs can print different versions of the same tool to best suit their needs.

The Duke team next tried to tackle the problem of synthetic biology education within Duke University itself. They have designed a house course that will be taught in the spring of 2015 by members of the iGEM team. This course will focus on the ethics and policies behind synthetic biology to educate Duke students on the controversies, ethics and immense potential of synthetic biology.

The third aspect of the Duke team’s policy and practices project was to help another iGEM team get their project started. The team assisted a local high school—the North Carolina School of Science and Mathematics (NCSSM)—in beginning their own team and designing their project, which will be presented at next year’s Jambooree. One of the team members, Garima Tomar, a current senior at NCSSM, serves as the liaison between the schools.

An Eye to the Future
The team is looking to the future and welcomes new members. Due to the interdisciplinary nature of engineering and synthetic biology, iGEM welcomes people from all academic fields, from science and engineering to public policy and political science. If you are interested in being a part of Duke iGEM, consider signing up for our house course to be taught in the Spring 2015 semester, and watch out for an application to join the team! For more information, please feel free to contact dukegemclub@gmail.com.

Delta Ghoshal is a sophomore member of the iGEM team, majoring in biomedical engineering with a certificate in genome science and policy.
A Decade of DEID

Today, it takes a student in San Jose Villanueva, El Salvador, three hours less time to get to school than it did five years ago, a Brazilian family has reliable access to water, and a Ugandan vocational school can offer boarding and education to women.

All because of a Duke engineer.

Undergraduates in the Pratt School of Engineering are engaged, motivated students who are passionate about improving the world around them and the lives of people all over the globe. And yet it can be difficult for students—especially underclassmen with little practical and academic experience—to find opportunities to effect tangible, substantial change in the world. With an eye toward this challenge, Duke Engineers for International Development (DEID) is a student organization that works to provide students with just that.

Now in its 10th year, DEID was born out of a long and illustrious presence of engineers on Duke University’s campus working tirelessly to use their knowledge and resources to make an impact on the world. The organization comprising undergraduates from all disciplines aims to design and implement impactful, engineering-related solutions around the world while developing students’ senses of civic responsibility, technical skills and intercultural understanding of what it means to be a part of a sustainable, global community.

This past summer, DEID sent teams of about eight students to four different locations: El Salvador, Uganda, Rwanda and Brazil.

In El Salvador, DEID constructed a piping system, 9,000-liter water tank and plate settler system in La Estancia. This was DEID’s fifth year working in El Salvador on a variety of projects ranging from bridges to rainwater catchment systems. DEID partnered with a non-governmental organization in Uganda—Bringing Hope to the Family—to construct two 1,800-square-foot classroom blocks for the New Hope Vocational School in Kyongera. In Rwanda, DEID worked with the national non-profit Bridges to Prosperity for the fifth time to build a pedestrian footbridge to replace an existing, unsafe log bridge used by hundreds each day. And in Brazil, DEID coordinated efforts with students of the Universidade Federal da Paraíba to build two water tanks and a rainwater collection/distribution system for the community of Santo Amaro.

Next year, DEID plans to return to Brazil and Rwanda where teams will construct a sustainable housing complex and a pedestrian footbridge, respectively, with the latter being a joint endeavor with Bridges to Prosperity. DEID will also restart its domestic program by implementing a project in Durham over the
The footbridge constructed in 2014 in Rwanda

The footbridge constructed in 2014 in Rwanda

spring semester. Students will also make an assessment trip to Costa Rica to evaluate potential projects in Gran de Oro, including a medical clinic, footbridge and water collection system.

While expanding its reach and ability to solve problems internationally, DEID continues to ensure that its projects create the highest impact and are of the highest quality. In doing so, students are provided the opportunity to make a real, noticeable change in the world during their undergraduate careers. One of the most remarkable aspects of the organization is that the students and the communities in which they work grow in tandem, each learning from the other. Between the personal connections and memories made, students gain much more than just design and engineering experience by participating in DEID.

As the group reflects on its past decade of bringing practical design opportunities to undergraduate students and impactful solutions to community-expressed problems all around the world, it is excited to also consider its potential for growth in the coming years in its capabilities, responsiveness and reach.

To find out more about DEID, or to make a contribution to the organization, visit sites.duke.edu/deid/ or facebook.com/pratt.deid.

Matt Tobin is a sophomore double-majoring in mechanical engineering and physics. He serves on the executive board of DEID as the vice president of publicity and as a project leader for the Brazil team.
New Minor, New Initiative
Energy Engineering at Duke

Over the past several decades, concerns surrounding how energy is acquired, converted and expended have grown in importance and complicated the lives of engineers. In 2013, the Pratt School of Engineering responded to these new challenges with the introduction of the Minor in Energy Engineering. This comprehensive program is intended to give Duke students the appropriate background to handle the complex and evolving issues surrounding the ways energy is used and produced.

Marc Deshusses, professor of civil and environmental engineering and director of the Energy Engineering program, says that the initiative began when Dean Tom Kat

“Many professionals would have enjoyed more formal courses in the energy field.”

soulaes formed a committee to look into how Duke engineering could better prepare its students for a world preoccupied with energy matters. The committee recommended the creation of an energy engineering major. Deshusses, whose research interests include biofuels and bioremediation, as well as Josiah Knight, professor of mechanical engineering and co director of the Energy and the Environment Certificate, were given the directive to construct a curriculum with the committee. After close consultation with the Engineering Faculty Council (EFC), the decision was made to create a minor that would be taken in addition to a primary engineering major with the long term goal of creating a major.

There had already existed a Certificate in Energy and the Environment program, offered through Duke’s Gendell Center for Engineering, Energy and the Environment. However, the certificate provides a more general education with less of a focus on the applied sciences. Deshusses explains that the Energy Engineering minor is intended to provide a more technical understanding of the subject and is for Pratt students only.

According to a survey Deshusses conducted of alumni and professionals in related fields, there is an overwhelming demand for graduates with a technical understanding of energy and energy technologies, an indication that the Pratt School of Engineering could benefit from an energy engineering minor. Specifically, Deshusses mentioned that the survey results indicated, Many professionals would have enjoyed more formal courses in the energy field.

Neil Simmons, a professor of mechanical engineering who also teaches the Special Topics class Energy for the Built Environment, describes Duke as a natural fit for a focused course of study in energy engineering. As he sees it, Duke has a strong background in energy studies due to the work conducted by the Sanford School of

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The building of a hydroturbine

Public Policy as well as the Fuqua School of Business, the Pratt School of Engineering and other schools. Coupled with the accelerating societal importance of the subject and the relative novelty of having a concentration in energy engineering, it seemed appropriate for Duke to take on this endeavor and stand out as a leader in the field.

The academic structure of the minor is as follows: one required core course, four electives in two general categories (Generation and Delivery, Conversion and Efficiency), and a capstone design course. As of Spring 2015, sixteen students have formally declared for the minor. Moving forward, Deshusses notes that the minor will need to increase course offerings. He and the school are currently working to expand selections to provide a diversity of topics. The expansion of the current curriculum is also due in part to the overwhelming enthusiasm from students, as some classes have reached their enrollment caps in the past two semesters.

Another example of how Duke and its supporters are channeling more resources toward energy studies and studies of the environment is through the establishment of the Gendell Center for Engineering, Energy and the Environment. A product of the generosity of Duke alumnus Jeffrey Gendell T’81 and his wife, Martha Gendell, the center was created to provide students with both technical and non-technical knowledge of the issues facing the environment and consumption of energy. The center’s initiatives range from improving course variety in energy studies to providing a meeting ground for leading academics and professionals in the field.

The Energy Engineering minor is also supported by Duke’s Energy Initiative, which is a strong push by the university to develop research opportunities as well as educate students on topics concerning energy. With forward thinking from the Pratt School of Engineering and the creation of the Gendell Center, Duke and its graduates are well-poised for dealing with future challenges in the energy field.

Nicholas von Turkovich is a sophomore majoring in electrical and computer engineering and computer science.
Digitizing DukEngineer

With the help of Duke’s Digital Production Center, all 74 years of DukEngineer magazine are now available online.

When you’re perusing seven decades’ worth of prose from mostly unguided undergraduate engineers, there are bound to be a few surprises—as the team at Duke Libraries who digitized the entirety of the DukEngineer’s archives found.

They turned up detailed explanations of how drinking-bird toys work and coverage of the latest egg-drop competition; lengthy technical articles on microelectronics and aeroelasticity alongside poems celebrating spring on campus; odes to the slide rule and earnest discussions of the newfangled television; painstaking diagrams of complex systems and cartoons poking fun at faculty members; jokes in questionable taste (that were routinely questioned by administrators at the time) and even—for a few misguided midcentury years—a Girl of the Month feature highlighting “co-eds” on campus.

One of the longest-running student publications at Duke, DukEngineer was founded in May 1940, during the first academic year of the College of Engineering, with the hopes (as its editor put it) that “This publication will develop into a record of the progress at the College of Engineering.”

It began as a free, mimeographed publication, but rapidly took on a more professional air, asking for a paid subscription of $1.00 per year and then $1.50. There were also pages of paid advertisements in the ’40s and ’50s from companies such as IBM, Westinghouse and US Steel. At the height of its businesslike boom, the post of magazine editor was hotly contested, with election races written up in the campus newspaper. Over the years, though, the ads and paid subscriptions were dropped, and the pace of the issues began to slow.

The magazine skipped a year in 1976-1977 with little more than a note in the subsequent issue about the student volunteers getting refocused and reorganized as an explanation. In the 1980s the publication merged with the engineering alumni magazine; it is currently mailed free to 11,000 alumni and friends once each year. And, of course, it’s still chronicling Duke Engineering from the perspectives of its students.

“It’s interesting to see how DukEngineer has changed over the years,” said Melanie Sturgeon, librarian for engineering, physics and computer science. “It used to be more of a social newsletter, using only people’s first names or nick-
names, and talking about clubs and societies or who got pinned or engaged. And then there were the war years where students dressed in uniform for class and the issues included reports about students who had been killed overseas.”

Sturgeon got a first-hand view of the publication’s metamorphosis as the lead on the project, which began when she started making inroads in the Pratt community as the new engineering librarian. Minnie Glymph, director of communications for Pratt, suggested that the Library could help preserve the history of the school by digitizing the entire DukEngineer collection in celebration of Pratt’s 75th anniversary.

Sturgeon jumped on the idea and soon began rounding up all of the old issues. Most were bound together in the Library Service Center, but for scanning purposes, loose issues were preferred. Sturgeon hunted for these in the University Archives as well as in the boxes upon boxes of old issues collecting dust in the basement of the Teer engineering building.

When the idea was first put forth to digitize the entire canon of the student-run DukEngineer magazine, it seemed like a straightforward proposition. The school was celebrating its 75th anniversary, so there should be roughly 75 issues of a few dozen pages to scan into the archives.

Nobody realized that at different points in its history, the magazine had published up to six times per year. All told, Sturgeon ended up with 205 issues comprising 9,065 pages of Duke engineering history that needed scanning. And Duke’s Digital Production Center (DPC) was more than equal to the task.

“The digitization of the DukEngineer wasn’t even all that big of a project for us,” remarked Zeke Graves, a digitization specialist with Duke Libraries. “But it certainly was an interesting one.”

After rounding up the issues, Sturgeon handed the project off to Molly Bragg, a projects coordinator in DPC, whose digitization team relied on some good old-fashioned German engineering to get the project completed before spring commencement.

The workhorse of the digitization process was a Zeutschel scanning machine, which looks a bit like a gigantic modernized overhead projector. The technician manning the station opens the document and lays it as square as possible under a piece of glass. A horizontal line of light quickly scans down the document while the overhead camera tracks and images its progress. Once the light reaches the bottom, the Zeutschel is ready for the page to be flipped so the camera can scan back up.

The scanner automatically corrects the white balance and alignment of the document. It also automatically crops, skews and splits the pages. When humming along smoothly, it can record up to 200 pages an hour of searchable text, meaning that nobody has to scan through 9,065 pages to find something specific, they can simply search for a name or keyword.

After a month’s work, the entire collection was scanned and ready to be massaged together into a digital collection. DPC checked that all the metadata was correct, the editions were complete and the scans were of the best quality they could be.

Now all that’s left is for people to read it. Who knows what other sorts of interesting artifacts are lurking in all those scanned pages?

“One of the most interesting articles I came across was on the collapse of the Tacoma Narrows Bridge,” said Sturgeon, speaking of the ill-fated Washington bridge that collapsed in 1940, mere months after its completion, after having twisted and wiggled about like a Jell-O mold. “I had studied the incident as an undergraduate in engineering, and here were Duke students in the magazine’s second issue ever analyzing the failure and why it happened.”

It just goes to show that, even 75 years ago, Pratt students have enjoyed finding practical solutions to problems. And writing about them—for DukEngineer.
**1940s**

**William H. Wetmore, Jr. E’43**, after graduation, served in the US Navy in the European Theatre and was there for the invasion on June 6. After leaving the Navy, he went to graduate school at Lehigh University. He then went to work for GE on the first axial flow jet engine (J47), then in the military space program [director of the first military communication satellite system (after Telestar)], then went to the National Science Foundation in basic research, where he was the director of engineering science for 15 years, then to the University of West Virginia as associate dean of engineering. He was on the engineering faculty at both Lehigh and UCLA. Everything he did at Duke and after Duke has been a challenge, but fun. He has been blessed to have responsibilities that tested the spirit and to work with wonderful people. For the past 20 years, he has been writing a series of books on theology. Six books have been published and two are now with his publisher. Duke has been and will always be a wonderful experience and a great memory.

**William B. Gum E’45** and his wife Constance celebrated their 62nd anniversary. They are both very well, active, and enjoying life.

**Harold Ornoff E’45** recently celebrated his 91st birthday with his two daughters, five grandchildren, and seven great grandchildren. He is enjoying life, attending to his hobbies of coin collecting and stamp collecting, and trying to stay active.

**John J. Geier E’46** recently participated in an Alzheimer study that was published in the March 11, 2014, issue of the *Democrat and Chronicle* (out of Rochester, NY) titled “A Potential Game Changer: Promising UR study might allow early detection of Alzheimer’s.”

**1950s**

**Edgar C. Fox, Jr. E’51** has a third generation engineer going to Duke—his grandchild Carolina Ayanian. Her mother, Anne Ayanian, graduated from Duke with a mechanical engineering degree in 1982.

**Malcolm G. Murray, Jr. E’52** has continued writing articles for various publications since retiring from the company now called ExxonMobil in 1982 and selling and giving away his small business, Murray & Garig Tool Works and Rescue Reflectors, Inc., in 2011.

**Harold Richard “Dick” Kessler E’59** is enjoying his 22nd year of retirement playing with his two grandchildren and building stuff for them. He is growing older and being amazed at the changes in technology and society. He is watching to see how the new graduates handle life and the changes in our world.

**1960s**

**James J. Ebert E’61** retired in 2007 but still substitute teaches in Guilford County.

**Robert F. (Sonny) Epps III E’63** remarried on October 21, 2012. His wife is the former Cynthia Brazell, who is a deacon in the Lutheran Church. He is enjoying living on Lake Murray and being close to his three grandsons in Columbia. Their mom is the former Amy Lynn Rawl (Duke class of 1993), who is a cardiologist in Lexington, SC.

**1970s**

**Paul S. Follansbee E’72** published a book titled “Fundamentals of Strength – Principles, Experiment and Applications of an Internal State Variable Constitutive Formalism.”

**1980s**

**Richard C. Gaskins, Jr. E’80** writes, “I am enjoying life as a grandfather and as executive director of an environmental non-profit. I recently received the Charlotte Sustainability Award for Water and the James S. Dockery award for environmental leadership in the southern United States.”

**Stephen M. Hunt E’80** now works for Novetta Solutions as an enterprise data manager. In July 2013, he was appointed to the Fairfax County Electoral Board, where he serves as the vice chairman.

**Murray R. Snyder E’82** is a professor in the mechanical and aerospace engineering department at George Washington University in Washington, DC. He is also a research professor at the US Naval Academy, where he is principal investigator for the Center for Air Wake Studies, which supports US Navy rotary wing aircraft research and development.

**Robert A. Canfield E’83** received the American Institute of Aeronautics and Astronautics (AIAA) Multidisciplinary Design Optimization Award at the AIAA Aviation Conference in Atlanta, GA, on June 19, 2014.

**John M. McDonald III E’83** is very pleased and proud to report that his son, John IV, is a rising sophomore at Pratt studying mechanical engineering. The apple does not fall far from the tree.

**Mark M. Murray E’86** was promoted to full professor at US Naval Academy’s mechan-
ical engineering department. He was assigned first program director for the newly established nuclear engineering major.

1990s

Patricia M. Barr E’90 has published her first novel, a space opera epic called “WYNDE.”

Susan B. Beauchamp E’90, B’97 runs her own business offering project management, strategic leadership, and training using lean six sigma expertise and senior consultant experience. She is grateful to Duke for giving her the confidence to use her love for math and science to offer herself career freedom and the opportunity to create new services to renew herself and her business over time.

Ronald R. Richardson G’92 was recently appointed deputy program manager for the Defense Health Management System Modernization Program—a $12 billion program to replace the legacy DOD electronic health record with an off-the-shelf solution. The new system will enhance interoperability with the Veteran’s Affairs (VA) health system and drive health data exchange standardization initiatives in cooperation with the Office of the National Coordinator (ONC).

Nicole Sabine Finger E’93 is a principal consultant with Daugherty Business Solutions. She lives in Dallas, TX, with her husband Sam and their son Andrew.

Stephen D. Williams E’93 and Kara Williams are proud to announce the birth of their third child, a beautiful baby girl, Taylor Bielle Williams. She was born on August 29, 2014, in Waconia, MN, at Ridgeview Medical Center and weighed 7 lb., 8 oz. Mom, dad, and siblings Caroline (6) and Drew (4) are doing great.

John A. Rule E’92, E’94, G’97 is a research and development leader at Bose Corporation. He recently welcomed a fourth child, Natalie Anne Rule, with his wife Tiffany T’93 and three sons Parker, Davis, and Chase.

Sara A. Grube-Edwards E’95 and her husband, Keith, would like to announce the birth of their son, Connor Otis Edwards, on February 12, 2014.

Nicholas A. Moraites E’95 and his wife, Ashley, would like to announce the birth of their daughter, Penelope Anastasia, on May 2, 2014.

Robert J. Waldner E’95 is still living in New York and working as a lawyer, but the big news is that he just published his first novel, called “Peripheral Involvement.”

Kristine M. Singley E’96, B’07 and her husband, Alec Ras, would like to announce the birth of their son, Charles Alexander Singley Ras, on December 14, 2013, at 9:47 am. Charlie weighed 8 pounds, 3 ounces and was 20 inches long.

William M. Houston E’98 and Lauren Houston are proud to announce the birth of their first child, Drew Michael. He was born on November 28, 2013, in Philadelphia and weighed 8 lb., 6 oz.

Gerald S. Meyer E’98 and his wife, Gina, are proud to announce the birth of fraternal twin boys, Danny and Drew. They were born on January 4, 2014, in Norfolk, VA. Gerald was also recently promoted to vice president, general manager at Legal Resources located in Virginia Beach, VA.

Lindsay Johnson Chang E’99 and Joseph Chang are happy to announce their marriage on November 29, 2013.

Riley W. Murdock E’99 and her husband, Jamie, are proud to announce the birth of a baby girl, Sydney Jean. She was born on April 4, 2014, in Memphis, TN, and weighed 7 lb., 12 oz. She joins her big brother Robin (2) and arrived just in time for the family’s move to Virginia Beach, VA.
2000s
Brian M. Stempel E’00 and Kathryn Coulombe Stempel T’02 are proud to announce the birth of a baby boy, Evan James. He was born on October 21, 2013, in Raleigh, NC, and weighed 8 lb., 9 oz.

J. Nathaniel Day E’01 and his wife would like to announce the birth of their fourth child, Peter Wesley Dutton Day, on September 14, 2014, at 2:14 am. He weighed 8 lbs. and was 20½ inches long. His big brother and sisters were thrilled to meet him, and mom and dad are doing great!


Mia K. Markey G’02 received her BME PhD in 2002 and is now a respected leader in breast cancer research. She is a professor of BME and an engineering foundation endowed faculty fellow at UT Austin, and an adjunct professor of imaging physics at MD Anderson. She has received numerous research and teaching awards from the American Medical Informatics Association, American Society for Engineering Education, American Cancer Society, and Society for Women’s Health Research. She is a fellow of the American Association for the Advancement of Science (AAAS) and a senior member of both IEEE and SPIE.

Jamie M. Alders E’04 and his wife, Erika T’02, would like to announce the birth of their son, Marshall Duke Alders, on April 19, 2014. He joins his two other siblings, Parker Bennett and Charlotte Carney.

Jeffrey M. Trost E’04 and Julia Hamilton T’05 are happy to announce their marriage on September 7, 2013, on Nantucket Island, MA. They currently reside in San Francisco, CA.

Pengyu Cheng E’05, X’06, since graduation, has been working in the medical device industry with Johnson & Johnson (Cordis Corporation) in Miami, FL, and currently with Biomet in Parsippany, NJ. He recently obtained his executive MBA degree from Columbia University in May of 2013. He is very glad to share the news with the Duke community that he and his wife will be relocating from their residence in West Caldwell, NJ, to the Bay Area of northern California as he starts a new job as the global supply manager with Apple, Inc. He feels that the amazing education he received from Duke University strongly helped to lay the foundation of his career and he will forever be grateful to this wonderful academic institution. He is looking forward to making valuable contributions to a great organization starting in April and representing Duke well by bringing his enthusiasm, dedication, and leadership to the workplace. It is also very exciting to know that his future CEO, Tim Cook, is also a Duke alum.

Michael S. Humeniuk E’07 and Katie Mary James would like to announce their marriage on November 2, 2013.

Addison W. Ferrell E’08 and his wife, Julie Matthews Ferrell T’09, are proud to announce the birth of a baby girl, Marie Christine. She was born on January 7, 2014, in Cincinnati, OH, and weighed 7 lb., 8 oz. She was also welcomed by her older sister Lydia (2).

Holly L. (Hackman) Ohlsson E’08 and Magnus Ohlsson were married on June 7, 2014, at the Duke Gardens.

Adam J. Dixon E’09 was awarded a Double-Hoo Research Grant from the University of Virginia, which funds pairings of undergraduate and graduate students who collaborate on research projects. Each project is awarded up to $5,000 toward research expenses, plus $500 in support to a faculty mentor. This year’s winners were selected from a pool of 50 applicants.

Kristeena L. Ray E’09 has been appointed to the position of West Virginia state director of the Nu Omicron chapter of Zeta Phi Beta Sorority, Incorporated. Kristeena has served the sisterhood well throughout her Zeta lifespan to include active participation in the Nu Omicron chapter and NPHC while at Duke and as secretary of the West Virginia executive board. There is no doubt that the state of West Virginia will continue to prosper under Ray’s leadership.

Margaret Hoff Hopkins E’10 and Adam Hopkins are happy to announce their marriage on October 5, 2013, in Rockford, IL. They currently reside in Brooklyn, NY.

Eric N. L. Thorne E’11 began working as an electrical/hardware engineer at Angaza Design, Inc. in January, developing pay-as-you-go finance technology for clean energy products—currently solar lamps in Kenya and Tanzania. He is happy to be getting closer to his engineering experience as well as back in the international development space—similar to his involvement with Engineers Without Borders (now DEID) while he was at Duke!
Donald M. Bernard, Jr. E'46 passed away on October 28, 2013.

James H. Corrigan, Jr. E'47, beloved and devoted husband, father, grandfather, brother, uncle, friend, and teammate, died on Monday, January 6, 2014, at his home at Arbor Acres. Jim was born in Buffalo, NY, on March 15, 1926, to Cleta and Henry Corrigan and grew up in Baltimore, MD. He enlisted in the Navy Air Corps in 1943, served in Air Intelligence, and was discharged as a Lieutenant JG. Jim graduated from Duke University in 1947 with a degree in mechanical engineering and met his wife of 62 years, Barbara, on a blind date in Atlanta. Following a quick courtship, they married and lived in Atlanta, where their daughter Ann was born; in Baltimore, where their sons Jim and Mike were born; and also Miami, before moving to Winston-Salem in 1967, where Jim joined RJR Archer. He was president of RJR Archer as well as RJR Foods before joining Mebane Packaging Company in 1980, where he became president and chairman of the board and retired in 1997. Jim drove to Mebane from Winston-Salem five days a week for 17 years, making the most of his travel time listening to books on tape. His community activities in Winston-Salem included serving as president of the Chamber of Commerce, and heading fundraising campaigns for the United Way and the Arts Council. He was a founder and director of what is now NewBridge Bank. He also served on the Parish Council and the Finance Commission at St. Leo the Great Catholic Church. Up until recently, Jim was a regular at the Stratford Rotary and a devoted Meals on Wheels volunteer. Jim was very active with Duke’s Pratt Engineering School, serving as chair and director of its Board of Visitors. He received the School of Engineering’s Distinguished Alumni Award. He also served on the Advisory Board of Duke’s Fuqua School of Business. After Jim and Barbara moved from Glen Echo Trail to Arbor Acres, they became involved in their new community, with Jim serving on the Arbor Acres board, joining the Men’s Club, and singing with the Sharps and Flats. Always welcoming with a big smile and a big heart, Jim loved his family and friends and kept up with everyone. He was always interested in their lives, often serving as counselor and advisor, and always there at every family event. Jim always showed up. And he never gave up, no matter how difficult the challenge, injury, or illness. Jim never lost contact with his Archer and Mebane comrades, attending lunches and dinners up until recently, as well as taking annual trips with his SAE fraternity brothers. A tremendous athlete all his life, he played lacrosse and tennis at Duke and was always a devoted golfer. He and Barbara enjoyed both golf and tennis at the beach at Litchfield and in the mountains at Hound Ears. Jim was also a full-time sports fan, particularly watching his grandchildren’s sports and Duke University’s basketball, football, and lacrosse teams and all golf tournaments. An avid reader, Jim had a stack of books, magazines, and newspapers nearby, as well as the daily crossword puzzle, keeping his mind as sharp as ever. His memory, his determination, and his sense of humor never failed. He is survived by his wife, Barbara Cronk Corrigan; daughter Ann Hopkins (Gerry) of Winston-Salem; sons Jim of Norfolk, VA, and Mike (Mitzi) of Charlotte, NC; eight grandchildren, Corri, Mary Kate, and Grace Hopkins; Keenan, Cole, and Drew Corrigan; and Abigale and Emma Corrigan; sisters Peg Smith Stegman of Frederick, MD, and Mary D’Ambrogi (Don) of Baltimore, MD; brothers Gene (Lena) of Charlottesville, VA, George (Mary) of Villanova, PA, and Dick (Sally) of Berlin, MD; and numerous godchildren, nieces, and nephews. Jim and Barbara are especially thankful for the dedicated and caring people who have helped care for Jim during the past year and a half, including the staff at Arbor Acres and Hospice. Online condolences may be made through www.salemfh.com.

Garnett L. “Jack” Ferguson, Jr. E'47 passed away in the early morning of January 17, 2014, just five days before his 87th birthday. Jack (Papa Bear, Paw Paw, Granddaddy Jack) grew up in Atlanta and went to Boys High. He was always an avid reader and in high school was active in the ROTC. He was proud to enter the Navy after high school and then continue his education to become an engineer at Emory before graduating from Duke. His family was always the most important thing to him, and he and his wonderful wife raised three beautiful daughters of whom he was very proud. He was committed to his wife Louisa and their 66 years of marriage is a testament to their love. He had several jobs before going to work at Lockheed, where he remained until his retirement in 1988 after 36 years. When he retired, he and Lou traveled far and wide around the world on cruises and across the US by car. When their travel slowed down, he became actively involved in the Lockheed Retirees Management Association, the Sons of the American Revolution (SAR), and the Old Guard. He became a speaker for the SAR and wrote and made hundreds of presentations over these last years to young and old groups around the south. He had a true gift for teaching and led classes in his church on many Sunday mornings.

William T. Henry E’47 passed away on Thursday, December 12, 2013.

Edward L. Koffenberger E’47, age 88 years, of Cokesbury Village, died September 21, 2014. He was born in Wilmington, DE, on July 4, 1926, the son of Arthur W. Koffenberger and Natalie T. Koffenberger. He graduated from P.S. DuPont
High School in 1944. He graduated from Duke University’s engineering school in 1947 with a BSME. At Duke, he was elected to Omicron Delta Kappa honorary leadership fraternity and Pi Tau Sigma honorary mechanical engineering fraternity. His illustrious athletic career included becoming Duke’s first two-time All American in basketball and was also an All American in lacrosse. He was named the outstanding amateur athlete in North and South Carolina in 1947. He later was inducted into Duke’s Athletic Hall of Fame and Basketball Wall of Honor as well as Delaware’s Athletic Hall of Fame. In 2008, he was honored as the first living legend by the Delaware Sportswriters and Broadcasters. He enjoyed working with young people and spent many hours volunteering coaching and officiating youth sports. He was an active tennis player, winning several Delaware Senior Olympic age group tournaments and participating in the National Senior Olympics. He retired from DuPont in 1989 after spending 42 years in a variety of Textile Fibers management jobs, first at plants in Richmond, VA, Camden, SC, Washington, VA, and Chattanooga, TN, and then for 22 years in Wilmington. He was part of the original development team for “Nomex” and retired as worldwide manufacturing manager for “Lyrica.” He and his wife are members of First Presbyterian Church of Newark where he was an elder, committee chair, and Sunday school teacher. His leadership, wisdom, and generosity will be missed by the church. He was also very active in New Castle Presbytery, where he served as treasurer for 14 years, as moderator, and on many committees. He was a member of Duke Engineering’s Board of Visitors for 15 years. He received Duke Engineering’s Distinguished Service Award in 2013. He also served on local boards of Pencader Hundred Community Center, Prison Ministry of Delaware, Master Gardeners, and as a docent at the Delaware Sports Museum and Hall of Fame. Ed married his high school sweetheart and they enjoyed 66 years of happy marriage and together. He will be greatly missed by his wife, Winnie, his ten grandchildren, and his five children: Ed Jr. and his wife Mary Ann; Barbara Chilcoat and her husband Ed; Laura Croom and her husband David; Charles and his wife Susan; and Carol Koffenberger-Jones and her husband Brian.

Billy B. Olive E’48 passed away on December 4, 2014. A Chevalier of the French Legion of Honor, recipient of North Carolina’s Order of the Long Leaf Pine, first and only awardee of the Triangle Intellectual Property Association’s Lifetime Achievement Award, recipient of Duke Forest’s Clarence F. Korstian award and Duke University’s School of Engineering Distinguished Alumnus award, beloved husband, and cherished father, grandfather, and great-grandfather, Billy Brown Olive filled his 93 years with life and love, and leaves a treasured legacy of achievements and memories for his family, friends, and colleagues. Mr. Olive was born in Fuquay Springs, NC, on November 6, 1921, to B. Ray Olive and Virginia Wood Olive. He enjoyed Hope Valley elementary and high school (a protest strike he led is featured in his music teacher’s memoirs), then enrolled in Duke University’s School of Engineering. World War II intervened and he entered the Army, first studying and teaching at the War College and then fighting in France and Germany with the 95th Infantry as part of what became known as the “Iron Men of Metz.” Mr. Olive’s service and his battle wounds earned a Purple Heart, two Bronze Stars, and other honors from the US as well as a knighthood (Chevalier de la Légion d’honneur) from the French government for his bravery and service in helping to liberate Metz from Nazi occupation. After the war and recovery from his injuries, he returned to Duke, where he completed his engineering degree. He then joined Westhouse’s International Division in New York. While working fulltime, he also attended and graduated from St. John’s Law School and met and married Denys Edwards, with whom he had three children. Mr. Olive moved back to North Carolina to become Fieldcrest Mills’ first patent attorney and then, in 1957, returned to Durham and founded the firm that now is Olive & Olive—the first private intellectual property firm in the Triangle and one of the first in North Carolina. The firm thrived as he protected inventions ranging from peanut harvesters and tobacco barns to knitting machines, sophisticated medical equipment, lasers, electronics, and computer technology.

No matter how busy, he always made time for his family and worked to instill in his children academic curiosity, a love both of science and of the liberal arts, and attention to detail. After his wife’s death in 1967, he was both mom and dad to his three teenagers, shepherding them through their driving years and into college. He and his family were blessed when he found love again with Eve Evans, an architect and eurythmist, to whom he had been happily married for over four decades at the time of his death. Throughout this time, his intellectual property practice continued to grow, with clients and colleagues around the world on every continent except Antarctica. His oldest daughter joined the firm after graduating from Duke Law School, ultimately becoming his partner and the other Olive in “Olive & Olive.” That made the firm the first intellectual property firm in the state to have a female partner. A few years later, it also became the first in the state to be racially integrated. His belief that all persons are created equal was genuine and practiced daily. Active in the community, Mr. Olive served as president of Duke’s engineering alumni; taught at the engineering school; wrote Duke’s first patent policy; co-founded the Triangle Land Conservancy (a bench in the forest was later dedicated in
his honor); founded the North Carolina Bar Association’s intellectual property law committee; fought to integrate the NC Bar Association; mobilized forces successfully to protect Duke Forest and New Hope Creek from commercial exploitation; worked for preservation of Durham’s black Crest Street community when construction of NC-147 threatened to destroy that historic neighborhood; and fought to ensure that environmental factors were not overlooked in the state’s road planning work. He also served on the vestry of St. Philip’s Episcopal Church. He and the firm continued his emphasis on civic responsibility, including support of Durham’s community soup kitchen and homeless shelter, Urban Ministries of Durham, both as founding supporters in 1983 and throughout the years since that time. Mr. Olive is survived by his wife of 43 years, Helen Eve Olive, his three children, and their spouses.

Harold M. Jackson II E’49, of Hendersonville, NC, passed away on March 8, 2014. He served in the USAF where he designed depot test equipment for USAF bombing. He read six books a month with no exceptions throughout his life. Hazen was a voracious reader, as an avid golfer, computer enthusiast, and community volunteer. He is survived by his wife, Mary, three daughters, one son, and 12 grandchildren.


Joseph L. Biggs E’50 passed away on October 29, 2013.

Emanuel J. Walker E’51 passed away on October 3, 2013.

David St. Pierre DuBose, Jr. E’54, age 82, passed away Saturday, April 19, 2014 at UNC Hospital.

Charles H. Pingree E’56, of Fort Wayne, IN, died March 1, 2014. Hazen was a true gentleman and a seeker of knowledge. These attributes were reflected in everything he did throughout his life until the day he passed away. Born August 27, 1933, in Detroit, MI, he was a son of Gilbert Bissell and Elizabeth Davis Pingree. He was the great grandson of the former progressive Michigan governor and Detroit mayor, Hazen S. Pingree. He attended the Detroit University School and spent his summers sailing with his father on their boat the Red Head on the Great Lakes. Hazen went on to win the Canada’s Cup, a prominent sailing race, in 1972. He attended Duke University where he was a member of the Alpha Tau Omega fraternity and majored in mechanical engineering. He furthered his studies as a graduate student at the University of Michigan. Hazen spent his professional life as an engineer until he retired at the age of 70. He finished his career as a sales manager for the European and Asian regions for Textron, where he pursued his passion for traveling. As a voracious reader, Hazen received awards for distinguished service.

Van L. Kenyon III E’58 passed away on March 2, 2011.

Karl J. Leupold E’61 passed away on December 9, 2013.

James L. Vincent E’61 passed away on December 5, 2013.

Alan W. Withers E’68 passed away on Saturday, September 7, 2013.

Perry D. Inhofe E’84 passed away on November 10, 2013.
Dear Fellow and Future Pratt Engineers,

After reading this issue of DukEngineer, you will undoubtedly understand that engineering students have some amazing opportunities at Duke. I would like to let you know how the Engineering Alumni Association contributes to these opportunities and the innovation, creativity and growth happening on the Duke campus.

The Engineering Alumni Council (EAC) represents the broader Engineering Alumni Association (EAA) and consists of Pratt alumni volunteers, development staff and student representatives. We bring a variety of experiences to our activities in support of the Pratt School of Engineering and are fortunate to return to campus at least four times per year to connect with the school and each other in support of the EAA’s mission. We are organized into committees that direct and implement our activities from year to year. Our local outreach focuses on students and our alumni base, while efforts are focused worldwide through our Distinguished Alumni and Service Awards. However, no matter where our efforts are focused, we are united by our commitment to each other and our school and are inspired by today’s students.

Fellow alumni, have you ever wondered why we send you an notice each summer requesting your annual engineering dues payment? Well, I would like to share a few (fun?) facts with you:

• The Pratt School of Engineering has more than 9,700 alumni, but only 10 percent pay annual dues to the EAA.
• The primary source of income for the EAC is dues.
• The EAC is financially independent from other Duke organizations, including the Duke Alumni Association and the Engineering Annual Fund. This independence ensures that our money stays within the Pratt community and goes toward supporting our mission as an alumni organization.
• The EAC has prioritized spending based on three core activities:
  • Supporting extracurricular student projects
  • Recognizing outstanding alumni
  • Helping engineering alumni stay engaged
  • Some years we can only fund 30 to 40 percent of student project requests.
  • All alumni can pay their engineering dues and annual fund donations online at gifts.duke.edu/pratt.
  • Each year the EAC reads proposals, listens to presentations and allocates money to enterprising student groups. We help teams attend competitions or purchase materials, but cannot fund every worthy activity to the extent we desire. What we consistently can provide—and always do—is our dedication and willingness to share ideas and experiences.

Hopefully you now see why we need your dues payments and how easy it is to contribute. We are also working on additional sources of funding by applying for—and receiving—grants. We have successfully applied for and received grants from the Lord Foundation to help us in our endeavor. In addition, we search out individual and corporate involvement and develop relationships within the broader Duke community to improve our reach and opportunities.

To keep connected with the school and each other, we use Facebook, LinkedIn and other social media. We can support each other, on and off the Durham campus, through many avenues, such as the Distinguished Alumnus and Distinguished Young Alumnus Awards. We would appreciate more suggestions; all we need is a name and a starting point of reference.

And we are always recruiting—seeking alumni willing to travel to Durham three to four times a year to join the EAC. If you are interested or want more information, visit the Pratt alumni website (pratt.duke.edu/alumni) or send me an email (ershela@alumni.duke.edu). For those of you still enjoying your time in the Gothic Wonderland, I hope that you will reflect back on your experiences, remember how your alumni family has tried to give back to you and become impassioned to keep connected.

I am honored to serve as your EAC President this year and hope that our activities have encouraged you to become or stay involved. And don’t forget our annual Engineering Awards Banquet is on April 25, 2015, at the Nasher Museum. We will be honoring our Distinguished Alumni Award, Service winners and our outstanding Pratt faculty, and there’s always room for one more. I hope to see you there!

Forever Duke,

Ershela L. Sims E’93
ershela@alumni.duke.edu
(919) 684-6582

PS: Your one-stop-shop on the web is pratt.duke.edu/alumni. Help us make a difference!
Pratt’s Growing Group of Class Agents

won’t you take your commitment to Pratt one step further and join our growing group of Class Agents?

Class Agents work on behalf of the Annual Fund and Alumni Relations to encourage class participation. This classmate-to-classmate contact is extremely important to the growth of Pratt’s fundraising efforts, alumni programs such as Reunion Weekend and to the university as a whole. Your willingness to share the importance of giving to the Engineering Annual Fund with your classmates will mean a great deal to the future of the school. In addition, you will get an opportunity to “reconnect” with members of your class.

As a contributor to the Engineering Annual Fund, you realize and demonstrate the importance of making a yearly gift to your alma mater. While total contributed dollars are clearly vital to the financial health of our school, the number of contributing alumni is equally important.

Last year 40% of Pratt’s graduates supported the school. We are aiming to increase to 50% this year for Pratt’s 75th Anniversary.

It takes a lot to raise the participation rate by just one point, but with your help, we can do it! Classmate-to-classmate contact has proven to be the key element in higher participation rates.

And it doesn’t take as much time as you might think. Your signature on a personal letter or a few phone calls to your classmates will get results. Plus you would not do it alone! We hope to get several classmates to help.

The Development Office will provide you with all the tools you need to contact your classmates. We will print and mail your letters and even help you compose them. The office will provide class lists and help you keep track of your progress. Communication will take place through regular mail, email and by phone. You are always welcome to meet with the Development and Alumni staff on campus, though on-campus meetings are certainly not a requirement.

It’s as simple as that!

We expect most of the Class Agent activity to occur in the spring (April 1 – June 30).

Some graduates need to hear from their peers directly about how important even a small gift of $10 - $25 can be. After all, small gifts add up to big dollars and make a real impact.

Please consider joining us to promote alumni support and involvement. Please contact me if you can help! Together, we can make a meaningful difference in the educational experience for generations to come.

Sincerely,

Pam Hanson
pamela.hanson@duke.edu

Giving to Pratt
### Annual Fund Campaign
#### 2013-2014

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<td>$0</td>
<td>0%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Alumni $2,496,400 $2,443,148 40% 41%
Parents and Friends $753,600 $987,084
TOTAL $3,250,000 $3,430,232
Annual Fund Dollars Raised 2013-2014 (BY CLASS)

Annual Fund Class Participation 2013-2014 (BY CLASS)
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 an individual and his/her spouse. Corporate matching gifts count toward membership if received or verified within the fiscal year.

<table>
<thead>
<tr>
<th>Gift Club</th>
<th>Gift Level</th>
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<tbody>
<tr>
<td>Cabinet Members of the President’s Executive Council</td>
<td>$50,000+</td>
</tr>
<tr>
<td>President’s Executive Council</td>
<td>$25,000 - $49,999</td>
</tr>
<tr>
<td>President’s Council</td>
<td>$10,000 - $24,999</td>
</tr>
<tr>
<td>William Preston Few Association</td>
<td>$5,000 - $9,999</td>
</tr>
<tr>
<td>Washington Duke Club Fellows</td>
<td>$2,500 - $4,999</td>
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<tr>
<td>Washington Duke Club Members</td>
<td>$1,000 - $2,499</td>
</tr>
<tr>
<td>Washington Duke Club Young Alumni Members</td>
<td>$500 - $2,499</td>
</tr>
<tr>
<td>Cabinet Members of the President’s Executive Council</td>
<td>$50,000+</td>
</tr>
<tr>
<td>President’s Executive Council</td>
<td>$25,000 - $49,999</td>
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<tr>
<td>President’s Council</td>
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<tr>
<td>William Preston Few Association</td>
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<tr>
<td>Washington Duke Club Fellows</td>
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<tr>
<td>Washington Duke Club Members</td>
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<tr>
<td>Washington Duke Club Young Alumni Members</td>
<td>$500 - $2,499</td>
</tr>
<tr>
<td>Washington Duke Club Seniors</td>
<td>$100 - $2,499</td>
</tr>
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</table>

Cabinet Members of the President’s Executive Council - $50,000+
1962 Mr. William Walter McCutchens, Jr.*
1971 Mr. John T. Chambers*#
1981 Mr. Darryl Wade Copeland, Jr.*#
1983 Mr. John Martin McDonald, III
1984 Mr. James Kelly McGowan
1987 Mr. George Nathaniel Mattson II#
1989 Mrs. Susan Green Daniel

Parents and Friends
1987 Mr. Lawrence David Lenihan, Jr.*
1989 Mr. Peter John Perrone
1994 Mr. Michael James Bingle

Parents and Friends
1984 Mr. Dan McKenzie Dickinson
1984 Mr. Kenneth Thomas Schichiano*
1988 Mr. Lawrence David Lenihan, Jr.*
1989 Mr. Michael George Rhodes#
1989 Mr. Peter John Perrone
1994 Mr. Michael James Bingle

Parents and Friends
1970 Mr. John G. Ordway III
1973 Ms. Susan Green Daniel
1974 Mrs. Glenn W. Laub
1984 Mrs. Dawn Renée McDonald
1985 Mrs. Mary Nancy McGowan
1985 Mr. David Eklund
1989 Mrs. Suzanne White Fehsenfeld
1990 Dr. Jeffrey Lund Gendell
1992 Mrs. Martha Powers Gendell
1992 Mrs. Sharon Doyle Hawkins
1994 Mr. David Scott Taylor
1995 Mrs. Lynn B. Terry
1996 Mrs. William T. McLaughlin
1997 Mr. John Craig Hausman III
1998 Mr. Jeffrey Kohl Wilkins
1999 Mr. Andrew Murray White
2000 Mrs. Kathryn Mountain White
2001 Mr. Robert L. Seelig
2002 Mrs. Nelson Elbert Matthews, Jr.
2003 Mr. Scott Jay Arnold
2004 Dr. William M. Ricci
2005 Mr. Richard H. Bevier
2006 Mr. Cameron Harold Fowler
2007 Mr. Robert Rudolph Wahl Jr.
2008 Mr. Robert L. Seelig
2009 Mr. Robert James Stets Jr. Ph.D.
2010 Mr. Geoffrey A. Wilkins
2011 Dr. John Christopher Dries, Ph.D.
2012 Ms. Yin Yin
William Preston Few Association
$5,000 - $9,999
1948 Mr. Gordon L. Smith, Jr.
1956 Mr. William A. Kumpf
1957 Mr. Paul D. Rishe
1958 Mr. Harold L. Yoh Jr.*
1960 Mr. James H. Frey
1961 Mr. Carl E. Rudiger Jr.
1963 Mr. Charles L. Grossman
1964 Admiral Grant T. Hollett Jr. Retired
1965 Dr. Douglas A. Cotter

1966 Mr. George P. Kelley
1967 Mr. Randolph K. Repass*#
1967 Mr. Stephen C. Coleby
1967 Mr. George H. Crowell
1969 Dr. Robert Charles Marlay
1970 Mr. R. Keith Harrison, Jr.#
1971 Mr. James L. Stuart ESQ
1973 Mr. Ozy Knight Horton Jr.
1975 Mr. Mark E. Baldwin
1976 Mr. Robert Edward Donahoe
1976 Mr. Philip J. Harkewicz
1977 Mr. John T. Harmon Fyaur Okal
1977 Mr. David P. Spearman
1978 Mr. Henry Kent Holland M.D.
1979 Mr. Jeffrey D. McInnes
1979 Mr. Gregory Scott Wolcott
1980 Mr. Russell C. Albanese
1980 Mr. Kathleen D. Oulon
1981 Mr. James Charles Keeler
1981 Mr. Douglas Allen McGraw
1981 Mr. Richard Bentley Parran Jr.
1983 Mr. John William F Baldridge
1983 Mr. Christopher Bertrand Cook
1983 Mr. Stephen David Bard
1983 Mr. William J. Florence III
1983 Mr. Steven Craig Rosner
1984 Mr. Harold Lionel Oulon III#
1984 Mrs. Julie Anne Keenan
1984 Mr. Sam Michael Liang
1985 Mrs. Carolyn O’Hara Molthrop
1985 Mr. Frank Eugene Wierenga
1986 Mr. Jonathan Michael Guerster
1986 Mr. John Carleton Lindgren
1987 Mrs. Suzanne M. Gregory
1987 Mrs. Denise Allen Williams
1988 Mr. Carlton Hayes Gerber
1988 Mr. Michael A. Harmon
1988 Mr. David Paul Kirchhoff
1988 Mrs. Tracy Anne Nickelsburg
1989 Mr. Joseph Anthony Saldiver Jr.
1989 Mr. Jeffrey M. Yoh #
1989 Mr. John L. Glushik
1990 Mr. Alfred Winborne Mardeci
1990 Mr. Stacy Stansell Gardner Ph.D.
1992 Mr. Mahesh Chandrakant
1994 Mr. Joseph Michael Bollinger, Jr.
1994 Dr. Geoffrey Richard Erickson
1997 Mr. Bharat Malhotra
1997 Mr. Theodore Grey Perkins
1997 Dr. Brot Alan Rogers
1998 Mr. Malay B. Shah
1999 Mr. Christopher Hilton Young
2000 Mrs. Margaret Prestwood Chiou
2001 Mr. Sean Everett Delleth
2002 Mr. Gabriel Ernest Tsuguboyama
Listed below and on the following pages are those Engineering Alumni that showed their affinity for the School by supporting the 2013-2014 Annual Fund Campaign. We are most grateful to those who donated to the School because they allowed us to reach 40% participation. Our goal is to reach a 50% participation rate in 2014-2015. Please don’t let your consecutive giving lapse by missing a year!

To better recognize our consistent donors, their names are denoted in bold for five years of consecutive giving. For those who graduated less than five years ago, their names will also be in bold if they have given each year since graduation. Finally, to recognize consecutive giving over the years, we are placing the number of years you have supported the School in parenthesis next to your name. We will update the list each year to continue recognizing our loyal alumni.

THANK YOU, THANK YOU, THANK YOU!!!
Undergraduate students at the Pratt E-Team's freshman welcome picnic – August 2014

Anne F. Ayanian (14)
John W. Barton (20)
Alan R. Blankshain (1)
Danal A. Blessis (15)
John A. Board, Jr. (22)
Robin K. Bochner (3)
J. Jon Brophy (1)
Carolyn N. Chase (24)
Christopher B. Cook (24)
Damian M. Craig (1)
Becky A. Cuthbertson (10)
Hal A. Davis III (7)
Scott H. Davis (2)
Kevin E. Flynn (15)
Elizabeth A. H. Fortino (4)
Edwin M. Ganes (4)
William B. Ge (13)
Jane W. Gezon (3)
Virginia T. Gibbs (4)
Nancy A. Glaser (4)
Scott D. Greenwald (6)
Bradford S. Grob (1)
Randolph M. Haldeman (9)
John C. Hausman III (10)
Akkio Hayashi (8)
Steven P. Hayes (24)
Catherine L. Iacobs (11)
Mark R. Jeffers (17)
Mark B. Kadonoff (17)
Bruce T. Keeseebe (24)
Howard I. Levy (10)
Wayne R. Locke (4)
Joel M. Marks (8)
Barbara C. McCurdy (15)
Bruce A. McDemott (4)
Richard A. McDonnell II (5)
William R. Mendes (9)
Thomas A. Natelli (9)
Keith S. Novak (4)
Lisa Z. Olens (20)
John Ortiz (14)
Laura L. Philip (1)
Anthony Pines (4)
Jeffrey R. Rahn (1)
Susan B. Ross (9)
Christopher B. Cook (24)
Thomas K. Sawanobori (9)
Michael E. Scher (1)
Mitchell J. Stein (8)
Jon M. Silver (2)
Gregory N. Stock (5)
Peter T. Tucker (16)
 Gunnar W. Zorn, III (23)

CLASS OF 1983
66 Donors/194 Class Roll
34% participation

Stephen D. Bard (1)
David M. Bennett (19)
Ivan L. Biloff (12)
Farley W. Bolwell (12)
Robert C. Bourg (19)
Robert A. Canfield (2)
Thomas L. Carter (3)
James A. Cavenaugh III (15)
Bart R. Combs (4)
J. Mark Dennis (12)
Daniel M. Dickinson (20)
Robert J. Ferrall (7)
William J. Florence III (1)
Jean D. Franke (6)
Graziano D. Giglio (15)
Allison H. Glackin (24)
Daniel J. Griffith (24)
Cheryl H. Hastings (6)
Angela W. Heughan (1)
John A. Horton III (1)
William H. Hubert (21)
Boris D. Illich (13)
Elizabeth T. Jolly (11)
Linda G. Kaelin (11)
Stephen K. Kershner (2)
Robert J. McCluskie (13)
John M. McDonald, III (22)
John T. Meaney (12)
Scott J. MacEwen (12)
Cynthia L. Manieri (24)
Robert J. Raehult (9)
Terrence J. Ransbury, Jr. (15)
Letitia E. Roe (5)
Katharine V. Rogers (1)
Steven C. Rosner (9)
John L. Russell (22)
Brian J. Savio (4)
Eric J. Schiffer (7)
Allan B. Shang (5)
James G. Short III (2)
Deborah S. Simpson (24)
David M. Strickland (24)
Joseph C. Sussingham (2)
David W. Swearengen (1)
James P. Toomey (6)
Jeffrey K. Wilkins (7)
Joseph B. Wood, III (18)
Harold L. Yoh, III (24)

CLASS OF 1984
68 Donors/218 Class Roll
38% participation

Glenn D. Altechek (1)
Bruce J. Andersen (20)
John D. Barker (13)
Laura B. Barker (13)
Kym T. Bean (19)
Stephen P. Blake (1)
Benjamin C. Bonfaint (5)
David A. Bouchard (4)
K. Monroe Bridges (24)
Andrew M. Brown (6)
Robert C. Brown (1)
Pinetta J. Bruce-Brookes (1)
David A. Brumbaugh, Jr. (4)
Marjorie G. Bryen (6)
Susan F. Bueti (2)
Laura G. Bulson (2)
Elizabeth A. Carter (1)
John Chao (3)
Robert M. Coleman (19)
Andrew Cowan (15)
David W. Craig (5)
Stephen C. Davis (1)
Jose B. De Castro (13)
Thomas F. Dziewulski (11)
Jeffrey S. Ebeling (24)
Kevin J. Fellenhoeter (1)
David G. Fentrald, (8)
Brian L. Garrison (2)
Philip G. Geraffo (1)
Omar Ghaffat (8)
Daniel R. Gilmore (23)

CLASS OF 1985
82 Donors/219 Class Roll
37% Participation

Matthew D. Bacchetta (15)
Belinda A. Bacon (11)
Peter T. Baker (11)
Christopher J. Bedell (22)
Jeffrey D. Behrens (4)
Paul G. Bernhard (16)
Stephen R. Bolte (17)
Susan A. Bortkus (12)
Audrey V. Brown (1)
Daniel L. Burnelle (7)
Richard G. Bryan (1)
Jeffrey M. Clark (2)
Karen E. Conover (3)
Cynthia Cooper (6)
Michael G. D’Antonio (18)
Aileen M. De Soto (5)
Vincent L. Dieters (1)
Kevin A. Dorsey (10)
Richard A. Ferguson (12)
Andrew L. Fox (3)
Scott P. Gatje (24)
Stuart M. Gaynes (18)
Bryce C. Ge (11)
Jane L. Gerb (15)
Charles A. Gove (13)
Sarah M. Greifenberger (11)
J. Joseph Handle (10)
Tanya J. Johnson (5)
Craig E. Jones (5)
Anand K. Kasbekar (17)
Bennett S. King (10)
Felix D. Klebe (2)
William H. Koch (5)
Kenji A. Kojima (1)
John A. Kolins III (2)
Michael A. Korman (13)
Ronan M. Kowalchuk (20)
Scott Kreese (3)
Imad S. Labban (12)
Jane A. S. Laib (12)
Stuart J. Laidlaw (2)
Jean G. Levet (24)
Amy E. Lutz (2)
Darren K. Maness (15)
Lienie M. Marchesella (1)
Paul M. Matsumura (22)
Nelson E. Matthews, Jr. (11)
Marybeth McGinn (15)
Kevin B. Nace (24)
Matthew S. Neill (1)
James R. O’Connell, Jr. (14)
Frank J. Oliveri (7)
Debra M. Parrish (7)
John L. Penvenne (7)
Timothy D. Pettit (17)
Phillip R. Pickett (5)
Sam C. Pointer III (1)
Richard J. Pond (12)
David L. Pratt (24)
James P. Rayfair (1)
Scott D. Ross (5)
Brian J. Roach (10)
David E. Robbins (10)
Robert E. Robinson, Jr. (12)
Kevin D. Romer (5)
Barry E. Schmeltzer (24)
Jeffrey S. Spear (13)
Hugo R. Toledo, Jr. (1)
Ledi S. Trunna (21)
Beth Urdahl (15)
Scott K. Walker (5)
Peter W. Waring (5)
Spencer W. White (16)
Kemp B. Wills (17)
Ron H. Wolfe (12)
Michael T. Yamamoto (16)
Michael H. Yoh (24)
Mark R. Zilling (5)

CLASS OF 1986
76 Donors/221 Class Roll
34% Participation

Daniel T. Adams (2)
James E. Albright (1)
Thomas L. Antonino (8)
Scott J. Arnold (5)
Jun Asai (22)
Duke Engineers for International Development (DEID) team members worked with community partners to construct two rainwater catchment systems in the rural community of Santo Amaro, Brazil. – Summer 2014

CLASS OF 2003
51 Donors/168 Class Roll
30% Participation
Joseph G. Baltz (11)
Craig R. Brown (11)
Darin H. Buxbaum (11)
Stephanie C. Chan (3)
Nathan L. Chao (1)
Kai Y. Chau (8)
David Y. Chong (9)
Max D. Cohen (11)
Michael L. De Simone (2)
David S. Dipietro (8)
Thomas L. Earl (2)
Martin A. Elisco (11)
John P. Gallagher (1)
Charles P. Gelatt (9)
Anthony R. Geonotti III (3)
Keith L. Gravert (1)
Elizabeth A. Herbst (9)
Ivan Y. Hsu (1)
Karen C. Hwang (4)
Derek K. Juang (2)
Erin E. Kaiser (1)
Robert T. Kaczierski (11)
David R. Kolstein (1)
Mark D. Krasniewski (11)
Gopind N. Kumar (4)
Christine T. Lin (9)
David H. Logan (5)
Matthew J. Mailloux (11)
Margaret F. Mandell (6)
Victor S. Mangona (2)
Paige L. Nelson (1)
Andy T. Ng (12)
Rizwan A. Parvez (9)
Vadim S. Polikov (11)
Zachary M. Robertson (9)
Daniel J. Roller (3)
Robert W. Schneider (1)
Elizabeth R. Schwartz (11)
Michael P. Sullivan (3)
Matthew E. Sutherland (2)
Mausumi N. Sylamal (1)
Amar K. Tanna (11)
Noelle A. Trent (3)
Gregory M. Williams (11)
Fran L. Wu (11)
Mark W. Younger (1)

CLASS OF 2004
66 Donors/224 Class Roll
29% Participation
Rose C. Acoraci (1)
Jamie M. Alders (1)
Robert T. Kaczierski (11)
David R. Kolstein (1)
Mark D. Krasniewski (11)
Gopind N. Kumar (4)
Christine T. Lin (9)
William O. Bell, Jr. (1)
Jason Bhardwaj (7)
Jonathan J. Bittner (10)
Christopher M. Boston (3)
Jason E. Chatterjee (8)
Udayaditya Chatterjee (7)
Meredith M. Cheng (4)
Kengeyi K. Chu (9)
Hyun O. Chung (6)
Patrick R. Colsher (2)
Teresa T. Crowe (9)
James M. Dayton (1)
Jose D. De Ojeda (1)
Christopher J. Dillonbeck (10)
Allison M. Douglas (9)
Jonathan D. Drillings (8)
Joseph T. Elliott (4)
Colleen N. Farrell (9)
Matthew P. Farrell (2)
Eric J. Gardner (5)
Christopher D. Garson (2)
Isik Gungun (2)
Brett A. Hainline (4)
Bradley H. Hiedik (8)
Calvin M. Hui (1)
D. Brandon Jones (10)
Jeffrey R. Jones (7)
Huihui Karol (6)
Jeffrey A. Keonee (2)
Beum K. Kim (5)
Emily A. Kloeblen (10)
Tess L. Kretschmann (1)
Jason B. Laderman (10)
Jeffrey M. Lake (2)
Cameron V. Levy (2)
Harry B. Marr, Jr. (5)
Patrick C. Mathias (6)
Vito F. Mecca (10)
Alice H. Meyer (10)
Michael R. Parsons (8)
Daminda M. Rajapaksa (5)
Matthew R. Raubach (4)
Scott W. Reid, Jr. (9)
Georgia A. Richter (7)
Christopher J. Sample (10)
Jeremy R. Skoog (7)
Russell Swagart (10)
Neil G. Terry (1)
Jennifer L. Thompson (3)
Jeremy M. Tucker (6)
Andrew R. Tupper (6)
Stephen T. Wu (7)

CLASS OF 2005
99 Donors/253 Class Roll
39% Participation
Meredith W. Allin (9)
Pasquale Arcesei IV (9)
Varun R. Baba (1)
Noel Bakhtian (9)
Justin C. Brower (4)
Jeffrey D. Burlin (9)
Benjamin Burnham (3)
Jonathan R. Carter (8)
Dennis S. Casey (7)
Laura M. Castaing (9)
Melvin H. Chang (1)
Patrick R. Crowell (3)
Michael G. Curcio (9)
Daniele M. Davidian (2)
Jeremy R. Davis (9)
Pierre J. de Boisblanc (2)
Julius K. Degesys (5)
Leahthan Domeshek (2)
Casey D. Donahoe (1)
Kirk Donahoe (2)
Jonathan A. Donahue (8)
David R. Dorrough (9)
Andrew F. Dreher (9)
Michael N. Economo (7)
John R. Felkins (9)
Thomas J. Fernandez (4)
James V. Finchum (6)
Andrew D. Galanopoulos (1)
Haven R. Garber (9)
Emma H. Garber (9)
Darwin Goel (2)  
Thomas C. Gollermann, Jr. (9)  
Steven C. More (7)  
Michael Guadano (9)  
Twinkie R. Gupta (1)  
Charles T. Hagan IV (8)  
Adam P. Hall (9)  
Megan Hanson (6)  
James D. Heaney (8)  
Stacey Hero (7)  
Brian R. Hirsh (9)  
Vy U. Hoang (7)  
Andrew B. Holtbrook (9)  
Bryan Justice (2)  
Tushar S. Kirtane (8)  
Emily M. Kovalick (9)  
David Kuban (1)  
Richard M. Larrey, Jr. (7)  
Anthony G. Lau (3)  
Katherine E. Bulgrin (8)  
Lori C. Hennemeier (7)  
Eric W. Dooley (5)  
Jennifer L. Wilbur (9)  
Taylor E. Apfel (1)  
Christine N. Armstrong (4)  
Bilal M. Aijazi (3)  
Roman G. Schwarz (4)  
Dana M. Edwards (5)  
Patrick J. Ellis (5)  
Arthur J. Esper (3)  
Edmund P. Finley (3)  
Bryan E. Fleming (5)  
Adam Di (5)  
Yuanlong Du (5)  
Erik P. Schmidt (5)  
Patrick W. Allen (5)  
Benjamin T. McConnell (1)  
Nicholas S. Menchel (4)  
Irem E. Fleming (5)  
Nancy L. McGovern (2)  
Matthew L. Ryan (5)  
Andrew M. Stalnecker (4)  
Blake E. Sowerby (4)  
Peter L. Allen (5)

CLASS OF 2006

96 Donors/226 Class Roll 42% Participation

Andrew A. Fitzpatrick (6)  
Jessica B. Smith (1)  
Gary C. Sing (9)  
Allison B. Rosen (1)  
Justin M. Shapiro (2)  
Jennifer L. Wilbur (9)  
Taylor E. Apfel (1)  
Christine N. Armstrong (4)  
Bilal M. Aijazi (3)  
Roman G. Schwarz (4)  
Dana M. Edwards (5)  
Patrick J. Ellis (5)  
Arthur J. Esper (3)  
Edmund P. Finley (3)  
Bryan E. Fleming (5)  
Adam Di (5)  
Yuanlong Du (5)  
Erik P. Schmidt (5)  
Patrick W. Allen (5)  
Benjamin T. McConnell (1)  
Nicholas S. Menchel (4)  
Irem E. Fleming (5)  
Nancy L. McGovern (2)  
Matthew L. Ryan (5)  
Andrew M. Stalnecker (4)  
Blake E. Sowerby (4)  
Peter L. Allen (5)
Winners of the wind turbine design contest at the fall kickoff meeting for Duke’s chapter of the American Society of Mechanical Engineers (ASME) – September 2014

Sahil P. Patel (5)  
Kenneth S. White (1)  
Daniel C. Wolf (5)  
Duo Xu (2)  
Tianhe Zhang (2)  
Jiang Zhu (5)  

**CLASS OF 2010**  
96 Donors / 245 Class Roll  
39% Participation

Sandip Agrawal (2)  
Pongpich Amatyakul (4)  
Douglas M. Giannantonio (4)  
Nicholas P. Bobrinskoy (4)  
Olivia C. Chang (4)  
Brianne F. Connolly (4)  
Van Q. Dang (4)  
Xuan Dinh (4)  
Alex D. Edelsburg (3)  
David A. Etel (4)  
Frederick W. Esch (4)  
Jason H. R. Ethier (1)  
Stephanie R. Everett (4)  
Manuel P. Fanarjan (3)  
Margaret L. Finch (2)  
Stephanie K. Finch (4)  
Andrew D. First (4)  
Erin A. Franz (2)  
David A. Freed (1)  
William R. Gamberota (4)  
Ilan Q. Gao (1)  
Kasey C. Geibel (1)  
Douglas M. Giannantonio (4)  
Samuel G. Gibbs IV (1)  
Jordan C. Goldstein (4)  
Lizhi Gong (2)  
Jing Guo (4)  
Eric C. Hall (4)  
Daniel F. Hanks (4)  
Zachary M. Harvaneck (3)  
Douglas M. Helfferich (4)  
Katherine M. Henderson (4)  
Pia F. Hoellerbauer (4)  
Justin S. Hong (1)  
Margaret A. Hopkins (1)  
Jason Hsu (1)  
Elizabeth H. Hwang (2)  
Paras P. Ihaevi (4)  
Kathnavi Ithimuruganesan (4)  
Brian J. Kim (4)  
Stephanie M. Korszen (1)  
Michael J. Kramarz (4)  
Gustavo Lee (4)  
George W. Leflar (4)  
Jordan A. Lewis (4)  
Jack Li (4)  
Xiao T. Li (4)  
Victor C. Lieu (4)  
Ping Ling (2)  
Emily A. Liu (4)  
Jamie Lou (2)  
Ashley H. Lyerly (5)  
Alexandra K. Lyons-Smith (4)  
Samantha M. Lyons (4)  
Michael A. McArthur (1)  
Clark C. McGehee (2)  
Matthew T. McKenna (3)  
Camil A. Mekouar (2)  
Carson C. Moore Jr. (1)  
Gerard J. Moorman, Jr. (3)  
Melissa K. Murphy (4)  
Alaina R. Plettman (4)  
Emily Poplawski (4)  
Ankit Prasad (4)  
Racquel M. Quarless (1)  
Jason D. Rehlaender (2)  
Alex S. Reinstein (4)  
Samuel J. Reiss (4)  
Taylor C. Ryne (3)  
Kalen J. Riley (4)  
Kevin C. Story (4)  
David M. Tainter (1)  
Jason S. Taylor (2)  
Michelle A. Torsi (4)  
Kevin B. Wade (1)  
Amy M. Wen (2)  
Jamie F. Wilkie (1)  
Peter C. Williams (4)  
Jordan S. Woodson (2)  
Tianyi Wu (4)  
Patrick P. Ye (4)  
Rebecca C. Yu (1)  

**CLASS OF 2011**  
89 Donors / 262 Class Roll  
34% Participation

Parv Aggarwal (3)  
Joseph K. Ahdoot (4)  
Pamela G. Anderson (2)  
Michael T. Bell (3)  
Rachel L. Belzer (3)  
Scott T. Birgenman (1)  
Anna M. Brown (3)  
Adam W. Caccavale (3)  
Andrea C. Casanova (1)  
Bingxin Chen (1)  
Haoyu Chen (3)  
Samuel G. Klein (3)  
Samantha M. Klug (3)  
Lauren A. Kottis (3)  
Jeffrey S. Kreutter (3)  
So Y. Lee (2)  
Charles R. Levergood (3)  
Edward Liao (3)  
Maria C. Lopez (2)  
James E. Love, IV (3)  
Trisha K. Lowe (1)  
Brooke T. Luo (1)  
Timothy McDowell (2)
Faculty gifts to the 2013-14 Engineering Annual Fund are vital to Duke's educational mission. We are very grateful for this expression of their faith in the work of the Pratt School of Engineering and Duke University. This year, 39% of our faculty participated in raising over $13,000 dollars for the school.

2013-14 FACULTY SUPPORT
In El Salvador, the DEID team worked in the community of La Estancia to improve the quality of available water, building a 9200-liter water tank and a plate-settler system to reduce water turbidity. – Summer 2014
The DEID team in Uganda spent eight weeks in the rural village of Karihuru working with Bringing Hope to the Family to begin construction on two 20' by 90' classroom blocks for the New Hope Vocational School. – Summer 2014
Duke Engineers showed off the 75th Anniversary pennant while conducting an experiment in NASA's Reduced Gravity Education Flight Program, which gives students the opportunity to conduct research on a microgravity C-9 plane.