Welcome to our second edition of the @pennawe newsletter! We were thrilled to hear from many alums after the first edition came out last spring. Learning what amazing things our alumni are up to is a great perk of my job! It was wonderful to meet up with some alums at the Grace Hopper Women in Computing and the Society of Women Engineers (SWE) conferences.

This year we were able to bring a great group of students to these conferences to interview for internships and full time jobs, attend conference sessions, and catch up with alumni who were recruiting or attending. One student said as we left one of the sessions at Grace Hopper, “I’ve never seen so many women computer scientists in one place before!” These conferences give our students the great opportunity to hear inspiring stories and be part of the larger women in engineering community. We are thankful for the corporate and SEAS sponsorship that enabled them to attend.

We also use these conferences as an opportunity to recruit students from other universities to apply for our graduate programs. Showing that Penn Engineering is a supporter of these events really helps communicate to prospective students how important diversity is to us at all levels.

By far my favorite part of these events is meeting up with alumni who are also in attendance. At one point, we had 4 generations of present and past SWE presidents at the Penn table! I love hearing what great things everyone has been up to, and connecting our current students to alums working in a large range of fields. So if you’re planning to attend either Grace Hopper or SWE in the future make sure to seek us out!

I hope you enjoy hearing what we have been up to as we finish out 2013. Written nearly entirely by our current students, inside this newsletter you will find stories about outreach, research, and alumni updates. Enjoy!
This summer Penn’s engineering campus was filled with middle and high school students participating in outreach events encouraging students to consider majors and careers in STEM fields. Every summer the GEMS program, (Girls in Engineering, Math, and Sciences) brings over 70 middle school girls to the exciting world of engineering.

This year I led a lab course in bioengineering through interactive and hands-on activities. Students used the BioPac system to watch signal transduction through electrical pulses generated by their muscles. Throughout the week the girls learned about other fields of engineering from a wide range of departments through exciting hands-on learning opportunities.

Penn also runs a Summer Academy in Applied Science and Technology (SAAST) for high school students interested in engineering. Students came to campus for three weeks to take classes in a focused area of engineering. As a graduate mentor for students in the biotechnology track, I helped a group of three students write a research proposal aimed at determining the role of a specific signaling protein on lung cancer metastasis. This was my third summer working as a graduate student mentor and I am always impressed by how much the students’ scientific knowledge and writing improve over the course of the program.

Both programs recruit engaged students excited about learning new things, it was a pleasure to participate in both outreach programs!

If you would like to learn more about GEMS or SAAST you can go to www.seas.upenn.edu/awe and http://www.seas.upenn.edu/saast/

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It is an incredible experience to bring a simple brainstormed idea to life. Such was the case with PennSustains, Penn’s newest annual competition centered on sustainability. The inaugural competition came together quickly through the efforts of the Society of Women Engineers, Engineers without Borders, SEAS Green, and Penn International Sustainability Association. Benefactor Andy Rachleff, alumnus and chairman of the SEAS Board of Overseers, challenged us to devise programming that encouraged Penn students to celebrate “the joy of building things” and the fun of engineering.

With these two ideas as inspiration, PennSustains has three goals in mind: making Penn a more sustainable campus, making Philadelphia a more sustainable city, and utilizing engineering in these endeavors. In our first year, 16 teams composed of 49 participants entered ideas ranging from piezoelectric tiles to a smart shower system to a solar-powered device for incubating premature infants. Teams submitted business plans and presentations to a panel of judges, which judged based on motivation, design, implementation, financial feasibility, and potential impact. The winning teams took home various prizes totaling $7,500 to further their ventures.

I am proud to have worked with such motivated individuals dedicated to making this competition a reality. It was an amazing opportunity to introduce a brand-new event to Penn Engineering that has serious impact on people’s lives!

This past summer I was given the privilege through the generosity of the Abraham Research Award to work under the guidance of Dr. David Issadore in Bioengineering here at Penn. The Issadore Lab focuses on the use of microfluidics in the development of point-of-care diagnostics. I worked on two major projects during the summer, the first of which involved designing a device that would couple the sorting of targeted cells with the concentration of output to enable imaging.

The second project involved designing a device that would capture circulating tumor cells. During these projects I not only learned about microfluidics and the design and development of diagnostics, but I was also fortunate enough to get a chance to shadow the many experienced individuals in the lab. Furthermore, both projects involved collaborations with labs in the medical school as well as in the Children’s Hospital of Philadelphia enabling me to observe research in multiple areas simultaneously.

The experiences I gained this past summer will remain with me throughout my research career and I sincerely urge all others to conduct research during their time as undergraduates. I would like to sincerely thank the Abraham Research Award program as well as Dr. Issadore and the remainder of the Issadore Lab for allowing me to gain experiences that have significantly impacted how I envision my future and how I approach my education.
Pre-orientation, one of AWE’s signature programs, gives incoming first year women engineers the opportunity to move in early and get advice from upperclassmen and faculty before the craziness of new students orientation begins. Over the last 6 years, pre-O (as the students affectionately have nicknamed it) has grown from 19 students to over 70 (or approximately 50%) of the women in the class. Students who participate in pre-orientation are statistically less likely to transfer out of the school. Here, two past participants reflect on their experiences as participants and volunteer mentors.

**Emily Hyman, SSE ’14 & SSE Masters ’14**
Imagine if your very first friend at Penn ended up being someone who you know helped you make it through four years of Penn’s challenging engineering program. Even better, what if I told you that you could meet that person before the majority of the freshman class even moves in? That is what the AWE pre-orientation program provides.

Coming to Penn as a freshman, I was nervous about how I was going to sort through the 2,500 students in my class and find people I wanted to be friends with. When given the opportunity to move in early and meet a smaller, more manageable number of people, I didn’t think twice. After three and a half days jam-packed with fun and informative activities, I entered new student orientation feeling a few steps ahead of the rest of the freshmen. Seeing a familiar face and having someone to sit next to is a great feeling, whether you’re a freshman or a senior, and I can’t think of a single engineering class that I’ve walked into and haven’t recognized someone from pre-o.

With graduation quickly approaching, the nostalgia is starting to kick in. I’ve taken part in AWE pre-orientation all four years because after loving it as a freshman, I was eager to be one of the volunteers. The sense of comfort I received from being told by upperclassmen that everything was going to ok helped me with my transition to Penn and was something I wanted to give others. That friend I made on the very first day is someone who I took 16 classes with. AWE has been a staple throughout my time at Penn, and it all started with pre-orientation.

**Logan Troppito, BE’ 13 & BE Masters ’14**
Coming to Penn, the possibilities seemed endless to me. I immediately took advantage of the opportunity to participate in AWE’s Pre-Orientation. I loved it so much that that I returned for the next three years as a mentor.

I can safely say that pre-orientation helped me find my niche at Penn. Getting to know my fellow colleagues made for easily formed study groups when my first round of midterms surfaced in freshmen year pre-requisite classes. Those study-ships soon turned into long lasting friendships that I have to this day. Every second of pre-o was designed to help us become more familiar with the next step in our life careers, whether it was playing numerous ice breakers, on a trolley tour of Philadelphia, listening to a panel of women professors talk about their own engineering experiences, or meeting professors through the famed final brunch. AWE’s Pre-Orientation was a defining moment in my Penn career and I look forward to see it grow in future years.
Penn Engineering alumna Julie Williams is going places—literally. She answers my questions during a break from her time in Equatorial Guinea, her fourth site location following the Netherlands, Cameroon, and Ghana. Julie is a 2010 graduate of the MSE program, and now she works for Schlumberger as a Wireline Field Engineer. She has certainly gone a long way from growing up in Rochester, New York, where she’d never experienced ethnic food (her first tastes came at Penn). But what exactly is the work that brings her across the globe?

“ Basically, after an oil company drills a well, they hire us to survey the well for information about the rock and fluid properties,” she explains. To collect data, her team lowers equipment into a well using a namesake wireline cable, where they look at hydrocarbon levels and the possibility of extracting fluid from the well. When Julie works “onshore”, her main duties deal with the equipment: maintenance, calibration, and testing. Offshore, the work is more managerial, and involves supervising the crew, handling data, and communicating between the rig crew, geologist, data scientists, and client.

Julie’s projects are high impact and technically challenging. The most intense jobs involve deepwater offshore exploration wells. In these cases, the rigs can cost up to one million dollars to rent. It is a brave undertaking, especially when you add in the fact that it is a vastly male-dominated field. Julie is often the only woman on the rig, and while she’s never experienced blatant sexism, she does say it’s impossible to escape being different.

The rig crews typically spend a month offshore, and as a result, are often very excited to have a woman on the rig. While it can be awkward, Julie handles it by staying confident and allowing her hard work to speak for itself.

Julie emphasized the importance of maintaining good relationships with all of her crew members despite this added challenge. Her approach is different from many other engineers who may over-assert their power or fail to set aside personal feelings and conflict. This attitude, she thinks, makes her more successful. “Doing what isn’t expected can be a good strategy,” she says. “Pay attention to the people you work with and keep them happy. It will make your job easier in the long run and it is a more pleasant atmosphere to work in!”

Julie’s engineering experience has given her the opportunity to solve big problems around the world. And while the gender imbalance is very real, Julie reassures that this shouldn’t drive women away from the field: “The only real solution to this treatment is for there to be more women in the oilfield!”
AWE sat down with Professor of Bioengineering and alumna Beth Winkelstein to talk about her new role as the Associate Dean of Undergraduate Education, how things have changed since she was a student, and her academic interest in biomechanics.

**How did you initially become interested in biomechanics?**
As an undergrad, I knew I wanted to do mechanics. I was a bioengineer here, and at that time, mechanics was either macroscopic and things you could see, or cell mechanics which was just coming onto the arena. I knew I wanted to do something that would have an immediate effect on preventing injuries. I just kept finding interesting problems.

**You completed your undergraduate education at Penn. What was your favorite class or professor?**
Biomechanics. BE200. At the time it was in the morgue, which was kind of fun. I think I was one of the few people who thought it was fun.

**When you were a student what was your favorite spot on campus?**
I actually used to study here (Towne Cafe). There weren’t as many study spaces, I’d be here by [9AM], and take rooms on the 3rd floor of Towne.

**How do you think Penn has changed since you were a student? Good or bad?**
Oh, of course its changed for the better. Some of the stuff is the same—students, those that have interests beyond engineering, but the facilities are better, West Philly is better. It used to be kind of isolated, now it’s seamless to get around.

**What would you most like to accomplish during your tenure as Associate Dean of Undergraduate Education?**
One of the things I’ve started to do is to assess and make more research opportunities available, in engineering and across Penn. Making them available, funding them, working with CURF. I’m really pushing for interdisciplinary senior design.

**What’s your favorite random, fun fact/weird hobby/quirk about yourself?**
I used to wait tables at Smoke’s. I did.

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**Beth Winkelstein**
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**Kate Miller**
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Our students have taken advantage of wonderful opportunities, jobs, and internships all over the world during the summer. These are a few highlights of what our students accomplished this summer!

**Brynn Claypoole (Computational Biology, '15)** worked on an independent bioinformatics research project in the Stoeckert lab in the Perelman School of Medicine as part of the University Scholars program. Brynn’s project involves using graph theory and other computational methods to analyze large databases with data on how genes connected to diabetes relate to each other, taken from about a hundred studies on various organisms. Additionally, she worked with the Campus Health Initiatives group in Student Health Services developing mobile applications.

**Bianca Datta (MSE, '14)** interned at 3M World Headquarters in the Twin Cities in Minnesota. Bianca's technical internship focused on the synthesis of semiconducting quantum dots and related characterization for industrial applications and product development where she conducted in-lab experimentation and analysis. She had the opportunity to explore production plants and work in a manufacturing-focused environment for the first time.

**Kristen Duda (MSE, '16)** interned at a small startup company called CarrierClass Green Infrastructure, developing and rolling out a product line of solar-powered tables for both public and private venues. She learned a great deal about various aspects of solar-power, including product development, component research, and market analysis.

**Liz Hiteshue (SSE, '15)** interned at the Air Force Institute of Technology, the graduate engineering school of the U.S. Air Force in Dayton, OH on Wright Patterson Air Force Base. Liz conducted research on integrated circuits and algebraic topology and completed four interviews as part of an oral history project of influential women in STEM fields.

**Amy Keech (BE, '15)** worked for her second summer as a laboratory technician in a clinical pathology lab at the University of Rochester, NY. She collected survey data of five different types of lymphoma, using the mutational status of the IgH gene as an indicator with diagnostic and prognostic value. Amy’s two summers have given her good experience at the lab bench and have helped her see her passion for research and possibly graduate school.

**Devika Mehta (MSE, '15)** worked at NASA’s Marshall Space Flight Center. Devika worked with a mentor to enhance the efficiency of thermoelectric materials. These materials have been used to power long-duration unmanned missions from Voyager and Cassini to Curiosity, where they are the primary source of power. She also worked on experiments growing semiconductor crystals, that will be flown on the International Space Station next year.

**Natalie Miller (SSE, '15)** interned at Goldman Sachs in the Technology division. Natalie worked as a project manager on a new data visualization heat map tool that would highlight opportunities to cut technology costs and improve efficiency.

**Annie Mroz (MEAM ‘13 & MEAM Masters ‘14)** participated in the Ruhr Fellowship program in Bochum, Germany. The two-month fellowship included a month of German language study and industrial site visits as well as a month-long internship at a German company. Annie interned at RAG, Germany’s only coal mining company learning about mining and the German coal industry.

**Christina Sorice (MEAM/Robotics, '14)** interned in Guidance, Navigation, and Control Engineering at Escape Dynamics, Inc. in Broomfield, CO. Escape Dynamics is an aerospace start-up company that specializes in wireless power transfer for propulsion via microwave energy. Christina designed a controller for wireless power transfer to a flying vehicle and designed and prototyped a gimbal stand for the microwave antenna.

**Alexandra Stambaugh (CBE, '14)** interned in research & development at Optofluidics, named the Philadelphia Life Sciences startup of the year in 2012. Optofluidics merges nanophotonics and microfluidics to optically trap nanoparticles. Alexandra worked in the lab honing skills such as microscopy, optical tuning & laser maintenance, waveguide coupling, chemical-mechanical polishing (CMP), cleaning methods, and research methods.

**Gabrielle Trotter (EE, '14)** interned at the University of California, San Diego through REU (Research Experience for Undergraduates) with Engineers for Exploration. Gabrielle used computer vision for applications that helped researchers observe animals and the environment beyond their physical limitations as people which included underwater, from high above, or in remote environments. She was especially excited about testing their project at the zoo with tigers!
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Want more information about AWE or just have questions about Penn Engineering? Contact Michele Grab at mgrab@seas.upenn.edu

The AWE program is dedicated to recruiting, retaining, and promoting women within Penn Engineering. Our goals are to:

- Develop and support initiatives to increase the number of women interested in studying engineering at Penn and elsewhere.
- Enhance the overall academic experience of female students in Penn Engineering via targeted curricular development and increased research and professional opportunities.
- Create and support social and networking opportunities for women in engineering.