Without scholarship money, I wouldn’t be able to be as wholeheartedly involved in my work or my volunteer activities,” Emily Olszewski says. “I might be one of those people who you can tell is pushing themselves too hard.”

Olszewski is able to put her whole heart into her work and volunteering thanks to the Ferraro Family Scholarship Fund. The junior and current scholarship recipient was drawn to tissue engineering and biomaterials research through a combination of family medical ties and a high aptitude for math. “My dad’s a doctor and my sister’s in medical school, so I always thought I’d be a doctor,” she says. “But I was always so good at math I wanted to include it. When I heard about BME, I thought, ‘This is perfect. It’s math and medicine.’”

Olszewski has been working under the direction of Professor Jack Jiang in his Laryngeal Physiology Lab since her freshman year, and is excited to study injection laryngoplasty. “It’s all about injecting a good material to help the vocal folds have full closure in their vibration cycle,” she says. “It’s a mix of materials and biomechanics and that’s pretty interesting to me.”

Her long-term commitment to the lab has allowed Jiang to assign her more complicated projects, including collaborating on a project with researchers in Fudan University in Shanghai, China. “Working with them back and forth, I had to deal with the time difference and only being able to communicate via email,” she says. “One of the things that taught me is how much time it takes to translate research into an applicable product or procedure.”

Most weeks, Olszewski volunteers at Our Lady of Hope Clinic in Madison. The clinic is a non-profit organization that offers free primary care to the uninsured, and Olszewski says she does what a nursing student and receptionist would do at a larger clinic. “It’s just one doctor who’s in charge of the clinic and we have two volunteer coordinators who are nurses,” she says. “I do patient interviews, run some tests, take blood pressure and temperature, do the medical charting—all the background work.”

Olszewski says the scholarship allows her to pursue career-related interests in her free time. “In thinking about what I wouldn’t be able to do without the scholarship, I don’t think I’d be able to work at the research lab and also volunteer,” Olszewski says. “I wouldn’t be able to do both because I’d need another job making money to pay for tuition.”

Alum Rick Ferraro (BSME ‘79) is committed to helping others succeed. “A lot of young people need the same kind of boost that I needed,” he says. Ferraro, a Racine, Wisconsin, native, created the Ferraro Family Scholarship Fund in 2003 to fund BME undergraduate students.

In his career, Ferraro has worked at various healthcare companies, and is currently the president and owner of a medical device manufacturing company. One of the reasons he still continues to fund the scholarship is that he still benefits from his UW-Madison education. “If it weren’t for the College of Engineering, I would not be where I am today,” he says. “I’m not obligated to give back, but it’s the right thing to do. Where would this world be without engineering?”

Lindy Couwenhoven’s family is grateful for engineering. She became interested in biomedical engineering in high school after watching her sister Anna undergo scoliosis correction surgery. “I remember seeing an X-ray of the two titanium rods in her back and thinking, ‘Wow, the person who made that had to be sure it wasn’t going to hurt Anna and was going to stay in place for the rest of her life,’” says Couwenhoven. “That’s when things clicked and I realized that would be something I would be interested in doing.”

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To India and back: BME design students motivated to reduce infant mortality

In fall 2011, a team of BME sophomore design students led by Caleb Durante (MS ’14), and including Rhodes Scholar Drew Birrenkott (BS ’14), wanted to see if their design project could address one of the United Nations millennium development goals: by 2015, to reduce the worldwide mortality rate in children under five years old by 66 percent.

The design team, advised by BME Associate Faculty Associate Amit Nimunkar, researched causes of child mortality and realized nearly half of infant deaths are preventable with monitoring technology. “Their idea was to prevent Sudden Infant Death Syndrome, responsible for thousands of deaths in developing countries,” says Nimunkar. “The goal was to design an accurate, cost-effective, reliable detection system that would provide an alarm to the family or caregiver if the infant stops breathing for a period of seconds.”

The team created an infant cardio-respiratory (CaRe) monitor, which uses a high-frequency electric signal to monitor a child’s breathing cycle and heart rhythm. The CaRe monitor is a cotton-covered elastic band to be worn around an infant’s chest (pictured). It uses detachable electrodes for monitoring an infant’s vital signs and connects to an electronic device fitted with both LEDs and alarms to offer caregivers feedback.

A manufacturing entrepreneur from an Indian company, Kriti Kare, approached Nimunkar to ask if any of the BME design teams were working on medical devices that might be of help in rural communities. “He builds projects to reach out to underserved rural areas in India,” says Nimunkar. “He heard there was a monitoring project that we were working on and asked if we’d be interested in seeing if our project could help those communities. That’s how the collaboration started.”

The collaboration with Kriti Kare gave the CaRe team a specific use case for its design project and an opportunity to improve its design. And in summer 2014, four members of the CaRe team—including Durante, Birrenkott and electrical engineering student Christine Morris—took a trip to India to meet with Kriti Kare, observe neonatal wards in hospitals, and present their research to various universities.

One of the CaRe team members who went on the India trip, Catherine Finedore has a passion for wearable electronics and design. “I love to design and create things, and I know how to
Over the past 15 years, the UW-Madison biomedical engineering department’s unique six-semester design sequence has given students hands-on experiences to design, build and test solutions to real-world challenges. Now, thanks to donations to the John G. Webster and Willis J. Tompkins Design Fund, the BME department has a newly renovated, modern, dedicated design studio that has become a hub for BME design students to work and learn.

Seniors Michael Simonson and Zach Vargas have seen the transition from previous design facilities and, as student assistants for BME 201, the sophomore guided design course, recognize how important an upgraded design studio is to students. “You can sit down and design anything you want in this room with all the resources that were put in it,” says Simonson. “And to dedicate this space solely to design is great because students can immerse themselves in this exclusive program.”

The dedicated space features multiple bench stations each fitted with wave-form generators and oscilloscopes, two laptops with multiple monitors for students to run testing software while documenting results, locking cabinets to store projects, power supplies to power and test electronic projects, and electrical outlets to power accessories.

The renovations to the design studio, Vargas says, created a more professional environment that fosters collaboration. “With the way the room is set up, we can allocate individuals or pairs within our team to work on different aspects of a project simultaneously, and each group has access to its own power supply and testing equipment,” he says. “We can independently develop things, but still be close enough to facilitate communication and collaboration in advancing a project.”

Simonson adds that the location of the design studio inside the Engineering Centers Building (ECB) is also advantageous. “Since it’s in ECB, students have access to all the resources of the student shop downstairs,” he says. “And it’s down the hall from PhDs in this field. You’re not going to find anyone with more publications than Professor Emeritus John Webster to be right next to your design studio.”

Access to top faculty isn’t the only advantage to this dedicated space. Both Vargas and Simonson say they frequently work, study and collaborate in the design studio and are always open to helping younger students. “Although the main purpose of this room during the spring semester is BME 201, it’s definitely not closed to other BME students,” Vargas says. “It’s a good collaborative space that brings students together in a way that otherwise might not be available.”

That mentorship is a bonus for the BME design program. “To have seniors and experienced graduate students around all the time, sophomores can come in and ask questions about design problems that we went through our sophomore year,” says Simonson. “I think that’s what makes this program pretty unique, and it’s because of how unique this room is.”

A design instructor and associate chair of the BME undergraduate program, John Puccinelli says the studio reflects the department’s commitment to design. “One thing that sets the BME department apart is that we were founded with design as the backbone of our curriculum—the students work on design projects every semester,” he says. “The design space gives them a home, and it excites the students. Many students have taken ownership of the space; they feel responsible for what goes on in there, and they want to see it being used to its full potential.”

Both Vargas and Simonson agree that the design classes have given them an edge while job hunting. “For me, the skills I’ve learned from design have directly impacted my employment opportunities,” Vargas says. “When I go to an interview with an employer, I don’t have just a resume with a bunch of classes I’ve taken: I have specific projects with measurable outcomes—physical prototypes I can bring with me to an interview and say ‘Hey, I made this.’”
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