



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



Rick Ferraro

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." (Continued, back page)

LIFTING AS THEY CLIMB: Ferraro Family Scholarship helps undergrads help others



From left: Couwenhoven and Olszewski are both involved in giving back through the Society of Women Engineers.

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Here's a chance to show your Badger engineering pride: We're excited to announce our online store, where you can purchase College of Engineering gifts and apparel. Check out our selection today at [store.engr.wisc.edu!](http://store.engr.wisc.edu)

MESSAGE FROM THE CHAIR

The last 12 months have been extremely exciting, watching the BME department grow in many areas, including the addition of two faculty members: Associate Faculty Associate Joe Towles and Assistant Professor Megan McClean. Joe's scholarly expertise will enhance our teaching excellence by developing new approaches to active learning applied to teaching musculoskeletal biomechanics and biomedical engineering design. Megan's primary research focus is cell signaling in biological networks along with answering questions related to cell signal kinetics, transcription factor regulation and creating biological networks for applications in biomedicine and bioengineering. We are very fortunate to have these two very accomplished scholars to continue our history of excellence in the classroom and in the laboratory.

As chair of this department I am honored to share with you the outstanding accomplishments, instructional awards and achievements for which our students, faculty and staff have recently been recognized. These accomplishments cover a vast array of scientific disciplines.

Harvey D. Spangler Professor William Murphy was recently named co-director of the UW-Madison Stem Cell & Regenerative Medicine Center, whose mission is to advance the science of stem cell biology and foster breakthroughs



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in regenerative medicine through faculty interactions, research support, and education.

Professor Naomi Chesler joined an elite group of scholars when she was named a fellow of the American Institute for Medical and Biological Engineering (AIMBE). Naomi achieved this prestigious status through her outstanding contributions in pulmonary hypertension research, and promotion of diversity in engineering and engineering education advances.

Assistant Professor Pam Kreeger earned a great honor when the National Institutes of Health named her a "New Young Innovator" for

Thank you for your continued support!

If you'd like to make a gift, you have a variety of options, including estate gifts, matching gifts, endowments, and an immediate gift, among others. If you are considering a gift, contact Cathleen Walters for more information on how to give: cgwalters@wisc.edu or (608) 265-8021.

engr.wisc.edu/bme/bme-giving.html

her work in studying what factors cause ovarian cancer cells to progress from their origin in a woman's fallopian tube through the ovaries and on to metastatic sites, where they become resistant to chemotherapy drugs.

The education, development and success of our students are among the primary reasons we strive for excellence in our classrooms and labs. Since our last newsletter, our students have received some truly outstanding awards and recognition for their accomplishments. As an example, BME student Mehdi Shokouejad was part of a two-person team that developed a smart, ultraviolet therapeutic bandage that won the top prize in the 2014 Qualcomm innovation competition at UW-Madison. The bandage is an example of creativity, innovation and a combination of engineering principles, and has the potential to make a huge impact in wound care, treating tumors and other skin-related ailments.

With student enrollment increasing, we are a growing department that is very excited to add two additional faculty in 2015 who will engage and educate our future biomedical engineers to help provide a positive impact in society.

A big thank you to our superb faculty, amazing students, fantastic staff, and the best alumni anyone can possibly hope for. There has never been a better time to be a part of biomedical engineering at UW-Madison.

Beth Meyerand, Chair, Biomedical Engineering

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



Finedore with the adult-sized CaRe shirt used for testing.

Innovative BME design studio sets UW-Madison apart

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.

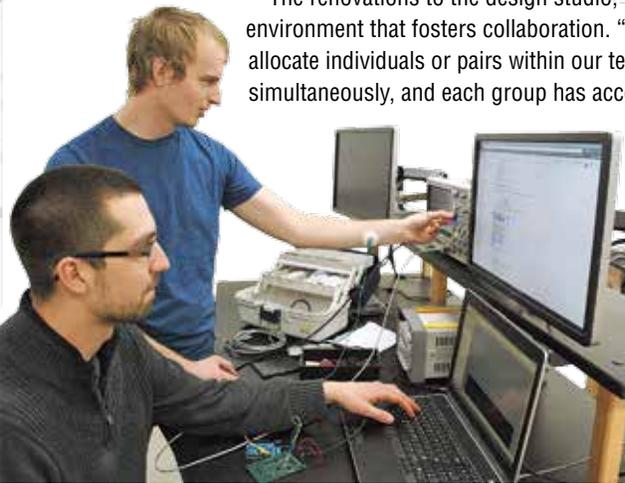
Seniors Michael Simonson and Zach Vargas have seen the transition from previous design facilities and, as student assistants for BME 201, the sophomore guided design course, recognize how important an upgraded design studio is to students. "You can sit down and design anything you want in this room with 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,

From left: Vargas documents test results while Simonson monitors the oscilloscope.



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.'"

sew," she says. "I really like the idea of helping kids with special needs because I had worked so closely with them when I was in high school. I was just a perfect fit."

Finedore says the trip generated a lot of feedback for the CaRe team. "One of the things we took back from the trip was to redesign the band. We didn't account for the fact that the babies would have other things—IVs, oxygen, other monitors—attached to them, and to put our design on they had to take everything else off," she says. "The babies also don't shift a lot, so we don't have to make the band as constricting as we thought to maintain a constant signal."

Another change the team made in the CaRe redesign was to purchase and use materials readily available in India. "One of the keys to the project is to make something that works, that we know works, using the materials that they have access to, and knowing that they will always have access to," says Finedore. "All the material in the redesign—except for the PCB and the snaps—is from India. And that's because we wanted to make a realistic design,

something that can actually be made in India."

While gift funds to the BME Design Fund helped get the team's project off the ground, the current CaRe multidisciplinary team is in the process of writing grants to return to India with the redesigned CaRe device. Finedore says that, even with the redesign, the concept remains the same. "We still want it to be affordable, durable, sustainable and to be able to acclimate to any climate," she says. "If anything, we want to lower the cost and increase the quality."

Nimunkar says by addressing engineering issues in other parts of the world, the team has gained a greater perspective for future projects. "It's one thing to conceptualize the project and design it in a lab setting, but it's another to understand the usability, the ergonomics, the human factors aspect of it," he says. "By addressing how a nurse fluent in a different language will interface with your device, by understanding how to design to fit with an existing power infrastructure and voltage specifications, these students are no longer local engineers. They are global engineers."



Save the dates!

Each year, the College of Engineering hosts several alumni events around the country. Save the date for an event near you—and if you'd like us to add you to the invitation list for an upcoming event, please contact Stephanie Longseth, (608) 265-3496 or slongseth@wisc.edu.

January 13—Houston, TX

February 18—Bonita Springs, FL

March 26—San Francisco, CA

May 21—Seattle, WA

June 26—Chicago, IL

July 16—Fox Valley, WI

August 20—Twin Cities, MN

September 15—Milwaukee, WI

October 4—Washington, D.C.

October 16—Madison (*Engineers' Day*)



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Ferraro Family Scholarship (Continued from front page)

Couwenhoven, the 2013-14 Ferraro Family Scholarship Fund recipient, is a senior from Port Washington, Wisconsin, who has already accepted a post-graduation job with the medical device and healthcare company CareFusion. She says that scholarship funding offered her the opportunity to take classes to make herself more marketable in her job hunt. "I'm in a marketing and management class right now and I've never had the chance to take a business class before," she says. "Last semester I took a leadership seminar with students from all across campus. Learning how to work with all different types of people is so valuable. Recruiters have really focused on that, too."

Couwenhoven already had an opportunity to use those leadership skills on campus. She is currently the vice president for internal relations for the UW-Madison chapter of the Society of Women Engineers, and is active in engaging members in professional development—from coordinating conference attendance, to hosting TED talk style-leadership discussions.

But of all of the events she's planned, Couwenhoven is most proud of her involvement in the SWE Engineering Tomorrow's Careers (ETC) camp. The ETC camp is a one-week, overnight camp for high school females from across the Midwest. There, campers participate in engineering labs and activities, and make connections with other female engineering students and professional SWE members in industry.

Couwenhoven, who has been a camp counselor or coordinator of the ETC camp for three years, says the camp emphasizes a tight ratio of campers to counselors to make sure the campers feel connected. "I know it doesn't hurt to have someone there to go to when you have questions or just to feel like you're not alone," she says. "The camp is something I couldn't have done without a scholarship because I was

putting in so much time. That was one of the ways I feel like I gave back and left a mark."

And giving back is important for Couwenhoven. "Lifting as I climb' is the phrase I use. It means, 'move forward, but keep an eye on the people following you to make sure they make it too,'" she says. "My parents and I are so thankful that scholarships exist. It's I would like to do some day because I know it's helped me so much."

Investing in faculty excellence is a college priority—and one way we can attract and reward star faculty is through endowed professorships. Currently, approximately one-quarter of our engineering faculty members hold a professorship or chair—and our goal is to greatly increase the number of endowed professorships for both junior and senior hires.

A gift to the university will enable us to realize that goal: Alumni John and Tashia Morgridge made a landmark \$100 million gift to UW-Madison in support of faculty excellence—and that gift provides a dollar-for-dollar match to other donors who make a gift to endow a professorship (\$1 million), a chair (\$2 million) or a distinguished chair (\$3 million).

To make a gift, contact Cathleen Walters, (608) 265-8021 or cgwalters@wisc.edu