Danielle Bourgeois' love of science is contagious. “If you can show people how much you love it and how excited you are,” she says, gesturing with both arms from atop a stool in Assistant Professor Pam Kreeger's lab, “it will inspire them to stay in science and engineering, and continue doing what they love as well.”

Bourgeois' inspiration comes from studying the signaling pathways of two proteins that have been linked to ovarian and other cancers. She is focusing on how tumor cells interpret signals activated by these proteins, and how this activity influences cancer progression.

And while she is clearly enthusiastic about her work, Bourgeois, a fourth-year PhD student, admits that she didn’t know what she would be studying when she went to graduate school. She credits the John P. Holton Wisconsin Distinguished Graduate Fellowship she received in 2010 with providing her the flexibility to develop a plan for her research. “Having this fellowship my first year allowed me to do a lot of preliminary research and gather data,” she says. “That way, we could write a grant to gain additional funding, instead of having to have it funded right away.”

John Holton, who established the fellowship in 1998, graduated from UW-Madison in 1972 with a BA in history. In graduate school, he became interested in Industrial and Systems Engineering Professor David Gustafson’s health systems engineering research. After receiving his master’s degree in industrial engineering in 1975, Holton went on to a successful career in healthcare, founding two healthcare-related companies. “I believe everyone has the right to the best possible healthcare,” he says, “and I want to help expand the engineering footprint in healthcare.”

When Holton established the fellowship, the BME department was only a couple of years old. Yet, Holton says he was impressed by the vision and drive of the department’s leaders. Now, he says he’s delighted to have been able to help advance the BME department because of how BME students have helped the public. “Engineers have the opportunity to provide devices and systems that will make a difference in people’s lives,” he says. “I am happy to support engineering research that solves healthcare challenges whenever possible.”

Molly Carroll, the Holton Fellowship recipient in 2012, is another student interested in healthcare solutions. Like Bourgeois, Carroll says the Holton Fellowship allowed her to find a research topic that resonated with her. “Because I was able to choose from a variety of projects,” Carroll says, “I had the opportunity to find the one that matched my interests and the one I had the most passion in pursuing.”

Carroll’s passion led her to ovarian cancer research in the Kreeger lab. Carroll is investigating the signaling interactions between ovarian cancer and macrophages. She hopes to understand how specific signals relate to the cancer’s progression. That knowledge, in turn, could identify targets in the signaling process that could aid current cancer treatments.

Carroll is focused on making practical healthcare advances. “I want the research I perform to be translatable in a clinical setting,” she says, “and I hope to retain that through close collaboration with researchers and physicians.”

Bourgeois’ and Carroll’s fellowships benefited Kreeger, their advisor, also. Kreeger, who came to UW-Madison in 2009, says students with the Holton Fellowship enabled her to establish herself at the university. “As a new professor,” Kreeger says, “funds are always tight, so the support from the Holton Fellowship gave me the flexibility to stick with projects long enough to develop them so that they could be funded externally.” Kreeger notes that the American Cancer Society funded this project externally.

Bourgeois says receiving the Holton Fellowship is inspiring. “It’s humbling to know people are donating specifically to graduate students in engineering because they find it important,” she says. “It motivates you because you know they are supporting you and believe in what you’re doing.”

Holton fellowship offers flexibility to students and faculty
As our new year progresses, I wanted to update you, our proud alumni, on some of the newest developments in the BME department.

We are excited to have welcomed two new faculty members this year: Assistant Professors Michael Murrell and Jeremy Rogers. Michael’s expertise is in cellular biomechanics; his lab strives to understand the mechanical principles that drive major cellular processes through the design and engineering of novel biomimetic systems. Jeremy and his lab develop optical techniques and instruments to enable quantitative measurements of cells and tissue at length scales ranging from nanometers to centimeters. Applications for his research include cancer risk screening and investigation of eye disease using endogenous fluorescence spectroscopy. Our students are very fortunate to have the opportunity to learn from these distinguished and accomplished scholars!

Our faculty, staff and students continue to do great things, making it an honor to be chair of such a thriving and successful department. A sample of this year’s accomplishments include:

- BME senior Drew Birrenkott (pictured) was awarded a 2014 Rhodes Scholarship. He is active in Engineers Without Borders and, for his senior design project, his team designed an infant cardio-respiratory (CaRe) monitor for use in developing countries. With this scholarship, Drew joins an elite group of students who have received one of the top honors in higher education.
- Four BME students earned the top award and $10,000 in the 2013 UW-Madison Qualcomm Wireless Prize by creating a software program for screening for cervical cancer, particularly in developing countries with limited resources. The AlgoCerv software enables people with limited medical training to scan Pap smear slides and provide results to a patient before she leaves the clinic. The second- and third-place teams also were made up of biomedical engineers!
- Our department continues to have a global impact on healthcare. Wisconsin Without Borders has awarded Associate Faculty Associate Amit Nimunkar its 2013 recognition award for achievement in global engaged scholarship. The award recognizes Amit’s work to connect biomedical engineering undergraduates with a physical therapy clinic in Honduras for several collaborative design projects.
- Through a mix of innovative instructional strategies and real world examples in the classroom, Assistant Professor Pam Kreeger won the 2013 James G. Woodburn Award for Excellence in Teaching. Pam has demonstrated a ceaseless drive to improve the ways she teaches her students, trying new methods and incorporating student comments to strengthen her courses each semester.

One of our major educational initiatives over the past year has been to increase our involvement with online, hands-on, and “real-world” approaches to education. This requires investment in new software and lab equipment for our courses, as well as outfitting our new design lab space. Gifts to the department help to support this top priority. Gifts also support the department’s design curriculum and community-building events. Scholarship and fellowship funds help us recruit and retain the best students. None of our impressive accomplishments would be possible without the generous alumni who keep our teaching and research missions on the cutting edge! To help the department continue its excellence in design experiences for our BME undergraduates, please consider donating to the Biomedical Engineering Design Course Fund at go.wisc.edu/BMEdesign.

Finally, please join us for an exciting event honoring Professor Willis Tompkins, who will retire in May, and Professor Emeritus John Webster. We’ll be hosting a symposium and celebration on April 5 to commemorate the lives and careers of these dedicated and inspirational scholars. You should have already received a Save the Date card. Look for the formal invitations in the mail soon. I hope to see you there.

Thanks, and on Wisconsin! Beth Meyerand, Chair

To give online: go.wisc.edu/givetobme