Dear Biomedical Engineering Alumni and Friends:

I am excited to send our Spring newsletter and share news of recent activities. Our brand new undergraduate program began in the Winter 2009 quarter with two new courses: BME 202, Introduction to Biomedical Engineering that was taught by Professor Derek Hansford, and BME 205, Numerical Simulations in Biomedical Engineering that I taught. Both courses went extremely well, and it was exciting to teach this class of pioneering, inaugural students. The BME 205 Numerical Simulation class is dependent on extensive use of MATLAB, Simulink, and Comsol computer packages with a variety of imaging and visualization applications. We renovated and equipped new computer lab facilities for the undergraduates with a “SmartBoard” and high-end iMac computer systems (capable of booting either Mac OSX or Windows operating systems for maximum flexibility).

The enrollment for this pioneering inaugural class of 2011 is just 16. We expect that there will be up to 25 beginning sophomore students in the Autumn, up to 50 for the following year, and then up to 75 per class-year in steady state. I hope that you will want to help fuel our continued successes -- there are many ways that you can assist. Most obvious is financial support that can be specifically targeted to the department. Gifts can help us achieve our strategic goals, and could include opportunities to endow a named professorship, a named scholarship, or laboratories and facilities. More modest gifts help with our operations and events. In addition to financial support, I am hoping that the network of alumni and friends will be able to help our students find internship and employment opportunities.

In this newsletter, we introduce one of our faculty members, one of our new undergraduate students, and highlight the Medical Scientist Program for MD/PhD students that has been an important component of the Biomedical Engineering graduate program since 1987.

I am always happy to meet our alumni and friends. Please stop by if convenient to get a firsthand look at our progress. Thank you, in advance, for your continuing support of our efforts.

Richard T. Hart, Ph.D.
Edgar C. Hendrickson Professor and Department Chair
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The Kettering Biomedical Engineering Scholarship Fund

The Kettering Biomedical Engineering Scholarship Fund was established thanks to the generosity of the Kettering family (http://www.ketteringfund.org/main.html) who made a $1.5 million gift to fund an endowment specifically for undergraduate education in biomedical engineering at The Ohio State University for students in their Junior and Senior years. The Inaugural Kettering Scholarship is a $6000/student gift spread over the next 2 years as $1000 per quarter for up to 6 quarters during both the 2009-10 and 2010-11 academic years. The Department of Biomedical Engineering is proud to announce the following students as recipients of the Inaugural Kettering Scholarship:

- Meagan Bechel, Beavercreek, OH
- Samantha Bernert, New Albany, OH
- Corey Best, Marietta, OH
- Fawn Bradshaw, Solon, OH
- Gunter Eickert, Helena, OH
- Taylor Ey, Waxhaw, NC
- Elaina Graeff, Spring Valley, OH
- Alexander Hissong, Centerville, OH
- Claire Parker, New Albany, OH
- Raymond Ratliff, Hamilton, OH
- Ti’Air Riggins, Akron, OH
- Jennifer Smith, Westlake, OH
- Grant Smucker, Orrville, OH
- Molly Sullivan, Mayfield Village, OH
- Suzanne Tabbaa, Westlake, OH
- Adam Zurmehly, Clarksburg, OH
**MEET OUR FACULTY AND STUDENTS**

**Gunjan Agarwal, Ph.D.**  
**Assistant Professor**

**Q: What brought you to The Ohio State University?**

I joined OSU BME in September 2003 as an Assistant Professor and have been here since then. I arrived here after a post-doctoral experience in academia and industry, and as a research scientist in a defense lab. My desire to be in academia and the restraints to be in Central Ohio (due to family reasons) were the driving factors that led me to OSU BME.

**Q: Where did you receive your degrees? What titles have you held?**

I received my BS from the University of Allahabad, MS in Physics from the Indian Institute of Technology, Delhi and a PhD degree in Physics from the Tata Institute of Fundamental Research, Mumbai, all in India. Thereafter I came to the US for post-doctoral experience in biophysics at the Albert Einstein College of Medicine followed by another post-doc at Procter and Gamble Pharmaceuticals, Mason, OH. I was then a research scientist at the Air Force Research Lab near Dayton, OH for about a year before joining OSU.

**Q: What/who influenced you to become a biomedical engineer?**

I loved Physics and after my MS in Physics I debated between theoretical physics or biophysics/bioengineering. I was fortunate to find the right advice from my professors at IIT to go the 'bio' route. Additionally my parents medical background served as an inspiration. I then realized how interdisciplinary and exciting bioengineering is and there is so much unknown. This all caught my passion and there has been no looking back. I simply enjoy the learning.

**Q: Name and describe your proudest professional moment.**

My proudest professional moment was when the first paper from my lab got accepted for publication. Though we have published several papers since then, that was the moment which marked the beginning!

**Q: Tell us a little about your personal background.**

I met my husband during our graduate school at TIFR, India. He works as a senior scientist for Procter and Gamble, Cincinnati and we live in Mason, OH. We have two wonderful daughters, aged 10 and 6 and most of our ‘spare’ time and energy is spent with them. We enjoy badminton, swimming and hiking together and involvement in Indian cultural events.

**Q: Tell us a little about your research.**

My research focus is to understand how cells interact with the extracellular matrix and how this interaction affects cardiovascular physiology and pathology. We employ a number of high resolution microscopic techniques like electron microscopy, atomic force microscopy and fluorescence microscopy to ‘look at’ single biomolecules in order to understand their function. Another vector of my research is to develop new methods and techniques to improve single molecule imaging both in-vitro and in-vivo.

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**Suzanne Tabbaa**  
**BME Undergraduate, Class of 2011**

**Q: What brought you to The Ohio State University?**

I initially started OSU in the Food, Agricultural, and Biological Engineering (FABE) program. However, at the beginning of my second year at Ohio State I heard news of the biomedical engineering program and applied to be part of the major early fall quarter. After filling out an application, writing a short essay, and attending an interview I received an acceptance letter into the major. I have recently completed my first BME classes this past winter quarter.

**Q: What/who influenced you to become a biomedical engineer?**

Growing up in a very large family surrounded by emerging and established engineers and professionals in the medical field, I have always been driven in the science and math fields. Until recently I’ve been fluctuating between the field of medicine and engineering. After learning more about biomedical engineering, I’ve found that this major really has endless possibilities in both the engineering world and medical world.

**Q: Name and describe your proudest moment.**

In high school as well as college I’ve received various academic and leadership awards, however, none of these awards compare to coming home and witnessing my younger sisters carrying on the Tabbaa tradition of excellence. I’m very proud of my academic as well as athletic accomplishments in high school. However, I’m even more proud that my younger sisters continue to follow these accomplishments and may even surpass my achievements.

**Q: Any memories of engineering courses or professors?**

I still can’t get over the chopsticks our first day of class in our Simulation and Modeling in BME course with Professor Hart. At first we thought someone just forgot their chopsticks by the computer but then every student in the room had a single chopstick. We later discovered he thinks the chopsticks are essential tools for pointing to images on the computer monitors and keeping fingerprints off the screens!

**Q: Tell us a little about your personal background.**

I am from Westlake, Ohio, which is located on the west side of Cleveland. I moved to Westlake as a junior in high school from Tucson, Arizona. I am also one of five kids and a dog. I have an older brother currently attending OSU, two sisters in high school, and a sister in middle school. I’m also currently training for the half marathon at the end of spring. I really enjoy playing sports and I love music. Playing in a steel drum band was probably one of my favorite memories from high school.

**Q: Tell us a little about your interests in BME?**

I’m not sure which part of biomedical engineering I would like to focus on yet. However, I’d definitely like to learn more about the cellular and tissue engineering aspects. We studied the general ideas of stem cell research and genetic engineering in our introductory course this past year. After being introduced to these topics I’d like to learn more about them or possibly pursue some type of career in genetic engineering.

**Q: What do you hope to accomplish with your degree in BME?**

After completing my first-year BME classes I’ve learned that the BME field is really an open field full of possibilities. BME is really fundamental for the medical field to continue to advance and I’d really like to be part of this advancement and essentially, to help humanity.
From its inception, the Biomedical Engineering (BME) graduate program has been a leader in multidisciplinary, collaborative education, beginning with Professor Herman Weed's awareness of the need to nurture trans-institutional research, providing an intellectual space in which colleges of engineering, medicine, veterinary sciences, and biological sciences could work together to bring affordable advances to underprivileged communities around the world. His vision resulted in a new breed of engineer with both the skills and temperament to actively seek the expertise necessary to bridge the gap between clinical and research worlds.

In this spirit, the Department of Biomedical Engineering is proud to have participated in the MD-PhD Medical Scientist Program (MSP), educating physician-scientists who are equally at home in both clinical and research settings. Jointly created by the Graduate School and the College of Medicine in 1987, the MSP was formed to accommodate students wishing to enroll in medical school and graduate school simultaneously.

Every MD/PhD student pursuing research in Biomedical Engineering has a different story to share about how and why they chose to enroll in this demanding and rewarding degree program. Whether officially admitted to the dual Medical Scientist Program or waiting to pursue biomedical research once well into medical school, MD/PhD students have been among our best and most resourceful. They exemplify those to whom OSU President E. Gordon Gee refers to when he says, “As always, students are way ahead of us, and we need to take their lead. The standard operating principle of today's Millennial generation is fully collaborative. The way they learn is no exception.”

Dianne Henry Glass, PhD, a recent BME graduate presently completing the MSP, says that “I generally found that if you asked, people were always willing to help. It didn't matter what department they were from.” Dianne pursued research focused on characterizing the biomechanical properties of the in vivo human cornea. Dianne’s research required expertise in ophthalmology, and chemical, mechanical, and biomedical engineering. Working with ophthalmic surgeons and engineers alike, she helped develop a method for measuring in vivo elasticity and viscosity using an air pulse and high-speed photography. Without the contributions of faculty from both medicine and engineering, such collaborative and fruitful projects would be impossible.

For Henry Chang, a current BME MSP student working with Professor Subha Raman, MD, MSEE, it is the “constant interaction” with people from a variety of departments that exposes him to a wide array of medical research and project roles. “I’m currently involved in cardiac imaging, an area of research which really crosses a multitude of disciplines. Whether it’s discussing clinical needs with cardiologists, MRI physics with radiologists, or image processing with electrical and computer engineers, it’s very exciting to be in such a mixing ground which I feel so truly captures the idea of biomedical engineering.”

Jeff Prescott had already earned an MS in electrical and computer engineering and was doing research in medical informatics and imaging during his first two years of medical school when he applied to the MD/PhD program. With an engineering degree, he had from the start envisioned himself helping to create tools for diagnosis and treatment; it was the combination of advanced research and medical training that led him to the PhD. Working with Metin Gurcan, PhD of biomedical informatics and the Nina Mayr, MD group in radiation oncology, Jeff has developed methods to predict outcome of radiation treatment for cervical cancer. “The opportunities for discovery are even greater than I thought,” Jeff says.

Now pursuing his medical residency at the University of Pittsburgh, alumnus Jim Ibinson, MD, PhD, discovered the dual option after spending several years in industry as a chemical engineer. “I had no idea that medical school was in my future as an undergrad. When I discovered that you could be both an engineer and a physician, I was sold.” His familiarity with Ohio State’s vast resources as well as an “immediate connection” with Professor Cynthia Roberts, PhD -- longtime advisor and advocate for MD/PhD students pursuing BME -- were the biggest factors influencing his decision to pursue the program. Professor Roberts’s background as a nurse who returned to graduate school to earn her doctoral degree in engineering contributes to her understanding of the skills necessary to work in both fields. She manages to capitalize on the unavoidable differences of engineering and medical cultures, providing each student with a smoother path than the last. Jim’s dissertation research involved expertise from anesthesiology, BME, and statistics departments. He worked in the lab of Professor Robert H. Small, MD, PE, and currently specializes in research related to functional imaging of the brain during pain processing.

Keith Vogt, current MSP student and BME PhD candidate, is doing research in anesthesiology that builds on the work of Jim Ibinson’s dissertation, for which he has already been recognized, see below.

MSP students begin in the BME PhD program for a year, and then switch to medical school for two years before returning to BME to finish their dissertation followed by the final two years of medical school.

The interdisciplinary education allows for career flexibility. It took Jim Ibinson about five years to decide that the ideal career split for him would be 75% research and 25% clinical practice. For Dianne Henry Glass, the balance swings the other way. “The more I interact with patients the more I enjoy it. I am still interested in doing research and running a lab, but I want to spend a good amount of time in the clinic.”

For Jeff Prescott, MD/PhD training is the only option that can provide such career flexibility. “Medical research is a wonderful way to get the best of both worlds by taking work from the lab to the clinic... It's a long path, and there are less time-consuming ways to get into the hospital and/or lab,” he says. “However, there really is no program that will offer the focus on each aspect of your training, both clinical and research, as the MD/PhD program.”

This year, the Department of Biomedical Engineering has worked closely with MSP Program Director, Larry Schlesinger, MD to recruit strong additions to the BME MSP student body. Professors Alan Litsky, MD, ScD, Director of BME Graduate Studies, (Litsky.1@osu.edu), and Samir Ghadiali, PhD, Associate Professor of Biomedical Engineering (Ghadiali.1@osu.edu) are managing the BME side for this year’s MSP process with the help of Melanie Senitko, (senitko.1@osu.edu), our Graduate Studies Coordinator. Undergraduates looking toward a future in BME and medicine may contact Cory Matyas, Undergraduate Studies Coordinator and Academic Advisor in Biomedical Engineering (Matyas.1@osu.edu).
ACHIEVEMENT, RECOGNITION, AND NEWS

BME graduate student Daniel Gallego-Perez won a STAR award from the Society For Biomaterials for his research. His poster, entitled “High Throughput Assembly of Spatially Controlled Microscale Tissue Subunits,” was co-authored by BME faculty members Derek Hansford and Keith Gooch, and Professor John Lannutti from the Department of Materials Science and Engineering.

Two graduate students from BME faculty member Ron Xu’s lab, Jiwei Huang (Biophysics) and Evert Qin (BME), won first- and third-place prizes respectively in the Engineering category at the university-wide 23rd Annual Edward F. Hayes Graduate Research Forum, held April 25th 2009. Huang won for a poster entitled “Development of Novel Heat-Sensitive Microbubbles for Ablation Margin Assessment.” Qin won for a poster entitled “Intraoperative Fluorescence Surgical Goggle.”

BME graduate student and BMES President, Caroline Haas, was featured in the "Dynamic Women: Graduate Student" column of the Winter 2009 Women in Engineering Newsletter.

BME faculty member Jun Liu was featured in the "Dynamic Women: Faculty" column of the Spring 2009 Women in Engineering Newsletter.

BME faculty member Mark Ruegsegger was honored with the John T. and Ruth Weimer Mount Award at the 20th Annual Mortar Board Senior Honor Society Recognition Reception, held March 11th 2009, to honor his “extremely influential contribution” to the career of nominator, Cynthia Schwartz, a Kettering Scholar minorng in BME.

BME Department Chair Rich Hart has been appointed by the Board of Directors of the national Biomedical Engineering Society to the office of Secretary of the Society, and as a member of the Executive Committee.

The American Institute for Medical and Biological Engineering (AIMBE) inducted BME Professors Alan Litsky and Cynthia Roberts as fellows during their meeting at the National Academy of Science and Engineering building in Washington, DC in February, 2009.